

Placing Nature

Culture and Landscape Ecology

EDITED BY
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ISLAND PRESS

Washington, D.C. • Covelo, California

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COVER PHOTOS

Top: Clearing, the New Gated Community, Des Moines, Iowa (April 1993).

Bottom: Fen with Creek, Shakopee, Minnesota (March 1996).

Library of Congress Cataloging-in-Publication Data

Placing nature: culture and landscape ecology / edited by Joan Iverson Nassauer

p. cm.

ISBN 1-55963-559-2 (pbk.)

1. Landscape ecology. I. Nassauer, Joan Iverson.

QH541.15.L35P58 1997

577.5'5—dc21

97-14842

CIP

Printed on recycled, acid-free paper ♻️

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

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Cultural Sustainability: Aligning Aesthetics and Ecology

JOAN IVERSON NASSAUER



OVERLEAF

Top: Swale in Freshly Plowed Field, near Lake Lilian, Minnesota (May 1994).

Bottom: The \$3.2 Million Model Home, Chanhassen, Minnesota (August 1993).

JOAN IVERSON NASSAUER is a landscape architect at the University of Michigan who specializes in the landscape ecology and design of settled landscapes. Formerly, she served on the faculty of the University of Minnesota. She is past United States chair of the International Society for Landscape Ecology. She has helped to build federal, state, and local government plans and designs to improve ecological health with aesthetic experience.

FROM THE AIR I can see the ecological patterns of my city. The enormous ribbons of the rivers and the intricate shapes of lakes and wetlands organize the landscape. Woodlands are embroidered into this connected pattern. From this vantage point, built artifacts diminish in importance. But when I am traveling around the Minneapolis–St. Paul metropolis, depending on the roads and buildings to tell me where I am, large-scale ecological systems are reduced to discrete places. They lose their continuity and no longer dominate my experience of the landscape.

To maintain these ecosystems for the future, the visible logic of rivers and woodlands seen from the air must be brought down to earth. The pattern obvious from the air must find an equivalent in cultural values visible on the ground. This translation is not immediate. What is apparent at the scale of $1' = 1,000'$ is not

necessarily apparent at $1' = 1'$. Cultural equivalents are not simple unveilings of ecology; rather, new relationships between culture and ecological function must be defined. We should construct a kind of cultural necessity to underpin ecological health across the landscape, as if there were no other choice.

The cultural necessity that could make patterns for healthy landscapes recognizable exists ready-made. We are deeply attached to *beautiful* landscapes, and we have strong cultural conventions for how an *attractive* landscape should look. Landscapes that we describe as beautiful tend to conform to aesthetic conventions for the scenic, but they are relatively rare. Landscapes that we describe as attractive tend to conform to aesthetic conventions for the display of care, which can be exhibited in virtually any landscape. The display of care creates a cultural necessity about even the most ordinary places. Both the scenic

aesthetic and the aesthetic of care are culturally ingrained and conceptually well developed. They are also resistant to change. Each creates a powerful cultural necessity for protecting and making landscapes.

The scenic landscape aesthetic is drawn from the eighteenth-century picturesque, in which the power of nature began to be seen as beautiful, as long as it was controlled. Rocky peaks, steep bluffs, crashing water, gnarled trees, and the ruins of ancient buildings began to be admired in the landscape. The picturesque was a cultural idea about how nature looks. It designated recognizable features of nature so that these features could be arranged for human enjoyment.

The picturesque has been so successful in becoming popular culture that scenic landscapes are often assumed to be ecologically healthy. But a scenic landscape aesthetic does not necessarily protect nature. It can be used to camouflage or distract us from actions that undermine ecological quality. While real ecosystems are dynamic, we try to protect scenic landscapes from changing. While some pristine ecosystems may exhibit the dramatic contrasts of the picturesque, some, like wetlands or deserts, do not tend to look conventionally scenic. At the same time, many landscapes that are far from pristine look scenic. The mining scar may look like a picturesque bluff to an unknowing eye; pesticide spilled in the scenic river may be entirely invisible. Where U.S. Forest Service policy has been aimed at meeting tourists' expectations, clear-cuts have been designed with curved, gradual edges that blend into the larger pattern of natural phenomena. Our strong cultural conventions for the way scenic landscapes should look has led to a contrived and frequently misleading nature.

Cultural conventions for the aesthetic of landscape care are even more omnipresent. Nearly all landscapes are judged and enjoyed according to the degree that they clearly exhibit care. In a

wild landscape, care might be shown by the absence of trash or signs of human occupation. In most settled landscapes, care is shown by neatness. Cultivated fields are expected to have straight rows and no weeds. Farmers who allow weeds in their fields risk being seen as lazy or poor managers. A neat and tidy lawn is so expected that we have ordinances to force conformity upon those who do not take care of their lawns properly. People who do not mow their lawns are assumed to have problems that prevent them from doing the right thing. In his book *Second Nature*,¹ Michael Pollan recalled the social censure that befell his father when he failed to keep the lawn mowed in a tidy middle-class suburb.

The aesthetic of care is laden with good intentions and social meaning: stewardship, a work ethic, personal pride, contributing to community. But like many other ways that we improve our lives or our surroundings, landscape care can cause unintended and unexamined harm. We have begun to prevent the continued loss of habitats and species that were weeded out when immigrants from other continents settled North America and improved it. We have become leery of the damaging surprises that may await us after we have used herbicides to keep our yards, gardens, and fields looking neat and free of weeds. For some of us, lush green irrigated turf glowing from cities in dry prairie or desert regions has taken on an eerie shimmer.

