



ARROWWOOD ENVIRONMENTAL

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TO: Town of Charlotte
FROM: Jeffrey Parsons, Ecologist
DATE: December 4, 2015
SUBJECT: Proposed Krasnow Subdivision

I. Introduction

The Krasnow subdivision proposal calls for the construction of 9 houses and associated infrastructure and clearings south of One Mile Road and east of Mt. Philo Road in Charlotte, Vermont. On November 25, 2015 I conducted a field investigation of the Krasnow property. This report addresses potential wildlife and ecological concerns associated with the Krasnow proposal.

II. Purpose of this Report

The town of Charlotte has asked Arrowwood Environmental to review the proposed Krasnow subdivision with respect to the *Protocol for Assessment of Impacts of Proposed Development on Significant Wildlife Habitat in Charlotte, Vermont*. (hereafter referred to as the *Protocol*) This *Protocol* is intended to identify ecological and wildlife concerns in relationship to proposed development activities in Charlotte.

III. Summary of the Protocol for Assessment of Impacts of Proposed Development on Significant Wildlife Habitat in Charlotte, Vermont.

The Town of Charlotte utilizes a dual approach when addressing the potential impacts of development upon significant natural resources within its borders. The town maintains a Significant Wildlife Habitat Map (SWHM) which identifies and delineates the approximate boundaries of important natural resources. Included on this map and resource data base are: Forest Habitat; Aquatic Habitat; Persistent Shrubland Habitat; and, Linkage Habitat. These habitats were identified through a combination of both remote and field identification and mapping techniques.

The Town of Charlotte's *Protocol* is used in conjunction with this SWHM when assessing the potential impacts of development upon these mapped natural resources. The Protocol identifies 7 Ecological Principles that are the basis for an area's inclusion in the SWHM. These principles are as follows: (1) Core Habitat; (2) Priority Species Habitat; (3) Rare Landscape Features; (4) Connectivity; (5) Maintenance of Ecological Processes; (6) Rare Species Protection; and, (7) Representation.

The Applicant has retained McCain Consulting to address Charlotte's *Protocol* and they have produced a Habitat Assessment in regards to the Krasnow proposal.

IV. SWHM and the Krasnow Proposal

The Town of Charlotte's SWHM identifies the presence of 3 different habitat types, Forested, Aquatic, and Linkage Habitats within the Krasnow subdivision proposal area. The proposed houses on lots # 1-8 are all located within Charlotte mapped Forest Habitat. The proposed building envelopes of all of these lots, with the exception of lot # 2 are also all found entirely within the Forest Habitat.

Charlotte mapped Aquatic Habitat is located within lots # 8 and 9. Aquatic Habitat is also mapped under proposed house # 8.

The proposed house lots # 1,3,4 & 8 are within Charlotte's mapped Linkage Habitat, and houses # 3 & 8 themselves are located within mapped Linkage Habitat.

V. Small-Scale Habitat and Features

The Krasnow's habitat report identifies the presence of several small-scale wildlife habitat elements located within the proposed subdivision. The most common elements located during field work were the presence of mast producing trees and shrubs, large snags, woodpecker cavities, live or dead trees over 16" with cavities or splits, supra-canopy trees (perch trees), and bird and squirrel nest trees. These habitat elements were scattered throughout the proposed subdivision area, including within the building envelopes of proposed house lots # 4,5,6 & 7. A seep wetland is located under the proposed footprint of house # 8.

VI. Ecological Principles and the Krasnow Subdivision

1. Core Habitat

House lots # 6 & 7 are proposed within Charlotte's mapped Core Habitat. Core habitat is forested land that is at least 100 meters distant from the nearest land use resulting from human activity such as roads, houses, and agricultural fields. Core forest habitat was originally mapped by the Spatial Analysis Lab of the University of Vermont. Charlotte maintains their own mapped Core Habitat database.

