Bare Cove Park
A Case of Forest Fragmentation Amidst the Presence of Forest Interior-Dwelling Species

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June 9, 2015

Forest Interior-Dwelling Species (FIDS) are Neotropical (North and South and Central American migrant) songbirds that require large forest tracts to successfully breed and maintain viable populations. Criteria for determining if FIDS habitat is present are:

a) Riparian forest of at least 300 feet in width which occur adjacent to streams, wetlands or a shoreline

or

b) Forest areas utilized as breeding areas by forest interior-dwelling birds and other wildlife species of 100 acres or more.

FIDS habitat is dependent on the forest age, shape, forest-to-edge ratio, vegetative structure and composition, degree of human disturbance and habitat quality of nearby other forested tracts.

Bare Cove Park falls within the Northeastern Coastal Zone Ecoregion and within the sub-ecoregion known as the Boston Basin. The Boston Basin is a heavily developed subregion and has multiple ponds, lakes, reservoirs and is drained primarily by four rivers. Forests here are mainly oak-hickory hardwoods, mixed with White Pine.

Most of the birds surveyed for the Bird Atlas of Massachusetts are associated with suburbia and thrive in the midst of human activity. The birds you find in your backyard can be found in the mowed areas of Bare Cove Park, e.g. Cardinals, Blue Jays, Robins, House Finches. At least three species of exotic/introduced birds from other countries are also found in Bare Cove Park – starlings from England, rock doves/pigeons from Europe, and House Sparrows from England. Nature preserves are not set up for these backyard species. Nature preserves are for the protection of those species that are diminished by humans and their activities. These species are those associated with wetlands, shorelines, estuaries and large forest tracts. This is what we have at Bare Cove Park. The park is along the Atlantic Flyway which is used by those birds migrating from the southern United States, Central America, the Caribbean Islands and South America to spend three seasons of the year here.

We have no control over the quality of the habitat in those far distant places south of us, but we do have responsibility to insure that our park, established to enhance, protect and manage, works for the betterment of the wildlife (birds, mammals, reptiles, amphibians and beneficial invertebrates) that are in need of habitat that sustains them.

In 1971, 468 acres were acquired by the town, which had been the old Naval Ammunition Depot from 1906 to 1968. Across the Back River Estuary, is Great Esker Park land which had been held by the federal government as a buffer zone. Together these former federal holdings comprise at least 705 acres which are some of the most scenic, forested, open space tracts in New England, a patchwork quilt amidst a sea of development. Besides the backyard species that live in the park where mowing has occurred, this land protects fragile species that have very few places to go in the urban landscape. There is also acreage of the park exist in the northern part, transferred to the Town of Hingham by the Massachusetts Highway Department and some from the Massachusetts Department of Fisheries and Wildlife.

Through the process of natural succession, the original tract of land that was the depot has evolved and continues to evolve into a larger more complex ecosystem including:

. Oak-hickory uplands
. White Pine stands
. Greenbriar (*Smilax sp.)* undercover
. Red Maple and other Hardwoods Swamp
. Coastal Wetlands
. Beach-Tidal Zones

Recent development, however, from housing development, in a land trade with the park, has increased the amount of "edge-effect" that diminishes the viability of the park to offer proper habitat to forest dwelling-interior species. Edge-effect, produced by mowing and development, diminishes the viability of the forest by changing the temperature differential within the tract, chopping up the forest and bringing in the backyard birds and excluding the forest interior-dwelling species, who are the ones needing protection, so that they may nest and maintain their populations. In a global perspective, our little park is a steppingstone to survival of the most fragile species on the planet – i.e. the birds who travel thousands of mile from the southern hemisphere over open water to occupy forests for three seasons of the year, and return again to their wintering grounds. There are many dangers along the way, in their journey and on their nesting grounds. Here on their nesting habitat, fledgling birds land on the ground until they are capable in flight and during that time, are vulnerable to predation. We do not need to contribute to those dangers by managing for dogs to be happy in the park. It is not our raison d'etre.

The numerous trails through the woods, cut and chop up the forest as well and the forest is prevented from deepening in complexity which offers viable preserved habitat. The purpose of a park is to allow a forest to grow in complexity, moving towards a mature stand, which not only increases the value of the forest to Neotropical Migrant Birds but also increases the property value of the houses next to the preserve, because the forest is mature and wild.

