

CHAPTER 1: INTRODUCTION

The US Department of the Interior and the Minnesota Historical Society (Society) have a mutual interest in the archaeological and early historic resources of the Camp Coldwater Locality in the Fort Snelling National Historic Landmark and National Register Historic Site and District. This mutual interest lies not only in the fact that the Camp Coldwater Locality extends into properties currently managed by each agency, but also because both agencies desire to better understand the early Euroamerican settlement period and the history of this military site. This additional information will permit the formulation of mechanisms to better protect historic resources in the vicinity as well as those within the Camp Coldwater Locality.

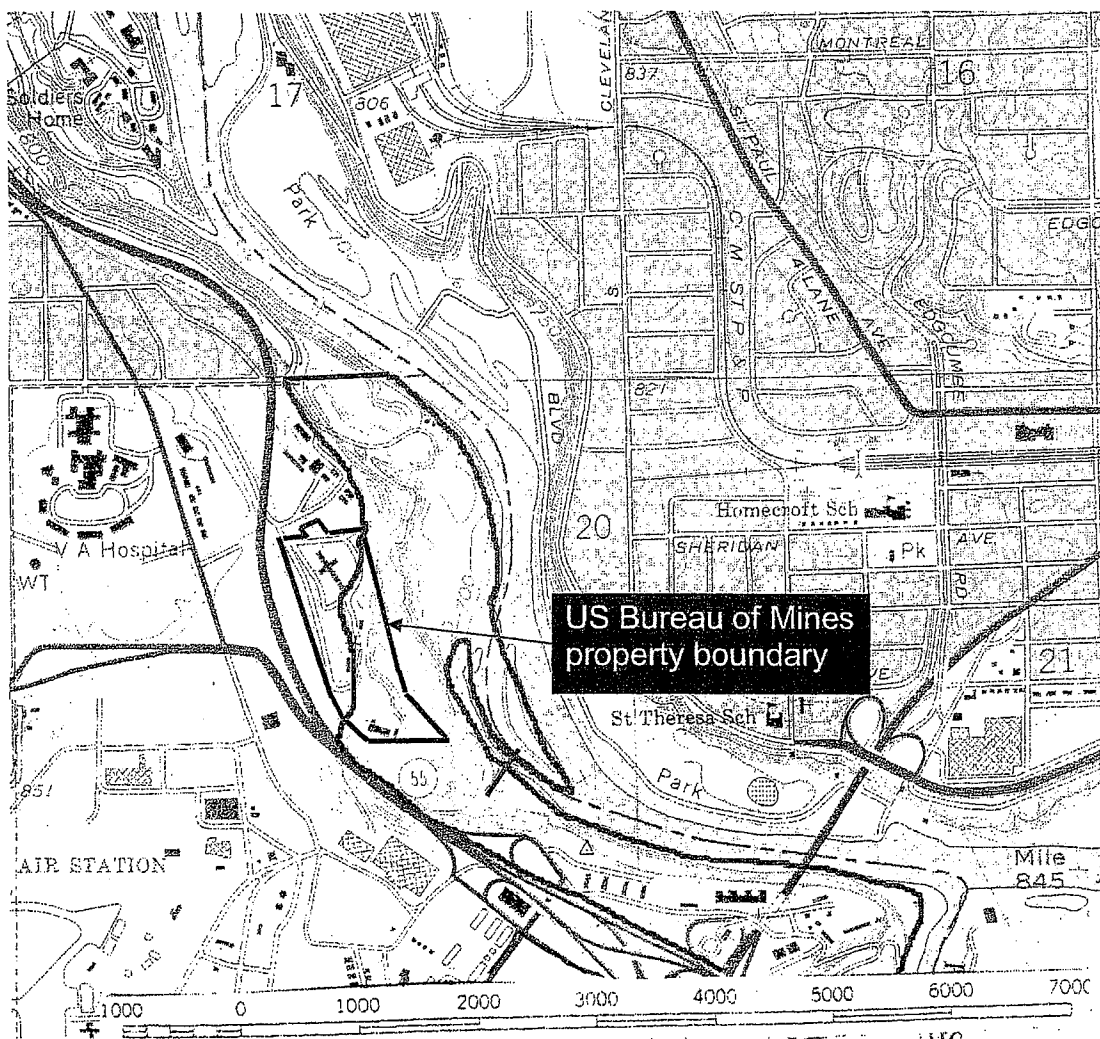


Figure 1 Archaeological project area and boundaries of former Bureau of Mines testing facility property (black lines) and National Historic Landmark boundary (blue lines). (St. Paul West USGS Quadrangle map)

