

*A Response To Sprawl:*  
Designing Communities  
to  
Protect Wildlife Habitat  
and  
Accommodate Development

Protection  
of wildlife habitat  
is one of a variety of values  
that depend on larger areas of open space  
and undeveloped land, values which have been  
traditionally embraced by Maine citizens.  
These include the appreciation of scenic vistas,  
farms, woodlots, clean water, hunting and fishing,  
hiking, snowmobiling and many others.  
With their common requirements for a relatively  
undisturbed landscape, it makes sense  
to integrate the protection of wildlife  
with other objectives of municipal  
and regional planning.

Report  
of the  
Patterns of Development Task Force  
Maine Environmental Priorities Project  
July 1997

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## Introduction

This report encourages Maine communities to promote patterns of development that preserve our traditional quality of life, in part by conserving open space, agricultural and recreational opportunities and wildlife habitat.

The project arose from concerns identified by the Maine Environmental Priorities Project (MEPP), an initiative that compared and ranked the most serious environmental problems facing Maine. Sprawl, the result of dispersed, uncoordinated commercial, residential and transportation construction in less developed areas of the state, emerged as a contributing factor in a variety of risk areas. (see Text Note 1)

A Patterns of Development Task Force was chartered by MEPP to look at one aspect of sprawl, its impact on wildlife habitat. As this report makes clear, sprawl affects the natural and manmade environments in many interrelated ways. For this reason, the task force decided to approach the protection of wildlife habitat as a challenge that involves a variety of lifestyle values traditionally embraced, by Maine citizens. The enjoyment of scenic vistas and clean water, opportunities to hunt, fish, snowmobile and support a family by working on a farm or woodlot are all pursuits dependant on large areas of undeveloped land. This report, along with additional educational and technical assistance from several Maine state agencies, is part of a 'toolbox' for municipalities concerned with protecting these open spaces values - while still accommodating development.

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What may be new about this approach is its attention to large open areas that serve purposes most of us take for granted. These are areas, for example, where deer and moose browse or where corn and potatoes grow or where trees are harvested or where time-worn woods trails provide recreation. Traditionally, state agencies and municipalities have focused on protecting specific types of land, such as wetlands, shore lands, rare plant sites or animal habitats threatened by development. This report focuses attention on other parts of Maine's landscape threatened by unplanned development, areas that do not have special protections, yet offer benefits that make life in Maine special. This report should be of importance to anyone who cares not only about wildlife, but also about forestry, agriculture, outdoor recreation, the traditional character of the Maine landscape - indeed, the survival of truly rural values.

The report begins with a hopeful vision of the future. It concludes very much in the present with a discussion of current approaches that can help communities confront the negative impacts of sprawl, and a list of Task Force recommendations for additional tools.

## A vision for the future Maine's Landscape In 2097

It is Thursday, October 30, 2097. In the center of town, shoppers converge on home ware stores and food marts while others drop by the community health complex or the nearby U.S. Communications Relay Center (still housed in the 1926 postal building). Workers on lunchbreak run errands on foot or join friends for a stroll through the local park. The town hums with activity as young families and retirees alike take advantage of services and amenities seldom more than a few blocks apart.

Several miles beyond the residential neighborhoods that radiate out from the town center, another community is thriving as well, a

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Maine landscape for centuries. A  
deer skirts a cornfield before  
ambling off through the farmer's  
woodlot, climbing to a ridge top,  
and down well-worn animal trails

to the river. The countryside is not a wilderness: roads leaving town have sprouted small clusters of houses and commercial buildings. But large areas, hundreds and sometimes thousands of acres, remain in a relatively natural state. Many of these large parcels of forest, farmland and open land are connected by greenways over ridgetops, along streams and through other natural features. These are corridors that town residents have protected to allow passage for people and for wildlife.

People from town take pride in this landscape. Some boast it is as bountiful as it was in 1897. They value the sporting and recreational opportunities provided by the network of public conservation lands and private land. There is a sense that everyone can experience the beauty and resiliency of Maine's natural heritage, just as their great grandparents did. It is a pride deepened by the fact that, less than a century before, all this — the compact, self-sufficient community surrounded by a healthy mix of farm, forest and plant and animal habitats — was nearly lost.

## Maine's Landscape Today

Head off from any southern or central Maine airport in a small plane and see what is virtually invisible from the ground: the patterns our residential, commercial, transportation and municipal developments have etched into the natural landscape. We live in a state of vast natural resources, of deep woods, serpentine rivers, rugged coastlines, mountains, lakes and more. So much of Maine retains the sense of untrammelled nature, especially when compared to the rest of the eastern seaboard, that we might be forgiven if we think our impact upon the landscape has been mild or that serious concerns can be deferred for several more generations.

But look down from the airplane. You see the mix of large and small open spaces; the manner in which towns are spreading, the houses scattered like tossed pebbles over the land. Look for these, but look also for the trends.

See the roads reaching outward with new homes and businesses and side streets branching off. Notice how these developments reach like tendrils into the countryside, how the roadways converge like arms around farmlands and woodlots and floodplains.

Perhaps to an extent you would not have expected, there are single homes topping hillsides and peppering riversides. In many places, nature doesn't appear as untrammelled as you thought.

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Welcome to sprawl, a pattern of development that is serendipitous at best, but has serious implications for how we experience our daily lives and whether Maine's native plants and animals have lives at all. Sprawl is about decisions people make, but not about people intentionally setting out to alter Maine as we know it. It is about unconsidered consequences, about questions rarely asked, about incrementally rising costs for taxpayers and costs untabulated to wildlife. Sprawl is about a Maine we value and may well be losing.

The work of the Patterns of Development Task Force is to identify ways Maine citizens can protect plant and animal habitats by shaping the ways in which our communities grow. Along the way, these efforts can also help nurture community, protect recreational opportunities, conserve energy, retain a working landscape and save tax dollars.

