Historic Overview-Natural Resources, by Skip Lisle November, 2013

Introduction

A small village in a valley, Grafton is the iconic image of Vermont. In addition to the work of some good carpenters, it is the product of topography. The Green Mountains, with their steep sides and tight valleys, predicated the location of most villages and ensured that they stayed small. An important part of Grafton’s appeal is this combination of lines: the straight ones of colonial architecture and the arcing skylines. The latter symbolize natural Grafton: the colorful, forested mountains, along with their associated valleys, streams, and wetlands. Along with the village, they are the foundation of good human habitat, and an important part of what has become a beauty-based economy.

Natural resource management and, more specifically, wildlife management, plays an important role in protecting these values. As wonderful as the aforementioned natural features are they would be stark and sterile without the animals that live in them. The human spirit is nurtured and restored by proximity to, and interaction with, other species. Sometimes our bodies are, too, when animals such as deer, turkeys, or brook trout are taken for food. Moreover, when we manage our forests and waters to optimize wildlife productivity it often improves the esthetic quality of the landscape, while translating into cleaner water and more stable, flood-resistant streams and rivers. Management includes identifying and countering threats that would degrade ecosystems and the health and beauty of the landscape. But it also offers opportunities for proactive improvements. The exciting thing about ecosystem, or habitat, management is that there are many things that can be done to make a town like Grafton even more productive. Some of these goals can be accomplished directly through town-government policy. But the greatest opportunity for improvement is likely to be realized via education, and the encouragement of good stewardship practices on private land. The first step in the planning process is to understand the ecological history of Grafton, the different habitat types here, where conservation efforts can make the biggest difference, and where threats exist. This plan cannot address every corner of Grafton or all its ecological zones equally. Forests, for example, will not receive attention commensurate with their status as the dominant physical feature of the town. This is because they are generally in good shape, are unthreatened by the activities of humans here, and have few features (e.g., a patch of old growth) that make them different from much of the rest of Vermont. The greater focus will be on unique landscape features or qualities, and rare, productive, sensitive, or native habitats and species.

History

The modern ecological history of the land we now call Grafton essentially began with the retreat of the glaciers roughly 14,000 years ago. Throughout time Grafton was predominantly an unbroken forest of large trees. From above, small, scattered beaver flowages would have been the only distinguishable landscape feature. A function of topography, water would have traveled the same streams it does today. For over 98% of this time Grafton was unoccupied and uninfluenced by humans. A new and very different history began with “contact”: the arrival in the 1600s of European settlers in North America.

Until recently, beavers were likely always part of the post-glacial landscape. In normal times, their predictable habitats (basins on small streams) are permanently or intermittently occupied, and dams are maintained or re-built. We do not have trees that can grow in standing water, so flowages become distinct, open patches in the forest. Roughly between the late 1600s and 1950 beavers were extirpated. Early in that process, flowages drained and became forested. Perhaps some specialized plants and animals dependent on these habitats were extirpated or became extinct (the New England bulrush barely survived). Fortunately, beavers have recently returned, drowning the tree interlopers and re-establishing their forest openings.

Relative to pre-contact history, and following centuries of heavy human activity, our forests today are less dense, both horizontally and vertically. They are also structurally different because of heavy cutting, tree-species loss, and, as we are beginning to see, the invasion of exotic plants. Furthermore, trees are much smaller (average diameter and height) and less widespread. Changes in streams have mirrored changes in the forest. Streams are now more open and contain less woody debris. This is because we continually “clean” forests and riparian areas by removing the larger trees before they have the chance to become blow-downs, substantial sources of shade, or dead snags. We also have a habit of using excavators to directly clean woody debris from streams following floods events.

Pre-settlement streams would have looked much different. Shrouded in tall, dense forests, and with a significant component of large fallen logs in them or over them, they would have been great trout habitat: structurally complex, highly shaded, cold, and flood-damage resistant. From a bird’s eye view they would have been virtually invisible.

In contrast to our forests and streams, the physical structure, at least, of today’s beaver flowages is probably about the same as it was 10,000 years ago. Caused by the Fur Trade, the predominance of standing, dead timber found in them is a new feature, but it won’t be around for long. Flowages are also in the exact same spots as they were historically. Beaver flowages are the one remaining feature that offers us a glimpse of how things looked in the ancient landscape.

