

# Industrial Archaeology, Landscapes, and Historical Knowledge of Sustainability

Donald L. Hardesty, University of Nevada, Reno

## Introduction

The emergence of industrial life support systems in the last three centuries dramatically changed human-environmental relationships. Industrial landscapes are repositories of historical knowledge about this ecological revolution. The key components of industrial landscapes include landforms (for example, waste rock dumps from mines), industrial buildings and structures, vegetation and other biotic patterns, spatial organization such as settlement patterns, transportation networks such as railroads and canals, and small-scale components such as fences and mining claim markers. Industrial archaeology records the landscapes of “industrial islands” that cover geographical areas ranging from small local places to large regions or beyond. The geographical boundaries and organizational structures of these industrial landscapes vary in time. Historical events and processes that affect human-environmental relationships operate on multiple time and space scales. Such landscapes reflect the sensitivity of geographical places as a habitat for human occupation. Managing industrial landscapes, therefore, is an important pathway to preserving knowledge about the history of human-environmental relationships in the modern world.

## Mining Landscapes and Changing Environmental Relations

Consider, for example, mining landscapes as repositories of historical knowledge about the impact of industrial life support systems upon human-environmental relationships. Mining landscapes often can be conceptualized as the physical expression of cumulative networks or mosaics of microenvironments that reflect changing human-environmental relationships. The Cortez mining district of central Nevada illustrates the evolution of a distinctive landscape in this way (Hardesty 1988, 2001, Sullivan and others 1999). Several historical phases of landscape transformation can be identified. In the first phase, miners created the first microenvironments after the discovery of silver in the Cortez Mountains in

1863. They included (1) the Garrison Mine in what was called the Nevada Giant Ledge; (2) a Washoe Process pan amalgamation mill, later converted to a Reese River Process mill, in nearby Mill Canyon; (3) pinyon-juniper woodlands on the western slopes of Mount Tenabo used to fuel the mill; and (4) Pleistocene Lake Gilbert in neighboring Grass Valley used to supply the salt needed for the milling technology. The Phase 1 network of human-environmental relationships came to an end when the mill closed in 1869.

The second historical phase of the Cortez mining landscape began in 1886 with the establishment of a new network of microenvironments. Simeon Wenban, one of the original Cortez prospectors, developed a new mine at the mouth of Arctic Canyon and constructed a new mill nearby that used what was then state-of-the-art Russell leaching technology. Lime used in the new milling process led to the creation of a new limestone microenvironment nearby with an outcrop that could be quarried and processed into lime with kilns. The demand for wood as fuel at the new mill led to renewed harvesting of the pinyon-juniper woodlands. The Phase 2 network of microenvironments came to an end when Wenban's mill closed in 1892.

In 1908, the third historical phase of the Cortez mining landscape began when a new mining company refitted Wenban's abandoned mill with cyanide leaching technology and began to reprocess old mill tailings. Imported petroleum fueled the renovated mill and replaced the local woodlands. During this phase, Cortez miners, mostly lessees, dramatically changed landform patterns until the mill burned in 1915.

The Consolidated Cortez Silver Mines Company built a new mill equipped with cyanide leaching equipment closer to the Arctic mine in 1923, at which time the Cortez landscape entered its fourth phase of historical development. Tailings from the mill eventually formed a large tailings flow down slope about one mile to the valley floor. The mill changed to oil flotation technology in 1928 but closed the following year with the beginning of the Depression.

Not until 1969 did the Cortez mining landscape enter its fifth phase of historical development with the establishment of a new milling facility and the beginning of several open pit operations in and around the Cortez

district. Cortez miners constructed, among other things, new heap leach pads, waste rock dumps, water pumps, haul roads, a refinery, assay office, administrative offices, and a carbon-in-column milling facility. This phase of development is still continuing.