(Many of these issues related to the impacts of sprawl are addressed in The Cost of Sprawl (1997) produced by and available from the Maine State Planning Office. It offers an excellent introduction to the causes and hidden costs of sprawl with discussions of decisions made by individuals, municipalities, regulatory agencies and lawmakers; for further discussion of sprawl, see Text Note 2)

Many experts insist that the tools we need to address the negative impacts of sprawl are already at hand. If Maine communities take action today to change trends that threaten what we value most about life in Maine, the Maine imagined for 2097 will come to pass. In our imagined town, the people recognized development patterns which were beginning to fragment the landscape. They saw that they could lose just those things they called Maine. Their task was not easy; previous

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planning efforts had stirred strong feelings. There had to be a balance between the town's vision of the future and the desires and needs of private landowners. The issues seemed complex, and there came a time to decide whether the future was worth the effort. But we need not imagine that time; that time is now.

For many, it is impossible to think of Maine without recalling time spent in natural settings. Many enjoy hunting and fishing, hiking, snowmobiling, camping, picking berries or fiddleheads, feeding birds or watching hawks soar overhead. Each of these pursuits, along with nature photography, education and research, have real value in economic terms. (Text Note 3) Plants, animals and undeveloped land both define our state and contribute to its economic health. Businesses stay in Maine and are attracted to Maine because of its distinctive quality of life. Yet, ironically, the economic growth these values attract bring additional pressures to subdivide farms, woodlots, wildlife habitat and scenic vistas for commercial or residential use.

## *How Sprawl Threatens Maine's Native Plants and Animals*

**W**e have said sprawl is complex and that it impacts many aspects of Maine life. Let's look more closely at plant and animal habitat. It will be easy to draw connections to other values of undeveloped lands. Here are a few examples of how sprawling patterns of development impact wildlife habitat:

1) Where human development dominates, native vegetation is replaced by asphalt or lawn.

Plants, animals and undeveloped land both define our state and contribute to its economic health.

2) Natural drainage patterns are altered to accommodate roads and building sites and degrade wetlands and threaten the water quality on which plants, animals and humans depend.

3) Road construction and residential and commercial development often chop up wildlife habitat (and other open spaces). Fragmentation of the natural landscape reduces the habitat available to plants and animals which need a minimum amount of land and water to sustain their populations.

4) Buildings, roads and other man-made barriers can also alter or block essential wildlife travel corridors, such as ridgetops, streams and wet lowlands along which animals have passed for centuries.

5) In addition to physical alteration of the natural landscape, human settlement and associated activities produce noise and introduce domestic and exotic animals and plants which may alter the ecological balance of an area.

It is no coincidence that almost all of the non-marine animal species on the Maine Endangered and Threatened Species List are native to southern and coastal areas of the state, those areas that are now under the most development pressure. (Text Note 4) In our world, all things are connected.

The disappearance of one insect species, for example, may seem insignificant, but that loss may lead to the extinction as well of the plant which depended on that insect for pollination, a plant that may be an essential food source for a bird or mammal. Changes in lake water quality resulting from road drainage, residential development or poor agricultural practices may promote major algae blooms, change lake water temperature and the assemblage of fish species supported by the lake. And the lake's suitability for swimming may decline. (Text Note 5)

## *A Landscape Approach To Designing Communities*

The Maine Endangered Species Act (MESA) and the Natural Resource Protection Act (NRPA) are not designed to address the needs of more common animal and plant species or to address the changing landscape outside the sites they do regulate. The landscape approach to habitat protection presented here takes a broader view, looking at large areas such as a town, a group of towns, or a watershed. It identifies the wildlife resources, the present and future land use patterns and existing ordinances and land ownership configurations. It envisions a public process through which the community has an opportunity to identify how it wants the landscape to function in the future (what it will look like, whether it will contain farm or forest land, whether it will accommodate recreation, whether the sight of wildlife will be common or cause for comment).

Sprawl impacts open space and wild life habitat in many ways, but most profoundly by fragmenting the landscape into smaller and smaller blocks.

### *Understanding What Plants And Wildlife Need*

As discussed previously, sprawl impacts open space and wildlife habitat in many ways, but most profoundly by fragmenting the landscape into smaller and smaller blocks. As development along roads increases, movement between remaining adjacent blocks of open space becomes all but impossible for most wildlife species. If the remaining isolated blocks are not large enough to provide what the plants and animals need to live, those species simply disappear. (At the same time, traditional uses of these lands such as hunting, farming and snowmobiling become less tenable.)

The relationship between an area's level of development and its capacity to support a broad range of plants and can be thought of as points along a continuum. The Maine landscape ranges from completely undeveloped areas, a near-wilderness, to urban areas dominated by paved surfaces. Along this continuum, the type and abundance of wildlife gradually shift from species that require larger blocks of open space to species that can adapt to more developed or urban landscapes.

An undeveloped landscape can naturally support a broad range of plants and animals, just as it can support a broad range of outdoor activities. As this landscape becomes more fragmented (first by sporadic houses and commercial structures and then by strip development along roads), blocks of open space are reduced in size. Point by point along the continuum, plants and animals drop off the landscape. In the completely developed landscape, the composition of wildlife usually shifts to a suite of "urban" species able to contend with pavement and traffic, noise and disturbance. As many suburban and urban dwellers have discovered, such species as gulls, English sparrows, pigeons, raccoons and skunks are often able to adapt,



even thrive, where others can not.

In summary, fragmentation of habitat, reduction in block size and barriers to movement are three key factors to consider when designing development to protect plant and animal habitat. They are equally valuable indicators of the suitability of an area for many recreational or agricultural uses. The following is a discussion of how municipal and regional planners and concerned citizens can identify key elements in the landscape that warrant protection.

