



A Guide to the Methods Used in the 2006 Update of State Resource Area Maps

The Delaware Department of Natural Resources and Environmental Control (DNREC) is working with New Castle, Kent and Sussex Counties and municipalities throughout Delaware to incorporate protection of State Resource Areas (SRAs) into their comprehensive land use plans and implementing regulations. County plans are currently undergoing a five-year update as required by state law. This guide explains the methods used to update the SRA maps, as is required by the Delaware Land Protection Act, for use in the county plans.

1. The 2006 update began with review of the first SRA maps created by DNREC in 1990 following passage of the Delaware Land Protection Act. The foundation for these maps was the Delaware Nature Education Society's 1978 publication, *Delaware's Outstanding Natural Areas and their Preservation*. Areas delineated in this report were modified according to the definition of "open space" lands in the Act, including the addition of public and private conservation lands, to form the basis for SRAs as detailed in DNREC's 1989 report *Greenspace for Delaware's Future*.

From the Act, "'Open space' means any open lands characterized by (a) great natural scenic beauty, or (b) whose existing openness, natural condition or present state of use, if retained, would maintain important recreational areas and wildlife habitat, and enhance the present or potential value of abutting or surrounding urban development, or would maintain or enhance the conservation of natural or scenic resources, including environmentally sensitive areas. For the purposes of this chapter, open space shall include significant cultural, historical or archaeological sites as determined by state plans and policies adopted by the Bureau of Historic and Cultural Affairs."

2. Conservation lands that gained protection status since 1990 were added to the original SRAs, as per the Land Protection Act's definition of "open space."

The Act describes protected lands as "parks, forests, wildlife areas, nature preserves or other recreation, conservation or cultural sites." DNREC developed a more detailed working definition of protected lands that includes:

- *Federal conservation lands (Bombay Hook and Prime Hook National Wildlife Refuges, lands adjacent to the C&D Canal, other small parcels)*
- *State conservation lands (parks, nature preserves, wildlife areas, forests, state-owned ponds, DelDOT mitigation sites, selected Historical and Cultural Affairs parcels)*
- *County/city conservation lands (selected large county/city parks and open space, spray/sludge farms)*
- *Private conservation organization lands (Delaware Wild Lands, The Nature Conservancy, Delaware Nature Society, Nanticoke River Watershed Conservancy, Sussex County Land Trust, Woodlawn Trustees)*
- *Public and private conservation easements*
- *Agricultural preservation easements, and*
- *Statutorily-protected tidal wetlands.*