The closure of the Twin Cities Bureau of Mines facility (BOM) and its contemplated transfer to a non-federal agency created some urgency to identify and devise protective measures for historic resources on that property. Research on historic maps and other documents show unequivocally that 19th-century military use and early historic settlement within the former military land grant and reservation extend into the tract of land formerly occupied by the US Bureau of Mines. Recent research also makes it clear that archaeological resources exist on Society land that are identified in early historic maps and plans (Clouse n.d.). These resources are historically related to those on the BOM tract and together formed the core of a multi-component 19th century community that occupied the Camp Coldwater Locality (defined below). The National Park Service (NPS), which was assisting the Bureau of Mines Closure Team on cultural resource matters related to the proposed transfer of land out of federal control, requested this research in order to better understand the potential for and significance of archaeological resources on the property. This report is the result of that research.

The Camp Coldwater Locality as defined here is an area in the vicinity of the Coldwater spring occupied by 19th-century military personnel and Euroamerican settlers. It also represents the area that served as a source of water and the core of a distribution system for Fort Snelling (variously called "New Post," "Department of Dakota," or "Upper Bluff") from 1880 to ca.1920. The Locality has a fluid boundary, at times larger and at other times diminished in size based on changes in use. It is generally defined as that area in and around the Coldwater spring shown on numerous historic maps and plans of Fort Snelling. The Camp Coldwater Locality is depicted in Figure 2 as an outline on the Smith 1837 map of Fort Snelling. The Locality is centered on the key resource in the area, the Coldwater spring, and is bounded by the Mississippi River on the east and Morgan's Mound to the west. It extends from the landing at Massey's on the north and the "Best Steamboat Landing" on the south end. The federal property now defined as the former U.S. Bureau of Mines Twin Cities testing facility lies wholly within the Locality as defined here. That property managed by the Society also lies within the Locality. The legal description of the project is the E ½ of Section 20, Township 28 North, Range 23 West, Hennepin County, Minnesota. Approximately one-half of the BOM land lies within the Fort Snelling National Historic Landmark. The boundaries of the landmark are depicted in Figure 1.

In order to evaluate the potential for cultural resources and document the status of existing archaeological resources within the BOM parcel, a cooperative agreement was signed between the National Park Service and the Minnesota Historical Society—the work to be executed by the Society's Archaeology Department under the direction of the author. That agreement called for an archaeological evaluation of buried cultural resources on the former BOM tract in order to determine the extent of significant archaeological resources that might be in need of protection if the property left federal ownership. During the fieldwork phase it was thought that the property would leave federal ownership, however it now appears that that will not be the case. The land has been transferred to the Fish and Wildlife Service.

While there appears no compelling need for immediate protective measures, these field investigations and recommendation will provide the new federal land managers with information relevant to their stewardship of the property.

