Representation and Reclaiming: Cartographies, Mappings, and Images of Altered American Western Landscapes

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Abstract: This essay argues that critical representation lies at the heart of understanding (and finding potential for) reclaiming landscape—an emerging practice of landscape design that will occupy significant acreage in the western United States by the year 2200. The western landscape is presented as a unique and dynamic region being reclaimed through the interests of mining and energy resource producers, federal and public land use controls, and population migration. These conditions are presented as entrenched frameworks guiding western landscape development. This essay argues that rather than deny their authority and ability to persist, these systems can be worked with opportunistically to create a future for the West whereby one imagines new dispersals of reclaimed federal domain land, and reclaimed private land, with inventive post-mined ecologies and programmatic uses. Speculation about a new western landscape demands fresh ways of seeing, imagining and designing its potential future. Envisioning how reclaimed landscapes are designed opens new dialogues for redirecting how culture thinks about reclamation. The work presented uses a wide array of graphical agents to represent reclaiming through cartographies, mappings, and images. Each representational system is explored as a unique language that reveals the emerging reclaimed landscape.

The Altered Western Landscape

"The making of one world out of another usually involves some extensive weeding out and filling—actual excision of some old, and supply of some new material."

"The history of the West is a history of exploitation."
Richard Lamm, former Colorado Governor (1982, p. 6)

"The men themselves might move on, but the evidence of their presence would remain."
Patricia Nelson Limerick (1987, pp. 16, 17)

The American Western landscape is being reclaimed. It continues spawning ideas of expansion and discovery, exploration and reconnaissance, and technological domination and transformation. Miners, ranchers, foresters, speculators, railroads, and the federal government all play major roles in this evolution (Webb 1931, 1951; Frazier 1989). Increasing human occupation and cultural production within the American West continues to alter the landscape. During the last part of the twentieth century, a concerted effort began to reclaim these alterations. Since passing of the 1977 federal Surface Mining Control and Reclamation Act (SMCRA), the first comprehensive regulatory mechanism for reclaiming altered landscapes (e.g. surface coal mines), dozens of other laws to enforce mined landscape reclamation, including hardrock and underground mines, have been enacted.

Few however, have paused to interpret landscape reclamation from viewpoints other than purely scientific or visual. Consider these questions:

1. What are the qualities of reclaimed landscapes that make them different from other types of land?
2. How do reclaimed, or altered landscapes, get reused?
3. Should they be made more or less productive?
4. What opportunities do altered landscapes create for new types of landscape occupation?

While my forthcoming book engages these questions and others in substantive detail, this essay explores some of the representational issues
derived from the evidence of altered landscapes.

Landscape reclamation has public and environmental health benefits, such as supporting the reduction of acid drainage and removal of heavy metals from waterways, or slowing erosion of exposed terrain. Reclamation or reclaiming, however, is much more complex than quantitative considerations alone. More difficult to discern are the creative, ethical, aesthetic, spatial, temporal, naturalistic, and philosophical effects of reclamation. From the qualitative point of view there are more questions to consider:

1. Why do we reclaim disturbed landscapes?
2. How are reclaimed landscapes perceived?
3. How do reclaimed landscapes evolve?
4. Are there other cultural and environmental benefits of reclamation?
5. Should we continue to pursue, or even value, reclamation as a landscape practice? If so, what might be the results?

These are the questions to be asked as the nascent interest of reclaiming landscapes begins to reshape significant portions of the American West. Speculating about this “emerging landscape condition” demands fresh ways of seeing, imagining, and designing its potential future. Envisioning how altered landscapes become reclaimed opens opportunities for new dialogues for redirecting how culture thinks about the design of reclamation activity. Another principal question arises that underlies the work of reclamation: Do methods of representation play roles in the cultural judgments of altered landscapes?

The following paragraphs address these issues, although providing definitive answers is a difficult task aided by the notion that reclamation is a cultural phenomenon. Rather, there are three pressures directing reclamation in the West. First: the federal control of Western land use. Second: the energy resources lying beneath the Western landscape, and their inevitable development.

Third: the paradoxical issue of postmined land use, or how to reuse landscapes that have been highly altered, or abandoned. These three topics are addressed first as a means to reveal the hidden cultural systems influencing the desire to reclaim landscapes. Next, reclaiming as a distinct type of landscape design will be defined. Then a more detailed exploration of cartographies, mappings, and images—three representational systems used to envision the reclaimed landscape—will be discussed.

**Mining, Energy, and the Federal Western Landscape**

After more than two centuries of accumulation, dispersal, distribution, and fragmentary occupation, federal western lands seem to be stabilized at about one-half of the western land surface (Figure 1) (Clark 2000). Grazing, water management, forestry, and national parks remain major influences over federal western public land-use policy. One of the greatest challenges for the future of the western landscape is mining in all of its varied forms (surface, underground, coal, and hardrock). Nearly 80 percent of the mineable U.S. coal reserves lie west of the 100th meridian, primarily on federal lands (Dragoo 1993, p. 173). The majority of U.S. recoverable metal resources (copper, gold, silver, platinum) also are found in this region (Figure 2). When consumable energy problems impact Americans (such as the 2001 rolling blackouts in California, or rising gasoline and natural gas prices), domestic dependence on relatively inexpensive coal-derived resources immediately increases (Figure 3). When commodity prices rise, hardrock mining for precious metals increases to lock in profits (Figure 4). The result is an increase in mining operations throughout the Western states, which ultimately become "reclaimed landscapes." The results are three-fold:

1. an increase in western mining operations
2. an energy crunch accompanied by accelerated land and mineral leasing by the Department of the Interior
3. an increase in activities to "reclaim" landscapes.

For example, during the energy crisis of the 1970s hundreds of thousands of acres of federal land were leased to energy concerns. Today, most federal land in the Western United States is leased for energy exploration and production by a relatively small number of corporate giants. In 1979 a study published after the energy crisis of the 1970s, the Federal Power Commission found that 8 major corporations leased 74 percent of the available oil and gas reserves within federal lands (Barnes 1979, pp. 126, 127).

With sustained demand for fossil fuels, such as coal, oil, and gas, control of land within the federal Western landscape will remain in the hands of energy interests. The United States Department of the Interior states: "The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people." Western landscape energy resources, assuming current production rates, on federal lands, will be mined out during the second decade of the twenty-first century. This means it is possible that over 130 million acres of federal western landscape (or about 8 percent of the U.S. coal reserves) will be reclaimed over the next two hundred years. Adding acreage associated with hardrock mining (mostly for gold, copper, and silver) and private property mining significantly increases the total quantity of potentially reclaimed lands. Although the total acreage is difficult to predict in the wake of coal and hardrock mining, a vast new post-mined landscape will be created in the wake of western mining.