Historically, the forests, streams, and beaver flowages of Grafton constituted a stable, rich ecosystem. An untold number of species had had a vast time period to adapt to this environment, carving out thousands of unique ecological niches without major anthropogenic disturbances. As a balanced, species-rich ecosystem, our forests were at their peak when we arrived. Since then, they have declined as we have managed and manipulated them as simple crops to be harvested. Since contact, the harvest has taken on two forms: forests have been entirely cut periodically, or partly cut steadily. It’s mostly an economic distinction between large, intermittent payments and smaller, consistent ones. Neither emulates natural processes in our ancient forests. “Scientific” tree-crop management in Vermont is only about 60 years old, representing less than one half of one percent of forest history.

Virtually all of Grafton’s small acreage of wetlands has always been created by, and dependent on, beavers. Therefore, the age-old ecological stability of our ecosystems was first shaken by the loss of these, our richest habitats. Victims of the Fur Trade (ca. 1600-1900), beavers were extirpated from most of the Northeast shortly after Europeans arrived. Unmaintained, beaver dams decayed and wetlands drained. In following decades, (and for hundreds of subsequent years) these small, sundrenched patches with rich soil were rapidly colonized by trees, probably for the first time, and ceased to exist as distinct landscape features. This obviously had a devastating effect on the hundreds of species that were dependent on these crucial habitats. An historical anomaly, the large, standing, dead (drowned) trees common in flowages today are testimony to the arrival of Europeans and the return of beavers hundreds of years later.

Beginning with the appearance of the first Euro-American settlers in Vermont during the 1700s, the next big change was the removal of the ancient forests for wood products and to create fields. Continued heavy cutting, and widespread grazing by sheep, retarded forest recovery during the 1800s. In the early 19th century, Grafton’s population peaked at around 1500. Not entirely coincidentally, this was also the nadir of the town’s wildlife population. To name a few examples, beavers, wolves, mountain lions, moose, fishers, and turkeys had been extirpated. Countless other species, especially wetland-dependent ones, would have been rare at best. Waterfowl like wood ~ 86 ~ ducks, hooded mergansers, and Canada geese may have been present only as they flew by while migrating.

In addition to the high human presence on the landscape, there was little in the way of a conservation ethic in early Vermont and America. Furthermore, no regulatory authority existed to limit the volume of killing, or the type of animals being killed. As conditions improved over time, however, many of our wildlife populations had nowhere to go but up. With an exodus of much of the human population (a 75% reduction between 1840 and 1940), with legal protection beginning for some species around 1900, and with our forests and wetlands recovering during the last century, we have enjoyed a return of many native species and a substantial growth in overall wildlife populations. Notable exceptions are wolves, mountain lions, and now-extinct animals like passenger pigeons. (Coyotes have moved in to partly fill the vacant, large-carnivore niche.)

In today’s Grafton, humans are far fewer and less widespread than they were 175 years ago. Perhaps, this is best symbolized by the collection of cellar holes, which are all that remain of the once thriving community of Howeville (mid-way up Howe Brook in west Grafton). Although we now only number in the hundreds in Grafton, it is still a human-dominated landscape. We are surrounded, in southeastern Vermont, by tens of thousands of our fellow hominids. Though we think of it as rural, Grafton lies within a matrix of dense human activity.

Ecosystems of special value

If Grafton’s unique, rare, or highly productive ecological features could be simplified into three words they would be wildness, streams, and wetlands. Wildness, or lack of development (usually houses), is a relative term. Compared to northern Maine, there is no wildness in southern Vermont. But relative to the rest of southeastern Vermont, there is a great deal of wildness in west Grafton. Thanks to the 19th century abandonment of Howeville and a number of houses in east Windham, very rugged topography (particularly in Grafton between Burt Hill and Roundy Mountain), and numerous property owners whom have protected their land from development, there is a large tract of wild land in west Grafton and East Windham. Call it the Grafton-Windham Wildlands (GWW). It runs from the Popple Dungeon Road north of our border with Chester to south of our border with Townshend. On the east, it is bounded by the Old Stagecoach Road, Cabell Road, Hinckley Brook Road, and the Townshend Road. Except on or near this road axis, there are no houses for about three miles to the west, encompassing an area of approximately 23 square miles, or 15,000 acres. The only road that runs through the GWW is Route 121, which is dirt, undeveloped in Grafton west of Houghtonville, and lightly traveled. Other than this, the only major “disturbance feature” in the GWW is the north-south power line that runs through it.

