Natural Resource-Based Planning*

Planning, when done well, is among the most powerful tools available to communities. A solid plan, based on good natural resource information, guides rational land-use decisions, and allows the community to consider innovative tools for resource protection with fewer chances for legal challenges to their planning authority. The plan also sends a clear message about what the community values and wishes to preserve, and if well crafted, results in few surprises to developers, local officials, or residents.

The Importance and Benefits of Natural Resource-Based Planning

Natural resource-based planning is a process that puts the community's natural resource base at the forefront. By identifying natural resources at the beginning of the planning process, your community can determine where development is most appropriate. This way, communities can avoid the unintended consequences of the typical planning process, such as open space becoming the "leftover" pieces, water resources being degraded, and community character being compromised.

A good comprehensive plan is not a "wish list" of local concerns – it's a rational list of actions based on accurate information about your community. Inventories and assessments are a key step in the planning process because they will help guide the discussion about where development or other land uses should occur and what natural resources should be protected or restored.

A natural resource inventory (NRI) is the information collected to identify the location and character of natural resources.

A natural resource assessment (NRA) is an analysis of the NRI to aid in decision-making and management efforts.

An NRI is simply a collection of data represented by descriptive maps. It can include anything from a simple hand-drawn map to comprehensive, geographic information system-based, land-cover maps. Once an NRI is completed, the information collected can then be used to conduct an NRA to investigate local natural resource issues.

Identify Natural Resource Issues of Importance to Your Community

Traditional municipal planning starts with areas "suitable for development" based on factors such as proximity to roads, utilities, and other infrastructure. It is common for the whole community to be designated "suitable" with different uses/densities allowed in

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*This chapter is adapted for Delaware from segments of *A Quick Guide to Using Natural Resource Information,* produced by the Minnesota Department of Natural Resources and the Dakota County Soil and Water Conservation District, 2004.

particular areas. Natural resources are not factored into the plan, unless they are barriers to development (for example, wetlands or steep slopes).

Alternatively, natural resource-based planning starts with a community's natural resource base and works "backward" to identify development potential. The foundation of the natural resource-based plan is a natural resources inventory, which tells the community what it has to work with. Because not all natural resources can be protected, they must be prioritized based on the community's values and goals. The community then develops plans and regulations that guide development to areas most suited for it, minimizing impacts to priority natural resources through the location, design, and engineering of new development.

Natural resource-based planning truly places the community in the driver's seat regarding its future. Of course, community involvement at all phases is a key part of the natural resource-based planning process to ensure your planning investment has good support.

The first step in natural resource-based planning is to identify the natural resource issues that are important to your community. One way to involve your community is to assemble a work group from the community. This group should consist of, and if possible be led by, members of the local commissions as well as interested community groups and local experts.

Conduct a Natural Resource Inventory

After identifying the natural resources that are important to your community, the next step is to conduct a natural resource inventory, which forms the foundation of the natural resource-based plan. The natural resource inventory (NRI) is a summary in map form of a municipality's open-space lands, water resources, natural areas, and protected corridors. From this inventory, you can start to identify areas of your town that are suitable for development or areas that are best preserved. This prioritization can provide the basis for your open-space plan and comprehensive plan, which in turn can be folded into other site- or regional-level plans.

Next, determine the boundaries of your inventory. The inventory can focus anywhere from the municipal boundary, your growth and annexation areas, or to a slightly larger surrounding area, such as the watershed area. The determination of the study area should be dependent on the overall goals of your community.

Once you have assembled your work group and determined your study area, you are ready to start assembling the maps and other information that will comprise the NRI. Map information can either be printed "hard-copy" maps, transparent overlays, or digital maps. If you have completed your municipal comprehensive

A natural resource inventory (NRI) is collected information (data) that identifies the location and character of natural resources. These data can be presented in two types of map forms, either hand-drawn or digital within a geographic information system. A geographic information system (GIS) is computer-based mapping software that allows the user to overlay data in order to identify and prioritize natural resource protection and management. If your municipality does not currently have GIS, there is a free GIS data viewer available for download at *www.esri.com/software/arcexplorer/index.html*.

plan, you may find some of these maps and possibly the data for your maps as part of your plan. It is important, at this point, to prioritize your collection process and to organize your data according to your goals. To begin your inventory you should start with the following:

A. Base map
B. Land use/cover
C. Water resources
D. Unique and fragile lands
E. Committed open space

In Delaware, we have several sources for digital mapping data. Please refer to the references section of this chapter for this information.
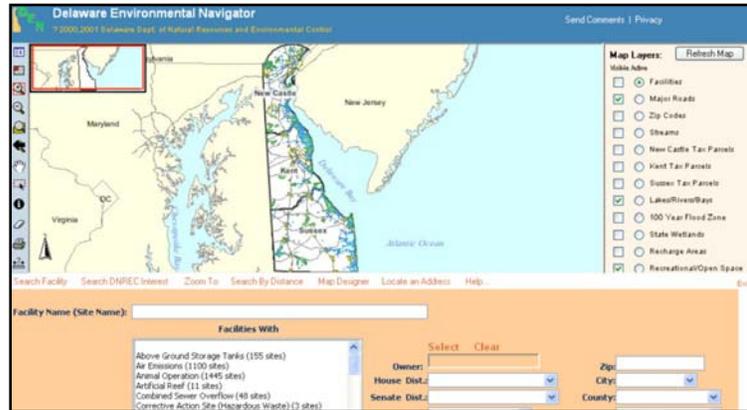
The Delaware Department of Natural Resources and Environmental Control (DNREC) maintains GIS datasets for a variety of natural resources. These data can be viewed on DNREC's internet mapping service, called the Environmental Navigator, *www.dnrec.state.de.us/DNRECeis/,* as shown in the graphic to the right. Other data can come from satellites and aircraft in the form of remotely sensed information.

The state of Delaware currently has aerial photography for the years 1992, 1997, and 2002, which is available for viewing and printing from the Delaware Data Mapping and Integration Laboratory (DataMIL). The Delaware DataMIL contains Delaware's most up-to-date "framework" datasets. These datasets are boundaries, water features, transportation, elevation, surface cover, and reference data (e.g., geographic names). The web site is *datamil.delaware.gov.* You can view, search, extract data, and create maps from this web site. These tools enable you to start your inventory.

The Delaware DataMIL: *datamil.delaware.gov/*

A. The Base Map will include the 2002 aerial photography, roads, and your municipal boundary. These initial data layers will provide a means for you to delineate the boundaries of your study area. Your study area could be your municipal boundary, a surrounding buffer, potential growth and annexation areas, or your local watershed boundary. The base map will orient your study area to other geographical features such as forest cover and streams, for example, so it is important to include surrounding information.

B. Land Use/Cover is an important data layer that helps define the development patterns of your community and provides areas of focus for land-use planning efforts. The land use/cover data layer in Delaware has been created from the aerial photography mentioned above for the years 1992, 1997, and 2002, depicting what is on the ground. An example of what would be represented in the land use/cover dataset would be residential or commercial areas, forests, wetlands, and water. If you have completed

your compre-hensive plan, an existing land-use map should be included that has the land-use coded by parcel, providing more detail. This data layer will also display water and agricultural areas. In a GIS, these individual categories can be queried to determine not only where these resources are located, but how much area is consumed by these resources. This will help you begin focusing your efforts in resource protection and economic development.

C. Water Resources are vital to biodiversity and the long-term environmental health of your community. There are a number of water resource layers available from the Delaware Geological Survey (DGS) and the United States Geological Survey (USGS) as well as DNREC. Watershed boundaries are one of them. The watershed is the area that drains into a particular water body. Watershed boundaries can be created at several scales. There are four major basins in Delaware: Piedmont, Chesapeake Bay, Delaware Estuary, and Inland Bays. The sub-basins comprise these major basins, and the smallest catchments that comprise the sub-basins average 5—10 square miles. Surface water can be shown using the streams and water-body layer available from the Delaware DataMIL. These data can be used to accomplish the overall goal of managing nonpoint source pollution and maintaining and improving water quality.

D. Unique and Fragile Lands delineate areas in your community that provide habitat for unique plants and animals. DNREC's Division of Fish and Wildlife has identified these sensitive habitats where species are listed as threatened, endangered, or of special concern. The identification of the most unique and fragile lands in your town will help you with the prioritization of lands during the open-space planning process. This prioritized list will help to focus the lands targeted for open-space acquisition.

E. Committed Open Space is land that is protected from development by public and private ownership or easements. The committed open-space information from DNREC gives the state, municipal, and private lands. This is another data layer that can benefit from the input of local experts, particularly from your local land trust. Knowing where the committed open space is in your community is key in planning for future recreation and open-space needs. With this knowledge, you can start to create connections between preserved land and prevent fragmentation of natural resources by directing development to appropriate areas.