**The New West: A Need for New Landscapes**

There is a renewed interest in the West (Limerick 1987; Riebsame 1997; Worster 1992). It is centered on an idea that the history of the
West continues to evolve and mining and reclamation activities increase. A long held definition of the West, as a “frontier” that was opened and closed, was formed by historian Frederick Jackson Turner (Turner 1996). Contemporary historians are rewriting Turner’s monolithic Western thesis into more fragmented versions of resultant evolution and change of western lands. In Atlas of the New West, the West is broken into separate regions known as the Pacific West, the Great Plains, and the Interior West (Riebsame 1997, p. 46). The Interior West (also called the InterMountain West) is described as those areas bordered between the Rocky Mountains and the ocean states. These include Colorado, Utah, New Mexico, Nevada, Wyoming, Montana, Idaho, and Arizona. The Intermountain West forms the largest conterminous active mining (coal and hardrock), and soon to be reclaimed, region in America (Figure 5).

The abundance of natural materials (perceived by many as endless), in the West continues to seduce multinational mining conglomerates, and attracts millions of migrating Americans. During the 1990s, Colorado, Arizona, Utah, Nevada and Montana were the five fastest growing states in the U.S. (Riebsame 1997, p. 96). Our culture exerts enormous expectations on these landscapes to support increasing popula-
tions to the point of challenging the landscape’s capacity to support growth (Figure 6). Other regions of the U.S., moreover, increase this pressure by exporting mined landscape resources from the Interior West (including water) to support their own needs. A fundamental contradiction results: For culture to maintain its current demand for natural resource production, it must alter (and reclaim) the western landscape at a rapidly increasing rate. In turn, culture occupies the altered (and reclaimed) landscape in new programmatic ways that include higher development densities (Clark 2000). This situation stimulates deeply contrasting opinions about preservation and resource production from the western landscape. Patricia Nelson Limerick writes in The Altered Landscape: “A tree falls, and in today’s West, rather than permitting the tree to fall silently and unwatched in the wilderness, the whole world seems to watch it fall and instantly flies into polemical overdrive. A tree falls, and nature has been improved, developed, settled, made profitable, put to good use, tailored to fit with human needs. A tree falls, and nature has been degraded, reduced, devastated, damaged, raped, castrated” (Limerick 1999, p. 11). When resource production occurs, culture struggles to figure out what to do with leftover landscapes; we treat them so as to prevent any further damage to culture or the environment itself. These issues are at the heart of what Donald Worster calls the "Western Paradox." He states:

To date the West has hardly acknowledged that it has created any contradiction at all. It has simply built more dams, made more money, packed in as many people as it could, ignored the costs to the environment and society that had to be paid, and told itself all the while it was the freest place around. Now that will no longer do. We have arrived at the age of complexity in this region, when it is clear that neither a simple-minded nature fantasy nor a simple-minded greed will give us a future worth living. (Worster 1992, pp. 90, 91)

A clear example of this contradiction lies only a few miles from downtown Denver. It is the Rocky Mountain Arsenal (Figure 7), which sits at the northern edge of Denver and covers 27 square miles. Beginning in 1993, the Rocky Mountain Arsenal was reclaimed into the nation’s largest urban wildlife refuge.
and is now known as the Rocky Mountain Wildlife Refuge. Guided public tours point out abundant fauna species and unique habitat. Neighboring Commerce City’s Economic Development Office promotes the refuge as a natural wildlife asset for all to enjoy and a place to discover nature right in the city.

Prior to becoming a refuge, the arsenal was home to chemical weapons manufacturing and munitions and pesticide production for more than three decades. The U.S. Environmental Protection Agency once believed the arsenal held the most toxic square mile of land on the planet! (Cronon p. 66). In late 2000, almost eight years after the site was opened for public tours, ten sarin (nerve agent) bombs were unearthed by a construction crew working near an area open to the public. Tours of the wildlife refuge by school children were canceled during the ensuing process to dispose of the bombs.  

The arsenal/refuge is managed by the U.S. Department of the Interior in cooperation with the U.S. Army. Reclamation is estimated to cost $2 billion. It is expected to continue until 2011. The arsenal is home to a winter-roosting population of American bald eagles, as well as other threatened and endangered species that share ground with constant reclamation activities. These activities include: extensive groundwater treatment, long-term groundwater monitoring, 200,000 cubic yards of contaminated soil removal, an on-site hazardous waste landfill to dispose of 1.7 million cubic yards of contaminated soil, and demolition and disposal of on-site structures and buildings.

This is the altered landscape. It is proof, albeit extreme, that Worster’s paradox is emerging as a new type of landscape complexity. This complexity is built into mined landscapes, because miners are required by federal and state laws to
have a permitted post-mining land use plan before mining begins. Resolutions of the "landscape paradox" offer new opportunities (in the forms of altered and reclaimed landscapes) to acknowledge the human-induced environmental changes in the western landscape, and to advance landscape production for broader cultural purposes. One of the suppositions of this essay maintains that all altered landscapes can be reclaimed into new types of ecological situations, having wider programmatic possibilities. The West's burgeoning population, with its vast mining resources, makes it fodder for speculation about the creative design potential of reclaiming for new users of the landscape. One of many "mining" landscapes that demonstrates the creative potential of reclaiming is a former gravel pit in the median of Interstate 70 near Grand Junction, Colorado. After mining, jurisdiction for the pit was assigned to the Colorado Department of Transportation (CDOT). CDOT agreed to let the U.S. Fish and Wildlife Service use the pit for the Upper Colorado River Endangered Fish Recovery Program. Fingerling Razorback Suckers now thrive in the 10-acre pond, which will be stocked each year as the fish are dispersed to new habitat along the Gunnison and Colorado rivers. This is the first time CDOT is known to aid endangered fish. 

Reclaiming Distinctions

The etymological origins of the word reclaim are derived from the prefix re-, meaning back, again, against; and the root claim, meaning to ask for as a right, or to call for. It is also derived from Latin clamare, meaning to cry out, or shout. Together, reclamae means to cry out against. In contemporary culture,
this translation is more akin to the reaction against human alteration of natural environments. "Crying out against" alterations of nature by humans created what we know today as "reclamation" (Smith 1993, pp.105–123). Works of reclamation operate in realms of the post-etymological translation; they refer to ideas of reform, recover, and rescue. A definition taken from a recently published dictionary demonstrates contemporary usage of the word reclaim. For example:

a. to recall from wrong or improper conduct (reform)

b. to rescue from an undesirable state or to make available for human use by changing natural conditions (reclaim)

c. to obtain from a waste product or by-product (recover)

d. to demand the return of or regain possession of (return).¹⁰

Common to all these definitions are ideas of claiming or constructing new futures out of pre-existing conditions. That is, a consumption of the old and construction of the new.