A Guide to the Methods Used in the 2006 Update of State Resource Area Maps

3. Since 1990, three additional sources of information have become available for natural resource features that fall within the Act's definition of "open space," and these were used to revise the original SRA maps. Portions of the following features were included/excluded according to the guidelines in the steps 4-8 below:
 - 2005 Green Infrastructure Natural Resource and Recreation Lands Focus Areas (GI) from the Livable Delaware Agenda. These focus areas are a network of the largest, most connected natural habitat throughout the state. They were mapped by examination of rare species sites, protected lands, 1997 aerial photography, and ecological evaluations by the US Fish & Wildlife Service, The Nature Conservancy, and the Delaware Natural Areas, Natural Heritage, and Open Space Programs.
 - 2005 Key Wildlife Habitats (KWH) from the Delaware Wildlife Action Plan. These habitats are considered critical to the conservation of Delaware's native wildlife, and consist of areas known to be occupied by rare species, habitats that are of conservation concern because of rarity or diversity, and blocks of forests and wetlands greater than 250 acres. They were mapped based on field surveys from the late 1980s to present, analysis of 2002 aerial photography, and habitat modeling conducted in 2004.
 - 1996 wetlands from the State Wetland Mapping Project (SWMP). These are wetlands that meet the Federal definition of jurisdictional wetlands as it relates to the application of Section 404 of the Clean Water Act. They were mapped by automated interpretation of 1992 aerial photography supplemented by field observations.