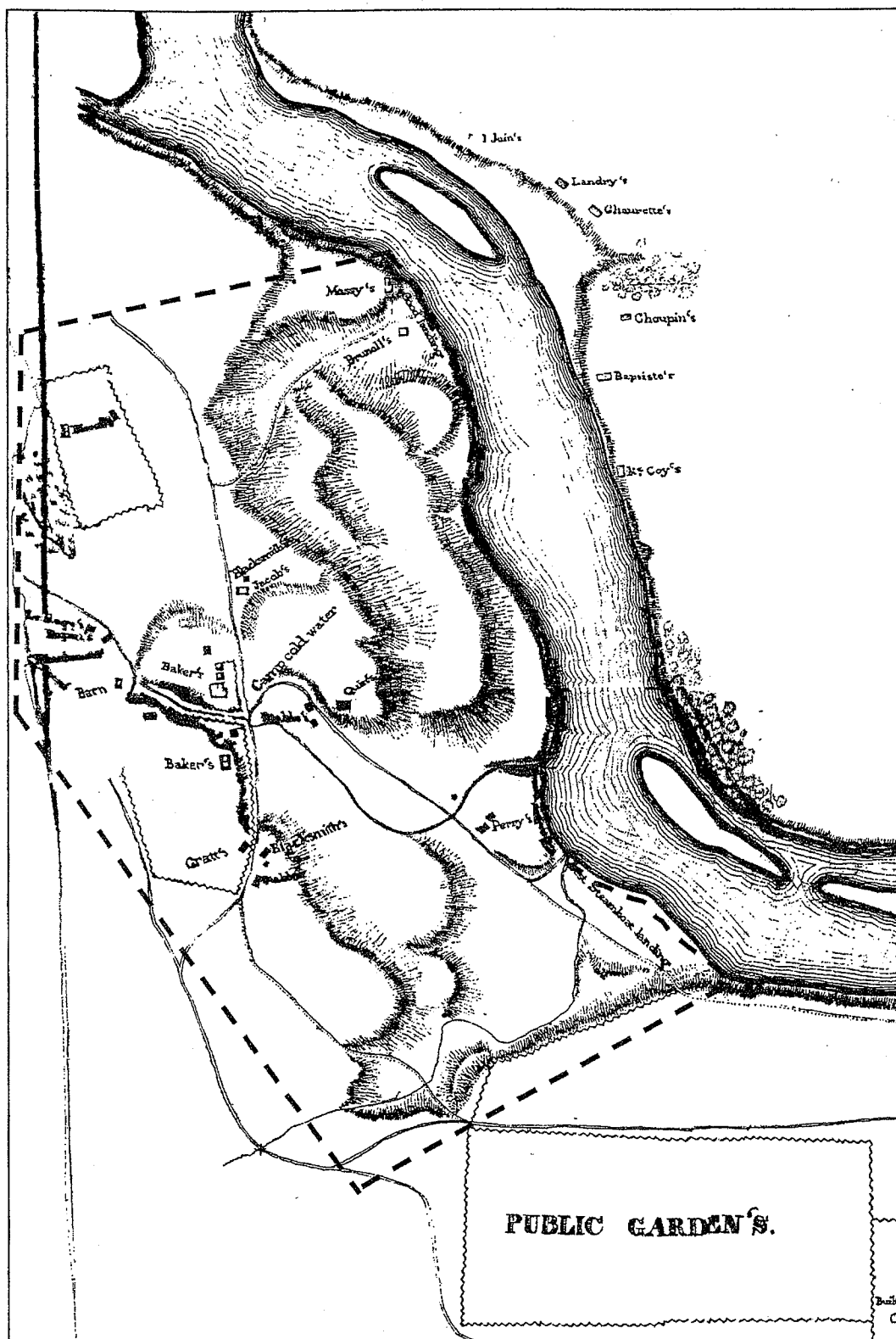


Figure 2 Detail of E.K. Smith's 1837 map showing the Camp Coldwater Locality within dashed outline.

CHAPTER 2: THEORETICAL CONSTRUCTS

It is often necessary to look into the past to discover the underlying forces, so often unconscious, that affect our perceptions of social processes and historical conditions that we visualize today in a static setting. The historical overview presented below focuses on the material remains of Fort Snelling to help better understand the relationship between past behavior and its remnant material expressions. However, it is recognized that the construction of substantive features used during the historic period likely biases our perspective towards one of permanence and those features of the more recent past. Historical data too is biased towards relatively recent literate people; not only are preliterate and illiterate people often mute in the record, they are often invisible. Archaeological evidence is another way of providing context in a way that this historic overview helps to provide evidence for general military and political conditions that effect aspects of the site that are located in the area of specific concern here. Archaeology picks up where the written record leaves off and provides a voice to those who might otherwise not be counted. To provide the voice of the diverse community that existed in this area, and not only that of the military, the archaeological record must be consulted and if found to contain data worthy of research it must also be managed appropriately. To more completely represent the points of view of individuals and communities alike, it is necessary to include both the historic and the archaeological record.