#### *A Concept for Habitat Planning: The Tiered Landscape Approach*

Previously, we have discussed the continuum that leads from undeveloped landscapes to paved urban landscapes, with an infinite number of stops in between. Since it would be difficult to base planning decisions on this continuum with its infinite possibilities, we have simplified the model as a series of six snapshots along the continuum. We think of them as six general levels or tiers. These in turn can be considered as examples of thresholds of development from which citizens can choose those best suited for a given region, town or even section of town. The descriptions of these thresholds or tiers are presented here to promote understanding of the consequence of certain patterns, types, and locations of development allowed by local and state regulation and policy decisions. (While much of the discussion focuses on wildlife, the concept also applies to the conservation of other traditional uses of the landscape.)

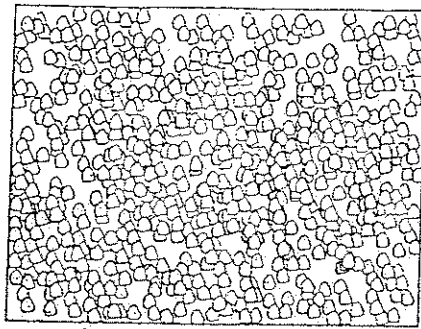
Point by point along the  
continuum, plants and animals  
drop off the landscape.

Each of the threshold land-use patterns or tiers described below supports certain characteristic animal species (Table 1). This assumes that the variety of uses and management practices employed will produce a range of conditions that provide suitable general habitat for most wildlife species. The group of animals presented for each tier level assumes that development along the block perimeters (roads) is heavy enough so that no movement is possible for animals between adjoining blocks of open space. (Text Note 6)

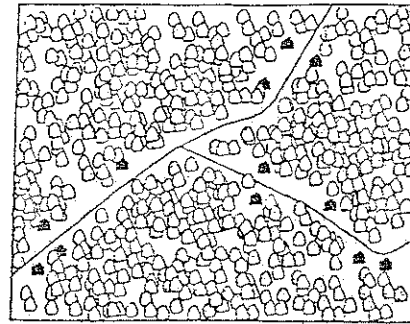
It is important to understand that the number of species able to be supported at each tier can be increased by paying special attention to the natural corridors of travel frequented by wildlife. Town planners and citizens can maintain desired wildlife habitat characteristics by maintaining natural corridors between large blocks of open space.

Tiers (Fig. A)

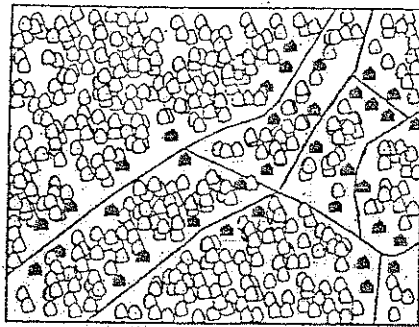
Tier 1:  
Undeveloped



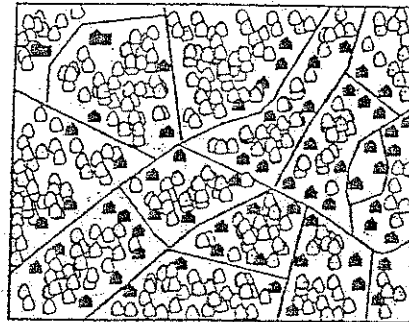
Tier 2:  
500 to 2,500  
acre blocks



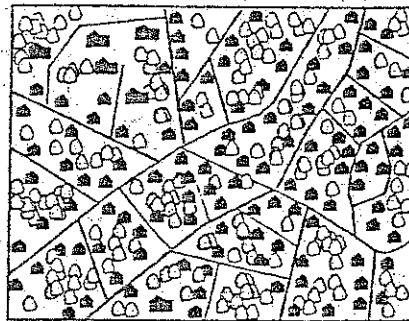
Tier 3:  
100 to 500  
acre blocks



Tier 4:  
20 to 100  
acre blocks



Tier 5:  
1 to 20  
acre blocks



1. The first tier represents undeveloped landscape as occurs on some of the industrial forest land. Here open space areas are fairly contiguous. This tier is not dissected by development patterns or highways that form substantial barriers to movements of animals. This is one end of the landscape continuum in Maine.

2. The second tier is characterized by a pattern of large blocks of contiguous open-space of 500 to 2500 acres that are fairly heavily developed along existing roads.

3. The third tier is represented by blocks that range from 100 to 500 acres in size.

4. The fourth tier has block sizes between 20 and 100 acres.

5. The fifth tier represents a suburban/urban landscape, with undeveloped blocks ranging from 1 to 20 acres in size. (A sixth tier could also be contemplated, one which is an urban or heavily developed suburban area with no open space. For our purposes, this offers little useful habitat and could be seen as the nether end of the continuum.)

Note that these tiers assume no corridors between blocks.

