

**The Northern Rockies Ecosystem Protection Act and Vermont:
Values, Applications, and Impacts**

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EC465 – Final Draft
22 November 2002

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All across the United States humans and other animals are being confronted with a dark scenario. As George Ledec of the World Bank explains, “Human activities in the last quarter of the twentieth century are reducing biological diversity at a rate that may be unprecedented in the history of life on Earth. It is impossible to assess, with our limited knowledge, the consequences of the disappearance of species for the stability of Earth’s environment or the economic value lost because of extinction.”¹ Habitat fragmentation, overuse of resources, pollution, and development have played a role in this loss of biodiversity in recent years.

Land management plans in the northern Rocky Mountains and in other natural places have been less than successful in preserving economic and biological value. Certainly, much progress has been made in conserving wild areas in the United States, but more can be done to care for the integrity of the resources at our disposal. Fortunately, great strides have been made in the fields of environmental economics, conservation biology, and land management. Research has begun to reveal new facts and shape new plans for defending the land and its dependents. In addition, academics and theorists continue to define concepts of value and worth as they pertain to natural places.

Out of this research has come groundbreaking legislation from the U.S. government. From the 1964 Wilderness Act, to the Endangered Species Act of 1973, to the recent protection of the Arctic National Wildlife Refuge in Alaska², Congress has acted to improve conditions for our diminishing resources, both flora and fauna. The opportunity has presented itself to evaluate both

¹ Ledec, p.7

² www.epa.gov

how we conceive of wilderness and how we benefit from it. Furthermore, an answer to these questions will lead to a better plan for managing wild and natural places. This plan will be developed in the context of the Green Mountains of Vermont, based on the principles created in the pre-existing research and legislation. Examples will be taken from work by well-known conservation biologists and economists, and from proposed legislation for the Northern Rocky Mountains.

In the last ten years, a lesser-known bill has been debated in Washington, a bill that some believe represents the next evolution of environmental legislation. In its current form, the bill is called the Northern Rockies Ecosystem Protection Act (NREPA). NREPA is an extremely progressive and far-reaching program that undertakes the management of natural areas in several northwestern states. The bill incorporates many new and current ideas for land management.

An important part of NREPA's groundbreaking system is how it helps human beings. The economic strength of the northern Rockies region is a major focus of the bill. As is the case in any conservation movement, the balance between economics and biology is crucial. Popular convention often pushes us to believe that economic growth and environmental protection are mutually exclusive. But as we shall see, "not only does protecting our natural landscapes not damage local economic vitality but such protected landscapes often are associated with enhanced economic vitality."³

NREPA recognizes this fact, as the bill allows for job creation, tax savings by the federal government, and improved value of natural resources in the region. The critical balance between economic and biological integrity can be maintained. And if NREPA can provide benefits to both the human and animal communities in the northern Rocky Mountains, could such a plan be applied elsewhere? The purpose of this paper is to discover the answer.

³ Power, *The Economics of Wildland Preservation*, p.4.

This paper is divided into four primary sections. The first section discusses contemporary conceptions of value and their importance in conservation policy. The second section outlines the history and geography of NREPA, and explains the critical components of the plan that will be applied. The third section develops a plan in the context of the Green Mountains of Vermont, based on the principles defined in NREPA. The final section investigates the impacts of such a plan, and attempts to incorporate the values discussed in the first section. Examples will be taken from work by well-known conservation biologists and economists, and from the proposed legislation for the Northern Rocky Mountains.

Traditional notions of wilderness and nature in general conceive of two distinct categories of value. On one side we have value that can be quantitatively estimated; on the other side we have more “vague” values relating to aesthetics, recreation, and other benefits. While this distinction is not an invalid one, much progress has been made in defining values individually, as well as their uses in economics.

Holmes Rolston goes so far as to explicate every defined individual value of nature⁴. He names the following: market value, life support value, recreational value, scientific value, genetic diversity value, aesthetic value, cultural symbolization value, historical value, character building value, therapeutic value, religious value, and intrinsic natural value. Clearly every one of these types is fully anthropocentric, save the last. In every other case, we relate the value of a natural object to ourselves and to the benefits we receive from its use. This is a natural human tendency, and as we shall see, the presence of intrinsic value in nature is still under debate. Since we relate these values to ourselves, then, an economic analysis of them should be possible. But this can be very difficult, and even if such a comprehensive estimate were arrived at, some would say that we still did not have a complete picture of the value of wilderness.

In order to simplify, we might say that Rolston’s first type, market value, is the traditional, quantitative concept of value described above. The remaining types are part of the more vague

⁴ Rolston, p.27.

category of value that cannot be as easily estimated or accounted for. This poses a conspicuous problem. We can say that an individual derives value from the religious experience she has in relation to a natural place. But is it possible to quantify that value in monetary terms? Rolston suggests, as have many economists, that such an estimate is possible in some cases. He focuses on recreational value for potential quantification.

Some factors of recreation value are simple enough to determine, as “it costs something – gas, meals, lodging enroute, fishing licenses, gear, campground fees”⁵ to access wilderness. But suppose we were to aggregate those numbers over every visitor to a particular area. Would this give us the recreational value of the place? Rolston suggests a contingent valuation method. If we can determine what users of a place are willing to pay to maintain the opportunity to use it, we can get a better idea of the true recreational value.

An important point here is that this “willingness to pay” is not a derivation of value for wilderness. It is simply an indication of such value. As Mark Sagoff explains, willingness to pay “is not a value or definition of value or a reason to value anything.”⁶ We can then use this same technique to estimate aesthetic, religious, historical, or any number of other values. This is a simple enough proposition in theory, but difficulties arise when attempting to undertake an actual estimation of such values.

As Rolston explains, not every type of value is as easy to estimate as recreation. “As values grow intangible, social and ecosystemic, the individual’s capacity to price them becomes progressively poorer.”⁷ If a survey respondent from Georgia were required to price the character building value of Glacier National Park in Montana (and part of the NREPA plan), he would have little context or experience to do so. But does that mean that the value for him is zero? This would entail that only those with experience of a place can conceive of a value for it, at least in monetary terms.

⁵ Ibid, p.32.

⁶ Sagoff, p.147.

⁷ Rolston, p.35

Such a definition of value seems out of place, given the postulation of “existence” value in contrast to the “use” value that we have discussed. Some people derive value from a place simply in knowing that it is there, whether or not they ever visit that place or directly experience it. And this is simply one example of the problems we might encounter when trying to elucidate the more vague notions of value.