To take advantage of the ready-made cultural necessities of scenic beauty and landscape care, we might ask how we can attach ecological health to these lawlike aesthetic conventions. Freezing nature to look scenic and making nature neat and tidy could create the antithesis of ecological health. But if we acknowledge that we live in a world dominated by humans, in which human perception of the landscape will ultimately affect how every landscape is used or protected, then we are led to find ways to use ready-made cultural necessities. Rather than focus-

ing on the dire implications of some aesthetic features, we can critically analyze those features and selectively use them because we recognize the power of overall aesthetic experience. Landscapes that attract the admiring attention of human beings may be more likely to survive than landscapes that do not attract care or admiration.

Survival that depends on human attention might be called *cultural sustainability*. Landscapes that are ecologically sound, and that also evoke enjoyment and approval, are more likely to be sustained by appropriate human care over the long term. People will be less likely to redevelop, pave, mine, or “improve” landscapes that they recognize as attractive. In short, the health of the landscape requires that humans enjoy and take care of it.

Protecting Land: Ownership and Aesthetics

People take care of what they own. Land ownership can mean holding legal title to land. It also can have a broader meaning that extends to the land over which we feel a *sense* of ownership: our street, our neighborhood, our park, our school, or our town. If we notice how people take care of what they own, how they design, construct, and manage the landscape, we establish a starting place for creating new habits of care that promote greater landscape ecological health.

Looking down over Minneapolis–St. Paul, and the rings of suburbs and exurbs that are the home of 2.5 million people, nearly all the places that I see where ecological function is now protected are publicly owned land. Public ownership has great benefits. I know that the network of woodlands banding the Mississippi River and the Minneapolis chain of lakes is public park land (figure 1), and while land uses in the city may change over time, the park land is likely to stay intact. The public lands are relatively large parcels that contain diverse ecosystems, and

they can be managed by a unified set of principles for ecological health. Another benefit is the result of cultural expectations for the scenic aesthetic in parks and preserves. Indigenous ecosystems have often fit the scenic aesthetic sufficiently to survive on public lands.

Just over a century ago a visionary landscape architect, H. W. S. Cleveland, convinced skeptical city fathers that maintaining the great wooded gorge of the Mississippi blufflands and the wooded fringes of the cities’ lakes was a worthy public investment. Seeing the value of protecting these natural features even before the city grew to surround them tested the vision of elected officials, but Cleveland persisted. A century later, all the residents of the metropolitan area use the great connected “Grand Round” of parks along the river and lakes, and they assume the parks to be their rightful civic inheritance. Their pride of ownership helps to assure the stewardship of the public parks.

Protruding from the northern edge of St. Paul, another network of wetlands, lakes, and planted and indigenous woodlands has a good chance of remaining intact because an early civic leader and entrepreneur envisioned that network and its watershed as the source of drinking water for the people of the city. Before Charles Gilfillan constructed a series of aqueducts that completed the flow of potable water from the Phalen Chain of Lakes and the Vadnais Chain of Lakes to the city of St. Paul (figure 1), the citizens all drank bottled water. About the same time Cleveland was at work convincing civic leaders to build parks connecting the rivers and lakes, Gilfillan sold the city water supply to a newly formed public water utility, and most of the immediate surroundings of the Vadnais Chain of Lakes also became public land. Public health, the protection of the water supply for 400,000 people in the city, assures the stewardship of these public lands.

At the top of the Vadnais watershed is the lake that serves as

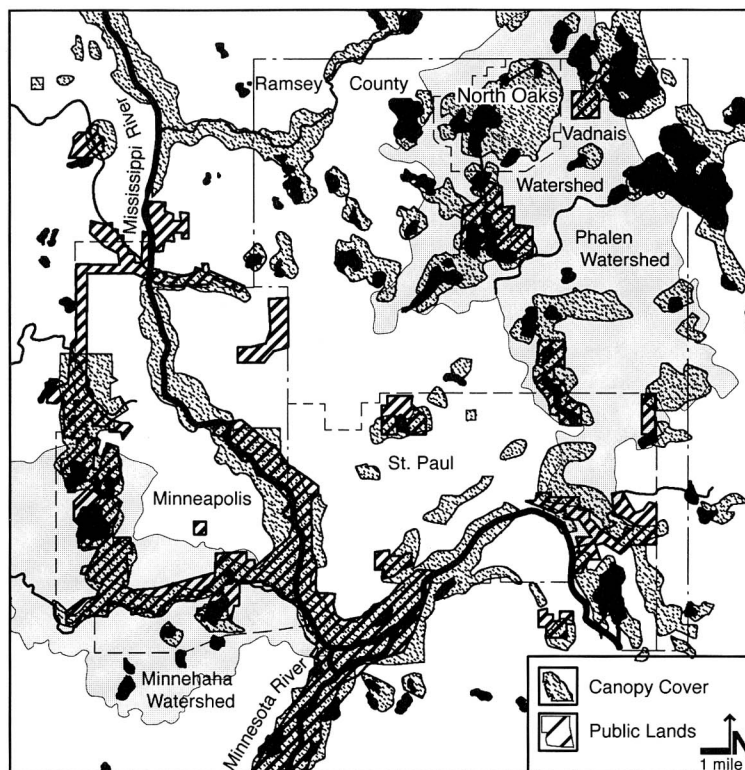


Figure 1. Minneapolis–St. Paul and the surrounding area.

one of the largest reservoirs for potable water for the city. Gilfillan sold eight square miles of land that drains into this lake to a railroad baron, James J. Hill. Hill's wealth allowed him and his heirs to manage their land with much the same aesthetic as the nineteenth-century English industrialists who wanted their estates to be picturesque. Hill experimented with raising bison, elk, and deer as well as prize beef cattle on North Oaks Farm (figure 1). Little of it was cultivated, and the oak woodlands and wetlands remained intact. In the 1950s, Hill's grandson began to

develop the farm as an ideal ecological suburb. He spent the next 40 years engaged in a thoughtful and leisurely development process, advertising the suburb as a game refuge village. It was explicitly aimed to achieve the ecological function of habitat at the same time as it invited people to live within its picturesque landscapes. This ecological suburb has been private land since the nineteenth century, but its wealthy owners' love of nature and paternalistic values led this large tract of land to be developed within a unified scenic landscape aesthetic.