As the natural landscape evolves over time, it is the responsibility of the Bare Cove Park Committee, in consultation with various experts and professionals, to assess and develop viable management schemes that serve the interest of the wildlands preservation even as people moving responsibly through the various habitats while engaging in their recreational activities. The concept of the Multiple-Use-Module has evolved to allow for both humans and non-humans of the ecosystem to co-exist. This concept has been used throughout the world where humans abut

natural areas where preservation efforts are occurring. The idea is that access is allowed through the park by an outer circular roadway or walkway with a few trails that are small coming off of the main walkway. The core of the forest is protected from access by closing in the existing trails in the most fragile area, the forest interior. For Bare Cove Park, that most fragile area is the south end, where the forest interior species have been found, and where the edge-effect is not as severe as at the north end, which is basically, a backyard to the houses there, with the backyard species present. The other areas of concern are the vernal ponds of the south end, home to the amphibians on the list, and Tucker Swamp, which is habitat to forest interior dwelling birds and amphibians.

Accepted (standard) practice of land conservation, in places where forest interior-dwelling species are established or trying to become established include:

1. minimize the number and length of roadways and driveways;
2. when existing roadways are essential, they should be as narrow as possible;
3. maintain forest canopy closure over roadways;
3. maintain forest habitat up to the edge of roadways and do not mow grassy berms or create new ones;
5. maintain or create wildlife corridors, i.e. "green necklaces" that connect to other forested tracts held by other land-holding groups;
6. connect forest fragments to other forest fragments with a corridor of at least 300 feet in width;
7. promote the development of a diverse forest understory, by not removing woody debris or snags and do not mowing;
8. encourage homeowners, adjacent to the forest tract, to keep cats indoors and if dogs are outside, kept on a leash or within a fenced in area,
9. permanently protect the sites where FIDS occur, eliminating all development, mowing, and limit the number of incursions into these sites within the tract, through the use of trail resting signs so they overgrow in a season or two and discourage people from entering those parts.