## Historical Knowledge and Resource Management

Mining landscapes as a repository of information about the history of human-environmental relationships have many implications for the management of natural resources. Consider, for example, what historical knowledge the Cortez mining landscape provides about the impact of mining upon local pinyon-juniper woodlands. The greatly increased demand for wood as fuel during the mining district's second historical phase of development intensified clear-cutting and thinning of the woodlands. Archaeological and dendroecological studies of Cortez landscape elements such as cut stumps, mine supports, rail ties, stacked cordwood, charcoal pits, and cabin timbers yielded information that countered the common belief that this episode of deforestation permanently changed the woodlands in the district (Hattori and Thompson 1987). The studies documented the continued survival of many trees from the most intense period of deforestation and provided information suggesting that the woodland reestablished itself after 1897, when new fuels and materials stopped local deforestation, and continued its growth, and possible expansion, to the present day.

In the same vein, a recent comparative study of the recovery of desert vegetation in two mining landscapes in Death Valley, California, provided historical knowledge about the sensitivity of plants to different soils and geological histories (Brown 2000). The discovery of base and precious metals in the valley in the first decade of the twentieth century brought about the emergence of several short-lived boomtowns that were abandoned within a few years. Recent studies of two of the town sites, Skidoo in the Panamint Range on the west side of the valley and Greenwater in the Black Mountains on the east side of the valley, show significant differences in the recovery of native desert vegetation. The desert vegetation at Skidoo is rapidly recovering after 70 years with a mix of short-lived colonizing plants such as cheesebrush and long-lived native plants like creosote. In contrast, plants have barely begun to recolonize the contemporaneous site of Greenwater. The different ages of the soils in the two places seem to be the principal reason for the differences in the rate of recovery of desert vegetation. Greenwater's soil is at least 100,000 years old, but Skidoo grew up on

a debris flow with soil less than 4,000 years old. Plants recolonize young soils, which are much coarser and resilient, faster than old soils.

## The Social and Cultural Construction of Mining Landscapes

The historical knowledge contained in mining landscapes also reflects the social and cultural construction of human-environmental interaction. Mining settlement patterns in 19th-century Nevada, for example, reflect Comstock-Era ideas about the formation of gold-bearing ore bodies (Tingley and others 2003). The Comstock model visualized gold and silver-bearing 'lodes' that occurred within 500 feet of the surface. Miners for several decades after the Comstock discovery following this idea in searching for ore bodies and established mining camps accordingly. They completely overlooked the gold-bearing weathered silica ledges that did not conform to this model. The 1902 discovery of gold in this geological formation at Goldfield, Nevada, dramatically changed ideas about and created a new geological model that patterned mining settlement patterns for several decades afterwards.

The cultural construction of mining landscapes involves interpreting landscape elements (for example, buildings and structures, landforms) as symbols that evoke images and memories of the past. Such culturally constructed historical knowledge affects human-environmental interaction. The ideology of geomancy or feng shui as a component of Chinese culture and ethnicity is a good example. Feng shui is "an esoteric set of theories and practices ... used in China to probe the landscape and to discern from the irregularity and asymmetry of mountains and waters appropriate locations for human settlement" (Fan Wei 1992). Feng shui practices may be expressed in such landscape components as settlement patterns and include orienting buildings to face south, calm water in front, placement at the confluence of streams but not at branching streams, square dwellings and settlement layouts, and alignment of buildings on a north-south axis. Archaeological studies of Overseas Chinese buildings and structures often provide the only source of information about the practice of geomancy as an active agent in the formation of mining landscapes. Certainly the extent to which Chinese immigrants applied the principles of geomancy varied enormously and depended upon local conditions and expediency. Exclusionary laws and policies, for example, or economic determinants such as high land prices appear

to have limited the practice of feng shui by Overseas Chinese in some localities but not in others (Greenwood 1993). Mining landscapes reflect these differences in the geographical arrangement and relationships of buildings and structures, clusters, and landforms.

The so-called “Myth of the West,” however, is perhaps the most classic example of the relationship between mining landscapes and the cultural construction of historical knowledge in twentieth century America. Mostly a creation of popular culture, the myth transforms abandoned buildings, structures, landforms, and other elements of historical mining landscapes into symbols of an imagined past, a theater of the wild, complete with all the trappings of “the western frontier” - tough and untamed with streets walked by six-gun toting white males, heroically good and bad, and soiled doves with golden hearts (Hardesty and others 1994). The Myth of the West, incidentally, also includes the idea of an empty wilderness untouched by human hands before Euro-American settlement, an idea often reflected in environmental management philosophies and practices in the American West. The archaeological record and other sources of historical knowledge (for example, oral tradition), however, document a long history of human settlement before European colonization of the region with a wide variety of impacts upon the environment.