4. For new SRAs, minimum areas were established of 150 acres for New Castle County and 250 acres for Kent and Sussex Counties (**Figure 1**). The 250 acre size has been used for forest conservation in other Delaware planning studies and is based on scientific literature – it is the smallest area that sustains viable populations of upwards of 90% of forest-dependent bird species. However, this threshold could not be obtained in most of New Castle County; the 150 acre size conserves about 75% of forest-dependent bird species. As has been done in other planning studies, the 150 acre and 250 acre minimums were also used for wetlands, where information on minimum habitat size is less informative. Size limits were not applied rigidly, such that slightly undersized areas that met other guidelines were sometimes included. Because of their width, paved roads were considered to separate one area from another ecologically, but most dirt roads and driveways were not. Parcel boundaries were ignored when evaluating minimum areas. Thus a single 250 acre patch of forest might be contained within a single parcel, or might cover multiple parcels, some of which contain only a few acres of the entire patch.
5. Areas that met the guidelines for minimum size were visually inspected to determine their shapes. Areas were included only if they had fairly regular shapes (tending towards square) and relatively smooth boundaries (**Figure 2**). This is because areas with irregular shapes (tending towards linear) and convoluted boundaries have pronounced "edge effects." Edge effects are the ecological impacts that adjacent dissimilar habitats have on one another. For example, impacts to forests from adjacent open areas may include changes in microclimate



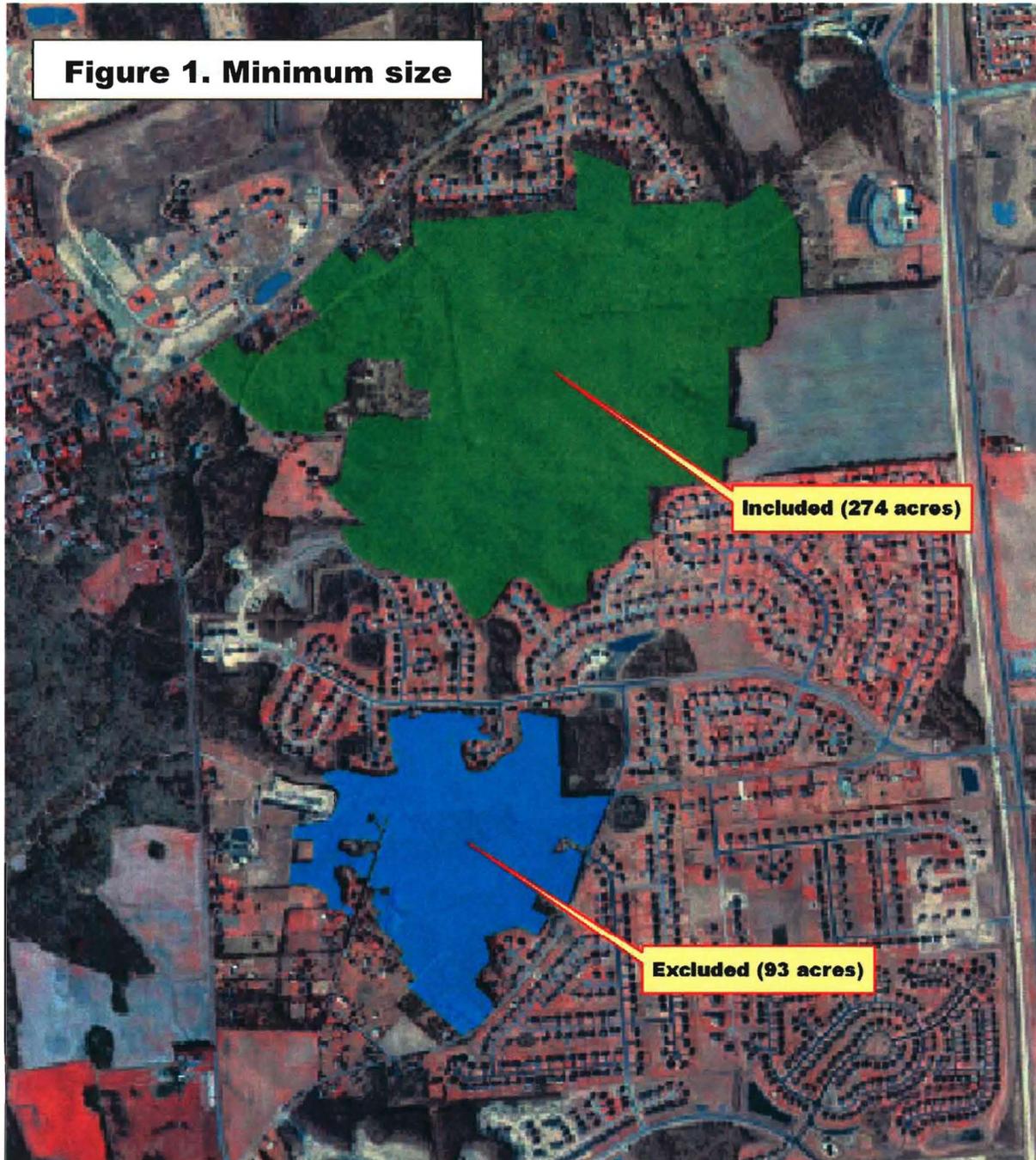
A Guide to the Methods Used in the 2006 Update of State Resource Area Maps