Even more difficult, “clever respondents might bid or sell high to save the wilderness. They could misrepresent to gain the outcomes they value.”⁸ This suggests something very interesting. A respondent who misrepresents what she is really willing to pay is doing so because she believes there is more to the wilderness than what can be measured in her personal monetary payment. Here we begin to see the final type of natural value that Rolston suggests: intrinsic value.

If we were able to compile the material price of each individual value type for a piece of wilderness in the Northern Rockies, as determined by contingent estimation, some economists might say that we had the right number. In this case then, a timber company could pay all respondents an appropriate amount for the right to clear-cut and develop that wilderness. This immediately translates all estimated value into a sort of final market price for the purposes of utilitarianism. According to the rules of economics, this is an acceptable, or even a preferred transaction. But there may be more to the story than a translation of humans’ “use-value” for a wild place.

Daniel Campos concludes that “the concept of willingness-to-pay [is] inadequate to evaluate the worth of natural products because it view the transaction between humans and nature in a mere economic dimension.”⁹ We have established that efficient deduction of economic value in nature is possible, perhaps even for highly intangible values. This piece of the estimate plays a

⁸ Ibid, p.33.

⁹ Campos, p.63.

large role in determining the feasibility of plans like NREPA. But from a theoretical perspective, there is more to be said.

Robert Manning, in his discussion of ethics in forest management, defines a new type of natural value. He asserts that we derive a “moral/ethical value” from wilderness. Manning defines this as “the opportunity to exercise a moral and ethical obligation to respect and protect nature and other living things.”¹⁰ Despite the anthropocentric attitude of this statement, that the value is derived in relation to our opportunity, Manning’s claim indicates that we have some kind of “obligation” to nature. This obligation represents the intrinsic and un-quantifiable value inherent in wilderness.

If we cannot estimate this value economically, perhaps it is enough to know that such a value provides further motivation for securing conserved wilderness. Whether we do have a moral or ethical obligation to protect wildlife or biodiversity may continue to be debated, but this possibility allows us to see the importance of efforts for conservation. Then, in conjunction with empirical cost-benefit analysis using *quantifiable* sources of value, we can determine the economic viability of conserving natural places such as the Northern Rockies and the Green Mountains.

Now that we have established what kind of values need to be quantified, it will be useful to describe how and why the Northern Rockies Ecosystem Protection Act is worthy of consideration for application to other places. An account of the qualities that make NREPA such an impressive bill requires first the context of history and of geography.

In September of 1992, with the endorsement of only five U.S. Congressmen, the first NREPA was introduced to the House of Representatives. The bill did not receive a great deal of exposure in the first months of its life. In the following years, however, supporters of the bill in Congress continued to introduce NREPA, in different forms, for hearings and debate. In addition, new sponsors signed on to support the bill. As more Congressmen endorsed NREPA, the bill’s

¹⁰ Manning, p.423.

exposure increased, gaining significant assistance with support from respected academics, political groups like Republicans for Environmental Protection, and politicians such as Jimmy Carter. In 1994 a newspaper poll showed that 32% of Montanans supported NREPA, nearly a three-fold increase from 1992¹¹.

The bill's popularity continued to increase, and in its current form, as H.R. 488, the bill claims over 150 cosponsors in the House. While NREPA remains in subcommittees, continued growth in the popularity of the bill will surely lead to open discussion in the future. Thousands of local residents, environmentalists, and political groups are working hard to make sure that this is the case.

The Northern Rockies region flows through the states of Idaho, Montana, Oregon, Washington, and Wyoming. NREPA covers wilderness areas and key ecosystems in each state, one of the primary benefits of the bill. This multi-jurisdictional aspect allows NREPA to manage these ecosystems on a level that was never possible before. At the same time however, the administration of such a task is extremely daunting. Thus while the large area of the Northern Rockies and its political comprehensiveness makes it a great positive, many critics have found fault with the feasibility of this part of the plan.

NREPA names five major key ecosystems within its design. They are the Glacier/Northern Continental Divide, the Greater Yellowstone, the Greater Salmon-Selway, the Greater Cabinet/Yaak/Selkirk, and the Greater Hells Canyon/Wallowa ecosystems.¹² Some of these areas are already protected wilderness to some extent. The Glacier/Northern Continental Divide ecosystem, for example, contains Glacier National Park and the Bob Marshall, Scapegoat, and Badger-Two Medicine Wilderness areas. Also within this specified ecosystem exist numerous management areas, state parks, national forests, and private land. This is the case with most of NREPA's key ecosystems, though some, such as Salmon/Selway, have much more

¹¹ www.wildrockies.org/nrepa

¹² see appendix A, figs. 1 & 3 for a map of NREPA's geography.

wilderness density than others. This is also the case in the Green Mountain region, where the GM National Forest provides the backbone of conservation supported by many smaller state, town, and private natural areas.

What are the features, then, that make NREPA such an interesting study? NREPA's multi-jurisdictional approach, and its coverage of federal, state, and local land provide the opportunity to conserve ecosystems in the most comprehensive manner ever. The creation of jobs, tax-savings for the federal government, wildfire prevention, and wildlife restoration are also worthy of mention. One of the most high profile and popular features of NREPA is the creation of corridors between the key ecosystems.

Corridor, or "greenbelt" systems gained popularity in the 1980s as the field of conservation biology began to establish itself. In the second issue of *Conservation Biology* in 1987, Reed Noss confronted the ideas of corridor techniques. The biggest strength of this idea, according to Noss, is that corridors can be used to ease or solve the increasing problem of habitat fragmentation¹³.

Habitat fragmentation is the result of increased development and human settlement in wild areas, as wildlife are cut off from traditional migration patterns and food supplies¹⁴. Human disruption can be material, such as a housing development or road, or it can take a more intangible form. Examples of this include seismic testing for subterranean oil deposits and noise from industrial operations. No matter the disruption, habitat fragmentation continues to be a concern for many even today.

Corridors, as Noss explains, can be used to cancel out the fragmentation and human effects of development by re-connecting vital pathways for all types of wildlife. Most systems seek to focus on "umbrella species", larger carnivores such as bears, wolves, and cougars, because those species require the greatest amount of space and are most sensitive to disruption.

¹³ see appendix A, fig. 2.

¹⁴ Noss, p.160.

Once a corridor can be proven to work for these species, there is a much greater chance that smaller animals will be able to travel through them as well. Other potential advantages of corridors include increased biodiversity and adaptability through genetic mixing, a wider range of habitat types, and a natural limit to sprawl and development.

There are potential disadvantages of these systems in some cases. Diseased animals or plants from one area might carry the virus to another ecosystem that is not adapted to the illness. Domination by one genetic mutation of a species might migrate and dominate other areas, leading to a decrease in biodiversity. Furthermore, corridors potentially block out the opportunity for human movement in certain places. Roads or highways certainly could not intersect with wildlife corridors, and this limits passage for local residents when geography forces the two together.