Today, Hill's village, the public-land system created by Gilfillan's water-supply system, and Cleveland's river park system contain the only remaining large remnants of indigenous habitats within wholly urbanized Ramsey County. They form the critical links in a connected system of woodlands, wetlands, and lakes. These are lands that have been owned in large parcels since before the city grew to surround them. They have been managed by single owners, in one case, a family that enjoyed great wealth and had an interest in the natural world, and in the other, by local government. Both large landowners, private and public, embraced a scenic aesthetic, and to the degree that indigenous ecosystems fit within that aesthetic, they were protected.

Ownership of large parcels of land allows ecosystems to remain connected at a *landscape scale*. However, most settled landscapes are not owned or managed in large parcels. As Curt Meine describes in chapter 3, the Public Land Survey and the success of Jefferson's ideal of democratic land ownership have tended to fragment ecological function at the same time as they have distributed land ownership among many small holders. In my city, the ecological framework created by Hill, Gilfillan, and Cleveland is an artifact of one set of historical circumstances. Today that era is over, and public-land acquisition has stumbled into a massive hole of public debt and popular reluctance. Large-scale ecological networks not yet in public ownership are vulnerable. The Vadnais and Phalen watersheds, which fed Gilfillan's public water supply, are now dominated by thousands of small city and suburban residential lots. Each lot has its owner, each owner takes care of his land as he sees fit. We must work at this democratic scale of ownership, the single lot or the single farm or ranch, to achieve ecological health beyond public lands and beyond the anomalies of privileged and enlightened land development. In the United States, where recent legal decisions have tended to narrowly interpret public interests in limiting private-

property rights, and where strong cultural traditions favor the rights of landowners to do what they deem most suitable on their land, overall ecological health depends on the aggregation of innumerable individual landowner's decisions.

Even if a different era allowed large public-land acquisitions, landscape ecology still would tell us that parks and reserves alone are insufficient to protect the ecological health of the metropolitan landscape. It would be a mistake for ecological health to depend solely on public lands, which are not always healthy and are not sufficiently large and connected to provide all the ecological functions we need. Beyond the edge of the park, and often within it, streets and lawns can pollute groundwater and aquifers. It would be a lost opportunity to ignore the ecological health of private lands, where components of some indigenous ecosystems are relatively healthy and where connections between other ecosystems can be formed. Woodlands and wetlands that span the boundaries of individual yards can provide habitat and protect some indigenous species. Air can be cleaned and climates moderated by the urban forest that is the product of countless trees planted.

The consequence of individual owners determining the management of many small parcels of land could be aggregation rather than fragmentation. To see the possibilities for aggregation, look at a subdivision unified by a blanket of turf (figure 2). Pause for a moment to contemplate this achievement. Inside the houses in this neighborhood live people who might have wildly different tastes in clothing or furniture. They might have dramatically different views about nature or environmental protection. Yet their front yards look almost the same. Cultural expectations for the appearance of front yards are so uniform, so well known, and so closely identified with the character of the inhabitant that we violate those expectations only at great social risk. Now imagine that blanket of turf replaced by cover that



Figure 2. This digital imaging simulation shows a suburban landscape with conventional planting unified by turf.

Figure 3. This digital imaging simulation shows the same suburban landscape with front yards unified by gardens of native plants.

might exhibit greater ecological health (figure 3). Only if that new pattern were recognizable as meeting cultural expectations could it promote new possibilities for the appropriate appearance of landscapes.

The next generation of ecological-protection strategies must go beyond a sound tradition of land acquisition and also address individual management and development of private land. To be successful these new strategies should use the persuasive power of cultural expectations. The way people think their neighbors think the landscape should look is as important as their individual, more idiosyncratic tastes or knowledge. Andrew Jackson Downing was right in 1841 when he described the lawn as a democratic medium.² New paradigms for the appearance of landscapes must speak a widely understood and generally accepted aesthetic language. By first being palatable, landscape aesthetics

ultimately can go beyond the merely acceptable to evoke intelligent tending of the land so that aesthetic decisions can become intrinsically ecological decisions.

Intrinsic Properties of Landscapes: Scale and Change

An intrinsically ecological decision would contribute to landscape ecological health not as an addition to a standard development approach and not as an additional cost in a cost-benefit analysis of development choices. An intrinsically ecological decision would result in landscape patterns that build ecological health out of cultural necessity, because people expect the landscape to be that way. The possibilities for designing cultural necessity into ecological health are endless, and many ecological

goals for such design are specifically described by William Romme in chapter 8 of this book and by others elsewhere.³ Two intrinsic properties of landscapes that have been central to landscape ecology research—landscape scale and landscape change—are also central to how we can align aesthetics and ecology in the design of the landscape.