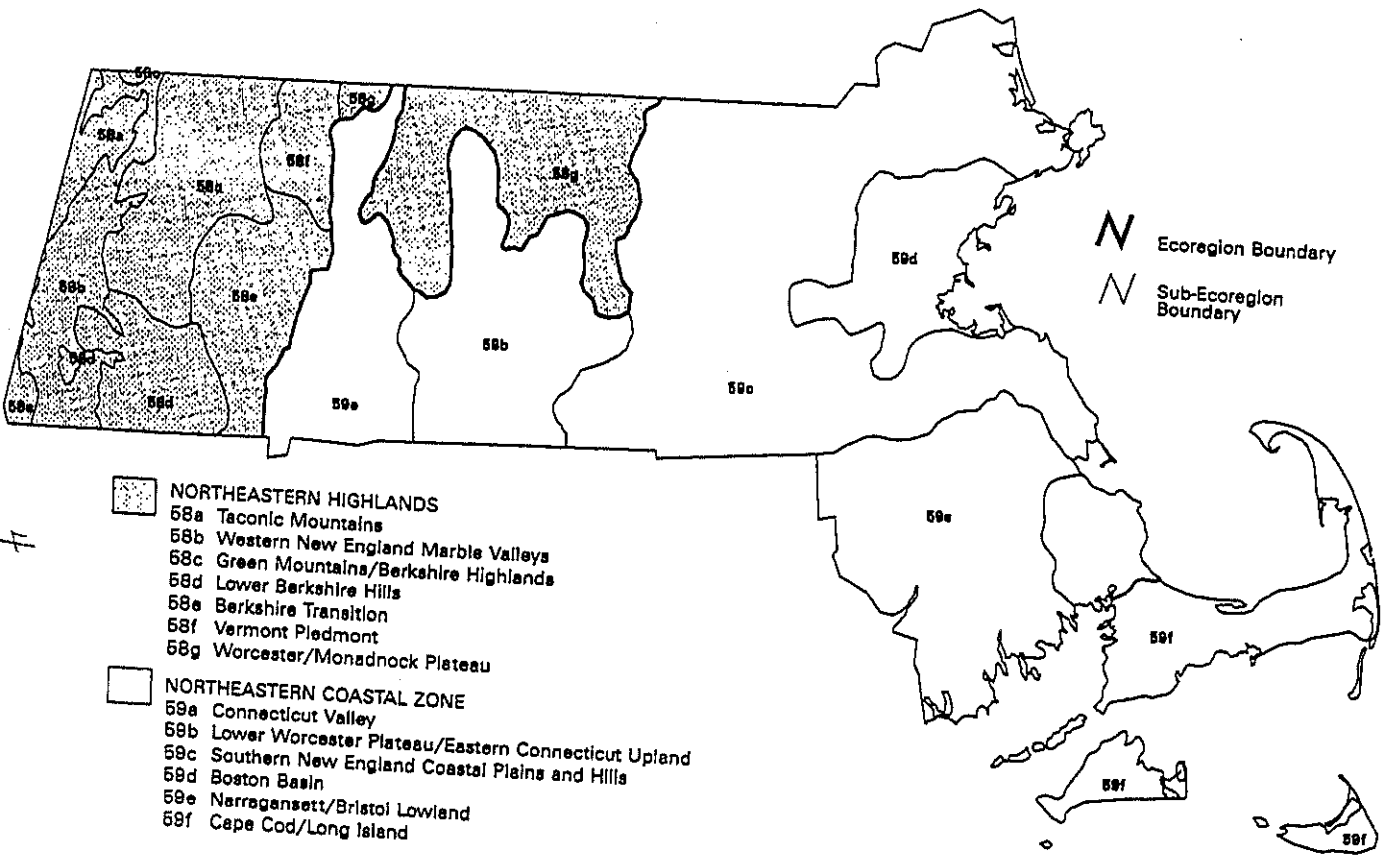


Figure 2
Ecoregions of Massachusetts


Hingham Yacht Club
Langley Is.
Ragged Is.
Sarah Is.
4
9
Weymouth
commuter boat
HINGHAM HARBOR
8
5
13
11
15
12
14
Baker Hill
26
WEYMOUTH BACK RIVER
39
33
40
36
56
57
54
63
POND
N
W
E
S
HINGHAM LAND CONSERVATION TRUST

Bare Cove Park Species List

Status Code
U-Uncommon
A-Abundant
E-Expected

Birds

Double-crested Cormorant	*Phalcrocorax auritus*	A
Great Blue Heron	*Ardea Herodias*	U
Great Egret	*Casmerodius albus*	U
Snowy Egret	*Egretta thula*	A
Little Blue Heron	*Egretta caerulea*	U
Green Heron	*Butorides virescens*	U
Black-crowned Night Heron	*Nycticorax nycticorax*	A
Canada Goose	*Branta canadensis*	A
Mute Swan (non-native)	*Cygnus olor*	U
American Black Duck	*Anas rubripes*	A
Mallard	*Anas platyrhynchos*	A
Osprey	*Pandion haliaetus*	U
Bald Eagle	*Haliaeetus leucocephalus*	U
Red-shouldered Hawk	*Buteo lineatus*	U
Red-tailed Hawk	*Buteo jamaicensis*	A
American Kestrel	*Falco sparverius*	U
Wild Turkey	*Meleagris gallopavo*	A
Virginia Rail	*Rallis limicola*	E
Killdeer	*Charadrius vociferous*	A
Spotted Sandpiper	*Actitis macularia*	A
American Woodcock	*Scolopax minor*	A
Herring Gull	*Larus argentatus*	A
Great Black-backed Gull	*Larus marinus*	A
Common Tern	*Sterna hirundo*	U
Rock Dove (non-native)	*Columba livia*	A
Mourning Dove	*Zenaida macroura*	A
Black-billed Cuckoo	*Cocczyzus erythropthalmus*	A
Yellow-billed Cuckoo	*Coccyzus americanus*	A
	(common with high populations of tent caterpillars)	
Eastern Screech Owl	*Otus asio*	A
Great Horned Owl	*Bubo virginianus*	A
Common Nighthawk	*Chordeiles minor*	A
Chimney Swift	*Chaetura pelagica*	A
Belted Kingfisher	*Ceryle alcyon*	U
Red-bellied Woodpecker	*Melanerpes carolinus*	A
Downy Woodpecker	*Picoides pubescens*	A
Hairy Woodpecker	*Picoides villosus*	A