Since the whole point of corridors is to connect areas between *human* settlement, this poses a serious problem. Some work has been done in this area, and managers at Banff National Park in British Columbia have made progress using underpasses and overpasses to allow intersection between corridors and roads¹⁵. Nevertheless, this is a serious disadvantage, and a successful solution must be found before corridors can be applied in all areas.

In the case of NREPA, the low population density of the Northern Rockies region and the large scale of the area have allowed the bill's creators to place corridors in locations where they conflict minimally with human necessities. Several smaller corridors, for example, link Greater Yellowstone to Salmon/Selway in northeastern Idaho¹⁶. A great deal of wilderness is already in place here, and major roads are virtually non-existent. The linkages in this case serve to strengthen and enlarge the connectivity between these two major ecosystems. In some cases conflicts do exist between roads and important corridors. Interstate 90 in Montana runs the length of the state and creates a major obstacle for wildlife movement. Advocates are hard at work to

¹⁵ Clevenger.

¹⁶ see appendix A, fig. 3.

apply Banff's overpass and underpass solutions to the Northern Rockies, which should allow for increased mobility between NREPA's key ecosystems.¹⁷

Another exceptional feature of NREPA is the focus on ecosystem management. The passage of the Endangered Species Act of 1973 marked a watershed moment for environmentalists. At last there was a tool to protect species affected by human development. The Act also marked an evolution of thinking about wildlife management. A focus on species was a beginning, but in the following decades, scientists began to realize that the interconnectedness of ecosystems requires a more broad focus. A particular endangered species could be managed for, but if other environmental factors resulted in a destruction of that species' major food source, the threatened animal was doomed. The same reasoning applied to the food source, and to the food source's food source, and so on down the line.

Researchers soon began advocating an approach that considered the relationships between many types of plants and animals in an ecosystem. R. Edward Grumbine defines ecosystem management as a system that "integrates scientific knowledge of relationships within a complex sociopolitical and values framework toward the general goal of protecting native ecosystem integration over the long term."¹⁸ This is an extremely broad definition, and rightly so. Ecosystem management cannot over-focus without losing purpose.

A major factor in ecosystem management is the concept of flux. Traditional theories of nature posited that ecosystems could achieve and maintain equilibrium. With the advent of ecosystem management techniques, however, managers now agree that "healthy" environments are in a constant state of change, always rebuilding and evolving. A plan focused on ecosystems must address this issue, and NREPA does. The bill establishes monitoring of the entire region in order to identify and implement changes to the integrity of the ecosystems.¹⁹

¹⁷ www.wildlands.org/l_highways.html

¹⁸ Grumbine, p.31.

¹⁹ NREPA, HR 488, sec. 602.

NREPA's ecosystem focus translates to other unique features in the management plan. As part of the "static" conception of natural systems, years of forest-fire prevention by the Forest Service have led to extreme conditions in recent years. Many scientists now agree that substantial overgrowth of understory forest plants has led to an increase in fire frequency and intensity. New techniques of management recognize that fire is a naturally occurring phenomenon, and part of the flux of the ecosystem. NREPA allows natural succession to take the place of active Forest Service fire-prevention, using popular techniques such as controlled burns to return that piece of the ecosystem to its proper order.

With the pieces of the environmental design in place, NREPA also attempts to create economic enhancement. The critical element of NREPA's attempt at aiding economic stability is that the plans integrate job creation and budget savings while *improving* the environmental health of the region. One major element is the establishment of the National Wildland Restoration and Recovery System.

Under this system, NREPA designates over one million acres of national forest for the purposes of improving ecosystem health. The bill states that the areas will be managed "so as to restore their native vegetative cover and reduce or eliminate invasive non-native species and native species diversity, stabilize slopes and soils to prevent or reduce further erosion, recontour slopes to their original contours, remove barriers to natural fish spawning runs, and generally restore, as much as possible, such lands to their natural condition as existed prior to their entry and development."²⁰ If such a program were successful, it would pave the way to establish Restoration and Recovery areas in other places where human impact has been significant.

On its own this program is special. The added benefit here is the creation of the National Wildland Recovery Corps. These Forest Service employees will oversee the implementation of the Restoration program. Environmental groups estimate that nearly 2,300 jobs will be created under this plan. The economic benefits of thousands of new jobs in this area are of significant

²⁰ NREPA, HR 488, sec. 503.

value, and the fact that employment is being created in order to improve the quality of natural areas adds further to this value.

The features of NREPA highlighted here, substantiated independently, now combine to create an innovative bill. This is the first legislation of its kind; crossing borders, managing broadly, improving environmental and economic quality. The stage has been set for an application of these ideas to another valuable set of ecosystems in the United States.

The Green Mountain region bears a remarkable resemblance to the Northern Rockies. Geologically the regions are not especially similar, the topography and size of the Rockies is significantly larger than the Green Mountains. The east side of the continental divide in the Rockies is more prairie-like land, while the west side is green and forested. The Green Mountains are not large enough to affect the climate of their slopes, and are consistently coniferous forests from north to south, rarely peaking above treeline. But in comparing opportunity for conservation, demographically and economically we can find a resemblance.

Both regions are very rural, with lower population densities and a relatively high amount of natural space surrounding developed areas. In the case of the Rockies, the undeveloped areas are typically ranches or public land, while in Vermont the natural space is regrown forest. Over 83% of the forest land in Vermont is privately-owned²¹, and in the Rockies the same can be said for the foothills and plains on the outskirts of the mountain region. In addition, the resource extraction industry comprises a higher percentage of the economic pie than in other, more developed areas of the country.

Biologically, the Rockies and the Green Mountains are home to innumerable species of plants and animals. Both regions remain the most untouched parts of the West and the Northeast, respectively. The Rockies have seen their fair share of extinctions and near-extinctions in the last century, with the destruction of the bison and the near extermination of wolves and grizzly bears.

²¹ Vermont Department of Forests, Parks, and Recreation, A Forest That Works For All: The Vermont Forest Resources Plan 1999-2008, p.10.

The Green Mountains are no different. Once home to lynx, panthers, and wolves, Vermont settlers killed off many of these species before their true value and fragility could be appreciated. Along with new plans for conservation, however, both regions are considering or have begun reintroducing former native species to the forests and mountains.