Mining the earth is the removal or extraction of non-renewable natural resources. The results are varying forms of permanent landscape alteration.

Why do we reclaim?

Many scholars attempt to answer this question. However, there is no consensus about the answers. Most arguments revolve around the ideas that society will no longer tolerate land used and left in unproductive or unaesthetic conditions. While true, it fails to explain the deeper meanings underlying culture’s need to reclaim. Consider these questions: Does culture, for example, not toler-
ate altered landscapes because they are ugly, dangerous, or wasteful? Would society approve of altered landscapes that are transformed to support productive uses rather than being left to heal themselves? Does society promote reclamation activities out of guilt or shame for the destruction caused by consumption-driven mining? What ethical values determine thoughts and methods of reclamation? One must probe reclamation with questions such as these by finding and representing evidence of altered and reclaimed landscapes occurring in the American West. Reclaimed landscapes are a product of technology, science and culture working to reorder it in new ways. Constructional systems created for landscapes, reclaimed or otherwise, are radical reorderings that potentially enable one to construct views of reality in ways that fulfill their purposes.

Humans are constantly reordering reality.11 (Goodman 1978, p. 13; Halprin 1986, pp. 40–59) with devices such as dams and hydroelectric plants, to highway systems, and inner cities. Reclaiming landscapes involves reordering physical entities (such as natural systems, ecologies, programmatic experiences, sun and shade, wind and water) and nonphysical phenomena (such as perceptions, jurisdictions and histories). Over the past two decades, the West has been marked with countless sublime reparations (Figures 8 and 9).12 (Nye 1999, pp. 7, 16, 43). From these interventions one may find a deeper, perhaps even critical reading of the ideologies that are giving form to the "reclaimed" American Western landscape as it is now known.

How is "reclaiming" distinguished from other types of landscape reparation? Landscape reclamation is most often confused with landscape restoration. The two activities involve very different concepts and practices. Landscape restoration in the United States is said to have begun around 1935 (Jordan 1987, pp. 1–21). There are now many examples of successful restoration landscapes worldwide. Landscape reclamation—the reconstruction of mined landscapes—did not begin on a wide scale until after the 1977 Federal Surface Mining Control and Reclamation Act. Results of initial reclamation efforts are beginning to emerge as their new ecologies have had fewer than twenty-five years to evolve.

Restorationist William R. Jordan III describes the role of his field in his forthcoming book: "Ecological restoration is the attempt... to do... everything possible to heal the scars and erase the signs of disturbance and disruption... The aim of the restorationist is to erase the marks of his own kind from the landscape"—without judgment.13 It implies "... bringing something back to a former condition whatever that might happen to be, and to do this comprehensively—that is, to restore all the features of the model system—that those that we find uninteresting, ugly, repulsive or even dangerous, not just those that we find beautiful, interesting or useful."14

Figure 7. Map of Rocky Mountain Arsenal/Wildlife Refuge showing its proximity to Downtown Denver.
Reclamation is similar to restoration in that it seeks to do all of these things, but different in that it often disregards the site's pre-existing condition. Reclaimed landscapes are larger in magnitude and alteration (that is, more is permanently taken from mined landscapes that cannot be replaced) than landscapes earmarked for restoration. It is therefore usually prohibitive to attempt any retrieval of its former condition. There are many qualities that make restoration and reclamation distinct landscape practices. Scale, however, is the most significant measure that distinguishes reclamation from restoration (Figures 10 and 11).

Reclamation, when compared to restoration, makes very little attempt to return the landscape to its former condition. Rather instead, the goal of reclamation is to reorder the landscape for a post-mining land use. How is this achieved? The concept and practices of reordering, in landscape reclamation, involve much more than merely visual issues. Visual aesthetics, while important, are always secondary to conditions affecting stabilization of hazardous and contaminated materials. In mining, inventories of ecological data are meticulously collected before site alteration begins. This data quantifies the inert and living landscape (number of species, depth of soil horizons, precipitation, soil pH, wind speed, solar fluctuations, etc.). During reclamation, this data is applied on site to recreate “natures,” or ecological conditions similar, but not identical, to the original ones. Reclamationists, however, acknowledge that these reconstructed ecological situations are “synthetic ecologies.” They will adapt to their new environments over time. Reclamation, therefore, always
promotes the reordering of new landscapes and ecological situations, while restoration does not.

Other issues may help to further clarify the distinction between restoration and reclamation. From the point of view of ecology, the scale of an ecosystem is important in order to determine whether or not it is more 'accurate' to its original condition. For example, if one considers the entire West, a single mine is insignificant to the discussion of regional habitat and health. Most coal and hardrock mines in the west are large and highly disturbed. Restoration, which seeks to restore all of the former systems of a site is physically improbable. Conversely, reclamation (especially at large scales) attempts to set up a (new or modified) framework from which nature adapts new natural processes that reflect conditions of the new place. Understanding potential ecological processes therefore is vital to strategies for reclamation, as the framework and trajectory for the site's future evolution (Figure 12).

Cost is another value-laden concern. It is economically impossible to reclaim big landscapes to near-original condition. Attempts at doing so would make mining costs prohibitively expensive. Regulatory standards are set up with the assumption that reclamationists know how to set ecological processes in motion (Figure 13), not finish every detail.17 They are strategists working with open-ended ecologies, not designers working toward a resolute ecology.

The question of authenticity, or what philosophers call ontological value, further distinguishes restoration and reclamation. At the heart of this issue are two positions: One taken by Robert Elliot's *Faking Nature* and the other taken by Jordan's forthcoming book. Elliot, a philosopher of ethics, argues that restored (and reclaimed) ecosystems are less valuable than their natural counterparts because of the disruption with their past and break in their ecological continuity. (Elliot 1997, pp. 116–150). Jordan believes that while Elliot's argument holds true and part of the original nature is lost in restoring a landscape, the restorationist also gives the landscape new

Figure 9. Coeur Rochester Mine (silver), Nevada: ground photograph. South Wasterock Repository: 252.4 acres, approximately 70 million tons of wasterock, topped at 6875 feet above sea level (500 feet above pre-mining topography). Coeur is one of North America's largest primary silver mines. Production averages 23,000 tons of ore and 22,000 tons of wasterock per day. $3.1 million has been spent for reclamation.