Core and Forest Habitat is important habitat for species of wildlife that are sensitive and wary of humans and the human-altered landscapes they create. Some species of wildlife such as black bear, and fisher shy away from humans and thrive in these core habitats only rarely making contact with humans. Other species such as white-tailed deer, Eastern coyote, bobcat, and other species seek out these more isolated habitats during sensitive periods of their life cycles such as during breeding, denning periods, or during the rearing of their young. If Core and Forest Habitat were eliminated from Charlotte and the town was left with all small woodlots and edge-dominated human-altered landscapes, wildlife populations of all but the most tolerant species of wildlife would suffer. Wildlife species such as fisher, black bear, moose, and bobcat would be in jeopardy. These species require larger forest blocks and /or access to different habitat elements in different locations on the landscape. The continued availability of movement landscapes or corridors is crucial to their persistence in Charlotte. The presence of bobcats and fisher within the MPSP have been documented (Mt. Philo Website). It is uncertain if the bobcat and fisher, utilizing the area require passage to a larger series of wetlands, forests, and fields in which to live.

Individual animals, (likely males and sub-adult or other non-breeding females) of species such as bobcat and fisher may still find some suitable habitat in Charlotte-but the deep woods required for breeding females of these sensitive species would not be present and ultimately the population of these species in Charlotte diminished. This is especially true if Charlotte's Linkage Habitat is further diminished by projects that fragment remaining Core, Forest, and Linkage Habitats.

Forest and particularly Core Habitat is also important for the maintenance of declining songbird populations. A group of birds that tend to thrive in deep woods, distant from habitat edges and other human disturbances, occurs in the forests of the Northeast. These birds often have minimum size requirements-below which females establish breeding territories only in greatly diminished numbers or not at all. This group of birds also does not react favorably to the edges of habitats or natural communities. Along these habitat edges or borders birds are often subject to high rates of predation and/or parasitism resulting in decreased populations. Edge habitats adjacent to agricultural activity, in particular active dairy farms, often harbor the brown-headed cowbird. The cowbird parasitizes other birds' nests causing declines in the host species populations. Nest predators such as raccoons, domestic cats, crows, blue jays, and others focus their feeding activities on forest edge communities-consuming the eggs of birds. The ovenbird, veery, wood thrush, black-throated blue warbler, hairy woodpecker, and scarlet tanager are species that thrive in these deep woods habitats largely in the absence of edge habitat. The Core Habitat that is located within the Krasnow property extends south into the MPSP, a public resource, in an area where bird-watching is a common human activity. Degrading the Core Habitat increases the probability that deep forest bird species will no longer breed in the area. Many raccoon scat were observed at the base of trees near forest edges on the Krasnow property. The Black-throated blue warbler, scarlet tanager, ovenbird, veery, wood thrush, and the hairy woodpecker have all been recorded in the MPSP. These birds may very well depend on the Core Habitat found there and shared with the Krasnow property.

In general, the greater the size of core and Forest Habitat, the greater the number of home ranges, and number of individuals of a species within an area. The conversion of core habitat to edge-dominated habitat and/or developed house lots translates into less living area for birds, mammals, and most species of wildlife. In some cases, animal numbers diminish over time as increased encounters with humans, their pets, and their vehicles-result in the injury or death of animals. Also as forest blocks become fragmented by human development-wildlife is often forced to travel across an uncertain and often hazardous landscape in search of life requirements-resulting in more human encounters and often injury or death. As large habitats become smaller-there is often more direct aggressive competition between the remaining animals in an area. An increase in the density of animals can result in increased rates of disease transmission, and the direct aggressive behavior between animals can result in added stress, injury and death to wildlife.

The proposed Krasnow subdivision is partially located within Core Habitat. The mapped Core area is currently 30.12 acres in size and overlaps the Mt. Philo State Park (MPSP) to the south of the proposed development. As stated the proposed subdivision is partially located within this Core Habitat area and the size of this mapped Core Habitat if the Krasnow subdivision is built would be decreased by about 45 % to 16.53 acres. This loss of Core Habitat represents a significant loss of one of the two larger Core Habitats at least partially within the MPSP (over 25 acres). While the exact results of a loss of Core Habitat on species that require wild forestland

for some or all of their persistence cannot be predicted- it is important to remember that sensitive species such as bobcat have been identified on lands immediately adjacent to the Krasnow property. Mt. Philo State Park is a resource that all Charlotte residents and all Vermonter's benefit from and enjoy. The experience of having species such as bobcat, fisher, and deep forest birds in the MPSP enriches all of its visitors.