The most important connection between the northern Rockies and the Green Mountain region is the existence of significant public conserved space. NREPA is founded on and expands from the numerous large wilderness areas and national forests that have already been established there. Vermont also has this foundation. The Green Mountain National Forest provides the backbone to any large-scale conservation plan, with support from smaller state parks, private land, and de facto wilderness. In addition, just as NREPA connects multiple key ecosystems, the Green Mountains are in close proximity to other major areas such as Adirondack State Park in New York and the White Mountains of New Hampshire. Clearly, the similarities between the regions provides an excellent opportunity to apply NREPA to the Green Mountains.

As in the case of NREPA, the first step in outlining a conservation plan for a particular region is to define the geography. The Green Mountain National Forest is the centerpiece of any wilderness plan for Vermont. In addition, key ecosystems abound in close proximity to the National Forest, with large tracts of land in the Northeast Kingdom, the Adirondack State Park in New York, and the northern forests of Massachusetts, New Hampshire, and Maine. Furthermore, smaller state parks and wildlife management areas dot the Vermont landscape, providing the opportunity to connect multiple ecosystems.

Vermont has the added benefit of having a diverse series of ecosystems within its borders. Terrain ranges from lowlands in the south, to wetlands by Lake Champlain, to sub-alpine peaks along the center of the Green Mountains.²² As in the Rockies, a comprehensive wilderness plan would protect a wide range of species in a wide range of habitats. The following proposed plan will attempt to do just that.

²² see Appendix A, fig. 4.

The first element of the Green Mountain Ecosystem Protection Act (GMEPA) will be to increase connectivity with corridor systems. This will be accomplished using corridors both between Vermont ecosystems and into key areas in adjacent states. The final result will be *regional* connectivity as in the case of NREPA. With higher levels of population density in some areas near the Green Mountains, habitat fragmentation is a more serious threat to biological health than in the Rockies.

The most important part of this element is to connect the two pieces of the Green Mountain National Forest. The forest is currently cut in half by private ownership and by multiple roads. Large areas of land need not be acquired for this purpose. Rather, one corridor would provide wildlife the opportunity to migrate more easily between the areas. Both halves of the GMNF contain designated wilderness, and creating a connection between those already established pure areas will be vital to the success of the plan.

The next step will be to connect the two halves with key ecosystems within Vermont. The largest area of wild and natural space in Vermont besides the GMNF is the Northeast Kingdom. Jim Northrup, Executive Director of ForestWatch, an environmental advocacy group, explains the opportunity for conservation in the Northeast Kingdom. “There is much conserved land already in the NEK, though much of it is land conserved for timber production. There are also several fairly large parcels owned by industrial timberland owners. The potential exists to manage most of these conserved lands as ecological reserves in the future.”²³

The GMEPA will call for a larger conserved area in the Northeast Kingdom, created by direct federal land acquisition. Smaller conserved areas can then be connected to this larger Northeast Kingdom Preserve with corridors. In addition, a major corridor will connect the NEKP with the Green Mountain National Forest. This is a substantial undertaking, and direct acquisition of land would clearly not suffice for this purpose. The alternatives to acquisition will be discussed in a later section.

²³ Communication with Jim Northrup, 11/18/2002.

Closer to the Northeast Kingdom Preserve, the Lake Champlain area houses numerous critical habitats for Vermont wildlife. Wetlands and riparian zones are among the most fertile and important areas for many species, and Lake Champlain provides many such zones. In recent years, expanding development from the Burlington metro area has begun to impinge on the vital habitats of the Lake Champlain basin.

The GMEPA plan will establish several small corridors to connect both the Northeast Kingdom and the GMNF with the wetlands of Lake Champlain. Since many of the most dense areas of settlement lie in the path these corridors, smaller belts will be used to minimize the disruption to wildlife and the inconvenience to humans.

The result of this plan is a triangle of conservation in Vermont, connecting the higher peaks of the Green Mountains, the heavily forested lands in northeastern Vermont, and the lowlands and riparian zones of Lake Champlain. By establishing new areas of conservation, and improving existing ones, the foundation is set to expand beyond Vermont.

Corridors will also connect the White Mountain National Forest in New Hampshire and the Adirondack State Park in New York. As Jim Northrup explains, these connections are critical to the success of a comprehensive plan. “Unless we can link Vermont’s interconnected wild areas with the large, wild areas in the northern most parts of this region, connectivity within the state will not achieve the benefits that it could.”²⁴ Northrup’s vision for the Green Mountains and beyond extends all the way to Canada, and perhaps such a dream is possible. In the context of NREPA, however, we are constrained to acting within the United States.

The next element of GMEPA is a shift to ecosystem management within the region. The legislation would establish specific guidelines for the Agency of Natural Resources and the Forest Service to frequently revisit land management policies and acquisition targets for review.

In keeping with the conception of the environment in a constant state of flux, goals must be continuously re-evaluated based on new events and changing information. As with NREPA,

²⁴ Communication with Jim Northrup, 11/18/02.

the organizations responsible for managing the natural areas in the Green Mountain Region must look carefully at themselves to ensure that current policy is best directed towards maintaining healthy ecosystems.

In addition, policy decisions will be guided by a more complete picture of conservation science. Land managers will focus on improving the integrity of the ecosystem as a whole, rather than focusing on specific species. A vast amount of consistent and improving science now exists to guide this management.

The ecosystem management element also guides GMEPA's stance on fire-protection. As is the case in the Rockies, Vermont faces increased probability of wildfires as a result of decades of fire suppression. GMEPA will allow the fire succession system to return to its natural state using methods of conservation biology as discussed above. The Forest Service will monitor controlled burns and other methods in order to learn further from this process and to apply it elsewhere in the region.

As in the Northern Rockies, much of Vermont's natural land has been disrupted by human development in some way. This disruption has taken the form of logging and resource extraction, habitat fragmentation, and recreational impacts. In the Green Mountain National Forest for example, only 4% of the total land is designated as roadless areas.²⁵ The remainder of the forest has been disturbed or altered in some way.

There is a solution. A century ago, much of Vermont was completely deforested, and much of the land has returned to a more natural state in recent years. This progress can continue, and under GMEPA it will do so. The plan calls for a Wildland Recovery Program to monitor and return federal land to a wild state.

To start with, the WRP will create a Wildland Recovery Corps similar to that of NREPA, but on a smaller scale. These Forest Service employees will work to improve the wilderness quality in the GMNF and in the new Northeast Kingdom Preserve. This program has the dual

²⁵ www.roadless.fs.fed.us

effect of improving ecosystem health and creating local jobs in Vermont. The negative result of this program will be the loss of jobs in the forest products industry, but as we shall see this impact will be minimal and can be offset with the new creation of jobs from GMEPA.