The Townshend road is not that busy or densely populated, so for all practical, wildlife-movement purposes the GWW attaches to another large, undeveloped piece of land: Athens Dome (including Bear Hill) in south Grafton and northeast Athens. The Dome has been recently recognized for its ecological importance. Part of this area was just purchased by the state largely because it harbors the New England Bulrush, an extremely rare plant that depends on the presence of beavers for its survival. The Dome has dozens of miles of hiking trails, which begin in Putney. A natural extension of these would take them through the GWW, perhaps terminating in Londonderry.

The GWW is a special feature of Grafton. Even without including the greater Bear Hill ecosystem, the majority of it is in our town. And almost all of its water drains through the Village on its way to the Connecticut River. As a preserved natural area managed for wildlife, hunting, fishing, snowmobiling, hiking, and skiing, it has tremendous potential value to Grafton, Windham, Townshend, Chester, Athens, and the state of Vermont.

Streams

Streams are not a rare feature in Grafton, or Vermont. However, “pristine” ones are. Many of Grafton’s streams do not fit this definition because of the presence of human structures, particularly roads, in their watersheds. Most of our streams essentially parallel roads—Cabell, Hinckley Brook, Eastman, Anderson, Route 121, Townshend, Otis, Four Chimneys, Turner Hill, and Fisher Hill. In these locales, the streams are intermittently degraded by massive erosion and deposition events when the roads wash-out during floods. Along with many other species, the habitat of an important game animal and food source, the brook trout, is hurt by this “instability.” Other streams (e.g., Hall Brook) do not parallel roads, but intersect them at several places. These bridge, culvert, and road points are classic sources of pollution from erosion, road salt and sand, and various other artifacts of human and motor vehicle use.

Only three of our major steams might be considered pristine. Shared with Townshend and Windham, they are the Stiles, Willie, and Howe brooks. These streams are closely related: they are long, parallel each other, flow northwest to southeast, and take sharp, northeast turns when they reach the south branch of the Saxtons River. The watersheds of these streams, which drain from the “Grafton-Windham Wildlands” (GWW), are undeveloped and mostly forested. The biggest exception to this is the power line, which nevertheless is largely “vegetated.” Together, they represent about nine stream-miles without any significant roads (just narrow, rarely used ones: logging roads, and the power line’s maintenance road) that either parallel or intersect them. As relatively small streams, they also were not, throughout most of their length, badly damaged by the massive floods we have had in recent decades. By contrast, our largest streams—both branches of the Saxtons River, and the main stem as it drains east—have been deeply scoured by the floods and subsequent work to clean them up with excavators. Consequently, the Saxtons River, once an excellent trout stream, is now a relatively sterile and structurally impoverished habitat.

Headwaters

Small, headwater streams are unique habitats that host some sensitive, highly specialized species like the dusky, two-lined, and spring salamanders. These animals require very stable, clean, cold, relatively steep, highly oxygenated, and largely fish-free streams. Streams with these characteristics typically begin on mountainsides and have watersheds that are road-free and fully forested. These habitats can be found in many sections of Grafton, but, not surprisingly, most examples are in the undeveloped west. The craggy mountains southwest of Houghtonville are particularly dense in streams of this nature. Here, there is a rare example of a headwater stream that is over a mile long.

Wetlands

The town government is not in a position to directly do much habitat improvement work. However, there is an exception. Beaver-dependent, most of our wetlands occur on small streams in valleys, and near roads. Therefore, depending on how they handle conflicts with beavers—lethal or non-lethal— Selectboards can have a big influence on the health and productivity of these rare ecosystems (1-2% of the landscape).

Outside of small, manmade ponds, beaver-created wetlands, or flowages, are also the only water bodies in Grafton. Looking from high above (Google Earth), Grafton is distinctive for its lack of lakes. Zooming in, the first to appear in the region are Athens Pond and Lowell Lake. As the elevation decreases a bit more, small, scattered beaver ponds begin to appear. Even during dry periods, Grafton contains an enormous amount of water, but most of it is not ponded; it is on the move, in streams.