Northern Flicker	*Colaptes auratus*	A
Pileated Woodpecker	*Dryocopus pileatus*	U
Eastern Wood-Pewee	*Contopus virens*	A
Acadian Flycatcher	*Empidonax virescens*	U
Willow Flycatcher	*Empidonax traillii*	U
Least Flycatcher	*Empidonax minimus*	U
Eastern Phoebe	*Sayornis phoebe*	A
Great Crested Flucatcher	*Myiarchus crinitus*	A
Eastern Kingbird	*Tyrannus tyrannus*	A
Warbling Vireo	*Vireo gilvus*	U
Red-eyed Vireo	*Vireo olivaceus*	A
Blue Jay	*Cyanocitta cristata*	A
American Crow	*Corvus brachyrhynchos*	A
Fish Crow	*Corvus ossifragus*	U
Tree Swallow	*Tachycineta bicolor*	A
Northern rough=winged Swallow	*Stelgidopteryx serripennis*	U
Barn Swallow	*Hirundo rustica*	A
Black-capped Chickadee	*Parus atricapillus*	A
Tufted Titmouse	*Parus bicolor*	A
Red-breasted Nuthatch	*Sitta canadensis*	U
White-breasted Nuthatch	*Sitta carolinensis*	A
Brown Creeper	*Certhis americana*	U
Carolina Wren	*Thryothorus ludovicianus*	A
House Wren	*Troglodytes aedon*	A
Blue-gray Gnatcatcher	*Polioptila caerulea*	A
Veery	*Catharus fuscescens*	U
Hermit Thrush	*Catharus guttatus*	U
Wood Thrush	*Hylocichla mustelina*	U
American Robin	*Turdus migratorius*	A
Gray Catbird	*Dumetella carolinensis*	A
Northern Mockingbird	*Mimus polyglottos*	A
Brown Thrasher	*Toxostoma rufum*	U
European Starling (non-native)	*Sturnus vulgaris*	A
Cedar Waxwing	*Bombycilla cedrorum*	A
Blue-winged Warbler	*Vermivora pinus*	A
Northern Parula Warlber	*Parula americana*	U
Yellow Warbler	*Dendroica petechial*	A
Chestnut-sided Warbler	*Dendroica pennsylvanica*	A
Black-throated Green Warbler	*Dendroica virens*	U
Black-and-white Warbler	*Mniotilta varia*	A
Ovenbird	*Seiurus aurocapillus*	U
Common Yellowthroat	*Geothlypis trichas*	U
Scarlet Tanager	*Piranga olivacea*	A
Eastern Towhee	*Pipilo erythrophthalmus*	A
Chipping Sparrow	*Spizella passerine*	A
Field Sparrow	*Spizella* pusilla	A

Song Sparrow	*Melospiza melodia*	A
Swamp Sparrow	*Melospiza georgiana*	U
White-throated Sparrow	*Zonotrichia albicollis*	U
Dark-eyed Junco	*Junco hyemalis*	A
Northern Cardinal	*Cardinalis cardinalis*	A
Rose-breasted Grosbeak	*P*heucticus ludovicianus	U
Indigo Bunting	*Passerina cyanea*	U
Red-winged Blackbird	*Agelaius phoeniceus*	A
Common Grackle	*Quis*calus *quiscula*	A
Brown-headed Cowbird	*Molothrus ater*	A
Baltimore (Northern) Oriole	*Icterus galbula*	A
Purple Finch	*Carpodacus purpureus*	A
House Finch	*Carpodacus mexicanus*	A
American Goldfinch	*Carduelis tristis*	A
House Sparrow (non-native)	*Passer domesticus*	A

Total species: 97

Birds at Greatest Risk from Un-Leashed Dogs Entering Their Habitat

Low Shrub or Ground Nesters, Forest Interior-Dwelling Species (FIDS)