In order to evaluate the significance of the features and structures composing Fort Snelling, there must first be an understanding of fundamental entities that pervade these diverse material elements and structures. The ability to connect past behavior to material remains is derived from a basic assumption that culture may be viewed as learned patterns of human behavior by which humans adapt to their physical and social environment. Rather than a sum of traits, culture is a series of interacting components which are continually acting and reacting to one another, resulting in constant variation and change (Buckley 1967; Kottak 1974). Human behavior is not random; therefore it is possible to document patterns in human activities. Organized structure is visible in the social integration of technology, economics, and other specialized activities. Changes in that structure may be chronicled, and organizational variation viewed as historical phenomena (Clouse 1996).

Historical and archeological records display patterns reflecting those in the cultural system that produced them and reflect changes in those patterns and in the cultural system. Archaeologists in particular have investigated in detail the relationships between past behavioral systems and the material record they leave behind (cf. Longacre 1970:131; Schiffer 1972, 1975, 1987). These approaches utilize assumptions of cultural process that focus on defining empirical distinctions in the material remains from cultural systems occurring at different times and places and use those distinctions to discover and explain systemic variability.

A basic question is, of course, what does any observed variation mean? The pattern ranges for any such variables depend on both intersite and intrasite comparisons and recognition of the effective social and natural environment. An understanding of intrasite conditions is a necessary prerequisite to broader scale intersite comparisons and pattern recognition. The

research conducted as a part of this project is an excellent example of the variability that can be exhibited within a relatively small parcel of land. That variability is not simply a product of natural processes but an extreme case of cultural transformations at work. The results here point out that particularly large, complex sites, such as Fort Snelling, may not be able to be treated as a whole when such significant variability exists. In order to structure questions and approaches to these data it is useful to model aspects of behavior that have influenced or were responsible for those material remains that are in evidence today. The following section briefly discusses theoretical constructs useful in modeling such behavior.

CHAPTER 3: MILITARY CONTEXT

In order to evaluate the material culture and organization of a military site it is first necessary to provide a general understanding of the function and structure of the military itself. In other words, one needs an organizational structure, i.e., a model, of cultural variability and regularity to operationalize research goals (Clouse 1996). The use of an analogue model in this process offers two advantages: first, it facilitates the organized categorization of complex observations by constructing hypotheses concerning suspected relationships, and second, the use of hypotheses based on the model form a predictive framework in which to evaluate and structure observations. This procedure permits the investigator to organize information and creates a structure within which to make relatively accurate generalizations. At the same time, this process allows the temporary assignment of relative significance to the data based upon its pertinence to particular problems. This Military Site Model is based upon a broad range of historic documents, and archaeological studies of both military and non-military sites, post orders, official correspondence, military histories (Foner 1970; Dupuy 1961; Prucha 1947, 1953, 1969; Weigley 1967), and a site interpreters manual prepared for Fort Snelling (Grossman 1977). The generalized attributes presented below have been summarized from earlier works by the author (Clouse 1996, 2000).

The definition of a presumed "enemy" and their suspected tactics, modes of transportation, and weaponry has a significant effect on site placement, defensive design, and the types of construction materials used in the construction of a military site. The initial design of Fort Snelling is one of an irregular and well-fortified installation constructed to fit within and establish control over the geographic conditions prevailing here (Figure 5). This design resulted in forming a relatively linear configuration aligned with the riverine avenues of transportation and communication. Despite this irregular exterior form, the internal site structure reflects the regular organization of military hierarchical structure and functional divisions. This reflected military structure can then be considered as a variable independent of garrison design, and independent of environmental and defensive needs, constraints, or conditions. Later, outside the bounds of the defensive walls of the original garrison, without a recognized "enemy" and lacking natural boundaries on the open plain, later growth at Fort Snelling reflected an arrangement of structures largely dependent on social and functional variables.