Beaver wetlands, or flowages, support a remarkable density and diversity of life. They are great hunting, fishing, wildlife viewing, and environmental education areas. Flowages also abate flood damage. They act like giant sponges, holding vast amounts of water during floods, and then releasing it slowly over subsequent weeks.

The history of flowage loss in recent centuries is an important reminder of the ultimate ecological consequences of modern road-defense policies that permanently extirpate beavers.

The good news is that by using flow devices, or Beaver Deceivers, the town has already non-lethally beaver-proofed almost all of its conflict points (mostly culverts in low-gradient areas). In addition to eliminating the need for the road crew to endlessly clean culverts with machinery, this policy has ensured the survival of many roadside wetlands and prompted the growth of others. These wetlands are a great attraction to walkers, bikers, and drivers who frequently stop there to view wildlife and the beautiful panoramas from the convenient platforms provided by the roads. The ecological and economic (much longer lasting remedy than killing) salience of flow devices is becoming widely accepted. Nevertheless, Grafton is well ahead of the curve. There is probably no other town in northern New England that has such a thorough and effective program. There is a small line item in the budget for this program (perhaps another first). This is important to retain, at least in the near future.

Vernal pools

Vernal pools are small, fishless water bodies required by specialized species like fairy shrimp, spotted salamanders, and wood frogs. Beavers create a lot of these habitats when they build dams in streams and depressions too small to support fish. Many of our little manmade ponds, including abandoned quarries, also serve this function. Other vernal pools in Grafton occur as small basins in the woods. This latter variety is extremely rare, which increases its importance. Even though they sometimes dry out in the summer (or perhaps for that reason), vernal pools teem with life.

Watershed Management

Vegetation, particularly trees (forests), is important to the integrity of watersheds. As with wetlands, forests soften the flood potential of heavy rains by acting as sponges and reducing run-off rates. They also help to hold the substrate in place, mitigating erosion. By comparison, in suburban areas with lots of un-vegetated surfaces like roofs and pavement, rainwater flows over the landscape rapidly generating much higher peaks of destructive energy and erosive potential.

Roads are the major component of our un-vegetated landscape. Barren and instable, they often contribute to flood damage and reduced stream quality. As we have witnessed for decades, many of our roads simply disappear during floods. By eliminating vegetation and shade, and as a relatively new landscape feature, roads also act to raise the temperature of streams above historical norms. Because people often settle along roads, they are also associated with fields and houses, which further contribute to water warming. This affects sensitive, cold-water species like brook trout. Most of our roads are a fact of life and aren’t going away. But because of these negative ecological effects, new roads should not be constructed unless they are relatively short, narrow, well designed, and, ideally, situated away from hillsides. Furthermore, old roads should be retired when the opportunity arises. Steep, dangerous, difficult to maintain, along a stream, and uninhabited, the upper portion of the Turner Hill road seems to offer one possibility.

Forests

It is not coincidental that our region is called the Green Mountains. The forests are lush. As a vegetative unit they have proven incredibly robust over the centuries. Seventy percent of Vermont was de-forested 100 years ago. As evidenced all around us, the forests have recovered rapidly from the heavy cutting and browsing of the past. No matter how badly we abuse them locally, our forests are “sustainable.”

Today, direct, local, on-the-ground human activity does not threaten our forests. However, indirect human activity elsewhere—the introduction of exotic pathogens, insects, and plants to North America—does. This has already caused the loss, largely or completely, of butternut, elm, and chestnuts. Other exotics, including wooly adelgid (hemlocks) and emerald ash borer, are presently infesting the forests of the Northeast. Unfortunately, there is likely to be a constant onslaught of these types of foreign invaders in the future.

Early successional habitats

Managing for rare habitats is a great way to increase productivity and species diversity. Grafton’s landscape is dominated by fairly homogeneous, mid-aged, selectively cut forest. Fields come in a distant second in total acreage, followed by wetlands. Shrubby habitats, or early-successional forests (ESFs), are extremely rare, as they would have been in the ancient forests (they would have occurred mostly in and around beaver flowages). ESFs are very important to a wide variety of wildlife. As one indicator, they are often thick with bird’s nests (e.g., yellowthroat, yellow warbler, catbird, cedar waxwing, and robin), which become more evident as leaves drop in the fall. Un-shaded by large trees, these habitats receive a lot of sun near the ground layer. They are thick and produce much food in the form of insects, berries, and browse. They are particularly important to game animals such as bear, deer, moose, snowshoe hare, partridge, and woodcock.