Eastern Towhee
Veery
Hermit Thrush
Wood Thrush
Ovenbird
Yellow Warbler
Chestnut-sided Warbler
Red-eyed Vireo
Great-crested Flycatcher
Eastern Wood-Pewee
Pileated Woodpecker
Blue-gray Gnatcatcher

Wetlands Associated Forest Interior-Dwelling Species (FIDS)

Northern Parula Warbler
White-eyed Vireo
Yellow-throated Vireo
Warbling Vireo
Eastern Phoebe
Least Flycatcher
Willow Flycatcher
Acadian Flycatcher
Eastern Kingbird

*Note that many birds forage on the ground and all fledglings land there, making most birds at risk at some point in their life cycle if dogs are un-leashed. Some like the Eastern Towhee, are right beside the path where dogs are moving!

Mammals

		Status
Virginia Opossum	*Didelphis virginiana*	U
Eastern Gray Squirrel	*Sciurus carolinensis*	A
Southern Flying Squirrel	*Glaucomys volans*	E
Woodchuck	*Marmota monax*	U
Eastern Chipmunk	*Tamias striatus*	A
Meadow Jumping Mouse	*Zapus hudsonias*	A
Meadow Vole	*Microtus pennsylvanicus*	A
Woodland Vole	*Microtus pinetorum*	A
White-footed Deermouse	*Peromyscus leucopus*	A
Eastern Cottontail	*Sylvilagus floridanus*	A
Northern Short-tailed Shrew	*Blarina brevacauda*	A
Cinereus Shrew	*Sorex cinereus*	E
Star-nosed mole	*Condylura cristata*	E
Eastern mole	*Scalopus aquaticus*	U
Big Brown Bat	*Eptesicus fuscus*	A
Eastern Pipistrelle	*Pipistrellus subflavus*	E
Little Brown Myotis	*Myotis lucifugus*	A
Eastern Coyote/Coywolf	*Canis latrans X Canis lupus*	*A*
(Jonathan Way, Ecologist in Quincy)		
Gray Fox (native)	*Urocyon cinereoargenteus*	E
Red Fox (non-native)	*Vulpes vulpes*	A
Fisher	*Martes pennant*	E
Long-tailed Weasel	*Mustela frenata*	C
American Mink	*Neovision vision*	E
Striped Skunk	*Mephitis mephitis*	A
Raccoon	*Procyon lotor*	A
White-tailed Deer	*Odocoileus virginianus*	A

Reptiles and Amphibians

Spotted Salamander	*Ambystoma maculatum*	A
Eastern newt	*Notophtalmus viridescens*	A
Northern Dusky Salamander	*Desmognathus fuscus*	E
Eastern Red-backed Salamander	*Plethodon cinereus*	E
American Toad	*Anaxyrus americanus*	A
Fowler's Toad	*Anaxyrus fowleri*	E
Spring Peeper	*Pseudacris crucifer*	A
Gray Treefrog – calling now	*Hyla versicolor*	A
Snapping Turtle	*Chelydra serpentine*	E

Eastern Musk Turtle	*Sternotherus odoratus*		A
Painted Turtle	*Chrysemys picta*		U
Northern Black Racer	*Coluber constrictor*	Non Poisonous	U
Common Gartersnake	*Thamnophis sirtalis*		A
Ring-necked Snake	*Diadophus punctatus*		U