In some settings, particularly in a frontier situation, a military installation may appear more like a community in and of itself rather than an installation that is in service to the neighboring or larger non-military community. This situation would appear to result from the lack of availability of certain elements -- both physical and operational -- required for the construction and maintenance of the military physical plant itself. Such elements might include the lack of a locally available skilled labor force for construction and continued maintenance of the structures. The limited availability of certain construction materials will also have an impact on details of design. The lack of availability of other cultural institutions (e.g., church, school, etc.) in the larger community outside the physical military complex also played a role in defining the military culture and structure in remote settings. At Fort Snelling, certain material objects that were not provided by the military were only available through the Sutler

or through neighboring fur trading establishments. Conditions such as these have the effect of restricting the availability of some material goods to local inhabitants and that which is subsequently recovered by archaeologists (Clouse 1996). They also have the effect of creating economic and social relationships between military and non-military communities. The tolerance, for example, of building a fur trade establishment on military grant land such as B.F. Baker's trading post and the squatter settlement at the Camp Coldwater Locality reflect a symbiotic relationship such communities may have had with the military.

A military installation, if it survives for any length of time, will likely not remain a static entity as functions may change in relation to the changing needs of the army in general. For example, a post on the frontier has a different role when the frontier passes it by, and if it survives, will likely function in a different context. A particular military site's function may have little to do with site occupants' decisions since its military role may be seen in terms of its strategic role based on its relationship to the army's perceived needs as a whole. It is in this larger military context that we must comprehend and within which we can best understand those changes reflected at a site like Fort Snelling (Clouse 1996, 2000).

The U.S. Army's institutional responsibility during the 19th century was to serve as a deterrent to conflict and to oppose any threats to national security and commerce. However one must also recognize the role of the army in the context of a social force in times of peace. Since the beginning of the United States, soldiers of the armed forces have undertaken exploration, established lines of communication, built and maintained transportation arteries, researched causes of disease, and developed flood control measures, in addition to protecting the nation's sovereignty. Because of the concern for the protection of democratic ideals, a fear of large standing armies, and because of the nation's geographical position, the United States has in the past relied on a rather small professional army. A citizen army of militia, National Guard, Reserves, or draftees were used to supplement the ranks of the Regular Army in times of need. These two components are what Russell Weigley (1967) has referred to as a history of "not one but two armies."

The early 19th-century military system of the United States consisted of the militia and the regular army. The U.S. militia was modeled after the British local defense system where all men between the ages of 18 and 45 were required to be trained, armed, and come to the nation's defense if called upon. The militia, in the event of an emergency, was commanded by officers who were essentially untrained political or social leaders. Although the militia was relatively ineffectual and did not regularly garrison forts, the regular army was kept small because of cost and the general fear that a large standing army posed a threat to liberty and free government. Military structure, by its very nature, subrogated 19th-century ideals of equality, individuality, and Republican freedom and thereby represented the antithesis of what the United States represented. More specifically, military subordination was thought to promote servility in enlisted men while fostering aristocratic tendencies in officers. A general impression in the 19th century was that the military could not to be trusted (Clouse 1996; Grossman 1977; Prucha 1969).

The remainder of the national defense consisted of a small standing force, the regular army, which was composed of long-term enlistment soldiers and was led by professional, trained

officers. Congress established the number and type of regiments, established staff departments and their authority, and appropriated funds for construction, clothing, rations, and pay. Congress also enacted the *Rules and Articles of War* that governed the military. In 1821, the Congress reduced the 10,000 man army to one authorized at a level of 6,000 men organized into the staff in Washington, D.C., and 4 artillery and 7 infantry regiments (Grossman 1977). It was the regular army that built and initially garrisoned Fort Snelling.

The regular army leadership was divided into the "staff" and the "line," respectively making up the support services and officers commanding troops. The staff, headquartered in Washington, D.C., consisted of 8 departments with varying duties. The line consisted of seven levels of authority, from a Major General in Washington to the Assistant Commissary at each post. In the early-19th century the army was based in 40 forts, barracks, arsenals, and camps. These facilities were primarily distributed along what was the perimeter of the United States, which at that time included the western frontier. The military was divided into geographic "departments," and Fort Snelling was initially a part of the sub-department called the Northwest Frontier, commanded by Brevet Brigadier General Henry Atkinson at St. Louis (Clouse 1996; Grossman 1977).