## Habitat Block Size Requirements For Wildlife in Maine

Tier 5 1 - 19 Acres	Tier 4 20 - 99 Acres	Tier 3 100 - 499 Acres	Tier 2 500 - 2500 Acres	Tier 1 Undeveloped
ACCOON	RACCOON HARE	RACCOON HARE	RACCOON HARE	RACCOON HARE COYOTE
SMALL RODENT	SMALL RODENT PORCUPINE	SMALL RODENT PORCUPINE	SMALL RODENT PORCUPINE	SMALL RODENT PORCUPINE BOBCAT
COTTONTAIL	COTTONTAIL BEAVER	COTTONTAIL BEAVER	COTTONTAIL BEAVER	COTTONTAIL BEAVER BLACK BEAR
SQUIRREL	SQUIRREL WEASEL	SQUIRREL WEASEL MINK	SQUIRREL WEASEL MINK	SQUIRREL WEASEL MINK FISHER
	WOODCHUCK	WOODCHUCK DEER	WOODCHUCK DEER	WOODCHUCK DEER
MUSKRAT	MUSKRAT	MUSKRAT	MUSKRAT MOOSE	MUSKRAT MOOSE
RED FOX SONGBIRDS	RED FOX SONGBIRDS	RED FOX SONGBIRDS SHARP-SHINNED HAWK	RED FOX SONGBIRDS SHARP-SHINNED HAWK BALD EAGLE	RED FOX SONGBIRDS SHARP-SHINNED HAWK BALD EAGLE
SKUNK	SKUNK	SKUNK COOPER'S HAWK HARRIER BROAD-WINGED HAWK KESTREL HORNED OWL BARRED OWL OSPREY TURKEY VULTURE TURKEY	SKUNK COOPER'S HAWK HARRIER BROAD-WINGED HAWK GOSHAWK KESTREL RED-TAIL HAWK HORNED OWL RAVEN BARRED OWL OSPREY TURKEY VULTURE TURKEY	SKUNK COOPER'S HAWK HARRIER BROAD-WINGED HAWK GOSHAWK KESTREL RED-TAIL HAWK HORNED OWL RAVEN BARRED OWL OSPREY TURKEY VULTURE TURKEY
MOST REPTILES	MOST REPTILES GARTER SNAKE RING-NECK SNAKE	REPTILES GARTER SNAKE RING-NECK SNAKE	REPTILES GARTER SNAKE RING-NECK SNAKE	REPTILES GARTER SNAKE RING-NECK SNAKE
MOST AMPHIBIANS	MOST AMPHIBIANS	MOST AMPHIBIANS WOOD FROG	AMPHIBIANS WOOD FROG	AMPHIBIANS WOOD FROG

### *Corridors: Making The Most Of Limited Open Space*

Can moose, bears, and bobcats (Tier 1) live on a landscape where the undeveloped blocks are less than 2500 acres (Tier 2)? Can deer survive where the blocks are less than 100 acres (Tier 4)? Yes, in both cases, if suitable undeveloped corridors are available to allow movements of these animals through developed areas to adjacent undeveloped blocks.

What are suitable wildlife corridors? Most wildlife species (except birds) move across the landscape in habitual, traditional, and predictable pathways that follow available cover, terrain, and riparian areas. Topographical features such as ridge

lines are typically used by a wide variety of wildlife that need to move around the landscape. Riparian areas along streams, rivers, and wetlands also are used heavily by wildlife.

Corridors allow wildlife to use adjacent blocks of open space. In this way, although individual open-space blocks may be too small to support the spatial needs of a particular animal, the ability to move across the landscape between adjoining blocks via suitable corridors allows the landscape to function (for wildlife) as though it was a single large unit and not fragmented.

Most wildlife species move across the landscape in habitual, traditional, and predictable pathways.

Realistically, the same group of animals may be maintained on the landscape between Tiers 1 and 2 if suitable wildlife travel corridors are maintained to allow movements between adjoining blocks on the landscape. The same is true of the other tier

levels shown in Table 1. If corridors are maintained, animals listed under Tier 2 could probably live on a Tier 3 landscape; Tier 3 species could be maintained on a Tier 4 landscape, etc.

Some likely areas for corridors are shown on the accompanying map (fig. B). In general, if corridors are maintained along ridge lines, wetlands, and other riparian areas, most wildlife will be able to travel to adjacent blocks of open-space. Wildlife need to be able to travel without disturbance if populations are to be maintained in an area. While there is no one suitable width for such corridors, protection from disturbance can come from heavy vegetative cover within the corridor, or from a wide enough corridor to prevent most disturbance from the edges.

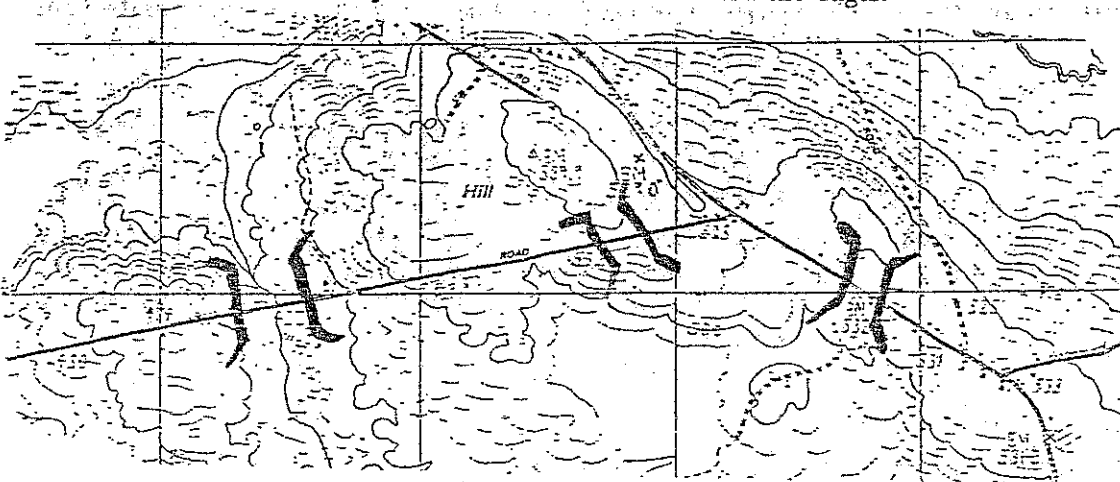


Figure B

## What You Can Do

Citizens can influence the future of their town's character by protecting areas suitable for wildlife habitat and other activities that require larger blocks of land. Conservation of wildlife habitat such as preserving corridors along streams and open space can also protect surface water quality, ensure opportunities for recreation, reduce flooding during storm events, and protect the scenic beauty of an area.

Protection of wildlife is most successful if integrated with other objectives of municipal or regional planning. For example, the land surrounding Jamies Pond in Hallowell has been protected for decades because it serves as a municipal water supply. These lands also support important wildlife habitat and accommodate a variety of recreational uses.