Images of the mythic West are often evoked by the so-called western “ghost towns.” Typically the ruins or archaeological remains of abandoned mining towns, ghost towns are icons of the myth. The Bodie Mining District in the Sierra Nevada Mountains of California offers a classic example. After a significant but short-lived boom period in the late 1870s and early 1880s, the silver mining district rapidly declined but continued to be worked off and on until the end of the twentieth century. The town of Bodie emerged as a popular ghost town in the early twentieth century that attracted tourists in automobiles and greatly changed human-environmental interaction and the meaning of the landscape to many observers (Delsyer 1999, 2003). Ghost towns such as Bodie teach the myth to visitors, not only through intentional interpretative programs but also through efforts to preserve the towns for posterity. The ghost town is a cultural construction that mobilizes public support for preservation and creates an historic significance much greater than would be justified by a more critical evaluation of its historical context.

## Conclusions

In conclusion, mining landscapes are “historical analogs” of human-environmental interaction taking

place over time periods of months to centuries that have significant implications for environmental management. They provide models of environmental change in the modern world that fill in the time gap between short-term or contemporary observations and long-term paleoenvironmental data. The components of mining landscapes provide detailed information about the history of human-environmental interaction that is both complementary to and independent of other sources of historical knowledge such as documents and oral tradition. Archaeological and other historical studies of mining landscapes have the potential to record detailed environmental histories of biota such as woodlands, stream drainages, and other hydrologic systems, and toxic waste such as mercury. Finally, mining landscapes provide information about how social and cultural constructions affect the history of human-environmental interactions.

## References

- Brown, Kathryn. 2000. Ghost towns tell tales of ecological boom and bust. *Science* 290(5489): 35-37.
- Delsyer, Dydia. 1999. Authenticity on the ground: engaging the past in a California ghost town. *Annals of the Association of American Geographers* 89(4): 602-632.
- Delsyer, Dydia. 2003. 'Good, by God, We're Going to Bodie!' Ghost Towns and the American West. In Hausladen, Gary J., ed. *Western Places, Western Myths: How We Think About the West*. Reno and Las Vegas: University of Nevada Press: 273-295.
- Fan Wei. 1992. Village fengshui principles. In Knapp, Ronald G., ed. *Chinese Landscapes: The Village as Place*. Honolulu: University of Hawaii Press: 35-45.
- Greenwood, Roberta. 1993. Old approaches and new directions: implications for future research. In Wegars, Priscilla, ed. *Hidden Heritage, Historical Archaeology of the Overseas Chinese*. Amityville, New York: Baywood Publishing Company: 375-403.
- Hardesty, Donald L. 1988. *The Archaeology of Mining and Miners: A View from the Silver State*. Society for Historical Archaeology Special Publication Number 6.
- Hardesty, Donald L. 2001. Issues in preserving toxic wastes as heritage sites. *The Public Historian* 23(2): 19-28.
- Hardesty, Donald L., Thomas Lennon, and Steven F. Mehls. 1994. *Historical archaeology and the myth of America's wild west*. Paper Presented at the World Archaeological Congress, New Delhi, India.
- Hattori, Eugene, and Marna Thompson. 1987. Using dendrochronology for historical reconstruction in the Cortez mining district, north-central Nevada. *Historical Archaeology* 21(2): 60-73.
- Sullivan, Alan P. III, Joseph A. Tainter, and Donald L. Hardesty. 1999. Historical science, heritage resources, and ecosystem management. In Szaro, R.C., N.C. Johnson, W.T. Sexton, and A.J. Malk, eds. *Ecological Stewardship: A Common Reference for Ecosystem Management, Volume II*. Oxford: Elsevier Science, Ltd: 493-515.

Tingley, Joseph V., Thomas P. Lugaski, and Alvin R. McLane.  
2001. Discovery of mining camps in south-central  
Nevada. The Eighth Annual Journal of the Mining History  
Association: 18-29.