In the early to mid 1900s shrubby habitats were widespread in Vermont. This was the result of the state being mostly clear-cut in the previous century, followed by economic changes that prompted a large-scale population exodus. The abandonment of farms meant less cutting, mowing, and browsing by sheep and cows. The “shrubiness,” and the absence of people and posted signs, temporarily made Vermont a mecca for bird hunting (partridge and woodcock). But the trees kept growing upward, shading out shorter plant species. Now shrubby habitats have largely disappeared along with many hunting opportunities. About the only place in New England where there is still good partridge hunting is in northern Maine where large-scale clear-cutting has resulted in a lot of ESF. Unfortunately, clear-cuts have developed a negative connotation. Because of the vigor of our plants and forests, however, they are a short-lived phenomenon; they soon support a lot of vegetation and impressive populations of game animals and other wildlife.

There are two ways to create ESF: by clear-cuts or by letting fields grow up. It is something to consider if one enjoys high densities of wildlife. As noted earlier, wetlands are rare and important habitats. In Grafton, they are almost exclusively dependent on beavers. Beavers, and their wetlands, do not persist without beaver food. Because of predators, beavers do not range far from their wetlands to gather food. Therefore, the best place to stop mowing fields, or to make small clearcuts, is beside beaver flowages. There, all the multiple-species benefits of an upland ESF are realized while also stimulating the growth of hardwood food for beavers. This indirectly creates or protects wetlands, which support a whole different guild of wildlife. The ideal species to grow is the one with the most nutritional value for beavers: aspen, or poplar. In addition to providing a lot of sunlight, the key to getting good aspen regeneration is to rake, or rough-up, the substrate by hand or with machinery to stimulate the roots. Another way to improve beaver habitat without clear-cutting is to kill the generally less preferred evergreens in order to favor hardwoods.

Because of our narrow valleys and great topographical relief, our beaver flowages are relatively few in number and small. A short wetland perimeter makes it even more difficult for beavers to sustain themselves, particularly in winter when they need stored forage gathered from the upland. Given the value of beavers to wetlands, this increases the importance of human activities that might improve beaver habitat around flowages. Therefore, while a forest-practices buffer is a good idea along streams, it would be ecologically harmful around flowages. Moreover, in the event of human-caused erosion, which is unlikely, flowages are the greatest sediment sinks in nature.

Fields

Most Grafton fields are in valleys, and most of that acreage is along the Townshend Road. The “leading edge” of the Athens Dome, this is a remarkable feature. The longest and straightest valley in Grafton, it’s essentially five miles of fields. From 100 miles above the Earth, this “white” line is the first recognizable geographical feature in Grafton. [Equally as straight, the second longest and most distinctive valley (forested) in Grafton hosts the Willie Brook, and forms a perfect “V” with the Townshend Road valley.]

Fields are important economically, as they often feed cows and goats, which translate into milk, cheese, and fiber. And although not native habitats, they are also important for wildlife. Flush with plants and insects during the growing season, fields are used by grazers and insectivores like deer, turkeys, and geese. Some bird species also nest there. And fields support a wealth of flowers and pollinators. With this in mind, it is important not to cut fields, unless they are being used for hay, until late in the summer. Ecologically, it would be even better if they were only cut every second or third year (trees don’t come in that fast). On an even more relaxed schedule, they could be cut, with different tools, every ten or twenty years, thus producing important early-successional habitat. The recent “loss” of a tiny amount of forest to flowages is really no such thing: it is the return of the landscape to the way it always was. Similarly, the much greater loss of fields to forest over the last 150 years represents the same pattern. When trees invaded flowages they were essentially exotics in those habitats; when they move into fields they are reclaiming ancient habitats. Nevertheless, the field forestation trend seems to have stopped. Total field acreage in Grafton has stabilized. Presently, our remaining fields are not seriously threatened by development.

Extirpations and exotics

Modern humans are often smug about our embryonic “scientific” management of the natural world. Mostly for selfish reasons, we have made improvements lately. But, overall, our post-contact history has not been fodder for over-confidence.