The Core Habitat that the Krasnow property shares with the MPSP provides habitat that potentially contains other species that seasonally or year-round live or spend time in its forests. We have to guess at what species this might be -- as we do not have a complete list of the species of the area because a species list, complete with winter assessments such as tracking -- was not completed by the Applicant.

Recommendations

(1) The locations of house lots # 6 & 7 are within mapped Core Habitat. The property boundaries as currently proposed for house lot # 6 are entirely within Core Habitat and this house should be eliminated. Within the property boundaries for house lot # 7, areas along the northwest property boundary are mapped as Forest Habitat but not Core Habitat. The house building envelope for house # 7 should be moved to the far northwest corner and out of the Core Habitat.

2. Priority Species

The bobcat is listed as a Species of Greatest Concern within the 2005 Vermont Wildlife Action Plan. It is a Medium Priority statewide. As currently configured the Krasnow proposal eliminates 45 % of one of the two larger Core Habitats in the MPSP area and 1 of the 5 largest Core Habitats in Charlotte west of Spear Street. Such further fragmentation likely adds to the stress that bobcats face within the Park forest and in forestlands west of Spear Street. The Vermont Wildlife Action plan states that the bobcat requires large tracts of undeveloped lands connected by forested corridors; and, that forest fragmentation and conversion to other uses is a major cause of the decline in this species. As stated, the Krasnow proposal, as is, fragments a significant proportion of a larger Core Habitat area shared with the MPSP.

It appears that no plant Priority Species occur on the Krasnow property (see Habitat Assessment). However only a very incomplete list of species is available for this property as there was no comprehensive inventory or winter assessment of animal species completed for the property. Therefore it is difficult to conclude that there are no other Priority Species present at the site that could be harmed by the loss of Core, Forest, and Linkage Habitats.

Recommendations

(1) Move house lot # 7 northwest and out of the Core Habitat, move house lot # 8 north to increase the protected area, and eliminate or move house lot # 6 to a new location out of Core Habitat. This should preserve sufficient habitat for the continued presence of priority species.

3. Rare Landscape Features

There are many rare plants identified and monitored within the nearby MPSP (see Habitat Assessment). Most of these species appear to be associated with ledges or rock outcrops that are not found on the Krasnow property. The natural communities on the property are not considered rare.

4. Connectivity

Houses # 6, 7, & 8 place a substantial added barrier to the already slim wildlife connections and corridors leading to other larger forested lands to the northwest of MPSP across Mount Philo Road. The forested land surrounding these 3 houses provide the necessary protective forest cover and remoteness for wildlife that might utilize these movement landscapes or corridors. Currently these areas have dense vegetation and little direct sign of the presence of humans.

The forest around houses # 6, 7, & 8 also provides the most immediate and protected access to the wetlands and stream courses to the southwest, including Bingham Brook and its associated wetlands. Wildlife movements between the MPSP area and Bingham Brook, and its associated wetlands and forests will be negatively impacted by the Krasnow subdivision. The presence of forest clearings, houses, lights, people, pets, driveways and cars, and other human-associated development will decrease the likelihood that wildlife, especially human-sensitive wildlife will venture into these areas.

Landscape connectivity is vital to the long-term persistence of wildlife and wildlife populations in Vermont. Landscape connections allow and facilitate the healthy exchange of genetic information through the promotion of more free-flowing breeding between individuals within different wildlife habitats. In the fragmented and people-dominated landscape of Charlotte, wildlife dies off as it is hit by cars, attacked by dogs, hunted, or subjected to disease and inclement weather. Habitats can temporarily lose wildlife species -- and as long as connections on the landscape are maintained -- they can be replenished from nearby habitats. Once these landscape connections are lost or continually degraded -- wildlife becomes locally extirpated as individuals either do not attempt landscape movements in the presence of human barriers or are injure, sometimes fatally in their attempts.

There is some connectivity habitat that connects the forested landscape on Kasnow's and the MPSP to wetlands and drainages and relatively small forested areas north across One Mile Road. The Applicant has provided a Nature Corridor of protected lands through the proposed subdivision. However this proposed Nature Corridor dead ends to the north in a backyard of an existing house. In the area of house lots # 1 & 2 a narrow open space corridor has been planned. This open space is largely north to south providing some continuity between the state park and lands to the north of One Mile Road, including hedgerows and wetlands. The location of this open space corridor has perhaps a better potential for facilitating wildlife movements than does the proposed Nature Corridor to the west.

Recommendations:

(1) The eastern open space should be widened to at least 300 feet to increase the open space's potential to facilitate wildlife movements to the north across One Mile Road. This enlargement along the Krasnow's southern boundary should be to the west (at least where it is south of Half Mile Road) to avoid the existing houses off of Mountains Edge Road.

(2) The house lots # 6, 7, 8 and their associated driveways and infrastructure greatly decrease the potential effectiveness of any landscape connections between the Krasnow's, MPSP and Kimball Brook and its forests and wetlands. Large forestlands are scarce in Charlotte and the landscape connections between them become more important in maintaining biological diversity as this forestland shrinks. The forestland on Krasnow's extends its furthest west here and provides the least distance connections to Kimball Brook. These houses should be eliminated or clustered in

such a way (perhaps all along the north property boundaries of their lots) that allows for the maintenance of open space (south of the houses) to allow wildlife movements east to west across Mt. Philo Road.

5. Maintenance of Ecological Processes

The presence of wetlands was noted in two different locations on the Krasnow property. The first wetland was located directly under the house lot # 8. The Charlotte SWHM shows Aquatic Habitat extending into the area. Field investigation revealed the presence of a wetland with cattails, blue vervain, dogwood, and many species of mosses located under house lot # 8.

Potential wetlands were also located in the fields to the west and just north of house lot # 8. There are driveways proposed in this area.

Recommendations

(1) All wetlands on the property should be have their boundaries delineated by a qualified wetlands consultant/biologist, and buffered by at least a 50 feet zone with no development. Charlotte's wetland maps generally do not include smaller wetlands within forested matrices, nor are they intended to show the actual on the ground boundaries. Wetlands boundaries are field identified as required by state and federal law.

Alternative locations for driveways should be considered out of wetlands, all Aquatic and Core Habitat. If wetlands must be crossed, crossing impacts should be minimized, over-sized culverts or bridges should be used, and vegetative management programs with the aim of facilitating wildlife movements should be implemented.

6. Rare Species Protection

There have been no rare species identified on the Krasnow property. The many rare species found within MPSP are associated with ledge habitats not found on the Krasnow property.

7. Representation

It appears that the majority of the Krasnow property is comprised of the Stockbridge and Georgia soil associations. These soils as noted in the Wildlife Report are soils that contain natural community types that are poorly represented by native vegetation in Charlotte. The wildlife consultant for Krasnow states only that houses, lawns, roads and driveways, and associated infrastructure will affect these natural communities -- the Krasnow's have not identified the total acreage of these human features that will negatively affect representation.

Recommendations

(1) The Applicant needs to document and total the acreages of human-associated alterations of the current land-cover so that an informed decision concerning the degree of natural community conversion on important soil types and natural community types can be made.

Small Scale Habitats and Features: Recommendations:

(1) Large dead snags, trees over 16" DBH with forks and cavities, and mast producing trees and shrubs should be identified and protected wherever possible. Trees should be marked and then protected by the landowner unless they pose an immediate hazard to the house or landowner.

(2) The Applicant or their Consultant should conduct at least 1 winter wildlife tracking survey to compile a wildlife species list.