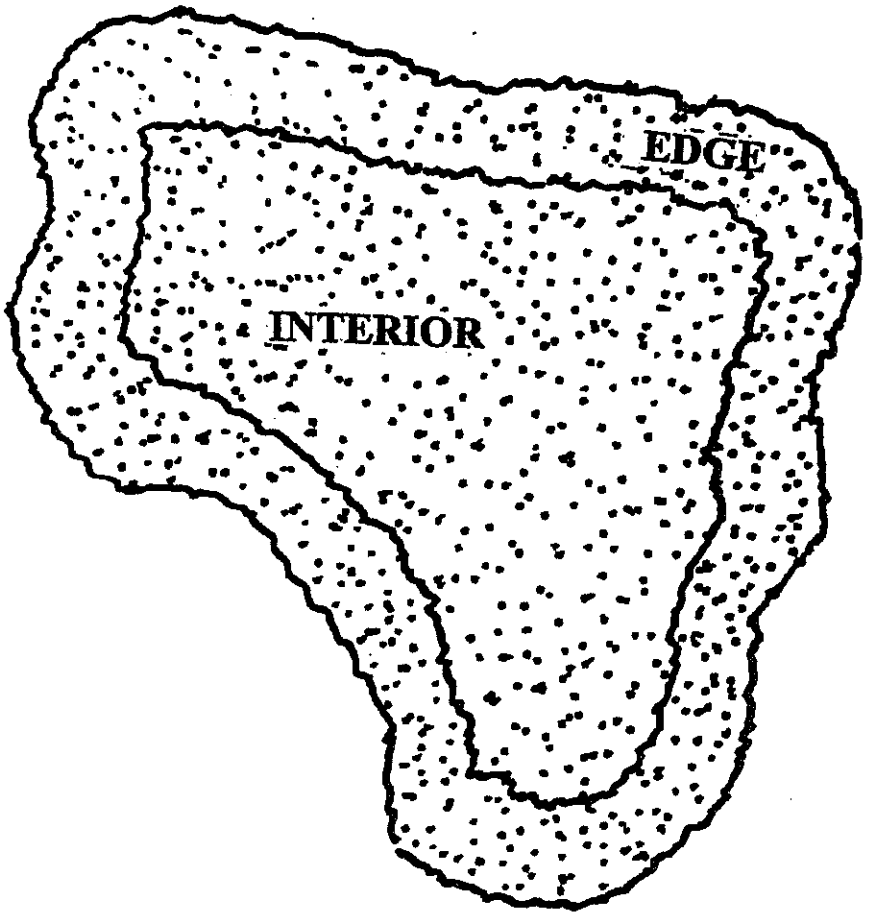
Butterflies and Moths

Mourning Cloak	*Nymphalis antiopa*	A
Eastern Comma	*Polygonia comma*	U
Bronze Copper	*Lycaena Hyllus*	U
Spring Azure	Celastrina ladon	A
Eastern Pine Elfin	*Callophrys niphon*	E
Juniper Hairstreak	*Callophrys gryneus*	E
Eastern-tailed Blue	*Everes comyntas*	A
Hobomok Skipper	*Poanes hobomok*	A
Tawny-edged Skipper	*Polites Themistocles*	A
Least Skipper	*Ancyloxypha numitor*	A
Monarch	*Danaus plexippus*	A
Fiery Skipper	*Hylephila phyleus*	A
Painted Lady	*Vanessa cardui*	A
Clouded Sulphur	*Colias philodice*	A
Red Admiral	*Vanessa atalanta*	A
Eastern Tiger Swallowtail	*Pterourus glaucus*	A
Common Wood Nymph	*Cercyonis pegala*	A
Silver-spotted Skipper	*Epargyreus clarus*	A
Cabbage White	*Pieris rapae*	A
Wood Satyr	*Satyrodes sp.*	U

- Developing Forest Track

Diagrams from *A Guide to the conservation of Forest Interior Dwelling Birds in the Chesapeake Bay Critical Area* by Claudia Jones, Jim McCann, and Susan McConville, June, 2000.

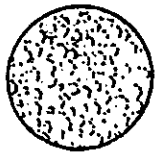
Edge vs. Interior



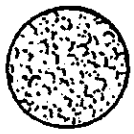
A schematic of preserve design principles as they apply to forest interior dwelling bird (FID) conservation; from Diamond (1975).

BETTER

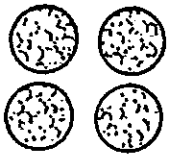
WORSE

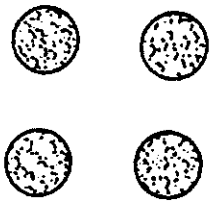


A. Maximize forest tract size - a large forest is better than a smaller one.

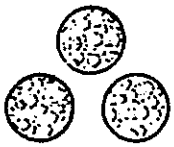


B. Avoid fragmentation of existing contiguous forests - a single large forest is better than several smaller ones of the same total area.