Landscape scale requires that our concept of landscape be large enough to accommodate flows of energy, materials, or species among heterogeneous ecosystems. For example, a wetland has little ecological value unless it is linked to other wetlands and to upland habitats as well. Landscape scale does not have a uniform meaning. Scale means size in proportion to some related measure. In landscape ecology, scale varies relative to the organism that is using a landscape. But landscape scale always refers to (1) a heterogeneous combination of ecosystems, which affect each other across space and time, and (2) a “middle” scale, within a hierarchy, of ecological processes that affects smaller-scale processes and is affected by larger-scale processes. Both the concepts of heterogeneity and hierarchy emphasize the connectedness of the landscape across space and time. Connectedness, then, is an essential property of the landscape scale.⁴

John Weins and Bruce Milne point out that at the scale of beetles, connectedness may be obstructed by a stone.⁵ At the scale of human beings, connectedness refers to landscape structure that allows flows of water, nutrients, energy, or species that people have noticed and believe to have ecological value. The human perspective, even for such a fundamental concept as landscape scale, is ultimately cultural—it depends on what we notice and value. Because humans are the organism that manages landscapes, in practice, landscape scale often means the combination of ecosystems perceivable as management units to humans. With this definition in mind, landscape scale could mean a yard, a na-

tional park, or a watershed. In each case, the ecological functions of individual patches of lakes, streams, turf, fields, forests, or even pavement are connected to one another.

Achieving ecological function at a landscape scale is critical for all lands, but for the smaller parcels typical of privately owned land, making intrinsically ecological decisions at a landscape scale contradicts our cultural norm, which allows landowners to do what they deem suitable on their own property. People design the broad landscape matrix in small increments, a yard, a farm, a subdivision at a time. What unifies this landscape matrix is widely shared cultural expectations for what people want the landscape to look like. To affect ecological function over the broad landscape, whether on public lands or the matrix of private properties, landscape scale needs to be matched with cultural scale, overarching cultural expectations for the landscape. The way people see the landscape, what they prefer and what they believe to be the proper appearance of the landscape, profoundly influences the shape and location of each patch. We need to find ways to use widely shared cultural expectations to create a highly connected network of biodiverse ecosystems.

Landscape change refers to the results of flows from one ecosystem to another and to the growth and inevitable deaths of some individuals and communities and their replacement by others. In Ramsey County, because large parcels were held by a few owners, some critical connected ecosystems have been managed at a landscape scale. But even this ecological framework is vulnerable to the degree that it lacks resiliency to accommodate change. As the old trees die, as air and water quality changes, as climate changes, as browsing deer and tidying people remove the forest understory and dead trees, how will the old plants be replaced by new ones? Will the same wildlife be able to find habitat in the woodlands, wetlands, and grasslands of the twenty-first century

as in the twentieth century? Most of the remaining biodiversity of Ramsey County has simply survived rather than reproduced itself during the past century of urban development. Passing the test of scale does not assure passing the test of time.

The scenic landscape aesthetic tends to obstruct the intrinsic property of change at a landscape scale. We try to protect scenic landscapes from changing. Martin Kreiger first wrote about the peculiar dilemmas posed by our cultural preference for preventing change in beautiful nature by posing the question, “Why not plastic trees?”⁶ While plastic trees may seem absurd, Kreiger’s question was drawn from a real proposal for the design of a Minneapolis street, and his example of shoring up Niagara Falls to meet the picturesque expectations of tourists was as real as the long-standing U.S. Forest Service policy to design clear-cuts to create a scenic image for the same audience.

Increasingly in our world dominated by humans, it is difficult to distinguish natural change from human-induced change. As Eville Gorham describes in chapter 1 of this book, industrial culture has changed landscapes at a rate that far exceeds previous natural history. These changes may be enormous and unanticipated, like the ozone hole, or small and intentional, like a patch of oak savanna cleared for a subdivision. In either case, such human-induced changes seem to be distinct from ecological changes: they occur faster and over larger areas, and they often may have undesirable ecological consequences. Where humans propose to change the landscape, the conservative drag of the scenic landscape aesthetic sometimes prevents damage; but without ecological knowledge, it also sometimes prevents ecological renewal.

The aesthetic of care incorporates change quite easily, if change appears to be mediated by human intention. A well-cared-for landscape is expected to change, but it is expected to

exhibit the signs that well-intentioned people are watching over that change. We try to keep well-tended landscapes from “getting out of hand.” We chafe against weeds taking over the field or shrubs growing over the windows. While we delight in seasonal change, we want the leaves to be raked. A forest fire allowed to burn would not exhibit care, except perhaps to the most knowledgeable fire fighter, who might see traces of thoughtful forest management in the moderation of the fire and in the appearance of the landscape after the fire. A forest timber cut could exhibit care—depending on how we expect good forestry to look. The aesthetic of care causes us to be watchful, if we know what to look for. If we know a well-cared-for woodland includes seedling canopy trees, we will look for them. If we know the oak woodland should not be diminished by fragmentation, we will look to see that the edge of the forest remains intact.