Figure 10. Potash mines near Carlsbad, New Mexico: aerial photograph. Salt tailings ponds stretch into the landscape for producing white potassium chloride. Since most of the tailings areas are under United States Bureau of Land Management jurisdiction New Mexico does not require potash mines to submit reclamation plans. In 2001 the BLM imposed its first reclamation/closure plan requirement on potash mines. New Mexico is the Nation's largest producer of potash.
Figure 2. Imagechart. 8 x 10”. Intermountain Production Rankings. Intermountain Western State’s leading mining production percentages ranked by total United States output. The cumulative market value of total production is listed under each state’s name. Sources: Data from National Mining Association’s State statistics, Mineral Industry Surveys 2001.
Figure 20. Cartographies. 16 x 20", Edna Coal Mine, Colorado.
Figure 22. *Mappings: Projections.* When projected toward completion, reclamation costs will far exceed mineral extraction profits from this landscape.
Figure 25. *Mappings: Terracing* 16 × 20". Hillsides are engineered for water control. The landscape is resurfaced into lateral segments that deliver measured amounts of water to a drainage system.
Figure 26. Mappings: Stripping, 16 x 20”. Mineral extractions are choreographed into “stripping” sequences on the landscape. Rich mineral deposits lie in horizontal strips beneath the earth’s surface, which are reached by stripping and stockpiling topsoil. The sub-surface is stripped to expose strata. Large machines strip the minerals out of the ground, which is simultaneously reclaimed in strips following the pit.
Figure 27. *Tailings landscape near Fairplay, Colorado: aerial photograph.* The site is abandoned from pre-law gold placer (streambed) mining. Mines operating prior to Federal or State reclamation laws are considered “abandoned” and must be reclaimed from the Abandoned Mine Land Fund.
Figure 29. Trapper Coal Mine (surface coal mine) Colorado: aerial photograph. The coal pit is directly linked to the power generating station. Symbiotically, ash is trucked back to the pit for use in reclamation. Reclamation begins in the wake of the coal pit to minimize erosion.
meaning. Something is ultimately gained that is richer than its predecessor is. The process of reclaiming landscape, as positioned earlier, is newer as a concept and practice than restoring landscape (for better or worse) simply because more is created and reordered. Jordan’s position is that what holds meaning to humans has to do with what is authentic—and there are many varieties of authenticity. Building on Jordan’s thesis of ontological value in restoration, if one views reclaiming as creating a richer value (which we assume holds true since culture promotes it), then it creates new ontological value, too. Reclaimed landscapes never seek to recreate the old, or represent it. Reclaimed landscapes seek to construct or assemble conditions that accept alteration as genesis for the new landscape structure that creates new ontological value from altered conditions (Figure 14).

**Representation and Reclaiming**

"All realities, experiences, cognitions are products of representational practices."


Any project representing “landscape” should deliver an inclusive strategy for the cross-fertilization of potential ideas and/or meanings (speculation), and physical presences of the landscape medium (forms). This representation allows one to construct readings of the landscape that otherwise would remain hidden or too complex. Representation allows one to find hidden relationships and processes rather simply “image” them. In this rubric, one must resist preconceived or popular notions of how reclaimed landscapes are portrayed (their images) in lieu of reconciling the meaning of the work. Understanding reclaimed
landscapes requires fresh readings that go deeper than mere “imaging,” into the realms of other representational systems that resist casual viewing. Again, the hope is that new light can be cast onto the American interest of reclaiming landscape at the beginning of the twenty-first century so that it can be adjusted for the future. Reclamation is not camouflaged here as a positive or negative practice, but revealed, through multiple representational systems, for individuals to craft a dialectical reading of their own.

This research uses three graphical systems to convey information: cartography, mapping and imagery.¹⁶ (Distinctions between these graphical systems will be discussed later.) These systems are commonly used in the mining and reclamation industries to envision and communicate proposed and performed landscape alterations. Mine operators rely primarily on plan and sectional views to display, quantify and predict outcomes for their work. For example, before surface coal mining begins, federal law requires mine operators to take sectional ground borings to determine topsoil depth and geologic structuring. They use these profiles to quantify the mineral amounts to be extracted and volumes to be replaced in order to rebuild landscape strata and topographic conditions to “approximate original contour” (or AOC) during reclamation. In other words, miners use representational drawings, namely plan and sectional views, to probe and index matter hidden below the surface for removal (mining) and reconstruction (reclaiming). Without plan and sectional viewing, landscape reclamation (Figures 15, 16 and 17) would be a difficult, if not improbable, task. One can also be critical of “objectifying” the landscape in this manner.
because it marginalizes and even veils other phenomena that may not be easily contained, drawn, or viewed, but is present nonetheless.

In the landscape representational aspects of this research, cartography, mapping, and imagery are used beyond their current conventional capacities— which in the landscape design disciplines typically represent the world aesthetic as whole, natural, friendly, stable, romantic, and accepting of historical references. I am more interested in how representation can expose agents of landscape reclamation and less concerned with cosmetic landscape design practices employed to hide the effects of mining. The former promotes openness and speculation, hopefully leading to new modes of discourse, while the latter collects and dispenses ocular information that is readily digested and excreted. Representations of the former kind operate critically to probe, reveal, discover and contest some of the hidden relationships and processes of reclamation.

Critical representation resists many of the pictorial traditions that are well entrenched in the allied landscape disciplines. It does not limit itself to graphic conventions because it works under the assumption that the world is not to be read as merely an array of scenographic images, because it is full of experiential complexities. In other words, the world is not as we represent it (Barnes and Duncan 1992; Bryson 1983, p. 189; Corne 1992, p. 249; Goodman 1996; Mitchell 1994; Panofsky 1997) and the act of representing itself can open new understandings of the world.

Representing the altered landscape relies on critical representation to express the peculiar conditions that aren’t repeated in any universal manner (Frampton 1983, pp. 16–30; Solomon-Godeau 1990, pp. 75, 76) Understanding the cultural phenomenon of reclaiming landscape, moreover, is just as individualistic as the landscape being reclaimed. Read critically then, the cartographies, mappings, and images are experiences, not merely information or graphic data.
Cartographies and Reclaiming

"Cartography is less a conclusion than an ongoing process."