To maintain a certain suite of resident wildlife species, or to protect any of the other related outdoor values mentioned in this report, towns will need to consider both nonregulatory and regulatory tools.

Community Values and Design Planning provides both a context in which to do the necessary research and information gathering and a venue to link wildlife habitat protection with other community values. Establishing these values through a community visioning process is a key first step in the planning process.

Inventory Of course, before wildlife habitat - or any other value - can be protected, it must be identified and located. As part of the planning process, most towns gather information available from state agencies and others on the location of important natural resources, including plant and animal habitat, in their town.

Planning provides a context in which to do the necessary research and information gathering.

Protection of wildlife is most successful if integrated with other objectives of municipal or regional planning.

The Maine Department of Inland Fisheries and Wildlife (MDIFW) continually updates information on large game species, the location of deeryards, the status and locations of certain wetlands, and the use of areas by waterfowl and wading birds as well as other habitats and species protected under the Natural Resource Protection Act and the Maine Endangered

Species Act. The Natural Areas Program at the Department of Conservation maintains a database of plants and natural communities which are rare or unusual in the state. Maps are available from MDIFW and MNAP which show general areas of concern to state natural resource managers. Some important habitats such as vernal pools, wildlife travel corridors or small wetlands are not tracked at the state level. But local knowledge can usually identify broader wildlife habitats, beyond the

state priorities, that are important to conserve.

Revising or developing a comprehensive plan to address wildlife habitat issues involves gathering information; identifying a desired end result and laying out a series of steps, some which may include regulation, to achieve the result. Wildlife habitat often transcends town boundaries and coordination with neighboring towns is critical.

The biggest challenge to planning is to find the public support and political will to actually implement the plans. Land trust members, hunters, foresters and others can find common cause in protecting areas that provide multiple benefits. These same individuals can provide volunteer assistance in the planning process and beyond. This is particularly important because planning by itself does not save wildlife habitat: following through with planning recommendations does.

### *Non Regulatory Approaches*

**A**mong the nonregulatory measures often used to protect wildlife habitat and open space are Conservation Easements, Land Acquisition, Private land Owner Agreements and Current Use Tax Abatement Programs.

**Easements** Important natural areas can be protected for conservation purposes by legal changes to the deed of a property (a deeded easement restriction), which limits the use of the property by the owner and protects certain natural features. Negotiation of conservation easements through donation or fee, is usually less expensive than outright purchase, and can accomplish many of the same conservation goals. An easement can be held by a town or organization such as a conservation land trust and can limit development, restrict certain land use practices and/or permit public access to the land.

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Conservation easements must be monitored to ensure that provisions are carried out in perpetuity. The cost of and the willpower to follow through with a monitoring program are important considerations in evaluating the appropriateness of legal easements.

**Acquisition** Direct purchase of land by municipal government or land trusts is an effective way to protect valuable wildlife habitat, however, changes to the landscape outside the parcel boundaries may still adversely impact the resource. Ownership provides a high level of managerial control over the resource and can be accomplished creatively with several local organizations sharing costs and responsibilities with local government. Acquisition can be used to accomplish several aims at once, such as preservation of wildlife habitat, protection of a source for town water (an aquifer or pond), and provision of public access.

Funds for acquisition can be raised through public appeal, appropriation of town

funds, or application to private foundations or public funds. Several towns maintain land acquisition funds to which monies are appropriated at town meetings each year. The State of Maine administers funds which can be tapped for land acquisition, among them: the Land and Water Conservation Fund and funds for trails from the Symms National Recreational Trails Act (Maine Department of Conservation), federal transportation funds allocated for alternative transportation under the Amendment of the Intermodal Surface Transportation Enhancement Act (ISTEA) (Maine Department of Transportation), Maine Outdoor Heritage Fund (administered by a board consisting of private and state conservation interests), and the Land for Maine Future's Board (Maine State Planning Office). In Maine, the state legislature has not allowed local municipalities to raise funds by levying a

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local real estate transfer tax, although this funding mechanism has been used by municipalities in other New England states to buy open-space.

**Habitat Restoration or Enhancement Programs, Individual Landowner Agreements** Voluntary programs are undertaken by local governments, individuals or civic groups to improve, create, or restore

wildlife habitat. Some efforts encourage the planting of landscaping shrubs, trees and other perennials that provide food to songbirds and other wildlife. Reforestation efforts are supported by the state which distributes seedlings at low cost to landowners. Towns can encourage and help publicize these private and public efforts. For example, a few years ago, the city of Augusta provided shade tree saplings at low cost to residents in an effort to beautify the town.

The Department of Inland Fisheries and Wildlife regularly negotiates voluntary agreements with landowners to protect wildlife habitat. Some habitat restoration and enhancement efforts are required as a condition of environmental permits issued by state and federal agencies.

**Current Use Programs** In Maine, the tree growth and farmland/open space programs are value taxation programs available to individual landowners. Tree growth land, open space and farmland all provide habitat and food for various species of wildlife. These programs can be used as an incentive for landowners to maintain the integrity of their land and maintain wildlife habitat.

Under use-value taxation, land is taxed on the basis of its current income producing capacity, not on its full market value as, for instance, residential house lots. The goal of this type of taxation is to reduce the tax burden for landowners who keep their land in agriculture, open space or forest, uses which also require less town services than commercial or residential development. The tax abate-

ments last as long as the low intensity use of the land is maintained and change of use usually results in considerable tax penalties.

The drawback to these programs is the reduction in local tax revenue that results, therefore, many municipal officials discourage enrollment in the tree growth or open space programs. In tax years 1997-1998, the Maine Legislature allocated sufficient funds to reimburse towns for most of the loss of tax revenues from lands in tree growth.

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municipal costs and  
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Studies in Maine (Ad-Hoc, 1997) show that conservation lands actually boost the value of adjacent property and in the long term, help stabilize the budget of a town by reducing the amount of land available for residential development which tends to increase costs and taxes overall.