Scale and Aesthetics: Community Attention

An aesthetic that meets the approval of the neighbors may seem a peculiar place to start if our goal is to save the planet for human habitation. To most people aesthetics implies trivial decoration, and social conformity seems to contradict social change. But philosophers convincingly argue that aesthetics has a fundamental effect on how we see the world, and naturalists and ecologists who are interested in protecting the landscape have reached the same conclusion. Marcia Muelder Eaton’s definition of aesthetic experience clarifies why aesthetics is fundamental, in part because it reflects cultural values: “aesthetic experience is marked by perception of and reflection upon intrinsic properties of objects and events that *a community considers worthy of sustained attention*” (emphasis mine).⁷

When applied to landscape ecology, properties that the community considers worthy of attention implies properties at a landscape scale, that is, properties that would be perceivable as people move throughout the landscape. The scenic aesthetic is perfectly suited to the landscape scale in that it explicitly values long distances (the beauty of distant horizons) and movement across the landscape (travel to enjoy a composed sequence of landscape views). Consequently, the scenic aesthetic has supported the protection of relatively large landscapes that are perceived as natural, like the large parks and public landscapes of Ramsey County, and within these landscapes it has allowed the protection of patches of some indigenous ecosystems. Ironically, the very qualities of distance and movement that fit the scenic aesthetic to the landscape scale make it inadequate to address the larger settled landscape, which is dominated by small parcels. The community values scenic places, and some people are lucky enough to live in them, but only the most wealthy might expect to *make* a scenic landscape in their own yard. In addition, the scenic aesthetic is fundamentally flawed by the premise that human presence should be hidden. The picturesque appearance of a landscape can distract us from asking questions about how humans have affected it.

The aesthetic of care affects landscapes more broadly than the scenic because it sets the aesthetic standard for even the most mundane places, including the small parcels that connect protected lands. Care implies that a person or community has ownership of a place—if not as personal property then as social identity. Fields of row crops in the Midwest, suburban lawns, and urban streets dotted with window boxes and planters all typify this aesthetic of care: neat, green, trimmed, straight, evenly mowed, painted and clean, and colorful flowers displayed. In all cases an ecological regime that depends on frequent human

tending tells all who pass by that someone is caring for the landscape. The place is perceived as the persona of its owner—whether the ownership is the caring of a community or a homeowner, whether the place is a park or a front yard. The place tells about the owner's pride, work ethic, or wealth. It tells about the owner's involvement in the future of that landscape.

The community values signs of care in the landscape, and these signs of care can prevent misuse of nature by showing traces of well-intentioned human action to maintain the landscape. We maintain landscapes to draw approving attention and to avoid the disapprobation of our community. A landscape that does not show signs of care may be perceived as abandoned and messy. A place that looks abandoned is vulnerable to development or misguided improvement: The prairie remnant becomes a superstore, the wetland becomes a neatly turfed pond. A place that looks messy is usually cleaned up so thoroughly that biodiversity is virtually eliminated. The new chief executive officer, who does not understand or appreciate the woodland restoration on the corporate headquarters site, replaces it with a conventional lawn. The happy owner of a building site in the country removes all the underbrush and weeds before installing a new landscape to equal the beauty of a new house.

Like the scenic aesthetic, care also can destroy ecological health while it satisfies community aesthetic values. The premise that human presence should be prominently displayed places no intrinsic value on nature. However, nature without clear human intention seems unoccupied and invites human presence, whatever its intention.

Both aesthetics, then, provide cultural rules for the landscape scale, but neither intrinsically supports large-scale ecological function. To support ecological function, the scenic aesthetic must be modified to reveal rather than obscure human effects.

The aesthetic of care must be modified to incorporate the apparent disorder of indigenous ecosystems within the reassuring visual framework of human presence.

Change and Aesthetics: Sustained Attention

Modifying the aesthetic of care may provide a key to attracting a community's sustained attention to ecological function. Eaton defines aesthetic experience as "perception of and reflection upon . . . (that which) the community considers worthy of sustained attention." Care of the landscape is a form of sustained attention that also invites the attention of others. When people notice landscapes, they are more likely to care about and take care of them. When people take care of landscapes or are flagrantly derelict in their care, people notice them.

Care is attentive to change. It means watching over something that changes. It means watching over a place and intervening in change to achieve a proper landscape. In this way, landscapes are more like children than works of art. They require tending, not making. They do not thrive under absolute control. Inevitably they change, and they change independently of those who enjoy and care for them. Regardless of good intentions, ignorant care can make a spoiled child, overindulged with too much of a good thing. Similarly, the signs of landscape care that we see in American neighborhoods and farms may show us spoiled landscapes, the products of superficial good intentions rather than a more profound understanding of what is ecologically good. Superficial appearances that belie ecological flaws leave us dissatisfied and uncertain. We know what we like, but we may learn that it is spoiled. We may come to see that neat landscapes of even, green lawns or straight, weed-free rows of crops have little biodiversity, little ecological structure, and require nutrients and pesticides from outside the ecosystem. Well-kept ponds seldom exhibit the

ragged edges of biologically rich wetlands. Prairies seldom exhibit the riotous bloom that we recognize in a perennial garden. Care is beneficent, but a healthy landscape requires intelligent care.

The pleasure of aesthetic experience compels attention and action to sustain our pleasure. Attention to landscapes and sustained action to maintain their ecological function is what we need. In a world dominated by humans, we want landscapes that evoke our care over generations.

Proper Care and Evolving Aesthetic Expectations

Propriety drives much of our culture's extravagant attention to landscape care. We should enlist the powerful force of social approbation that drives homeowners out with lawn mowers on weekend afternoons to invest proper care with a broader, more authentic meaning. Care can be intelligent and strikingly apparent at the same time. If cues to propriety can be retained in the landscape, there may be room for greater ecological quality as well. Intelligent care would be knowledgeably attentive to ecological health. Vivid care would signify the existence of ecological health by unmistakable beauty or attractiveness.