It is generally acknowledged that the regular army saw frontier duty as a diversion from its primary role in national defense and resented the types of labor associated with frontier life. Officers often perceived frontier duty as preventing them from the social, professional, political, and financial advantages in more developed areas in the east (Prucha 1953, 1969). Most officers tried to avoid frontier duty by using political influence or family connections to obtain staff jobs in the War Department or as recruiting officers in large cities. The military's *duty* as a frontier police force and its *image* as a professional European-styled army created a perceptual and philosophical conflict limiting the army's ability to carry out either role with efficiency (Grossman 1977).

American social values in the 19th century emphasized making one's place in the world by hard work. The army on the other hand was interpreted as a place for a man who gave up his individuality and responsibilities in exchange for food and clothing. During peace-time the regular army was not necessarily representative of society as a whole. The army regulars were often those with few opportunities or were recent immigrants unable to find jobs. Most of the immigrant soldiers, as well as those that were U.S. citizens, were recruited in large cities in the eastern part of the U.S. and they brought a variety of trade skills to the army that were present in the general population. During periods of economic stress, many tradesmen entered the army to assure the basic needs of clothing, food, and housing. Enlisted men were considered near the bottom of the social ladder, and to some, enlistment may have been an alternative to prison or starvation (Prucha 1969; Weigley 1967).

Each soldier's identity was defined in terms of being part of a regiment; but since regiments were often split between posts, rarely did he experience what it was like to be a part of the whole. The division of regiments into different, widely separated garrisons also kept regiments from training as the unified force they were designed to be (Hansen 1958 [1918]; Weigley 1967, 1973). At the time Fort Snelling was constructed, the regiment, the largest independent unit in the army, was to contain 10 companies not to exceed 547 men and

officers. This size restriction changed on numerous occasions as duties of the military changed, especially in times of war.

Physical and social separation of officers and enlisted men was strictly maintained, with interaction necessitated only by duty. This strict segregation was inherited from the British army structure, where rank was based on social class and economic status. In that system, officers were gentlemen and enlisted men were commoners. No enlisted man would ever be eligible for a commission because of the inherent superiority of officers. In the United States, military-school-trained officers took on the characteristics of British officer-gentlemen, keeping horses, hunting dogs, servants and/or slaves. A few slaves were present at Fort Snelling prior to the Civil War. Officers also engaged in extensive leisure activities, such as hunting and horseback riding (Grossman 1977). In adopting the British military structure, the U.S. military promoted the opposite of the 19th-century American ideals of equal opportunity for all.

Subsistence supplies consisted primarily of official military-issue rations. The quality and quantity of food for posts at great distances from settled agricultural areas varied considerably. At Fort Snelling, and some other posts, rations were officially supplemented with produce from the company gardens. Unofficial additions to the diet also included wild game and fish. Dietary supplements depended upon available time, equipment, and available resources. Fresh vegetables were seasonally available and included potatoes, turnips, onions, lettuce, cucumber, corn, beets, squash, carrots, cabbage, beans, and peas (Subsistence Department Records 1820-25, NARG 92, GAO). Additional company purchases from the sutler included such items as pickles, apples, raisins, butter, cheese, eggs, sugar, coffee, and tea. Speaking about Fort Snelling in 1838, the Inspector General, Col. George Croghan, wrote, "No soldier ought to live better than they have always done at this post. The government ration is sufficient in itself, and to it may be added the abundant supply from the gardens of several companies" (quoted in Prucha 1969).

Initially each company at Fort Snelling had a mess kitchen that was in the basement under company quarters. Food consumption took place at a table in each squad room. There were no official army cooks during this early period, and enlisted men were assigned for 10- to 20-day shifts preparing meals. Army regulations also dictated the distribution of the daily fare. Breakfast consisted of bread and boiled beef or pork or hash. Lunch (officially designated dinner) was bread and soup or stew. Supper officially consisted of only bread, but may have been supplemented by meat obtained by hunting or fishing and by garden supplies produced in excess of the daily ration. Later, barracks buildings had separate kitchen and mess facilities usually built at the rear of the habitation structure. Companies were responsible for preparing food for their own unit. And although the army experimented with garrison-wide messes they were never a significant component at Fort Snelling until periods of war in the 20th century

General garrison work routines on the frontier were different from that of the eastern coastal fortifications near areas of settled population (Prucha 1953). The duties at Fort Snelling were not "make work," but were critical for survival of the troops through severe winters. The duty-day was from dawn to dark (which varied considerably with the seasons at such a

northern latitude), and there were at least 40 potential duties to which a soldier could be assigned. These duties were broadly categorized into fatigue, daily, extra, and duty under arms. Work undertaken on a daily basis was related to seasonal needs, the needs of a specific post, and the trade or skills of the individual soldier. Extra duty, such as engagement in building construction, entitled a soldier to additional pay.