"If we are truly concerned with the social consequences of what happens when we make a map, then we might also decide that cartography is too important to be left entirely to cartographers."
J.B. Harley (2001, p. 203)

Since the 1780s, the United States government has recorded cartographic representations of the American western landscape. Cartographic surveys of the West were instrumental for its division, settlement, and habitation. Only since the 1940s has the United States Geological Survey (USGS) incorporated "private" landscape features into its topographic quadrangle library of America. Private features, according to the USGS, now include cultural alterations of the landscape such as factories, sewage treatment plants, housing developments, and mines (Figures 18 and 19). Since a large percentage of western land remains in the possession of the federal government, under the term "public lands" (Riesbame 1997, pp. 58-60), the representation of private operations within federal properties (many of which are grazing and mining operations) makes it easier to locate surface disturbances for further investigation. Subsequent ground inspection reveals the effects of mining and reclamation on individual landscapes.

A major component of the research for this project comes in the form of "trace" cartographies, or maps adapted from public records. Trace cartography is a distinct form of mapping that attempts to produce new maps from those already drawn. Why redraw maps already in existence? The answer lies in two areas of thinking: First, my interpretation of reclaimed landscapes evolved from understanding the cartographic languages used by miners and reclamationists. Initially I believed that if one could speak mining's "landscape representational" language one could reveal an internal, and hence gain a new external, understanding of their work. Second, it became clear early on in my research that reclaiming the landscape was as much a social construction as it was a physical construction. Showing ways in which cartographic information is mapped (by tracing them) could reveal how the landscape was being represented by the mining industry and others. Heeding the late modern cartographer J.B. Harley's warnings, I suspected that the mappings found in public records were a "construction of reality... laden with intentions and consequences that can be studied in the societies of their time. Like books, they are also the products of both individual minds and the wider cultural values in particular societies" (Harley 2001, p. 36). My discoveries rang true to Harley's. Defining exactly how cartographies construct new realities or values, however, is not my intention. I prefer to reveal the designed landscapes being created by mining and reclamation and let the reader decide their merits concerning cultural value.

Figure 15. Plan view map of pre-existing mine topography used by a coal mining company during reclamation. Source: State of Colorado Division of Minerals and Geology.
Cartographic maps used in mining and reclamation describe how sites are altered, justified, and absorbed into culture through quantification and spatial analysis. They reveal landscape alteration and reclamation through the cartographic strategies of those undertaking the work (since they were adapted from their drawings). This kind of cartographic information also captures quantifiable, physical attributes of terrain and various forces that underlie the workings of a given place. These include: environmental processes, scientific data, histories, legal boundaries, and private or public programmatic structures. Cartography in plan or section is by far the most used graphic convention in mining and reclamation. On the one hand, cartography is a valuable visioning device for manipulating large landscape systems in an orderly and efficient manner. On the other hand, cartography’s dependence on quantifiable systems (such as surface area, depth, volume, and distance) detaches both the maker and reader of cartographic maps from other qualitative site experiences. For example, cartographic spatial and volumetric delineation obfuscates other potential readings of site-altering processes. The point is not to argue that cartographic data is inessential to reclaiming, but rather to reveal its limitations for landscape invention. Cartography, as used to alter the landscape, lives its life in the past. Cartographic information is compiled so action can be taken on the ground. Once the action begins, the cartography’s life is over and new cartographies must be made in order to measure change.

Cartographies can also be thought of as measuring devices in themselves. Observing landscapes through a cartographic language allows one to compare and contrast landscapes at micro and macro scales, and to make observations within sites and between sites. Cartographies, in this sense, are chartering devices that measure the landscape and make its qualities readable. William Blake’s poem, *London* describes the quality of chartered landscape as allowing a measured experience of the otherwise unmeasurable aspects of the city:

I Wander through each chartered Street
Near where the chartered Thames does flow,
And mark in every face I meet
Marks of weakness, marks of woe.

In every cry of every man,
In every infant’s cry of fear,
In every voice, in every ban,
The mind-forged manacles I hear:
How the chimney-sweeper’s cry
Every blackening church appalls,
And the hapless soldier’s sigh
Runs in blood down palace-walls.
But most, through midnight streets I hear
How the youthful harlot’s curse
Blasts the new-born infant’s tear.
And blights with plagues the marriage-hearse.
(William Blake 1914, p. 111)

Cartographies represent three discourses that offer insight into the cultural phenomenon of reclaiming landscape. The first one, described earlier, is through the textual and visual languages of reclamation that are painted by its operational milieu (such as government agencies, specialists and technicians, environmentalists, and other consultants). This discourse is created by the producers of reclamation at local site-specific levels. The second one is through the mining companies themselves, who work within guidelines (political, economic, judicial, and regulatory) to reclaim the landscape as they simultaneously derive profit from it. This discourse is wider in scope; its representations are regional. A third discourse is revealed through the subjective reactions of viewers who dialectically “read into” the cartographies and arrive at new opinions regarding mining and reclamation. This is the widest, perhaps most important discourse because it is created outside the mining’s milieu, unprejudiced yet fecund with potential to redirect future action.

It also became apparent that cartographic information could be recombined into graphic categories that more clearly expose the numerous synthetic forces reordering each landscape. Instead of accepting the “hard” cartographic information as given, or using universal graphic conventions (such as color coding by the USGS), I recombine the cartographic information into new categories for mapping that reveal the cumulative alteration of the landscape (from mining through reclamation). These are: surfaces, subsurfaces, jurisdictions, topographies, sequences, stagings, clearings, movements, diversions, displacements, volumes, dispersals, and ecologies (Figures 20 and 21). This new graphic language does not omit the objective, scientific language used by the mining, reclamation and environmental industries. It amends the language with a highly graphical and more accessible one that can open the field of reclamation for public
discussion. One of the revelations made by redrawing cartographies in this manner is the concentration of landscape alteration and reordering invested on a site to prepare it for post-mined use. Two categories emerge: coal mines required to follow AOG rules typically reorder to blend in to their surroundings and land uses; hardrock mines reorder to stabilize large disturbances such as pits, highwalls, waste rock piles, and leaching pads. The former is lawfully required to blend in; the latter is not.

One must also be aware that in any mining and reclamation project, cartographic information is compiled by a professional subculture of specialists, and reflects their values, biases, and agendas. The milieu of this subculture promotes operational efficacy, public safety and welfare, and fiscal gratification. In their view, cartographic information is compiled and arranged in scientific, objective, and rational ways to “protect society and the environment from the adverse effects of mining.” However, the underlying motives of production are extremely subjective. For example, determinations of mineral deposits to be excavated, vegetation to be removed, soil to be replaced, and ultimately how the landscape will function and appear are decisions made by mine operators and governing authorities prior to groundbreaking. Their assumption is that a very precise measurement of the future reality of the landscape can be produced and this is rationalized in order for citizens living near the mines to accept and confirm their actions. Once action begins, the “hard” data is used to create a spatial ordering of events, or a sequenced (indexed) cycle of relationships, that enables complex sorting and organization of the landscape. For those who alter landscape at very large scales and wish to represent its stability, this is a most useful way of seeing the landscape.