Another experimental, and potentially controversial part of GMEPA will be the reintroduction of wolves to the Green Mountain region. Mladenoff and Sickley have estimated that the Northeast is biologically and geographically capable of supporting a population of over 1,000 gray wolves. This estimate is based on geographic information, and the opportunity for wolf reintroduction would be significantly aided with the establishment of a program such as GMEPA. The authors explain that “such large areas are increasingly rare and important for wolf recovery if populations large enough to have long-term evolutionary viability are to be maintained within the United States.”²⁶ In addition, such reintroductions have been attempted in other regions of the U.S. with some success. The precedent exists to allow for the reintroduction of wolves to the Green Mountain region.

A critical piece of the GMEPA program is what takes place on private land. A large-scale conservation system loses its effectiveness if it does not address and support environmental health on privately owned lands. GMEPA will mandate support for sustainable practices in resource extraction on private land through tax incentives for land owners. In addition, some acquired lands could serve as testing grounds for the Forest Service to experiment with logging practices. This serves both the public and private land, and helps pave the way for responsible management in the entire region.

An alternative to complete acquisition of land in the GMEPA program is the use of conservation easements or partial acquisition. Managers have the option to create corridors between critical ecosystems by supporting the creation of private easements. Jim Northrup confirms that “easements are a good way to conserve buffer lands around ecological reserves and

²⁶ Mladenoff, abstract.

lands connecting ecological reserves.”²⁷ In this way, land owners need not give up their land, but can participate in the conservation process and improve the health of their land adjacent to the corridors. This plan could also be supported with tax incentives and special consideration in determining property values for tax purposes.

Just as NREPA brings together many pieces of conservation science and policy, GMEPA applies these ideas progressively to create a dynamic and groundbreaking plan for the state of Vermont and adjacent areas. While the Green Mountains may differ from the Rockies, the opportunity to create a large-scale plan exists in both cases. Furthermore, it will be useful to examine to impacts of the GMEPA plan for Vermont, based on predicted impacts from NREPA.

In order to evaluate this application correctly, it will be necessary to compare the costs and benefits of such a plan. It is possible to undertake a tremendously specific estimation of these costs and benefits. With a detailed plan for the Green Mountain region, each aspect of the system could be analyzed with respect to the individual political, ecological, and economic impacts. For our purposes, however, as with the above summary of GMEPA’s key features, it will suffice to carry out a more general estimation and analysis of such impacts in Vermont.

The basis for this analysis will be the method proposed by Thomas Power in “The Economics of Wildlands Protection.”²⁸ Power’s step-by-step outline undertakes an estimation of the economic impacts of protecting a natural area.²⁹ This outline also provides the example of a local Montana economy. This will be supported by another work by Power, estimating the impacts of a proposed conservation area in Maine.

According to Power, the primary concern for opponents to conservation plans is that the protection of natural resources will have a negative impact on the local economy. This criticism is based on the assumption that conservation and economic growth are opposed and mutually

²⁷ Communication with Jim Northrup, 11/18/2002.

²⁸ Power, 2000, p.10.

²⁹ see appendix B, fig. 1 for outline.

exclusive. Power believes this assumption to be invalid. His estimation of the economic impacts in Montana and Maine provide the context with which to evaluate this assumption.

There is no doubt that conservation of potential wilderness will reduce the quantity of resources being developed on the land. While this may entail the loss of jobs in the resource extraction industry, Power explains that it is critical to place this loss in the appropriate perspective. This is the first step in his analysis. As is the case in Maine, the vast majority of resource extraction in Vermont is in forest products. The first stage, then, is to estimate the relative importance of the forest products industry in Vermont's economy. According to the U.S. Bureau of Economic Analysis, total gross product from lumber and wood, paper products, and agricultural services such as forestry totaled \$684 million in Vermont for 2000. The total gross state product (GSP) was \$18.4 billion. Thus, forest products contributed approximately 3.7% of GSP to the Vermont economy in 2000.³⁰ This percentage is comparable to Power's findings for both Maine and Montana.

The next step is to evaluate the trend of the forest products industry in recent years. Power's Maine study provides a comparison of the industry's performance with that of the total economy from 1979 to 1998. His analysis shows that in relation to other industries, production and benefit from forest resources is declining³¹. A similar comparison applied to the Vermont economy yields interesting results. The graph indicates that while the forest products industry in Vermont is not floundering as in Maine, the rest of Vermont's economy is significantly outperforming.³²

In addition, employment growth in the forest-based industry (excluding furniture manufacturing) in Vermont has been non-existent in the last 15 years.³³ In contrast, Vermont's other industries have added 82,000 jobs in the same time period, with an annual growth rate of

³⁰ www.bea.gov.

³¹ Power, 2001, p.6.

³² see appendix B, fig. 2.

³³ Vermont Department of Forests, Parks, and Recreation, A Forest That Works For All: The Vermont Forest Resources Plan 1999-2008, p.57.

1.7%.³⁴ Clearly, the forest products industry in Vermont is far from helping the economy grow and improve. As Power indicates in his analysis of the Maine economy, “continued economic decline seems highly likely unless the local economic base is expanded to include new activities.”³⁵

Continuing Power’s analysis, we undertake a three part investigation of the impact of conservation on National Forest land. Power’s first question is “What percentage of total jobs was associated with the wood products industry?” Excluding furniture manufacturing, the number of total jobs in forest products in 1997 was 5,800, or 1.54%.³⁶ Power’s second question is “What percentage of timber harvest came from National Forest Land?” According to the U.S. Forest Service report on timber sales, approximately 5.8 million board feet was harvested from National Forest land in 1998. That is less than 2% of the total harvested wood in the state of Vermont.³⁷ Power’s third question asks “What percentage of National Forest timber harvest came from or was planned to come from roadless areas?” The Forest Service does not currently harvest wood from any inventoried roadless areas in Vermont, though they plan to begin with a cut of one thousand board feet in 2004.³⁸

The purpose of Power’s argument is to show that conserving roadless areas in the Rocky Mountains of Montana would result in a miniscule cost, one that would easily be accounted for by the growth of the economy. In the case of Vermont, as mentioned above, we can apply this logic in terms of harvest in *all* National Forest Land. Putting a halt to logging on Forest Service land and allowing the land to return to wilderness would cost, according to Power’s framework for calculations, only .03% or three one-hundredths of a percent of the jobs in the forest products industry.³⁹ This translates to a loss of 181 jobs in Vermont. As discussed above, the Vermont

³⁴ BEA REIS CD-ROM.

³⁵ Power, 2001, p.35.

³⁶ www.bea.gov.