Ecological “nativeness” is an important concept to understand, and a valuable landscape condition to protect, if possible. Native species and ecosystems in Vermont at the time of contact had evolved undisturbed by humanity for 14,000 years. Because of subsequent events, this represented the apex of ecological health, stability, and species diversity in the region.

Historically, ecological isolation resulting largely from oceanic barriers allowed different parts of the world to establish unique ecosystems. The intercontinental mixing of species began to accelerate as ships, and then planes, became common, rapid modes of long distance transportation. Exotic species often overwhelm native species and ecosystems, which have not had time to develop defenses against them. Two recent examples are white-nose syndrome, which kills bats, and Eurasian buckthorn, which competes with native plants, and is presently spreading rapidly across Grafton.

In addition to introducing many exotic species, we have also had the effect of one. In recent centuries, humans—a none-exotic species in post-glacial Vermont (but not in pre-glacial North America)—arrived en masse in the Northeast, in a new cultural form, and this time from the west end of Eurasia. Their numbers, technologies, and the new economy they introduced, have had the full effect of a foreign, exotic agent. This began with the direct and thorough killing of native species (e.g., wolves, mountain lions, and beavers), continued with habitat destruction [e. g., wetlands, forests, rivers (dams blocking salmon, shad, and others)], and has always included the intentional or unintentional introduction of actual exotic species.

Thus, Grafton’s native ecosystems have a 400-year history of threats from abroad. The Fur Trade destroyed the wetlands for almost two centuries, and nearly eliminated them permanently along with beavers, bulrush, and dozens of other species. Conducted on behalf of the European market, and by newly arrived Europeans (with help from Indians), this event was not unlike a foreign pathogen that specifically targeted tens of millions of beavers across the continent. Wolves and mountain lions are still missing from Vermont because of the same outside force.

There were Vermonters in Vermont for perhaps 10,000 years before the people who now consider themselves natives arrived. But no evidence has been found that Indians ever had permanent settlements in Grafton; it is more likely that they would just pass through occasionally—probably along the Saxtons River and its two main branches in Grafton—or stop to briefly hunt, fish, or gather food and other products from the forest.

Because of their low densities, the nature of their economy and technology, and our wet, fireresistant forests, Indians did not greatly alter Vermont’s ecosystems. Although they were probably not innately better stewards than the latter human settlers, Indians never dammed the rivers, treated the forest as just a crop for wood products, or saw beavers as only a form of money (until the Fur Trade). They survived here for thousands of years, as did native ecosystems, without the need for science to manage resources sustainably to maximize yields and profits.

Modern exotic invasions may be a phenomenon that is largely impossible to halt. Therefore, our ecosystems are likely to change a lot in coming decades. We may have to accept these species as “new natives.” At any rate, it is a problem that is much bigger than any one town. State and federal governments are taking the lead in developing policy and responses.

Future developments

On a local level, environmental or ecological threats are usually associated with development. In its typical usage, and as it relates to Grafton’s history, development is symbolized by buildings and the roads that service them. Buildings used to correlate with “resident population” and “human activity,” but that is less true now given the second-home trend. Houghtonville, for example, has lots of buildings, but a light human footprint (few resident adults, no children, one cat, no dogs). In the absence of a catastrophic event that drives people into the countryside from our east coast cities, it does not appear that there is going to be a significant increase in Grafton’s population, and traditional development, in the near future. The American and Vermont economies continue to struggle, and jobs here are hard to find. Moreover, part of the reason Grafton has never been threatened by serious development is because it has so many steep-sided mountains, which are difficult and costly to build on.

Roads

Roads are generally harmful to wildlife. Even in Grafton, vehicles kill a great number of mostly small animals each year (at least scavengers such as crows, foxes, and coyotes benefit from this easy-to-acquire protein). Nevertheless, our roads are not busy enough, particularly late at night, to be significant barriers to wildlife movement. Although fairly narrow, roads are long, and hence remove thousands of acres of wildlife habitat from the balance sheets. Also, our busier, paved roads receive a lot of salt in winter, which has a negative effect on freshwater ecosystems. (A policy issue the Selectboard might be able to improve upon.) Roads are also unstable. During floods they often wash away, helping to degrade streams.

As important human travel corridors with coincidental services—road care, electricity, phone, cable—public roads also attract houses, or development. Whether this is bad for a town’s wildlife depends largely on how the humans choose to live on the land, where the building takes place, the density of buildings, and whether there are large wild areas available away from settlements.

Knowing that development is likely to occur along roads means that we should identify wild sections of roadway that we might want to keep that way. Route 121 west of Houghtonville is a perfect example of such a spot. It has wonderful wild, undeveloped, and scenic mountains on either side of it, which are also great bear habitat.

Houses

Over the course of any given decade, humans work on, hunt in, or otherwise pass through most individual acres in Grafton. Therefore, when considering the effects of humans on wildlife we are usually thinking more specifically about core areas of human activity as represented by houses, or groups of houses.

Nevertheless, houses, and the people in and around them, are not necessarily harmful to wildlife. They may even be beneficial if the surrounding land is managed for wildlife habitat, if measures are taken to reduce bird kills on windows, if domestic cats are kept inside, and if domestic dogs remain relatively quiet and close. The “dog disturbance” factor can keep animals threatened by canid predators, such as deer and bear, from using a habitat (functional extirpation) even if it is very good. In addition, people often improve one aspect of habitat by feeding a lot of wildlife—deer, turkeys, gray foxes, chickadees, etc.—around their houses.

Houses can become much more wild-animal friendly if residents happen to have an understanding of wildlife and a stewardship philosophy. Because many people are not aware of how to protect and encourage wildlife, big gains are possible through education.

Even at their noisiest and least wildlife-sensitive, houses are primarily avoided by large animals like bear, deer, and moose. And there are even exceptions to this rule, as when animals are particularly hungry, when there is an extremely rich food source (e.g., bears and garbage, bird feeders, and bee hives), or when an animal is suffering from loneliness and separation anxiety and wants company (sometimes yearling moose).

Buildings become a greater ecological issue when they occur at a high density over broad areas. They then might act to extirpate dangerous species, like bear and moose, which can’t be tolerated (otherwise, they might even use these areas more frequently), or species that need thicker or more widespread vegetation to hide from predators or acquire food. However, following hundreds of years of settlement, Grafton has yet to become thickly covered with thousands of buildings. In our mountainous, difficult-to-build-in landscape far from major urban centers, widespread house development apparently faces natural and economic constraints. Presently, few species are hurt by Grafton’s house density, or house locations.

There is another possibility, however: big, extirpated, native species that may someday return. The wolf and mountain lion, both species that tend to avoid humans and occupy large territories, might be able to make use of the wilder parts of the region, including, if they stay that way, sections of Bear Hill and west Grafton.

Houses, and their absence in wild areas, are mostly an issue for our species. Humans enjoy the ability to get away from their own kind. This fact lends tremendous value to large, undeveloped pieces of land, particularly in an area of dense human presence like southeastern Vermont. For example, one cannot hunt too close to houses and roads, and large tracts of undeveloped land tend to get posted less often than small parcels near houses. Some deer hunters also prefer to cover a lot of ground, and need the space to track their far-ranging prey. Bear hunting, particularly with hounds, is also less likely to stir resentment when conducted away from houses. And moose generally select large undeveloped tracts of land, particularly if there has been a lot of cutting by humans that increases browse.

Many hikers, cross-country skiers, and snowmobilers also like to get into “bigger” country, away from civilization.

Ridgeline development

The most important and widespread component of the viewscapes of Vermont are its mountains. In the anatomy of a mountain, the skyline may offer even greater value to esthetic sensibilities than do mountainsides. In a mountainous community like Grafton, whose quality of life and economy is defined by its natural beauty, the skyline is a precious commodity. Relative to valleys, or even hillsides, towers, houses, and clear-cuts on ridges are widely visible, disturb the natural skyline, and have a disproportionately negative effect on the scenic value of an area. Mountaintop development also requires new roads to be built up mountainsides. In a town already prone to massive flood damage, this has significant water quality and habitat implications.

Grafton still has a lot of relatively wild, undeveloped country simply because it is so mountainous. Even within different parts of town, population density drops as the terrain becomes more rugged. Because they have always resisted development, the mountains are a refuge, particularly for larger, shyer (in most instances, and particularly during the hunting season) animals like moose, bear, and deer. Mountains are also a refuge for naturalists, and the more “wild” among us. For hunters, they also represent freedom from human confines, and areas where rifles can be used safely.