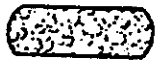




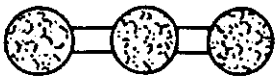
C. Minimize forest isolation - forests in close proximity to each other are better than forests located far apart.



D. Maximize the juxtaposition of individual forest tracts.

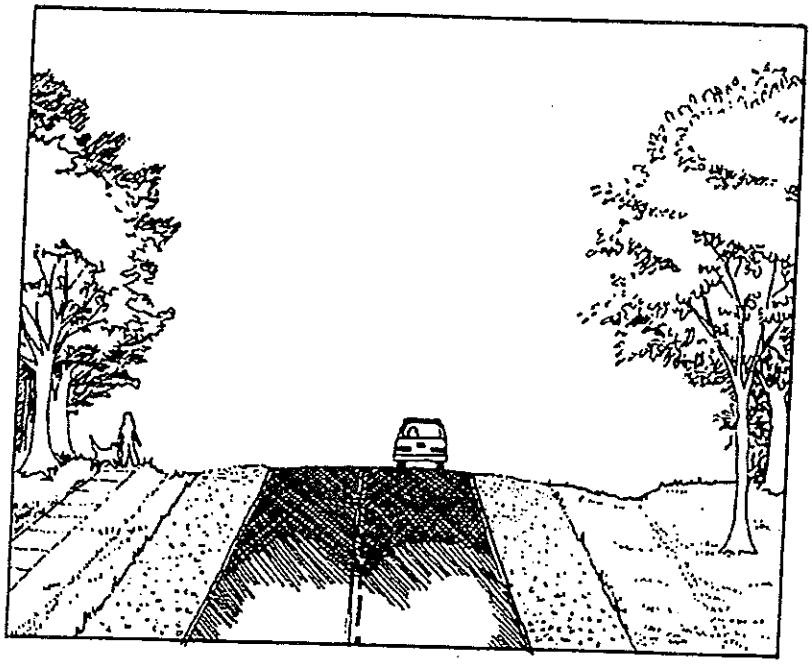


E. Minimize the forest edge:area ratio - forests that approach a circle or square will provide a greater proportion of "interior" habitat than thin, narrow forests of the same total area.

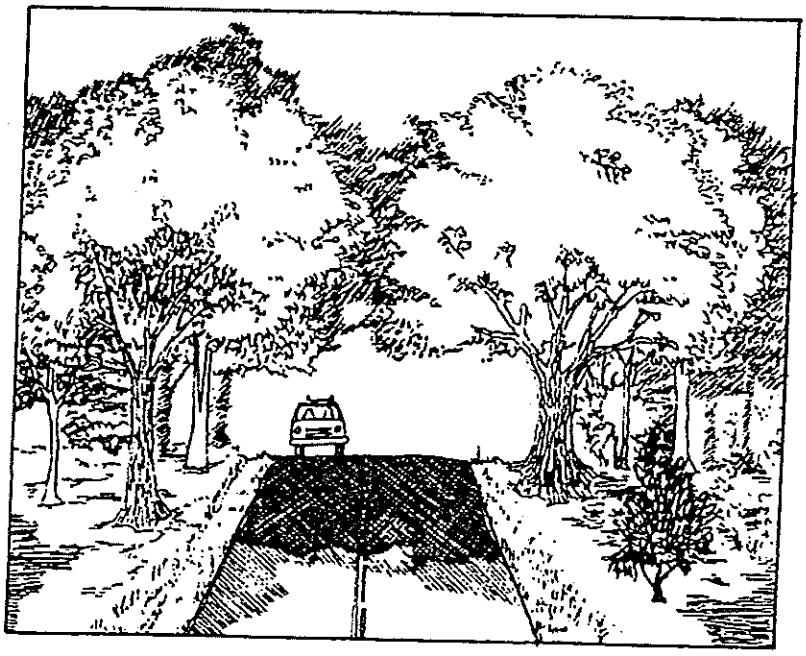


F. Maximize connectivity between forests and the width of the connective corridors - forests that are effectively linked are better than disjunct forests.

GUIDELINES NOT FOLLOWED



GUIDELINES FOLLOWED



Maintain forest habitat to edge of roads and driveways and maintain canopy closure over roads, where possible.