Intelligent Care. Intelligent care depends in part on learning to recognize what is ecologically healthy. Eaton describes the aesthetic rewards of ecological knowledge in chapter 5. Because aesthetic satisfaction involves us more deeply in the landscape, we continue to learn more and grow more intelligent in how we tend the land.⁸ Intelligent care also depends on knowing that we seldom know enough. It depends on *environmental humility*, a term Edward Relph coined to describe that we need to acknowledge the limitations of what we know and even what we *can* know when we change the environment. He suggested that

“it is the responsibility for protecting and guarding environments as they are in themselves, and with neither domination nor subservience, that is the foundation of environmental humility.”⁹ Aldo Leopold’s admonition that “to keep every cog and wheel is the first precaution of intelligent tinkering” suggests a first principle for exercising environmental humility.¹⁰ As we confront the limitations of our ecological knowledge, we need to work conservatively in the landscape, saving every possible remnant of remaining indigenous ecosystems even if we cannot fully anticipate all of their potential values. Similarly, we are wise to extract what we can observe about indigenous ecosystems and imitate these observable properties when we construct and maintain the landscapes where we live.

A picture of environmental humility might look like a prairie in a garden in a prairie—all writ large on the landscape. At the broadest scale, environmental humility would require that tended places fit into a larger ecological scheme—avoiding the wet prairie or the driest prairie where a garden would not thrive. At a middle scale, the well-placed garden might look recognizably neat, an inviting place where we might expect to find the gardener. At a smaller scale, we might find a small patch of prairie in the garden, alongside the pumpkin patch and the rows of carrots. More than any other part of the picture, this little prairie symbolizes our environmental humility. It says that even where we think we know, we suspect we have more to learn about what the garden can produce. Intelligent care intentionally inserts valued properties of indigenous ecosystems into inhabited landscapes.

Vivid Care. Vivid care draws attention to the human presence in healthy landscapes in order to sustain ecological health over time. Emphasizing a benign human presence protects ecologically rich landscapes from less intelligent human control. A well-kept

prairie park will not be mistaken for a weed patch. A carefully managed oak woodland is less likely to fall under a future subdivision. The more vivid the cues to human care in an ecologically rich landscape, the stronger the social claim to its ecological quality.

D.W. Gotshalk described the artist’s work this way: to select, refine, and vivify what ordinarily is lost in the confused array of everyday experience.¹¹ Gotshalk’s description suggests that designers should vivify ecological function if we want people to enjoy the health of the landscape. Designers’ and artists’ work to improve ecological quality may have its greatest effect where it selects valuable ecological functions and makes them vivid for human experience. In this way, small, special places can demonstrate the health that is required for a more authentic conception of care. Undoubtedly, artists’ and designers’ ecological visions for particular places move people to see all landscapes in a different way. Gotshalk’s description also suggests that we can select, refine, and vivify the essential cues to care in the everyday landscape. Refined and concentrated, cues to care may be used sparingly to evoke public attention to ecologically rich landscapes over time and across space. Rather than dominating the landscape matrix, the well-kept landscape may evolve to include new forms of ecologically rich landscapes that clearly stake a social claim in their future.

We can align aesthetics and ecology by design. Bringing aesthetic expectations into play in a way that benefits landscape ecology requires designing strategies, landscapes, and policy with an awareness of what people enjoy and value in the appearance of the landscape now. A certain aesthetic conservatism about landscape change is not a bad thing when it prevents undesirable ecological consequences. But where the landscape should accommodate ecological change, how can landscape aesthetics evolve to make a place for dynamic ecological function?

People will sustain healthy landscapes if they enjoy them, and they will enjoy them when they know more about how to recognize ecological health. Eaton's central point in chapter 5 is that aesthetic experience of landscapes is increased by greater ecological knowledge. How do we achieve greater ecological knowledge? Environmental education is essential in all its forms. In the landscape, teachers can educate about the environment in places that are intended for education like school yards or nature centers. They can also teach about nature in a neighborhood, a farm, or a forest. In any setting, when people are directly involved in the landscape, for example, by constructing or planting or monitoring it, their sense of ownership may be greater and their attention to the place more sustained over time. Perhaps the most powerfully omnipresent form of environmental education is simply viewing the landscape. Looking at the landscape as we go about our everyday travels, we constantly judge what we see and learn from it. We should design landscapes and policies to intentionally use the appearance of the landscape to help people recognize ecological health.¹²

One way to do this is to design landscapes that protect or reveal ecological function. Analyzing and protecting ecological function has been part of the normal process of landscape architecture for more than a century. More recently, a new genre of art has aimed to reveal ecological function, and landscape architects have emphasized ecological revelation in their work as well. Each of these actions toward ecological function—to protect it or to reveal it—advances the evolution of new aesthetic conventions for the landscape. But as strategies, neither action is sufficient to evoke change at the scale of the landscape. Neither protection nor revelation necessarily involves people in maintaining ecological quality in the landscapes that are part of their everyday

experience, where artists or landscape architects have not designed every site. Art can speak to the condition of the larger landscape matrix, but it does not immediately transform it. Landscape-scale change beyond the edges of protected areas or art works must grow out of changed cultural expectations for the everyday landscape. Cultural expectations affect ecological health at the landscape scale—over the entire matrix.

Cultural expectations can change when familiar aesthetic conventions are used to frame the novel appearance of ecological function. Elsewhere I have described the juxtaposition of what we tend to see as “messy” ecosystems with orderly frames, cues to care in the landscape.¹³ Cues to care include mowing, tidy fences and walks, bright flowers, and trimmed, straight edges—all used sparingly and placed strategically to frame ecosystems for sustained human attention. Along with the more large-scale features of the scenic aesthetic, cues to care can encompass ecosystems that bring greater biodiversity and more types of habitats into settled landscapes. They label the landscape as attractive in a way that is familiar and immediately apparent. Framing ecological change in recognizable aesthetic features allows us to use the cultural momentum of the present to benefit the ecological function of the future.