Conduct a Natural Resource Assessment

The next step is the analysis phase. There is a definite difference between compiling database information and maps for your town and the analysis of that information. The natural resource assessment is a separate activity from the inventory and usually involves the manipulation of the data in order to answer questions you or your group have about your town. The first step in your NRA is to create a checklist of the analyses that should be conducted. This checklist will be based upon the goals of your municipality or issues your municipality is facing. The list may include imperviousness, forest cover and quality, flooding, wetlands, waterways, lakes, water quality, habitat and habitat corridors, endangered species, etc.

An NRA can range from a simple visual analysis to detect land-use patterns on a map to a complex water runoff model (generally requires a GIS). A visual NRA is a qualitative approach that works well with a hand-drawn NRI, but can also be used with a GIS-based NRI. The overlay approach of viewing natural resources, whether it is with mylar

overlays or with a GIS, will open up a dialog of questions regarding these areas in your municipality.

In Appendix A, the town of Milton will be used as an example to take a look at a proposed development and perform an assessment of the natural resources that are within the proposed parcels.

What Are the Important Questions to Ask?

∑   At what scale was the data created? *When overlaying data with mylar or transparencies, all the data should be printed at the same scale.*

∑   Who is charged with maintaining the dataset?

∑   How often is the data updated?

∑   What is the best method for obtaining the most resent dataset?

For More Information

There are numerous resources for more information related to data within Delaware. The following web sites are either internet mapping sites (IMS), where one can interact with the map, or a resource for gathering data related to your particular needs.

∑   The Delaware Department of Natural Resources and Environmental Control (DNREC) web site, the Environmental Navigator (DEN), provides many types of information collected by DNREC such as permitted facilities, enforcement actions, and environmental monitoring. *www.dnrec.state.de.us/DNRECeis/*

∑   Through the Delaware DataMIL's Map Production Lab, Delaware citizens can create maps and download GIS framework data of any location in Delaware. Data layers that are available for viewing, printing, and download off the DataMIL can be found at *www.datamil.udel.edu/home.asp?main=onlinedata&toc=tocdata*.

∑   On New Castle County's E Parcel Viewer, one can view zoning and parcel data; locate environmental features such as waterways, forests, and water resource protection areas; and find nearby schools, parks, and libraries. *dmz-arcims02.co.new-castle.de.us/website/nccparcelmap2/viewer.htm*

∑   Kent County's web site allows the viewer to access land-use information down to the parcel level, including zoning, acreage, building permit, property location, building type, year built, and land-use application information. *www.co.kent.de.us/Departments/Planning/GIS/index.htm*

∑   Sussex County's web site allows the viewer to access zoning, parcel information, school district boundaries, flood zones, and tax ditches. With this site you can make a map of your neighborhood, city, or even the county and choose what

elements you would like to include.
www.sussexcounty.net/departments/mapaddress/index.cfm

∑ Thompson Mapping's *(www.smartmap.com)* web sites that are listed below allow the viewer to access a wealth of information for land-use planners, technicians, utility companies, managers, and others from the Delaware Department of Agriculture, the city of New Castle, three municipalities in Kent County, as well as Kent County's web site listed earlier.

- o Delaware Department of Agriculture – *www.smartmap.com/dda/*

- o City of New Castle – *www.smartmap.com/newcastle/*

- o Kent County municipalities of Milford, Smyrna, and Dover – *www.smartmap.com/kc_mun*

∑ The University of Delaware's Institute for Public Administration Water Resources Agency provides comprehensive instruction on source water protection in Delaware through its *Source Water Protection Guidance Manual for the Local Governments of Delaware,* "A Toolbox for Protection of Public Drinking Water Supplies in Delaware."
www.wr.udel.edu/swaphome/phase2/SWPguidancemanual.html

∑ Soil data availability varies throughout the state of Delaware. SSURGO soils data will be posted when available at the University of Delaware Spatial Analysis Lab.
www.udel.edu/FREC/spatlab/soils/

For questions about data, contact the data steward (owner) of the dataset under source information on the maps provided. For questions regarding the DNREC Environmental Navigator, contact the agency directly.

References

1. State of Minnesota, Department of Natural Resources, 2004. *A Quick Guide to Using Natural Resource Information.*

2. Delaware DataMIL, *datamil.delaware.gov/*

3. Delaware Department of Natural Resources and Environmental Control (DNREC) Environmental Navigator, *www.dnrec.state.de.us/DNRECeis/*

4. Delaware Division of Fish and Wildlife, *www.dnrec.state.de.us/fw/*

5. ESRI's ArcExplorer Java Edition, *www.esri.com/software/arcexplorer/download.html*