³⁷ <http://maps.vcgi.org/indicators>

³⁸ www.roadless.fs.fed.us

³⁹ $1.54\% \times 1.97\% = .03\%$

economy has been adding an average of 6,000 new jobs annually in the past decade. The loss of economic vitality would therefore be very small. Power's conclusions apply to Vermont as well.

An additional cost to the Green Mountain region would be the price of establishing many of the pieces of the GMEPA program: paying new wages, infrastructure costs, and land acquisition payments. In the case of NREPA, a great deal of this cost is offset by ending inefficient timber sales on Forest Service land. This is not an option in Vermont, where little timber is harvested by the federal government itself. Conceivably, some of this cost would be offset by higher tax earnings and increased visitation and recreation in the region. This is, however, a consideration, and it should be noted that a substantial commitment from the Federal government would be necessary to finance such a program.

Now that we have a sense of the costs of scaling up the national conservation plan in Vermont, we can investigate the potential benefits. Power has suggestions regarding how to quantify the benefits as well. The most important positive repercussions for a large-scale conservation plan are employment growth, improvement of economic vitality, and increased land value.

Power cites a study that examined job and income growth in Western states with large tracts of land in public control. The results showed that local economies with a significant percentage of land in National Parks, Monuments, and Wilderness had employment growth 1.85 times the average and income growth 1.43 times the average of typical rural Western counties. Further supporting his thesis that areas with federal parks have increased economic vitality, Power points to another source that indicates 84% had above average population growth, 82% above average job growth, and 80% above average income growth nationally.⁴⁰

A further indicator of the benefits of an ecosystem protection plan reflects information from the Green Mountain region itself. Spencer Phillips of the Wilderness Society studied land value for counties adjacent and close to the Green Mountain National Forest in 2000. Phillips

⁴⁰ Power, 2000, p.5.

concludes that “proximity to wilderness enhances land value,” and that specifically, “parcels located in towns that contain wilderness have per-acre sales prices that are 13% higher than towns without wilderness.”⁴¹

While the results of these studies obviously cannot guarantee that GMEPA or a plan like it will improve economic vitality, they are indicative of the benefits of having a large piece of wilderness. Power summarizes the potential benefits of conservation into several categories. He asserts that economies with wildlands and protected natural areas receive positive visitation impacts, amenity impacts, and increased government receipts from fees and public access⁴². Increased visitors to an area results in multiplied economic effects from spent money and job creation helps offset the loss of jobs from transferring out of the forest products economy. In addition, the federal government offsets its losses from discontinuing timber sales with park access fees and increased receipts from sales, property, and income taxes.

The size of this offset would be dependent on the type of plan established in the Green Mountain region. As opposed to National Parks and Monuments, which see high levels of tourism activity and are geared towards a great deal of visitor traffic, a wilderness plan like the one described above would require reduced visitation to maintain ecosystem health and prevent human disruption. The effects of these particular benefits would be significantly less than for the proposed National Park in Maine, or for areas covered in NREPA such as Glacier and Yellowstone National Parks.

Some of the suggested ideas from NREPA have already been put to work in Vermont. The Vermont Agency of Natural Resources has identified the need for ecosystem management, corridors, and conservation easements as an alternative to complete land acquisition. In keeping with the concept of nature in flux, as proposed by conservation biologists, the ANR declined to create a map of key areas for acquisition in Vermont. They determined instead to deal with

⁴¹ Phillips, p.13.

⁴² Power 2001, p.74.

acquisitions and conservation on a site-by-site basis.⁴³ Thus, some of the worthwhile and applicable features from NREPA are in place or have merit in the Green Mountains. As of now, however, there is no unifying system that can strengthen the conservation of Vermont's natural resources and help improve economic vitality. The plan proposed above, or one like it, can serve such a purpose.

If the ideas from NREPA can be applied anywhere, then Vermont's Green Mountains seem to be the place to try. There is no small share of differences between the regions certainly, but at the base a comparison can be made. In addition, the academic foundation exists to undertake a quantitative analysis of this application, at least to some extent. Many factors play a role in the success of such a large-scale plan. And in the end, NREPA may not be politically feasible. Nevertheless, the new approach to management that the bill provides can play a valuable role in policy making both in the Rockies and elsewhere.

In the years to come, with U.S. and world populations increasing, and with added pressure on the natural areas that are still intact in our country, wilderness will become an increasingly valuable entity. Large strips of wild land will be important in all the facets of value we have evaluated, from scientific, to biological, to economic. The regions that undertake modern conservation plans will be best situated to capture these values for present and future generations. NREPA provides the opportunity for the Northern Rockies to become a model of such a modern plan. If the bill succeeds, it may pave the way for applications to other special places such as the Green Mountains of Vermont.

As Jim Northrup explains, the creation of “[a large scale program] will be difficult, but it is not impossible, especially if money for acquisition is available and if policies and laws are changed to create incentives for such conservation.”⁴⁴ In this way we must return to the discussion of values. Before GMEPA, and even NREPA, can be successful, a larger majority of

⁴³ Hurley, p.306.

⁴⁴ Communication with Jim Northrup, 11/18/2002.

Americans must begin to understand the more indirect values described above. Once political leaders accept the non-monetary worth of our natural resources, the U.S. will be ready to undertake these large-scale plans. Jim Northrup adds, “The majority of Vermonters want more public land and more wild lands, and would support an initiative to conserve them.”⁴⁵ If the average Vermonter supports plans like NREPA and GMEPA, the issue is simply to help those in power understand the truth. If this can be accomplished, the road is clear towards ecosystems with improved health, diversity, and value, in all its forms.

⁴⁵ Communication with Jim Northrup, 11/18/2002.

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- Wild Rockies Action Fund, www.wildrockies.org.