Mappings and Reclaiming

“The territory no longer precedes the map, nor survives it. Henceforth, it is the map that precedes the territory.”

Jean Baudrillard (1983, p. 2)
Whereas cartographies primarily look to the past to reveal how the landscape was measured and represented for the purposes of mining and reclamation, mappings take a fresh look at the altered landscape to envision what was either overlooked, subordinated, unrepresented, unseen, unimagined, or unpredictable. In this sense, mapping is more speculative than cartography in that it primarily seeks to reveal new relationships in the landscape for the mapper and reader to experience (Corner 1999, p. 214). Cartographies have a way of combining information to enable a holistic view of the mappable area’s surface operations. In contrast, mappings are deconstructive devices, made from fragments and pieces of mapped data from numerous sources: visual, graphic, textual, and verbal (Figure 22). They are deconstructive in the sense that they open up the singular readings of the landscape, such as those constructed by cartographies, into polyvocal and translational readings (Eagleton 1986, p. 80). In this research, recombinations of myriad mappings and new layerings from sources other than graphical (such as verbal and textual), open up many possible interpretations of “reclaiming” that may have been excluded or dismissed in the cartographic languages described above (Harley 1992, p. 239).

In his recent book, Mappings, geographer Denis Cosgrove adroitly describes the importance of speculative mapping (and its distinction from what I term trace cartography) as the “...creative, sometimes anxious, moments in coming to knowledge of the world... the map is both the spatial embodiment of knowledge and a stimulus to further cognitive engagements... their spaces of representation can appear liberating, their dimensionality freeing the reader from both the controlling linearity of narrative description and the conforming perspective of photographic or painted images” (1999, p. 2). Cosgrove cites the renewed interest in mapping during the last two decades that opened the field of mapping in the West from an objective representation of the earth’s surface and spatial delineation [what J.B. Harley would call “cartographic positivism” (Harley 2001, p. 5)] to one that has theoretical and cultural dimensions and “creative... tactical... and imaginative...” potential to change existing models of the earth’s representation (Cosgrove 1999, pp. 9–15). Speculative mappings are more subjective than cartographies in that their primary role is not to accurately measure the landscape35 but to envision what may need further investigation. Unlike cartographies, mappings do not lead one through a singular reading of the landscape. Rather, mappings ask the reader to engage in a discourse with the map that will reveal new stories (Figure 23).

The subjective role of maps for envisioning the future is not a novel discovery. During the Renaissance, geographical information was a commodity (as it is today in warfare and peacekeeping) and maps evolved as instrumental tools rather than purely objective guides. However, as literary critic Brian Jarvis notes, since the scientific revolution, maps have been stripped of their fantasy and religion (their primary function prior to Renaissance). They are left devoid of any sense of experiences involved in their production. He argues, “Maps became strictly abstract and functional systems for the factual ordering of phenomena in space, defining territorial boundaries, property rights, trade and communication routes, domains of administration and of social control” (p. 52). Cartographies die once physical action is initiated on the landscape. Conversely, mappings live in the future, allowing one to envision numerous potentials for any particular landscape. Mappings, especially used for altering landscapes, have much longer lives than do cartographies.

Mappings are more diagrammatic than dogmatic. Another way to describe the kind of mappings that I am interested in is that they are more akin to discovery than recovery; they are more concerned with process than results (Figure 24, front cover). They do not seek absolute empirical confirmation. Instead they are creative attempts to influence the discourse of reclaiming by viewing altered landscapes in other ways. They are neither factually legitimate nor scientifically authoritative. The mappings often have little resemblance to the measured ground. These are mappings of the phenomena and processes working to imagine, create, or speculate about resultant conditions (Figure 25).

One of the revelations made by mappings is the cumulative effect of technological change on the landscape. In many of the mappings, a technological dominance of the landscape is revealed that allows it to be altered with efficacy and reordered during reclamation (Figure 26). Reclaiming is revealed in the mappings as a temporal process underpinned by technology. Whether it is in the form of engineered ditches, hydrological stability, slope manipulation, volumetrics, or even the aspects of geological time, technology and reclaiming are inseparable. Mappings reveal the mostly invisible technologies that change the landscape.

 Especially in mining, mappings are made to reveal some of the following dynamic conditions: geologic hazards, unstable slopes, landslides, expansive soils and rock, seismicity, avalanches, water flooding, soil settlement, corrosive soils, erodible soils and rock, ground subsidence, radioactivity, soil contaminations, water pollution (pH), and chemical exposure. Every mining expedition and reclamation project is a unique design scheme that relies on mappings of temporal landscape processes.

Images and Reclaiming

"In photography, I can never deny that the thing has been there.”
Roland Barthes (1981, p. 76)

“For him who flies above it, a map is all he sees,
this living scape of being but symbols and degrees;
the reader of the maplines has neither known nor felt
the place where the great Mihaly
Vorossmarty dwelt; *
what’s hidden in the map? yes, barracks, mills, and arms,
but for me crickets, oxen, steeples, quiet farms; 
with field-glasses he marks the crops and industries, 
but I, the trembling laborer, the forest trees, 
the twittering orchards, vineprops with their tended grapes, 
and the old crony in the graveyard where she weeps; 
and what is targeted as rail or factory is just a lineman by his signal-box to me, 
and children watch him wave his red flag for the guard, 
and sheepdogs roll and tumble in the foundry-yard; 
and in the park the trace of loves who once loved me, 
the honey taste of kisses sweet as bilberry, 
and on the way to school you’d not step on a crack, 
lest you’d forget your lesson, or break your mother’s back; 
the pilot cannot see that paving-stone, that grass; 
to see all this, there is no instrument or glass.”
Jan 17th 1944

*Mihaly Vorosmarty: a major Hungarian poet of the Nineteenth Century
Miklós Radnóti (writing about the bombardiers during WWII) (Turner and Oszváth 2000, p. 171)

Reclaimed landscapes are often valued by their mere image even when that very image signifies a much larger (maybe even hidden) cultural agenda such as “nature,” “preservation,” or “restoration.”* Looking at images of reclaimed landscapes simultaneously reveals “appearances” of altered sites and subjective attitudes toward them. The photographs captured in this research are both recording devices and investigative tools.* As recording devices they serve as evidence of the vast project under way to reclaim the American western landscape. As investigative tools they require the reader to studiously “look into” their glossy surfaces in order to reveal a story about altered landscapes that the reader can take away from the photographic evidence (Figure 27).

Although I have chosen photography as a representational tool viewers need not be concerned whether or not these pictures serve as correct representations of their subjects. The imagery neither masks nor bears a relation to visible reality, but forms its own pure likeness. An image in itself no longer may try to bear an image of a reality, but is a simulation, a “play of illusions,” both verbal and visual.* Images of reclaimed landscapes do not abide by simplistic aesthetic codes because there are no universal visual critiques that can account for the diversity and complexity of all altered landscapes. Even when one thinks they have achieved a complete understanding of the visual appearance of reclamation, one will also discover that the images do not tell the entire story. A prime example would be a landscape that is photographically seductive yet saturated with invisible toxic agents beneath its surface.

There are three types of imagery that enter into cultural judgments of reclaimed landscapes. The first type visually blends the reclaimed landscape into its unaltered surroundings. This type tends to allow nature to enter into the imagery over time, slowly blending the edges where alteration took place. The second type literally ignores the appearance of the pre-existing site and makes not attempt to blend in reclaimed areas, this type usually occurs when the post-mine land use for a reclaimed landscape is drastically different than the pre-existing condition. (A forested area that is mined and reclaimed as a grazing field, for instance.) The third type makes curious hybrids of the pre- and post-mining imagery in their new land use situations (Figure 28). This type is more difficult to describe because it is a hybrid of the binary forces trying to either work with or against images of nature. Perhaps Rosalind Krauss, speaking about contemporary photography, described the third category as a “world where . . . the possibility of distinguishing between reality and phantasm, between the actual and the simulacral, is denied (Krauss 1990, p. 25).

Reclaimed landscapes can take on many post-mining uses and appearances, from wildlife habitats to reservoirs and subdivisions. From the miner’s perspective, appearance is rarely a primary concern in the post-mine land use conversion process, as water quality and environmental health issues take precedence. From the spectator’s view, (such as those people living in view of the mine) appearance ranks high in the reclamation hierarchy and may influence how the landscape is “imagined” against its contextual environment.

Images also reveal the nomadic or “profane” nature of mined and reclaimed landscapes (Figure 29). Mircea Eliade, a historian of religion, describes this condition as having no fixed point that truly enjoys ontological status. “It appears and disappears in accordance with the needs of the day . . . (the world is) an amorphous mass consisting of an infinite number of more or less neutral places in which man moves, governed and driven by the obligations of an existence incorporated into an industrial society” (Eliade 1959, pp. 24–34; Crewell 1997). Miners never intend on occupying the landscape permanently, but rather temporarily reordering it, inhabiting it, quantifying it, and transforming it.

Précis

This essay explores and documents the reclaimed landscape, which is spreading rapidly across the American West. In addition to its environmental issues, the proliferation of altered landscapes in the West faces new cultural pressures that require rethinking of post-mined land use to be more ecologically inventive and programmatically creative. In about two hundred years, federal and private energy and mineral interests in the West will begin to fade as recoverable resources are exhausted. One supposition from this projection could be redistribution of federal western lands for new uses—perhaps the largest landscape project of the twenty-first and twenty-second centuries. With large-scale reclamation only in its third decade, now is the
time to begin speculating, questioning, and redirecting its production and potential benefits.

Reclamation is a distinct category of landscape alteration. It creates higher ontological value by looking toward landscape's generative potentials rather than retrieving former status. The reclaimed landscape was presented through critical representation. Trace cartographies reconstructed reclamation by looking to the past as a means to reveal cumulative alteration involved in reclamation, or quantitative measures of the ground. Mappings deconstructed reclamation by speculating on other qualitative measures and technological agency. Images presented evidence for further dialectical speculation. The ways in which reclaimed landscapes are represented may offer powerful means to speculate about their possible future, simultaneously perpetuating their existence and revealing their vulnerabilities. A new dialogue must emerge to redirect reclamation of the American western landscape, as the removal of its mineable resources will not falter.

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Credits
All photos taken by Alan Berger. Figures 1–16 photographs by author. Figures 18–29 were composited in Quark XPress and printed through a digital laser process onto archival Cibachrome and FujiChrome paper.

More information about this project, including the traveling exhibition schedule for 2002–03, can be found on the Web at http://carbon.cudenver.edu/~aberger/index.html

Notes
1. An exhibition of this work is traveling internationally through 2004. The idea for addressing the topic of representation evolved from the exhibition and discussions with colleagues and prospective book publishers responding to the tremendous amount of visual evidence created through my research. This essay is a component of the critique of the western altered landscape paradigm being developed in the full-length text of the book Reclaiming the American West, which documents evidence of and strategizes futures for the mineable and reclaimed West—its altered landscapes.
3. There is no national uniform reclamation law for hardrock mines. For the latest attempt at this see the EPA's National Hardrock Mining Framework, September 1997 (EPA 833-B-97-003).
4. Reclamation did not begin in the United States until the 1977 Federal Surface Mining Control and Reclamation Act (SMCRA). The first large-scale landscape reclamation projects were not completed until the late 1980s, making reclamation a relatively young industry.
6. Projection based on mapped mineable coal resources in each state located on federally
controlled land. This amount does not include hardrock, metal, or other mined minerals. 7. For example, Colorado’s largest surface coal mine, Colorado’s ships end up Texas, Wisconsin, Tennessee, Nebraska, California, Minnesota, and Kansas. See Colorado magazine, Spring 1996. Affile of Kennecott Energy, or mail a request for the latest magazine to 5731 Highway 13, Meeker, CO 81641. 8. There has been a tremendous amount written about the arsenic/lead story. For an account of the bomb tests, see “Arsenal bomber” made bold satiric,” by Jim Kirksey, Denver Post, Oct 20, 2000. “Cleaning of Bomb Tests” in Colorado Referees’ Expected Soon,” by Michael Janis, New York Times, Dec. 1, 2000. For critical interpretations, see (Cronin 1995, pp. 69-64) and (Hamson 1997, pp. 63, 56, 57). 9. There are many examples of creative post-mined land use that will appear in the forthcoming book. For more on this example see Loholm, Nancy, Denver Post, June 5, 2001, p. 2b. 10. As Neil Greenberg points out, simply scanning a picture is actually an ordering of the “reality” of the image by the computer. Landscape architect, Lawrence Halprin, produced one of the earliest works in urban design and landscape architecture to use mapping and notation as a translation of ordering of coordinates scored into a temporal sequence of a trip or experimental performance. 11. Nye’s book documents that an American sublime developed out of other types of sublime and is linked with ideas of nationalism, religion, and technology. The American sublime merged with and embraced technology to “transmog” the individual’s experience of immensity and awe into a belief in national greatness. Nye argues. “The art of determining what is sublime is to observe whether or not an object strikes people dumb with amazement.” I often experienced this reaction during visits and flights over altered landscapes. 12. Draft manuscript (Jordan, William R. III, Chapter 1, pp. 2-23). Forthcoming book by Berkeley: University of California Press, 2002. 13. Draft manuscript (Jordan, William R. III, p. 35). Forthcoming book by Berkeley: University of California Press, 2002. 14. Personal interview with Viktor L. Kovelapple, region 8, United States Environmental Protection Agency, Region 8. 15. For a good discussion of these strategies used in restoration see (in Jordan 1987), A.D. Bradshaw “The Reconstruction of Biotic and the Ecology of Ecosystems,” pp. 55-74 and J.A. MacMahon “Disturbance and Ecological Processes,” pp. 211-225. 16. For example, most western reclamation standards allow for full reclamation bond release when only 25 percent or 50 percent of vegetative cover is established. The exact amount differs between states. 17. Draft manuscript (Jordan, William R. III, Chapter 4), Forthcoming book by Berkeley: University of California Press, 2002. 18. Imagery is used three ways in the exhibition portion of this research. Each site is represented through aerial and ground photography. There are also aerial sequence photos for each mine, showing transitions from mining to reclamation over the life of the operation. 19. Reclamation is defined as: “the employment of procedures reasonably designed to minimize as much as practical the disruption from an operation and for the establishment of plant cover, stabilization of soil, protection of water resources, or other measures appropriate to the subsequent beneficial use of the affected lands” (Senate Bill 95-156, 1965, Colorado Land Reclamation Act #1). For the Extraction of Construction Materials). Coal mines are required by federal law to return land to “approximate original form,” which would be impossible without plan and section viewing and mapping (103rd United States Congress #1, Session, House Committee on Natural Resources, Compilation of Selected Laws Concerning Minerals and Mining). Documents for sale by the U.S. Government Printing Office Superintendent of Documents, Congressional Sales Office, Washington, D.C. ISBN 0-16-040007-4. 20. The computer offers a form of graphic resistance because the image can be created heterogeneously. In my representations the cartography is eroded, layered, composed, registered, plotted, and measured. 21. The term “critical,” as used to describe representation, can be further clarified by a similar term coined by Kenneth Frampton to describe his theories of architecture and critical regionalism. “Critical” is a fundamental mediating strategy used to resist universal civilization by deriving more from peculiarities of a particular place (understood and eventually build in) them. Also see Lakatos and Musgrave (below) for an expanded discussion of critical approaches in scientific fields. Another important topic that must be addressed here is the politics of critical issues surrounding this project. If the work is critical and resistant, is this reflected by a political position? Abigail Solomon-Godec’s clearly summarizes this issues in her essay, “Living with Constructions: Critical Praxis in the Age of Sappho-Side Aesthetics.” “The notion of a critical practice, whether in art production or criticism, is notoriously hard to define. And insofar as critical practices do not exist in a vacuum, but derive their forms and meanings in relation to their changing historical conditions, the problem of definition must always be at the core of the present.” Describing John Heartfield’s work she states, “Although Heartfield was clearly a political artist, few contemporary artists concerned with critical practice are comfortable with the appellation political; first, because to thus defined is almost inevitably to be ghettoized within a (tiny) art world preserve; second, because the use of the term as a label implies that all other art is not political; and third, because the term suggests to politics of content and to minimalize, if not efface, the politics of form. It is for all these reasons that throughout the essay I have chosen to employ the term critical practice in lieu of political practice... But if we assume that critical practices conceptually assume both an activity and a position, the emphasis needs to be placed on discursive and institutional function. In this regard, Walter Benjamin’s rhetorical question of 1938 is still germane: ‘Rather than the free spirit, what is the attitude of a work to the relations of production of its time?’ I should like to ask, ‘What is its position in them?’ The relevance of this question is that it underscores the need for critical practices to establish a context within which the form of uterine or address speaks to otherwise unrecognized, or passively accepted, meanings, values, and beliefs that cultural production normally reproduces and legitimizes” (Solomon-Godec 1999, pp. 75, 76). 22. For a useful definition of cartography see Harley 2001, p. 151. 23. For a contemporary synopsis of the processes and measurements of land division in the West since the adoption of the Land Ordinance Act of 1785, see Modern Measures and the American Landscape in (Cronin and Maclean 1996, pp. 30-35). For a historical synopsis, see White, C. Albert. A History of the Reclamation of Surface Water Supply in the United States government Printing Office, Washington, D.C. Stock Number 07440110001506. 24. For a broader discussion of this see Monmonier 1996, pp. 124, 125. 25. For a more detailed discussion of this condition see Harley 2001, p. 165. 26. It should be acknowledged that the new graphical language can create its own discussions within public discourse, especially for those accustomed to interpreting graphical systems. 27. The majority of western coal mines are on federal land, most typically within Bureau of Land Management grazing land. The BLM follows the Federal Land Policy and Management Act (FLPMA) of 1976 and Public Rangelands Improvement Act (PRIA) of 1978 concerning land use on federal land. FLPMA comprehensively controls the BLM’s land uses and grazing management strategies. Thus, most mining operations in the West coordinate post-mined land uses with the BLM and FLPMA, resulting in very little flexibility to reclaim for inventive or more productive land uses than grazing or wildlife habitat. 28. Quoted from section 102, p. 148, Surface Mining Control and Reclamation Act of 1977 (Public Law 95-87). 29. Quoted from section 104, Senate and House of Representatives of the United States of America. 30. For an interesting discussion on quantitative versus qualitative measuring of the landscape see Corner and Maclean 1996, pp. 32-33. 31. For another point of view see Soule 1995, especially pp. 137-170. 32. For a brief discussion of these ideas see Burgin 1982, p. 2. 33. See Baudrillard 1983, p. 11 and Snyder 1994 pp. 182-189. Snyder discusses practices of San Francisco photographer Carleton Watkins, an early American western landscape photographer devoted to land development and industry. Watkins would dote and burn his prints of mined landscapes to reduce the harsh edges between natural and man-made elements in his photographic prints. Also see Phillips, 1996, pp. 20, 21 for a discussion about Watkins’ ambivalence concerning contradictory uses of
the land. See Garnett 1994 for black and white images using very strong contrasting values to make landscapes unrecognizable at first glance. For an interesting essay on images of ecology as constructed things, see Ross 1994.

See Frank 1969 for a discussion of images in modern literary criticism and poetry. Also see Lindberg 1976.

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