Ridgeline development has been a minor issue in Grafton so far. There are few towers and clear-cuts on mountaintops, and most houses are in valleys or on hillsides close to long-established roads. But perhaps future improvements in off-grid technology, a robust economy, or a growing local population would make traditional development more attractive on mountaintops.

Industrial wind

An industrial wind development (IWD) is proposed for approximately 5000 acres in southwest Grafton and east Windham near our border. This is a controversial subject that many would prefer to ignore, but it would be irresponsible not to address it here.

Although the developers have been vague on the subject, it might include 30 or 40 towers placed on nearly every mountaintop in the area. Roughly 500 feet tall (the technology is dynamic; recent industry trends are for towers to continue to grow in size), the towers would be about the same height as the average mountain in Grafton. For example, the vertical rise of the south end of Spring Hill from its base just east of the Cabell Road is 433 feet. Even the diameter of the blades of some of the larger turbines can exceed this. These towers will dominate Windham’s skyline, but they will also be visible from almost every mountaintop in Grafton, and many lower elevations. This would harm our visual resource, an important component of our economy.

The tops of the mountains would be blasted off and replaced with enormous concrete pads to support the towers. Relatively large roads would have to be made to deliver the tower components to the top of each mountain, and thereafter be used to maintain the structures. This level of development would greatly affect the waters of Grafton, and do so far more than those of any other town. Virtually the entire project watershed flows through the whole east-west width of Grafton from the Windham border to Cambridgeport. Every drop of this water passes through Grafton Village, mostly via the Townshend Road valley, but also through Houghtonville. We have repeatedly seen what happens to Grafton’s roads, private properties, and streams during major flood events. By replacing hundreds of acres of forest with concrete pads and roads, erosion, run-off rates, and water temperatures will increase, damaging our aquatic ecosystems in the west and south branches of the Saxtons River, the Styles, Willie, and Howe brooks, and numerous small, nameless headwater streams.

Because they are relatively small, the Three Sisters were not, throughout most of their length, badly damaged structurally by the massive floods we have had in recent decades. By contrast, our larger streams, like both branches of the Saxtons River, and the main stem as it drains east, were deeply

scoured by the floods and subsequent work to “clean them up” with excavators. Largely because of these events, the Saxtons River, once an excellent trout stream, is now a relatively sterile and structurally impoverished habitat.

Over the decades, the owners of the property where the wind development is proposed have been generous and never posted their land. However, once the towers are in place it is quite likely that most of this 5000-acre parcel will forever be closed to traditional uses like hunting. The audible and inaudible (infrasound) noise the windmills produce can badly affect human health, and may functionally extirpate some wildlife from the areas around them. Planes have to be warned of these towers, so they will be lit up, and blinking. Both the sound and the light these towers produce is rightfully considered environmental pollution.

The spinning blades of the towers, and the pressure differential they create, also kill bats. Many of our bat species in Grafton and Vermont are already in deep trouble because of white-nose syndrome. This is a disastrous time to introduce new bat-mortality factors. With potentially harmful results for mankind, the loss of bats would remove the entire nightshift of our most efficient insect and mosquito eating fauna. In addition to bats, the US Fish and Wildlife Service has estimated that over 500,000 birds are killed each year by industrial wind towers in the United States. Acquiring energy from wind, a natural resource, is a great concept. And there may be areas of our country well suited to IWDs. There may also be locales where they would not hurt wildlife and local ecosystems. But this is not one of them.

The proposed IWD is supported by many well-meaning people. The towers are seen as a way to improve the entire Earth’s ecosystem, of which Grafton is part. However, an IWD in Grafton and Windham, no matter how big, would be incapable of achieving that outcome.

Conclusion

We live at a time in history when our natural resources, ecosystems, and wildlife populations in Grafton are far healthier than they were 150 years ago. This is partly because fewer people live here now. But it is more the result of a collective mindset that is more enlightened and has an improved awareness of the economic importance of a healthy, productive, and beautiful landscape. Nevertheless, we can continue to make improvements in Grafton’s ecological wealth. We still face threats, but most emanate from other states and continents. Although we have generally done a good job preserving our natural heritage recently, we must always remain vigilant.