from increased sunlight and wind penetration, invasion by exotic plant species, and increased predation by foxes, raccoons and crows.

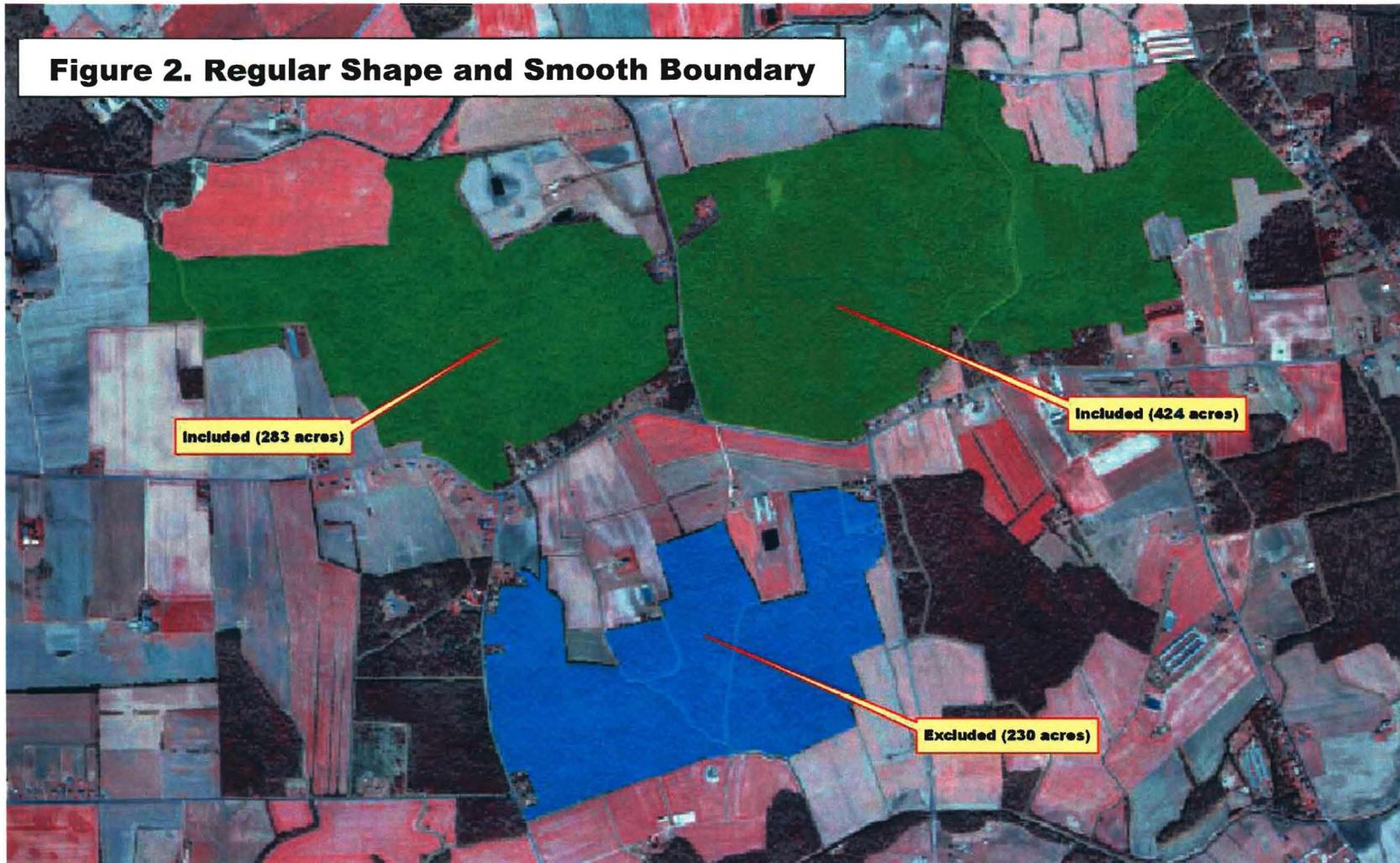
6. Some GI, KWH and SWMP features were included to provide connectivity between larger SRAs even if the features did not meet the size and shape guidelines. Riparian corridors (streams and their associated floodplains) were often used for this purpose (**Figure 3**). Such connections provide routes for wildlife movement and dispersal of plants, thereby enhancing the ecological value of the SRAs that they connect.
7. Generally, agricultural fields and working forests were excluded because they do not fit the definition of “open space” as it relates to natural condition. Exceptions were made where these lands were entirely surrounded by natural habitats, or where they substantially disrupted the boundary of natural habitats. In these instances, a portion or all of these lands were included in order to meet the size and shape guidelines (**Figure 4**).
8. Information from the following sources was sometimes used to further clarify the significance of GI, KWH and SWMP features if their size and shape were marginal:
 - Locations of rare species from the Delaware Natural Heritage Program
 - Surveys of natural communities (forests, wetlands and meadows) by the Delaware Natural Heritage Program and others
 - Stream Biological Assessment Program data from DNREC’s Division of Water ResourcesFor example, a patch of forest slightly smaller than the 150 or 250 acre thresholds may have been designated an SRA if it contained a large number of rare species.
9. Current (2006) maps of roads and developed lands were reviewed in order to exclude any such features that postdate creation of the GI, KWH and SWMP maps.

DNREC determined developed lands based primarily on 2002 Land Use/Land Cover categories for residential, commercial, industrial, transition, extraction, farmsteads and farming operations (includes buildings and feeding operations, but not the entire farm). This was supplemented by maps of major subdivisions approved through June 2006. Minor subdivisions (5 lots or less) approved from 2002 to 2006 were not included because they are not mapped.
10. Major open water bodies (Inland Bays, C&D Canal and tidal rivers) were excluded because they are not developable.
11. Adjustments were made to the draft maps following public workshops, a public hearing and review by the state Open Space Council. The final version of the SRA maps was adopted by the Secretary of DNREC on September 27, 2006.