APPENDIX A: Maps and Diagrams

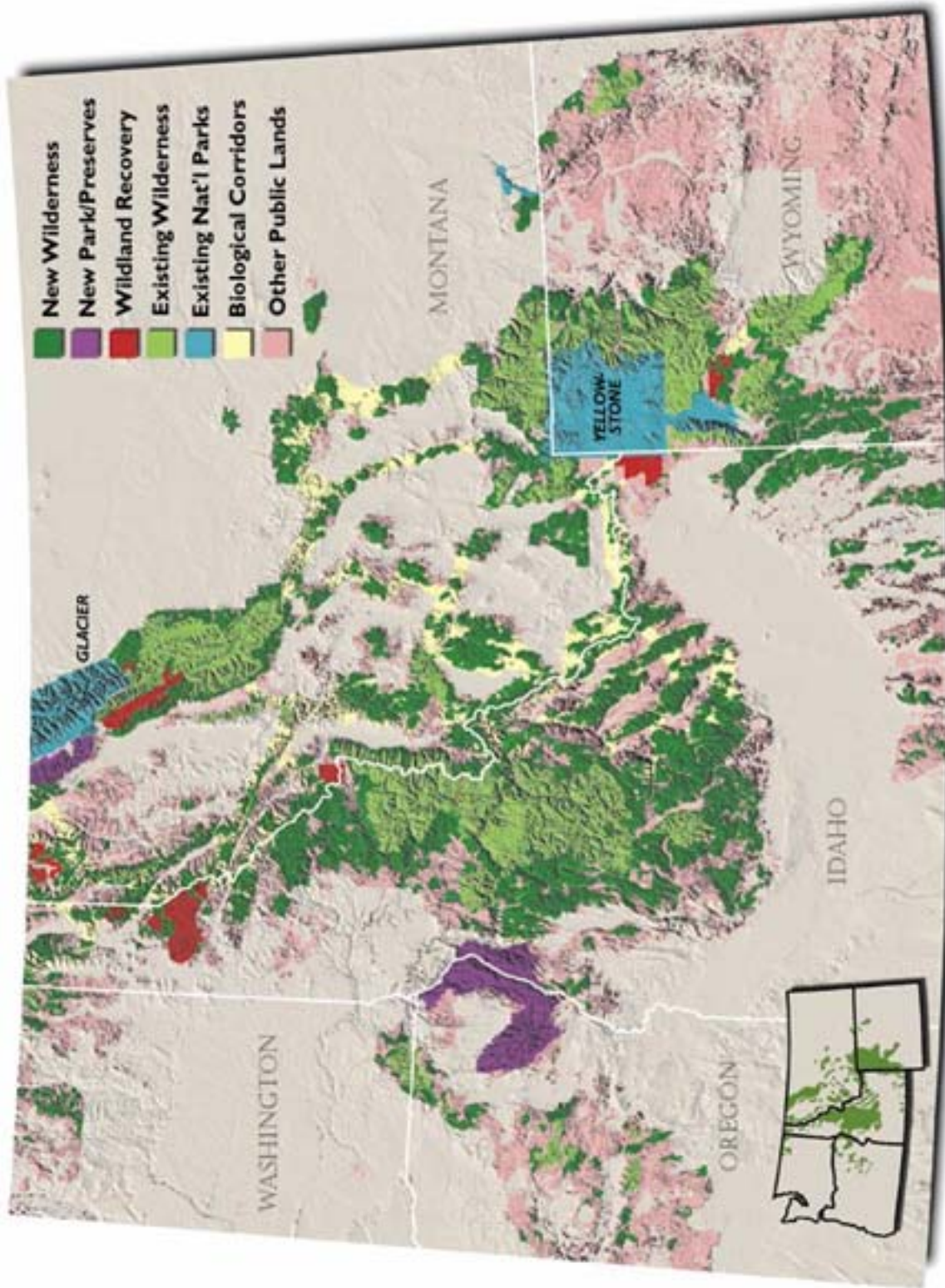


Figure 1. NREPA's Geography. <http://www.wildrockies.org/nrepa>

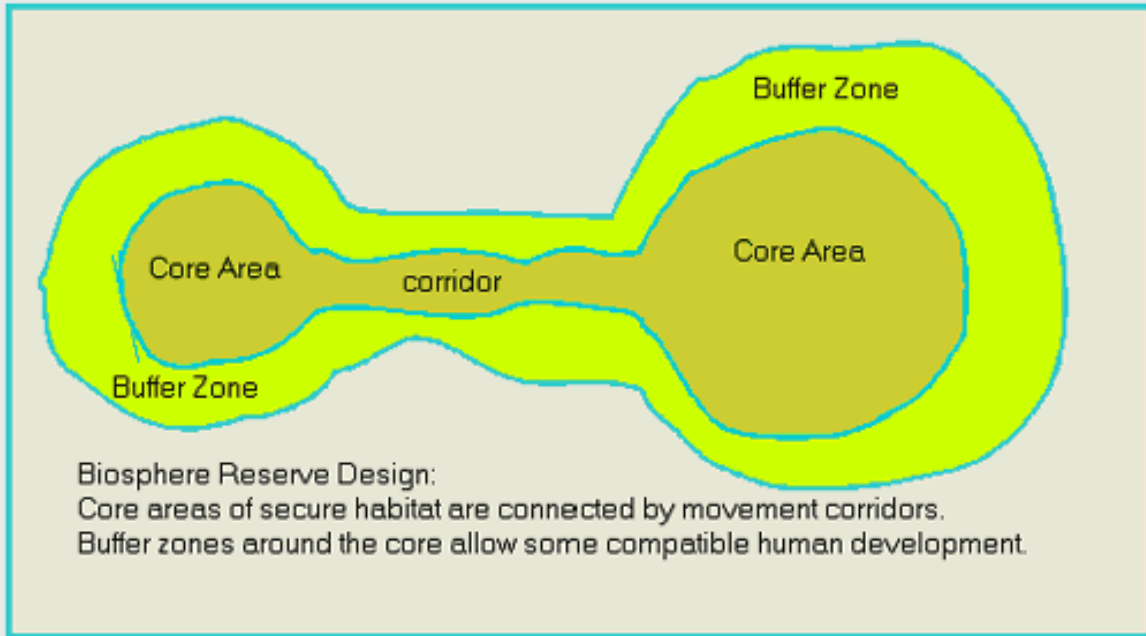


Figure 2. http://www.wildlands.org/1_intro.html

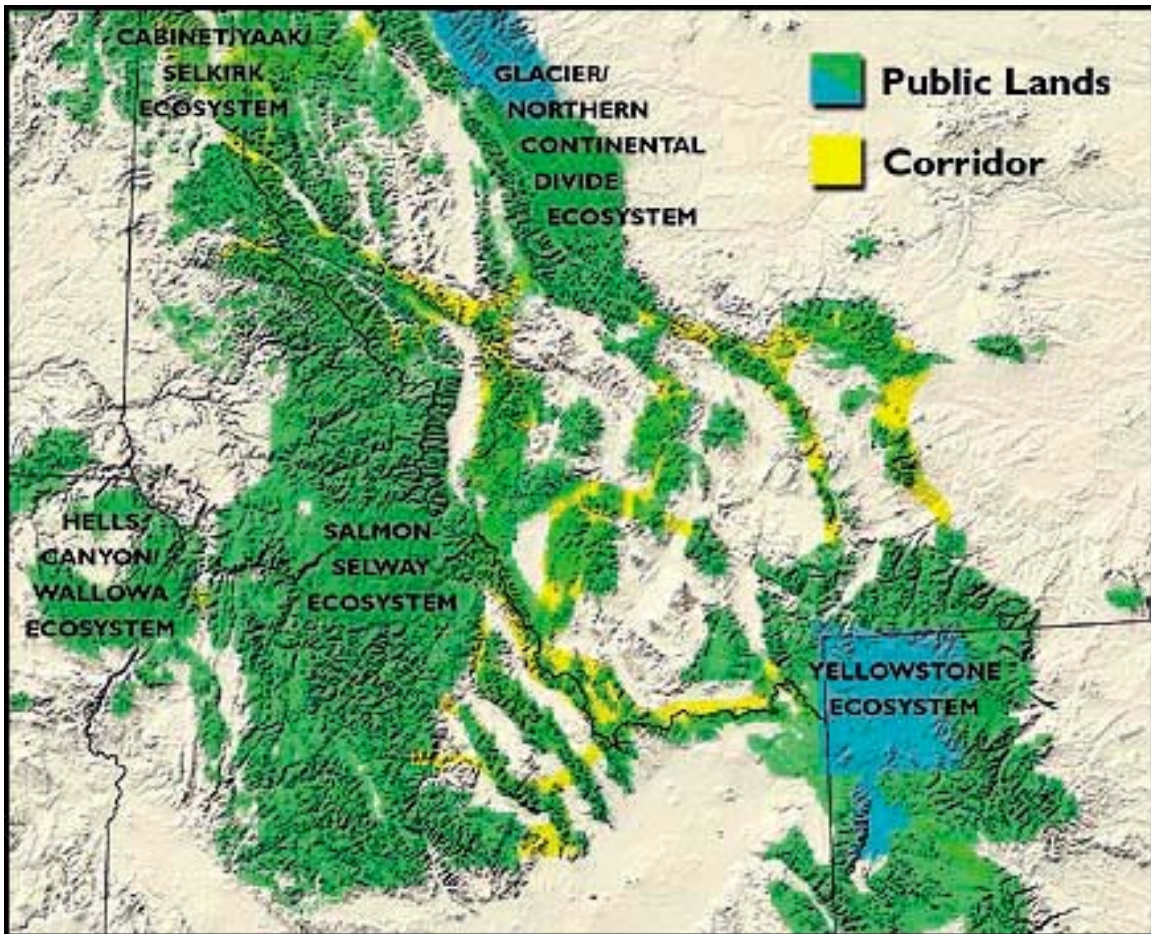


Figure 3. NREPA's Core Ecosystems. <http://www.wildrockies.org/nrepa>

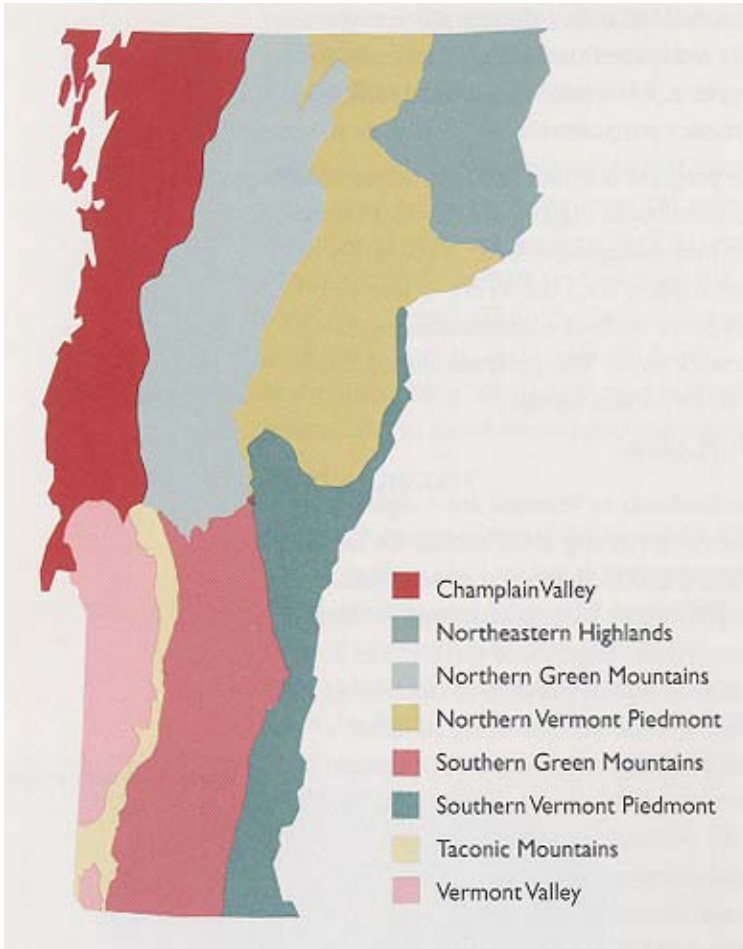


Figure 4. The Eco-Regions of Vermont. Vermont Department of Forests, Parks, and Recreation

APPENDIX B: Charts and Graphs

Figure 1: Power's outline

<p style="text-align: center;"><i>Estimating Local Economic Impacts</i> Employment & Income Effects</p> <p>I. Describe and Quantify the Existing Local Economy</p> <ol style="list-style-type: none">1. Define the geographic extent of "local"<ol style="list-style-type: none">a. Account for in- and out-commutingb. Include major trade centers2. Trend analysis of major sectors<ol style="list-style-type: none">a. Analyze the whole economy not just pre-selected sectors.b. Include non-employment income, locally-oriented, and self-employment income.c. Compare trends in assumed economic base and the rest of the economy. <p>II. Measure Local Economic Impacts</p> <ol style="list-style-type: none">1. Define the impacts to be analyzed<ol style="list-style-type: none">a. Include external impacts as well as direct impacts.b. Include impacts associated with changes in the attractiveness of the area to potential new residents and businesses.2. Measuring Net Impacts<ol style="list-style-type: none">a. The estimated impacts should be the direct impacts <u>net</u> of external impacts and amenity affects.b. The focus should be on primary impacts rather than on induced (multiplier) impacts.c. The offsetting dynamic adjustments by markets and economic actors should be reflected at least in the longer run impact estimates.d. The relative size of the net impacts should be established by referring to the size of the over- all economy and the annual changes in it.e. Check the sensitivity of the estimated local impacts to key assumptions used, including multiplier or ripple effects. <p>III. Evaluate the Local Economic Impacts in the Context of Overall Community Development Objectives</p> <ol style="list-style-type: none">1. Growth / Quantitative Expansion2. Vitality / Qualitative Objectives3. Stability / Sustainability4. Range of Economic Opportunity5. Household Prosperity6. Support for Public Services and Infrastructure
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Figure 2:

