MARYLAND'S FOREST CONSERVATION ACT: A PROCESS FOR URBAN GREENSPACE PROTECTION DURING THE DEVELOPMENT PROCESS

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Abstract. The Maryland Forest Conservation Act (FCA) was passed in 1991 to protect the state's forest resources during development. Compliance is required for any project for which grading is required on a unit of land 40,000 ft² (0.42 ha) or greater. Applicants must generate and submit two documents. The first, a forest stand delineation (FSD), must identify forest stands, specimen trees, and sensitive areas such as steep slopes, hydric or erodible soils, critical habitat areas, streams, and floodplains. This map is used to direct the location of the impacts away from priority areas onsite. The second, a forest conservation plan (FCP), follows a priority sequence concerning impacts to and retention of priority areas identified in the FSD. Thresholds for clearing, afforestation, and reforestation are established based on the net tract area, land-use category, existing forest cover, and proposed clearing area. Forest and tree protective measures are required for stand edges and specimen trees. Long-term protective instruments are required to ensure that the retained area will remain forested. In its first five years, FCA has been responsible for the retention of more than 22,000 ac (10,000 ha) of forest, and 120% more forest retained and planted than has been cleared for development.

Key Words. Forest conservation; greenspace protection; tree protection.

The mission of the Maryland Department of Natural Resources is to inspire people to enjoy and live in harmony with their environment and to protect what makes Maryland unique—its treasured Chesapeake Bay, diverse landscapes, and living and natural resources (Griffin et al. 1998). The Chesapeake Bay is the largest estuary in the United States and is one of the largest and most productive such bodies in the world. More than 96% of Maryland is in the Chesapeake Bay watershed (Schwaab et al. 1995).

Approximately 5.1 million people live in Maryland (U.S. Bureau of Census 1998). The state faces some of the greatest land-use pressures in the nation, ranking sixth in population per square mile. Nearly 80% of Maryland's population live in the greater metropolitan areas of Baltimore and Washington, D.C.

Nationally, land in the United States was converted to development at a rate of approximately 3 million ac (1.22 million ha) per year for a total of 16 million ac (6.48 million ha) during the years 1992 through 1997. This was more than double the amount (13.9 million ac [5.63 million ha]) converted during the previous ten-year period of 1982 through 1992 (Stevens 1999). Land in Maryland was developed at an average rate of 1.6% from 1973 to 1981, and 1.2% from 1981 to 1985. From 1985 to 1990, the average rate of development increased to 3.9% per year (Schwaab et al. 1995). The Maryland Forest Conservation Act was passed in 1991 to protect the state's forest resources during development (Howell and Ericson 1997).

Urban forests have been described as primarily providing services, in contrast to the traditional view of forestry and forests primarily providing goods (Clark et al. 1997). Urban forests play important roles in urban ecosystem function (Rowntree 1998) by providing air-pollutant reduction (Nowak 1994; Scott et al. 1998; Scott et al. 1999); carbon emission reduction, storage and sequestration (Nowak 1994a,b; McPherson 1998); urban heat-island cooling (McPherson et al. 1994); structural heating and cooling cost reduction (Akbari et al. 1992; McPherson 1994; Simpson and McPherson 1996; Simpson 1998); stormwater runoff reduction through interception and canopy storage of precipitation (Xiao et al. 1998); nitrogen, phosphorus, and sediment interception (Lowrance et al. 1995); wildlife habitat creation (Schwaab et al. 1995; Dunster 1998); and improvement of urban aesthetics (U.S. Forest Service 1991; Thompson et al. 1999).

The presence and health of forests on the land have significant ties to water quality (Ducnuigeen et al. 1997). Riparian forests in the coastal plain store up to 89% of nitrogen inputs and up to 80% of phosphorus inputs per hectare per year (Lowrance et al. 1995). Most annual pollutant washoff in urban areas comes during the "first flush" of storm events;

small storms are responsible for most such washoff. Urban forests are most effective at interception during this type of rainfall event (Xiao et al. 1998). Stormwater flow during a peak storm event in the Baltimore-Washington corridor increased by an estimated 540 million ft^3, or 19%, over the past 25 years due to canopy loss (American Forests 1999).

THE FOREST CONSERVATION PROCESS

Compliance is required for any project in which subdivision or grading is necessary on a unit of land 40,000 ft^2 (0.42 ha) or greater. Applicants must generate and submit two documents. The first is a forest stand delineation (FSD). The FSD must identify forest stands, specimen trees, and sensitive areas such as steep slopes, hydric or erodible soils, critical habitat areas, streams, and floodplains. This map is used as a tool to direct the location of the impacts away from priority areas onsite to portions of the site with less environmental value. The second submittal is a forest conservation plan (FCP). In this portion of the process, a priority sequence is followed related to impacts to and retention of priority areas identified in the FSD. Thresholds for clearing, afforestation, and reforestation are established based on the net tract area (the total area of a site, minus any area where forest clearing is restricted by local law or program), the land-use category, the existing forest cover, and the proposed clearing area. Forest and tree protective measures are required for stand edges and specimen trees. Long-term protective instruments (covenants, easements, etc.) are required to ensure that the retained area will remain forested. The required documents (FSD and FCP) must be prepared by a Maryland licensed forester, a Maryland licensed landscape architect, or other qualified professional as determined by the Maryland Department of Natural Resources–Forest Service.

FOREST STAND DELINEATIONS

"Forest" is defined as a biological community dominated by trees and other woody plants covering a land area of 10,000 ft^2 (0.1 ha) or more, having a minimum density of 100 trees per acre and with a minimum of 50% of those having a dbh of at least 2 in. (5 cm). Forest includes areas that have been cut but not cleared.

The FSD is the methodology for evaluating the existing natural features and vegetation on a site proposed for development, taking into account the environmental elements that shape or influence the structure or makeup of a plant community. The FSD submission includes an application, a site vicinity map, and an environmental features map (FSD map). The site vicinity map puts the site in its larger context and includes the surrounding area, major roads, political boundaries, adjacent land uses, and forested areas, at a minimum scale of 1" = 2,000' (1:24,000). The FSD map includes information such as that found in the site vicinity map, as well as topographic contours and intervals, steep slopes greater than 25%, 100-year nontidal floodplains, intermittent and perennial streams and their buffers (50-ft [15-m] width around streams), nontidal or tidal wetlands and their buffers, soil classifications, designated critical habitat areas (a critical habitat for an endangered species), proposed limits of disturbance, and areas proposed

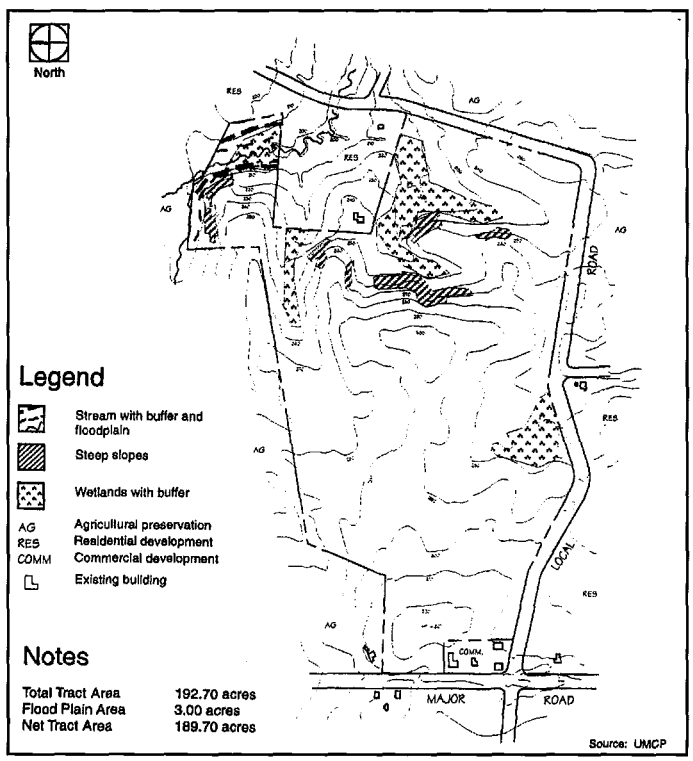

Figure 1. Preliminary environmental features map.

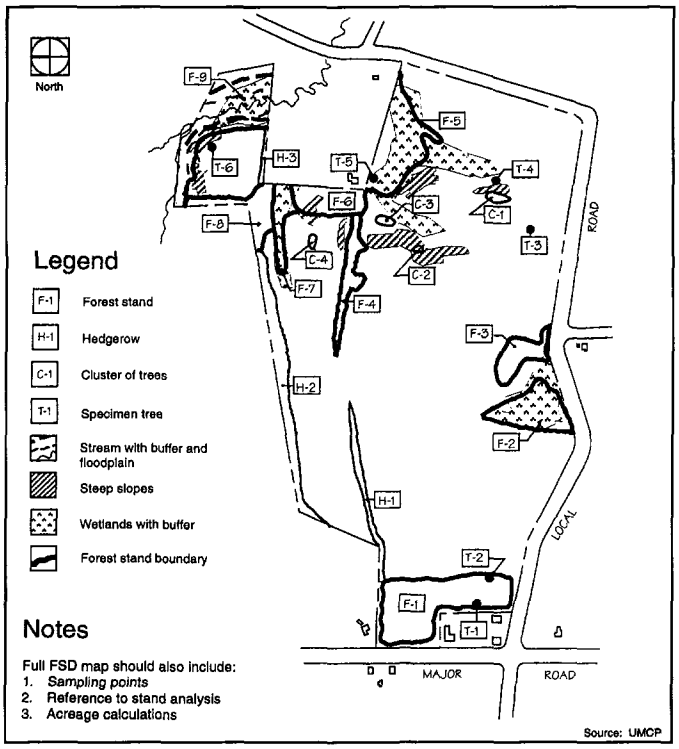

Figure 2. Full forest stand delineation map.

for long-term forest protection (Figure 1 and Figure 2). The FSD map is reviewed to prioritize areas within the site for environmental function.

Depending on site conditions, one of three levels of FSD may be submitted. If the activity is to occur on an applicable area where no forest exists or where no forest will be impacted and if the forest will be placed in long-term protection, a simplified version of FSD may be used (no narrative or sampling is required). If existing forest will be impacted but all priority areas will be retained and retention will be equal to or greater than the break-even point (the point at which forest conservation requirements can be met through retention alone, without reforestation or afforestation), an intermediate version of FSD may be used (limited field sampling required; narrative may be submitted as notes on the FSD). If priority forests will be cleared, if forest will be cleared below the break-even point, or if forest will be cleared below the afforestation threshold, a full FSD must be submitted (plot sampling, analysis and narrative, and forest stand summary required).

FOREST CONSERVATION PLANS

The FCP is the part of the site development plan that ensures forest retention, reforestation, or afforestation will be accomplished. The FCP submittal includes an application; an approved FSD map and narrative; a forest conservation map; forest retention, reforestation, or afforestation calculations; and a long-term protective instrument (covenant, easement, etc.) to ensure the maintenance and retention of designated forested areas (Figure 3 and Figure 4).

The forest conservation map contains information on the limits of disturbance, a long-term protective instrument, and forest retention areas with locations and specifications for retention and protection, including the construction sequence. Any planting (onsite or offsite) is accompanied by a map with a planting plan and

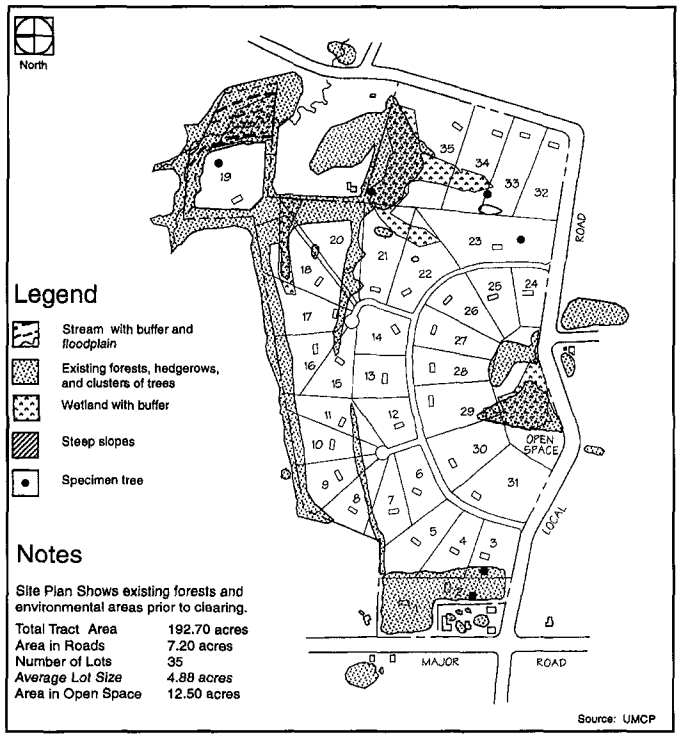

Figure 3. Site development plan before forest conservation plan.

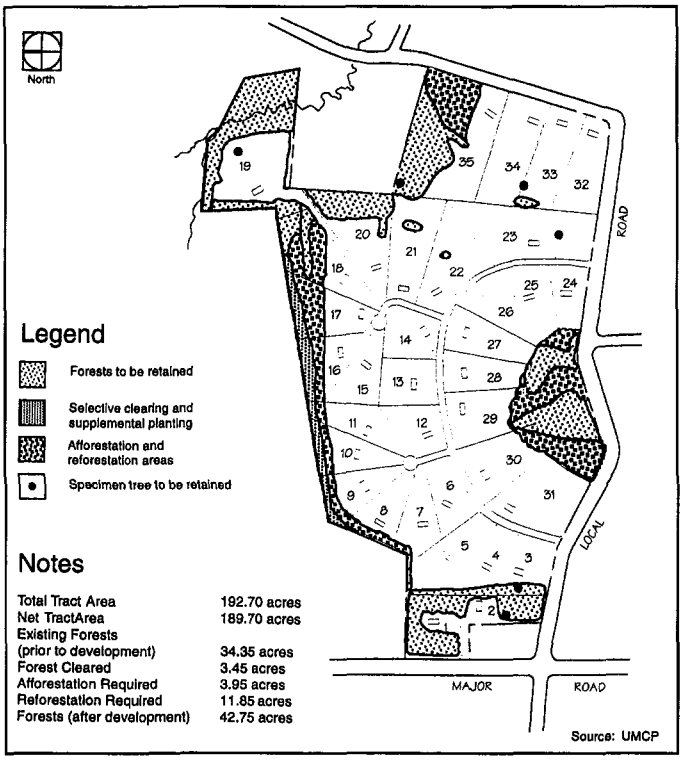

Figure 4. Forest conservation plan map.

specifications and information related to site preparation and planting schedules (species lists, amounts and totals, stocking levels, etc.).

The goal of the FCP in site planning is to maintain forest at or above the break-even point while protecting all priority forests and sensitive areas onsite as determined by the FSD map. Priority areas (areas that are sensitive, contain priority forests, or provide significant environmental function—such as wetlands; intermittent and perennial streams and their buffers; areas in the 100-year floodplain in a watershed of 400 acres or more or that include Class III waters; steep slopes; critical habitats; forest contiguous to offsite forest; rare, threatened, or endangered species; and specimen trees), including the critical root zones (CRZs) of any specimen trees scheduled for retention, must be protected by the installation of tree protective fencing or other approved devices. The CRZ is a circular region measured outward from a tree trunk representing the area of the roots that must be maintained or protected for the tree's survival. The CRZ is 1 ft (0.3 m) of radial distance for every inch of tree diameter measured at 4.5 ft (1.3 m) above the ground, with a minimum radius of 8 ft (2.4 m). For specimen trees, the critical root zone is 1.5 ft (0.45 m) for every inch of tree diameter. Specimen trees are trees with a dbh of 30 in. (75 cm) or more, or trees having 75% or more of the diameter of the current state champion for that species. This includes champion trees, which are the largest trees of their species within the United States, the state, county, or municipality as determined by the Maryland Department of Natural Resources.

The final document is a long-term protective instrument, such as a conservation easement, deed restriction, covenant, or other legally binding agreement ensuring that the area retained, reforested, or afforested remains forest. If the terms of the FCP are violated, enforcement actions may be taken, including revocation of the FCP; issuance of a stop-work order (this causes the entire project to halt until the situation is resolved); restoration of the area destroyed, if applicable; requirement of noncompliance fees (at least US$0.30 per square foot of area in question; more in some jurisdictions); or payment of up to US$1,000 per day for each day a FCP violation continues.

With the exception of federal and state-funded building projects, which are reviewed by state personnel, the act is administered locally by the planning and zoning agencies of local jurisdictions. Local jurisdictions create their own programs, which must be at least as stringent as the state program. This allows for a certain degree of program alteration to suit the particular needs and desires of a community.

In its first five years, FCA has been responsible for the retention of 22,508 ac (10,025 ha) of forest and 4,314 ac (1,960 ha) of reforestation compared to 12,210 ac (5,550 ha) of forest clearing during the development process. One-hundred-twenty percent more forest has been retained and planted than has been cleared. Approximately 65% of existing forest was retained and approximately 35% was cleared during development.

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Zusammenfassung. 1991 wurde die Maryland Forest Conservation Verordnung in Kraft gesetzt, um die staatseigenen Waldresourcen während Entwicklungsvorhaben zu schützen. Jedes Projekt zur Abstufung und Einteilung auf einer Fläche von 40 000 square feet oder größer (3720 m²) benötigt eine Einwilligung. Die Antragsteller müssen zwei Dokumente entwickeln und einreichen. Das erste ist eine Skizze zum Baumbestand (FSD), die Baumstandorte, Baumarten und sensiblen Bereiche, wie Steilhänge, wasserhaltige oder erosionsgefährdete Böden, schützenswerte Lebensräume, Wasserläufe, Überflutungsflächen etc. identifiziert. Diese Karte dient als Werkzeug, um die Lokalitäten des geplanten Eingriffs von diesen Bereichen fernzuhalten und sie in weniger schützenswerte Bereiche zu verlegen. Das zweite einzureichende Dokument ist ein Forsterhaltungsplan (FCP). In diesem Teil des Projekts wird eine Prioritätsliste auufgestellt, die sich auf die Eingriffe und die Ausklammerung derjenigen Gebiete bezieht, die in dem FST als höchst schützenswert ausgeklammert sind. Es sind Vermessungen des Waldes und Maßnahmen zum Baumschutz erforderlich, um Bestandsgrenzen und besondere Bäume zu schützen. Um abzusichern, daß die geschützten Gebiete auch in Zukunft bewaldet bleiben, müssen langfristige Schutzmaßnahmen (Vertragsabschlüsse, Grundstückslasten, etc.) ergriffen werden.

Résumé. La Loi sur la conservation des forêt du Maryland a été votée en 1991 afin de protéger les ressources forestières de l'État lors de leur développement. Une autorisation est requise pour tout projet impliquant un rehaussement sur un terrain de 3700 mètres carrés et plus. Les demandeurs doivent produire et soumettre deux documents. Le premier est un Plan de délimitation de la forêt existante où sont identifiés les peuplements forestiers, les arbres spécimen ainsi que les zones sensibles telles que les pentes abruptes, les sols hydriques ou d'érosion, les zones d'habitats critiques, les ruisseaux, les zones inondables, etc. Cette carte est un outil qui permet de diriger les impacts le plus loin possible des zones prioritaires vers des zones de moindres valeurs. Le second document est un Plan de conservation forestière. Dans cette étape du processus, une séquence de priorités est suivie relativement aux impacts et à la protection des aires prioritaires identifiées sur le premier Plan. Les périmètres d'éclaircie, de déboisement et de reboisement sont établies clairement sur l'ensemble du site ainsi que le type d'utilisation, le couvert forestier et les techniques de déboisement sur les aires proposées. Des mesures de protection des arbres et de la forêt sont requis en regard des bordures du couvert forestier et des arbres spécimen. Des outils de protection à long terme (engagements, droits de passage, etc.) sont nécessaire pour assurer que l'aire protégée va demeurer boisée.

Resumen. El Acta de Conservación de Bosques de Maryland fue aprobada en 1991 para proteger los recursos forestales del Estado durante los proyectos de desarrollo. Se requiere su aprobación para cualquier proyecto donde se necesite terraceo sobre una unidad de terreno de 40,000 pies cuadrados o más. Las solicitudes deben generar y someter dos documentos. El primero es un Delineamiento del Rodal Forestal (FSD) que identifique los rodales forestales, los especímenes de árboles y las áreas sensibles tales como pendientes fuertes, suelos erodables o hídricos, áreas de hábitat críticas, corrientes de agua, áreas inundables, etc. Este mapa es usado como una herramienta para dirigir la ubicación de los impactos lejos de las áreas prioritarias, sobre sitios o porciones de sitio con menos valor ambiental. El segundo requisito es un Plan de Conservación Forestal (FCP). En esta parte del proceso, se sigue una secuencia de prioridades relacionada con los impactos y la retención de áreas de prioridad identificadas en el FSD. Con propósitos del aclareo, la aforestación y la reforestación son establecidas con base al espacio neto, la categoría de uso del suelo, la cobertura forestal existente y el área de aclareo propuesta. Son requeridas medidas de protección del bosque y de los árboles con miras a establecer límites y árboles espécimen. Se piden también instrumentos de protección a largo plazo (convenios, servidumbres, etc.) para asegurar que el área retenida permanezca forestada.