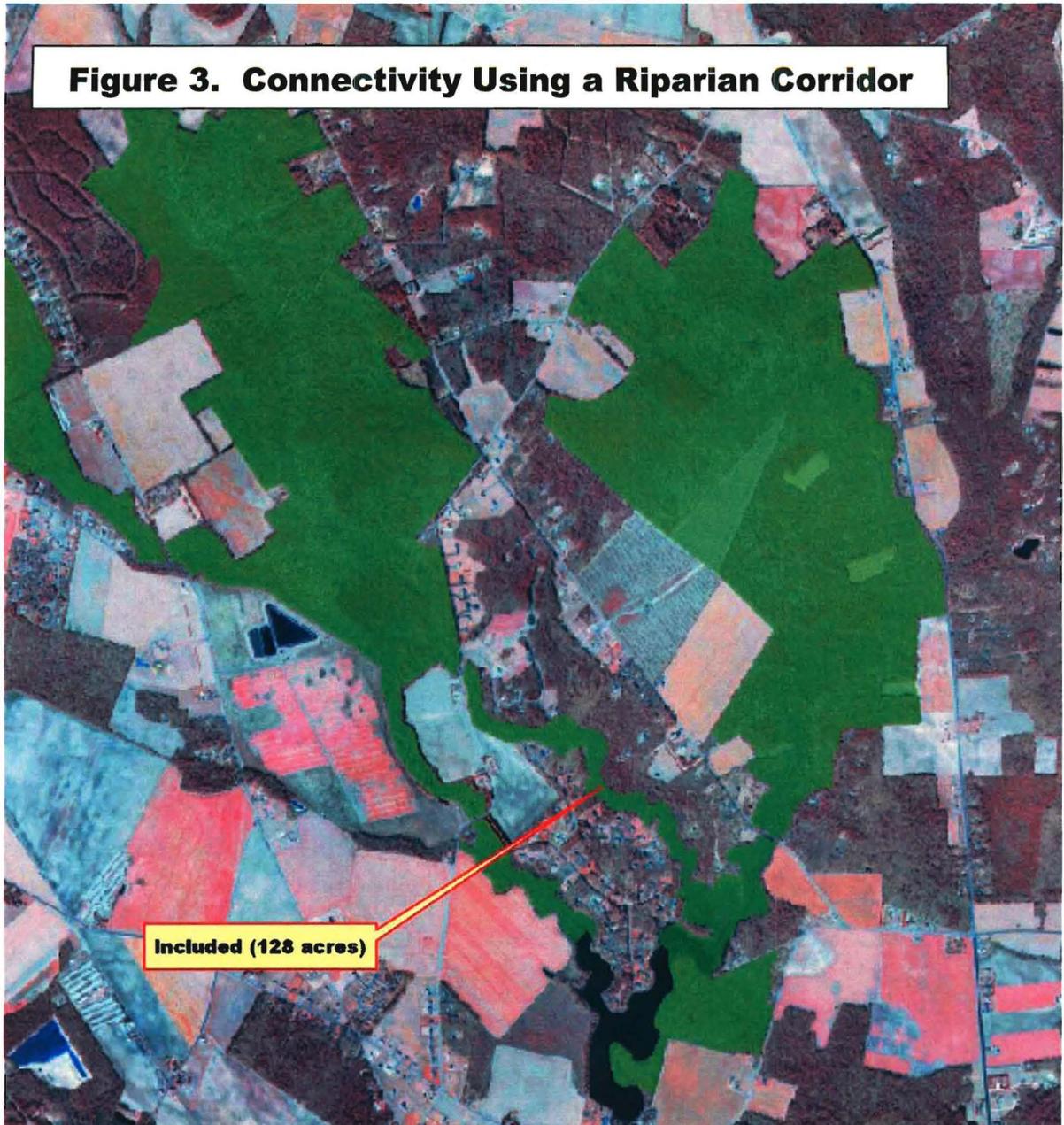
A Guide to the Methods Used in the 2006 Update of State Resource Area Maps



A Guide to the Methods Used in the 2006 Update of State Resource Area Maps



A Guide to the Methods Used in the 2006 Update of State Resource Area Maps



A Guide to the Methods Used in the 2006 Update of State Resource Area Maps