Aesthetic Expectations in the Service of Ecological Function: The Phalen Watershed

A new set of aesthetic expectations is emerging in the watershed surrounding the Phalen Chain of Lakes, which formed one arm of Gilfillan's public water supply system (figure 1). From the air, the watershed looks like other sectors of the city. It is covered largely by houses and yards, driveways and streets. Like much of

the region, it encompasses hundreds of acres of connected oak woodland, once part of the indigenous oak savanna ecosystem. Happily, these beautiful trees fit easily into recognized cultural images for attractive yards. While their understory companions have been nearly eliminated and their means of regeneration is in doubt, for now the oak canopy exists as a dramatic wash across public and private land. However, the canopy has been severed where freeways and streets lay a placeless network of auto traffic over the landscape. Shopping centers, office parks, strip malls, schools, and churches establish nodes of human activity throughout the system. The Phalen watershed is also distinguished by its ecological spine, the chain of lakes, streams, and wetlands running down its center with their immediate perimeter protected as public land.

But I know that what I see from the air tells only part of the ecological story. Beneath the chain of lakes and the shaded neighborhoods is a complex network of storm sewers—all of which dump rainwater carrying the debris of suburban living into the lakes. The thin fringe of public land surrounding the lakes cannot protect them from the sediments, nutrients, and waste products that are expelled by the storm sewers. Both the quality of water entering the lakes and the biodiversity of the habitats that make up the network of Phalen watershed ecosystems are being addressed by vivid, intelligent care in new forms of urban landscapes. These new forms of care are encouraged by a watershed ecosystem-management plan that was developed by collaboration among six municipalities.¹⁴

At the mouth of the watershed, near where Gilfillan's pipe drained water from Lake Phalen, a five-acre wetland, apparent on nineteenth-century maps, helped to clean water before it flowed into the Mississippi River. In the 1960s a land developer tracing the route of a planned highway saw the wetland as a large un-

occupied parcel of land in a densely settled neighborhood. It was purchased, the wetland was filled, and a shopping center and large parking lot were constructed in its place. The wetland soils and plants that had occupied this place soon made their presence known by the cracking foundations and wet basements of the shopping center buildings and the persistent large puddles in the crumbling asphalt of the parking lot. Today, people in the neighborhood envision a wetland park in place of the shopping center (figures 4 and 5). Soon the landscape will be constructed in a pattern that local people will recognize as a well-kept amenity they can be proud of and that the landscape ecologist will recognize as the replacement of a missing part of the ecological network. This double vision of cultural expectations for everyday landscapes and patterns for ecological function makes the wetland and its associated upland habitats sustainable as part of the community's image of the park.

Sloping south toward the wetland, a sunny, well-kept lawn will adjoin the apartment houses, where many children live. New businesses are planned along the street next to the lawn. From the shops and play area, people will look down on the lush wetland and a riparian woodland beyond. Brightly colored flowers indigenous to wet meadows will line the wetland in vivid bands. Before water runs into the wetland, pollutants from the lawn and the street will be filtered by the wet meadow and by neatly edged gardens of prairie plants pouring down the hill. All of these cues to care will frame the wetland and woodland. Ecological function will be more explicitly set forth in the storm-water-cleaning garden in the southeast corner of the park. Taking water directly from the storm sewer of the surrounding neighborhood, the garden will be a beautiful urban space that vividly demonstrates how storm water is cleaned before it enters the wetland. Finally, the wetland park will build connections to



Figure 4. The Phalen Shopping Center in St. Paul as it appears today.



Figure 5. The design for the Phalen Wetland Park as it is envisioned for the current site of the shopping center includes a woodland corridor, filter strips of native prairie and wet meadow plants, and a storm-water cleaning garden.

landscapes at a larger scale. All along the busiest road in the park, a habitat corridor will connect the constructed ecosystems of the park with the larger migratory and daily foraging corridors of birds that have had to pass over the old parking lot. Cues to care in other parts of the park will encourage people to stay on the grassy slopes to observe wildlife rather than entering the woodland corridor.

Further north in the watershed, in a first-ring suburb, an imaginative city engineer questioned the fiscal cost and ecological benefit of retrofitting a subdivision established in the 1950s with a conventional storm-water system in the 1990s. He knew that a conventional system would only increase the direct flow of polluted water to the lakes and reduce local recharge of the aquifer. Beginning with an intensive interview process to understand what residents of the subdivision expected and enjoyed about the appearance of their yards, the city engineer has worked

with landscape architects to design a storm-water system that will infiltrate rainwater back into the ground rather than sending it down a gutter and into a pipe. This design increased the connectivity and biodiversity of the urban forest by constructing a wooded corridor down the abandoned alleyway. Open views to the fronts of the houses, ample (though reduced) front lawns, and new flower gardens (that infiltrate storm water) were designed as cues to care (figure 6). The modest homes and quiet street have become a model for other suburbs in the city.