While the servility of enlisted personnel continues to be a necessary component of how military hierarchy functions, significant changes took place during the latter part of the 19th century that rectified long standing problems and inequities and made living conditions more bearable for the troops. These changes were brought about by two major factors: 1) high desertion rates in the army (as an example, 1/3 of enlisted personnel deserted in both 1871 and 1872), and 2) widespread and sensational press stories of inhumane and capricious disciplinary treatment of enlisted personnel (Foner 1970).

Desertion rates were undoubtedly associated with military lifestyle that included poor living conditions, inadequate food, harsh discipline, low pay, and the ability to get better jobs outside the military. As the army grappled with these problems, it brought about solutions that resulted in a more humane setting for military service. By the end of the 19th century a number of changes had been made:

1. Increases in daily food rations with the addition of a pound of vegetables per soldier;
2. creation of the canteen system at garrisons to replace the post traders store;
3. creation of summary courts and a code of punishment to reduce capricious punishment;
4. methods of promotion from the ranks;
5. increase in base pay and retirement benefits;
6. improvements in housing, clothing, and more recreational opportunities; and
7. professional and practical training schools for officers.

CHAPTER 4: ENVIRONMENTAL SETTING

To better understand this region, and the initial military presence within it, the resources of the area are discussed with an emphasis on the natural conditions prevailing at the time of initial Euroamerican occupation--conditions very different from the current setting. One such description of the general setting of Fort Snelling was provided by its commanding officer who made the final selection for the fort's location:

Ft. St. Anthony [later Ft. Snelling] is situated on a high point of land immediately at the junction of the River St. Peters [later named the Minnesota River] with the Mississippi, its elevation is one hundred and ten feet from low water mark, it commands the channels of both rivers and the adjacent country within point blank distance; . . . on the north side of the hill is a perpendicular bluff on the south the ascent is steep and a road has been cut . . . between this and the St. Peters is a fine bottom [flood plain] containing about 14 acres . . . (J. Snelling to T. Jesup, 6 November 1822, NARG 92, QMG)

While Fort Snelling's location (Figures 3 - 5) was chosen for its defensive capabilities and its control of the major rivers, many other elements of the natural environment allowed the building of the fort in the manner in which it was constructed. These included renewable resources such as the natural vegetation that supplied trees for lumber and forage for livestock and wild game and fish resources. Fertile soils allowed the fort's inhabitants to