**Technical Assistance, Establishing Conservation Commissions** Town officials can call on the Department of Inland Fisheries & Wildlife, private groups, town staff or other folks to assist landowners with wildlife habitat identification & wetland delineation. Training in wetland delineation is available for code enforcement officers from the State Planning Office or regional planning agencies. Often members of local land trusts, lake associations, sporting clubs or other conservation groups have expertise in habitat identification.

Establishment of a municipal or regional conservation commission can provide town planners and leaders with expertise on natural resource issues. Conservation Commissions are municipally-appointed boards with advisory authority.

Regional Planning Councils are important sources for technical assistance with planning, ordinance development and training.

**Volunteer Habitat Monitoring** A network of marine water quality volunteers has been established in many Maine estuaries; likewise many lake associations monitor the water quality in freshwater lakes. Monitoring of wildlife habitat is not well organized on a statewide level. Community-based volunteer habitat monitoring provides an opportunity to connect Mainers with their natural world, and to supply important trend information to natural resource managers and town planners.

### *Regulatory Approaches*

**R**egulation & Zoning Most of the authority to regulate land use in Maine resides at the municipal level. In the unorganized territories, the Land Use Regulation Commission in the Me. Dept. of Conservation manages land use. Zoning ordinances are tools used to regulate both land use as well as the characteristics of the permitted uses. Town-wide zoning, Shoreland Zoning, and Floodplain Management Zoning are the three most prevalent types of zoning in the state. The Saco River Corridor Commission in southern Maine is the only non-state extra-



municipal organization with zoning authority in the state. The commission has authority over the land along the Saco River and its larger tributaries.

Development can be guided away from areas with important wildlife habitat by enacting local ordinances which encourage development in areas suitable for growth. Reduction of minimum lot size, road frontage and setback requirements and construction of supporting infrastructure such as water and sewer lines, sidewalks and bike paths/pedestrian trails are municipally controlled measures which can serve as incentives or "bonuses" which can influence the location of new development. Local regulations can protect wildlife habitat by: protecting water quality by requiring performance standards to reduce runoff during site development such as limiting the amount of impervious surface within an area; requiring buffers for certain activities, e.g. residential, forestry, agricultural, etc.; or minimizing habitat intrusions such as roads, driveways, utility right of ways and other modifications of the landscape that accompany development.

State resources are available to municipalities exploring regulatory options. The Community Planning and Investment Program at the State Planning Office provides municipalities with both technical and financial assistance for comprehensive land use planning and ordinance development as well as model ordinance language.

Some zoning provisions found  
in town ordinances actually  
encourage sprawl.

Workshops and technical assistance are available from the State Planning Office and Regional Planning Councils. The State Planning Office also administers the Code Enforcement Training and Certification program. The Department of Environmental

Protection reviews and provides technical assistance for development of shoreland zoning ordinances and best management practices for control of nonpoint pollution.

**Drawbacks to Regulation** Some zoning provisions found in town ordinances actually encourage sprawl. For instance, large minimum lot sizes can lead to division of large areas of open space, farmland or woodland and therefore fragmentation of wildlife habitat. Such fragmentation can also make some locally important economic activities, like farming and forestry, very difficult. This risks the loss of local working rural landscapes. Even if adequate zoning provisions are in place, there needs to be local political support for enforcement and implementation of the regulations. Local code enforcement officers need to be well trained and effective.

Often general zoning regulations do not specifically protect wetlands and special habitat areas. While these regulations may apply to all land within a town, they may not adequately protect the special habitat values of a particular area. Provisions should be added to the subdivision and site plan review regulations which address the effect of developments on particular areas identified by name. Regulations need to be regularly reviewed and updated, and local plans modified to reflect current trends and needs.

## Recommendations

The Patterns of Development Task Force recommends that an integrated approach to habitat management and conservation be embraced by Maine communities, state and federal agencies and organizations. Maine can encourage growth and development and still maintain the open spaces that are vital to our quality of life, including wildlife. But to do so it must plan carefully, coordinate efforts, and educate the public and development community alike as to the benefits.

The task force believes that open space protection, of which wildlife habitat is but one component, requires a new level of cooperative planning between neighboring communities; that truly long term protection cannot be insured by State actions alone. For this reason, the task force

recommends that the state continue through programs such as the Community Planning Program at State Planning Office, to educate and assist citizens and municipal planners in the creation of local comprehensive land use planning and development strategies. In addition, *the Task Force recommends:*

Maine can encourage growth and development and still maintain the open spaces that are vital to our quality of life, including wildlife.

### *Tools for Municipalities*

- *developing* state funded incentives (such as technical assistance and planning grants) for municipalities and conservation and recreation interests to cooperatively develop multi-town regional plans that provide for open space and wildlife protection;
- *devising* additional landowner incentives (such as property tax relief) or disincentives to encourage land to remain undeveloped;
- *developing* model performance standards to protect habitats of importance (through a cooperative effort of regional councils and the Maine Department of Conservation, Maine Department of Inland Fisheries and Wildlife and the State Planning Office);
- *initiating* pilot projects that seek to demonstrate and test the efficacy of planning and management tools and techniques outlined in this report. The Maine Department of Inland Fisheries and Wildlife, the Maine Natural Areas Program and the State Planning Office will work on pilot projects to develop and implement plans for habitat protection based on a broad landscape approach. The purpose of the pilots would be to determine what opportunities and constraints arise when actually working with the towns and to test effective regulatory and nonregulatory techniques at the local level. The pilot projects would be showcased in a municipal

planning guide, prepared by the State Planning Office, that would provide guidance on the landscape habitat approach and how to incorporate the approach into municipal land use plans, ordinances and policies. The guide would cover the gamut of regulatory and nonregulatory measures suited to Maine communities.

#### *Public Involvement*

- *undertaking* major public education efforts to share information about the importance and benefits of wildlife habitats to the state's economy, quality of life and environment;

#### *Institutional Changes*

- *establishing* Multi-Objective Management (that encompasses habitat protection, but also groundwater and surface water protection, flood mitigation, recreation and open space, quality neighborhoods and community development, historic and archaeological preservation, forest land and agricultural land conservation) as the preferred method of planning for development and conservation by state agencies and municipalities;
- *favoring* land acquisition programs in areas which have regional open space plans (as part of the Public Land Acquisition Advisory Committee guidelines);
- *amending* Land for Maine Future Board criteria to include consideration of the value of wildlife corridors on property being considered for state purchase;
- *revising* state policies that encourage sprawl and increasing awareness of the unintended consequences of federal, state and local agency policies;
- *directing* state policies and funds to revitalize city/village centers;
- *initiating* a publicly funded bond issue to increase the amount of land in public ownership in Maine by 20%, with special emphasis on protection of natural reserves that would conserve outstanding examples of Maine's native plant and animal habitats.

The Task Force views these recommendations as ways of initiating wider discussion on the topic of sprawl, its impacts and the ways in which Maine citizens can protect values they have traditionally embraced. Public comment on this report and further recommendations are encouraged.

Please send comments to:

Maine Environmental Priorities Council  
c/o Mark Margerum, Department of Environmental Protection,  
State House Station 17, Augusta, ME 04333

## Text Notes

(1)

Maine Environmental Priorities Project: Three technical working groups were convened in 1993 to review and rank the most serious environmental problems facing Maine according to their threat or risk to Maine's ecological health, human health and quality of life. In July 1995, Phase I of the project was completed and the technical reports were published. One report titled "Maine's Built and Natural Landscape," described how scattered patterns of settlement were threatening Maine's quality of life. In particular, deterioration of downtowns, loss of character of town centers, loss of rural character and loss of ecological values were cited as consequences of sprawl or suburbanization. Phase II of the MEPP project is now focused on ways to address the environmental problems ranked significant in the findings of the technical groups.

(2)

Sprawl: Traditionally, Maine communities grew in a development pattern common in New England: a densely developed town center surrounded by an area of less dense residential development and, further out, farmland and woodland. This pattern was typical until the advent of the automobile and building booms of the 1970s and 1980s.

a.

In many areas, commercial and residential settlement sprawls across the landscape. Residential subdivisions are often located far from town services such as schools, fire houses, public water and sewer supplies and even further from employment centers. Commercial strips often line major roads away from historical pedestrian-oriented town centers and Main Streets have lost historic vitality. Dispersed residential subdivisions and commercial strip development result in increased use of automobiles and miles traveled. In many Maine towns, such as Sanford, the increase in automobile traffic on the roads has outpaced the increase in local population. To understand the benefits and costs of this kind of development,

it helps to characterize communities by their function in the economy of a region.

A 1996 report by the Maine State Planning Office identifies 85 Regional Service Centers, cities such as Portland and Bangor, towns like Machias and Caribou, and clusters of communities, Rockport-Camden-Rockland for example. These Regional Service Centers are generally more densely settled than areas around them and are historical centers of commerce and industry or important crossroads like Jackman or Unity. Health, education, recreation and cultural services are concentrated in these service centers as well as 75 percent of the state's jobs and more than half of the population. Yet, many of the older centers have experienced a decline in population, while others, located in tourist destinations such as Blue Hill, Freeport or Damariscotta, have grown.

There are 235 areas known as Growth Communities. Some of these communities have experienced "very high" growth, Litchfield, Rangle, Standish, and Gorham for example. Others have attained "high" growth, among them Belgrade, Liberty, Prospect, and Steuben. These communities are characterized by both rapid population and housing growth. These growth communities cover 52 percent of the land area in the organized territories and include 47 percent of the 496 municipalities in Maine. In the thirty years between 1960 and 1990, population in these communities increased by 95 percent. In contrast, the state overall during the same period experienced an average population growth of only 27%.

Significantly, the number of housing units in Maine has increased far beyond the increase in population. This trend reflects a national trend toward smaller household size because of the aging of the population and changes in family structure. Most growth in housing stock over the past 20 years has occurred in growth communities: an average increase of 78% as compared with an increase of 35% in regional centers and 31% in slow growth communities.

Within a 20 year period, from 1970 to 1990, the equivalent of six Portlands, each with 31,000 housing units, were built outside the state's regional centers, in the growth communities.

The remaining 159 Maine towns (such as Beals, Cape Elizabeth, and Winslow) are municipalities with stable or slow growth and include former mill towns, many rural communities and most island towns. What is evident in this analysis is that settlement is no longer oriented around ports, harbors, major industries or other features. *Instead, development tends to follow major roadways or leapfrogs over existing settlements into former farmland or woodland.*

b.

*Sprawl costs the taxpayer.* This overall pattern of growth, more or less broadcast over a rural landscape, has come in response to greater mobility and the ability of individuals to live where they do not work. Many see this as a gain, but towns that once welcomed all the new residents they could get are now facing costs they did not bargain for. And taxpayers statewide are picking up much of the tab. A recent study commissioned for Maine Coast Heritage Trust (Ad-Hoc 1997) found that property tax bills tend to be highest in towns with the largest tax bases. In Maine, according to the study, the average housing unit costs the school district about \$2400 in education costs (based on an average of 0.46 public school students per occupied housing unit in Maine and an average annual spending per pupil of approximately \$5,300 (1993-1994.)) The median valued (at \$87,300) owner-occupied house, however, paid only about \$800 in property taxes, leaving \$1600 to be picked up by other taxpayers.

Residential development can increase the costs of other town services, such as road maintenance, too. While publicly-funded new road construction in Maine has declined over the years, new road construction continues for subdivisions and commercial development. Maine municipalities accept over 100 miles of privately-constructed roads for public maintenance every year, the equivalent distance of a new two-lane road from Kittery to Augusta.

c.

*The causes of sprawl are complex and interre-*

*lated ranging from government policies to population growth, the conversion from an agrarian to a service economy, and American preferences and attitudes.* Government policies controlling land use and environmental regulation guide the placement of new development, often away from already developed areas. State traffic regulations may make it more costly to locate in an area that is congested, driving development to less crowded areas. In Maine, regulations requiring certain amounts of open space around new schools has been cited as promoting the construction of new schools in rural areas away from service centers. Local minimum lot sizes (two acres in many Maine communities) encourage the subdivision of land on the fringes into ample lots and spread out the impact of development, rather than promoting concentrated development and conservation of open space on large pieces of land.

Tax policy also influences the location and pace of development. According to the Northern Forest Lands Council, the capital gains tax on timber encourages liquidation of timber assets, thus leaving forest land available for more intense development. High property values near urban areas often drives residential and commercial development to less expensive open lands in nearby rural areas. Since municipalities depend on property tax revenues to fund local services, there is an incentive to increase property values by promoting development, even though many studies show that development costs outpace short term gains. Inheritance taxes may force heirs to subdivide family land. Rising property values encourage the subdivision of agricultural lands. Low federal and state gasoline taxes keep the costs of commuting low and effectively subsidize the separation of workplace from living space.

Infrastructure decisions by federal, state and local governments often promote sprawling patterns of development. Water and sewer systems are often expanded with federal and state grants without careful analysis of the long term costs and consequences. Road developments and improvements are often made in reaction to the demands of developers to accommodate growth. Highly traveled roads attract development seeking market access, resulting in the strip development lining many of Maine's highways. As men-

tioned above, private roads and rights-of-way to off-the-road development often become accepted as town roads, increasing the overall tax burden of road maintenance. Ideally, local officials would proactively direct development to areas which are to provide the most significant benefit to the town.

The demographics of our growing society may help explain sprawl. As the population grows—and household size shrinks there is more demand for housing. The 'American Ideal' of a house on a large lot in a sylvan landscape contributes to market demand for homes in the suburbs, by the coast or on the shore of a pristine lake or mountaintop. People are leaving the problems associated with big cities such as pollution and crime, and seek refuge in the rural communities of Maine where they often find lower taxes and an improved quality of life.

Lack of coordinated land use planning between and within towns also contributes to sprawling patterns of development. Development happens incrementally over time; permits are issued piecemeal. Even on the state level there is no process to adequately address the cumulative impacts of individual developments. While many Maine towns drafted comprehensive plans under the criteria of Maine's Growth Management Act, far fewer actually have implemented ordinance programs to direct development consistent with their comprehensive plans and community vision. As of October 1996, 315 towns had received grants through Maine's Growth Management Program to update or prepare comprehensive plans. Of those towns, only 125 have begun to implement the plans by developing or updating land use or zoning ordinances. XXX towns have actually enacted new or revised land use ordinances.

(3)

The economic value of hunting, fishing and trapping contributes some 640 million dollars to the Maine economy each year (Boyle, 1989). Tourist activities associated with Maine's Great Ponds generate about \$269 million in annual expenditures and support as many jobs as Bath Iron Works, according to new report from the University of Maine Water Research Institute (Boyle & Schuetz

1997). These expenditures contribute new money to Maine's economy, and they are only a portion of direct expenditures by all lake users, including Maine citizens, which amount to about \$1.8 billion.

(4)

Adamus (1985) characterized wetlands in southern Maine as "often the last refuge of wildlife in an urbanizing region." In his study of wetlands in a nine-town area in southern Maine, Adamus noted that 76% of the wetlands were visible from or within 2000 feet of a road and 10% were boxed in with roads on all sides. He concluded that the habitat value of wetlands may decline when boxed in by roadways, particularly if the roads have heavy traffic.

Development impacts to native plant and animal populations are often incremental and cumulative. As the Maine landscape suburbanizes, the filling and draining of small unregulated wetlands and vernal pools happens frequently. This particular habitat change affects amphibians and other animals that rely on wetlands during a part of their life cycle, wildlife that visit the area for food, shelter and drink, as well as plant and animal species that are specially adapted to survive only in these areas.

(5)

The loss of nesting sites for piping plover and least tern on southern Maine barrier beaches is a classic case of incremental development and its cumulative impact: one house lot was developed, and then another, and another until the beach dune habitat no longer sustained successful nesting populations of these endangered birds. Several rare plants have been extirpated from Maine in recent years as a result of changing land uses. For example, the sand barrens in Oxford once supported a healthy population of wild lupine. In Old Orchard Beach, botanists had located the only known occurrence of butterfly weed in the state. The plant was monitored over years and then found missing in 1989. The area of blueberry barrens which had supported the plant, was severely eroded due to All-Terrain Vehicle use, an activity which may or may not have contributed to the disappearance of the plant.

Protecting rare species and habitats presents a continual challenge. The pitch pine scrub oak barrens in the Waterboro area support a community of plants, insects and animals rarely found in Maine. Part of the acreage is protected by conservation ownership, but most of it has been subdivided into house lots, a use which takes advantage of the well-drained soils of the barrens and their proximity to urban centers. Researchers studying rare blanding and spotted turtles in York County recently reported the bulldozing of a pool with the most spotted turtles ever found in Maine, by a landowner who knew of the importance of the pool to the turtles and the interest of the state in protecting the site.

(6)

The tier levels presented in Table 1 assume that the blocks are surrounded by roads and development to a degree that prevents movement of terrestrial animals between adjacent blocks. This means that the species listed under each tier level can probably live entirely within the block sizes listed without protecting natural corridors. The list of species in each tier is representative, and certainly not exhaustive, and, as in the case of deer, indicative of habitat requirements for healthy populations. All species occurring in Tier 5 also occur in Tier 4; all species in Tiers 4 and 5 also occur in Tier 3, etc. Thus, Tier 1 potentially supports all species.

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