Near the north end of the watershed, another suburb is constructing a new kind of urban ecology center. A wetland, which is being constructed on the site of an abandoned sod farm now in public ownership, has been designed to evoke a scenic aes-

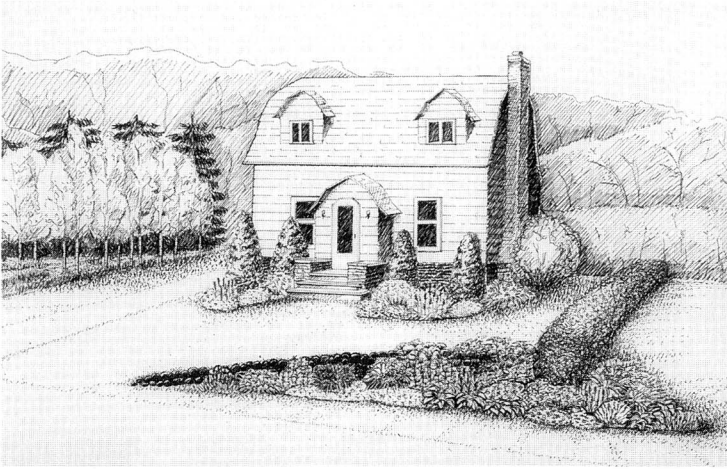


Figure 6. The front yard of one house on the street that was retrofitted to infiltrate storm water and increase biodiversity. New rainwater gardens have been designed to introduce people to native prairie and wetland plants and to improve ecological health.

thetic, to look like a place where people can immerse themselves in nature. What is new about this urban ecology center is that it will show people in the community a nature that they themselves are actively constructing and monitoring over time. This is a conception of nature that requires intelligent care and makes it vivid, not a conception of nature that hides the effects of human tending. For the hundreds of children who will use it as part of their studies, the center will not only be an isolated place; it will also be experienced on a landscape scale, as part of an urban landscape ecology journey (figure 7). Walking from their school, they will follow a designed route that vividly displays the ecological effects of their school, a shopping center, and residential neighborhoods that are connected by water moving into and from the wetland. The journey will help people see the ecology center in its landscape-scale and cultural aesthetic contexts as well.

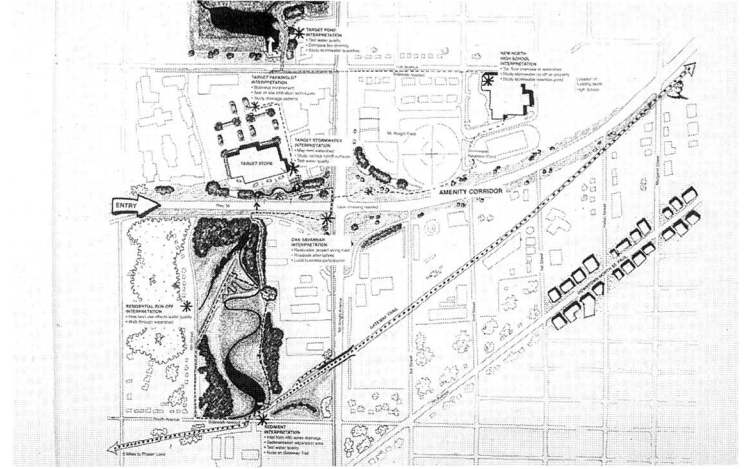


Figure 7. The new urban ecology center teaches students about the ecology of the surrounding city when they take the landscape ecology journey to and from the constructed wetland.

Conclusion

In the twenty-first century, landscape ecology must be supported by cultural sustainability. Landscapes that evoke the sustained attention of people—that compel aesthetic experience—are more likely to be ecologically maintained in a world dominated by humans. Waste places, where remnants of indigenous ecosystems survive unnoticed, will not be able to escape anthropocentric land management under pressures of population growth. We will no longer enjoy the unintended benefits of our own neglect. Public lands where parts of indigenous ecosystems remain will depend on increasingly active management to retain selected ecological functions in the face of disturbance regimes and atmospheric effects altered by culture. Selecting those ecological functions that will be supported by human action is itself a powerful expression of culture. The omnipresence of human distur-

bance demands that concern for ecological health extend beyond the boundaries of public lands to encompass the larger matrix of private land.

Enlisting human behavior to support ecological function requires cultural analysis. We must look beyond rational economics to aesthetic experience to understand why people maintain particular landscape patterns. People make and manage landscapes not only for what they produce but for how they look and how they are *supposed* to look. Policies and strategies, landscapes and technologies should be designed to align aesthetic expectations with ecological health.

If we align the aesthetic experiences that people already value with the ecological health they do not yet know how to recognize, we can build landscape ecological structure while we are building new cultural expectations for ecological health. We can open and correct the scenic aesthetic by engaging the aesthetic of care to show beneficent human intention. We can correct the aesthetic of care by aligning the complexity of healthy ecosystems with recognizable cues to human intention. A landscape is culturally sustainable if people pay attention to its quality. The pleasure of aesthetic attention can draw people to attend to the ecological quality of the landscape. The social significance of the well-kept landscape further compels people to attend to landscape care. We should use the pleasure of aesthetic experience and the social significance of care to build new aesthetic expectations that intrinsically rest upon ecological health.

Acknowledgments

The figures included in this essay are part of research projects conducted with the support of the USDA Forest Service Urban Forestry Project, the McKnight Foundation, and Minnesota legislature as approved by the Legislative Commission on Minnesota Resources. Their

support was essential to this work. For assistance in creating the figures in this essay, I thank Andrew Caddock and Kevin McCardle (figure 1), Fred Rozumalski (figures 2 and 3), Ross Martin and Vera Westrum (figures 4 and 5), and Amy Bower (figures 6 and 7), all of whom assisted me in conducting research. For their leadership and collaboration in Phalen Watershed Projects, I am very grateful to: Sherri Buss, manager of the Phalen Watershed Project; Cliff Aichinger, director of the Rhamsey-Washington Metro Watershed District; Ken Haider, Maplewood City Engineer; and Karen Swenson, director of the Northeast Neighborhood Development Corporation.

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