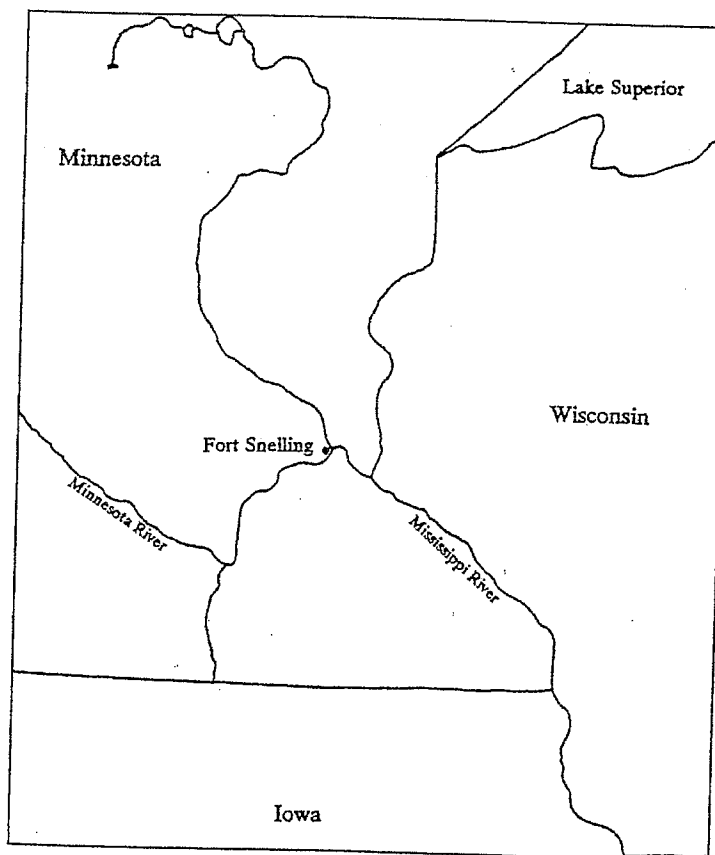


Figure 3 Location of Fort Snelling, Minnesota.

supplement and vary the army's daily ration through agricultural production. At nearby St. Anthony Falls the water power capabilities converted natural energy into usable power. This environment also included non-renewable resources such as the underlying limestone deposits that literally supplied the "building blocks" of the original garrison, and subsequent additions with underlying shale deposits provided a clay source for making bricks. Although blessed with an environment rich in exploitable resources, there were also deterrents to the development of the region around Fort Snelling. Among these were the harshness and the length of the winter season, the lack of nearby supply centers for manufactured goods, and no significant neighboring Euroamerican communities from which to obtain labor, supplies, services, or provide social interaction. Part of the world view of these new arrivals, as members of a culture that arose from western European society, was one of an extractive and additive value system. That is, they looked upon the landscape with a mindset based on what they could take from it or add to it, not how to live within it as it existed. This view is in stark contrast to that of the indigenous populations of Dakota and Ojibwe Indians already living in the region when they arrived.

During his expedition, which included negotiating for land for future military sites in 1805, Lt. Zebulon Pike described the area around the juncture of the two rivers where the future Fort Snelling would be built:

From the St. Croix to the St. Peters [Minnesota] the Mississippi is collected into a narrow compass; I crossed it at one place with 40 strokes of my oars, and the navigation is very good. The E. bank is generally bounded by the river ridges, but the W. sometimes by timbered bottom or prairie. The timber is generally maple, sugar-tree, and ash. From the St. Peters to the Falls of St. Anthony the river is contracted between high hills, and is one continual rapid or fall, the bottom being covered with rocks which in low water are some feet above the surface, leaving narrow channels between them. The rapidity of the current is likewise much augmented by the numerous small, rocky islands which obstruct the navigation. *The shores have many large and beautiful springs issuing forth, which form small cascades as they tumble over the cliffs into the Mississippi.* The timber is generally maple. This place we noted for the great quantity of wild fowl (Coues 1965:309-311 [1895]). (emphasis added)

In 1817, prior to the establishment of a post at the juncture of the Minnesota and Mississippi rivers, Maj. Stephen H. Long undertook a reconnaissance mission to document the region and recommend a location for the garrison. He commented that:

After arriving at the St. Peters [Minnesota], we lay by 2 or 3 hours in order to examine the country in that neighborhood. At the mouth of this River is an Island [Pike] of considerable extent, separated from the main[land] by a Slough of the Mississippi into which the St. Peter's discharges itself. Boats in ascending the former, particularly in low water, usually pass thro' this slough, as it affords a greater depth than the channel upon the other side of the island. Immediately above the mouth of the St. Peter's is a tract of flat Prairie extending far up this river & about 350 yards along the Slough above mentioned. This tract is subject to inundation in time of high water, which is also the case with the flat lands generally situated on both of these rivers. Next above this tract is a high point of land, elevated about 120 feet above the water and fronting immediately on the Mississippi but separated from the St. Peters by the tract above described. The point is formed by the bluffs of the two rivers intercepting each other.

Passing up the river on the brow of the Mississippi Bluff, the ground rises gradually for the distance of about 600 yards, where an extensive broad valley of moderate depth commences. But on the St. Peters the bluff retains nearly the same altitude, being intersected occasionally by ravines of moderate depth (Kane et al. 1978:75-6).

Scientist George Featherstonaugh (1970 [1847]) recorded the presence of a number of species in his travels up the Minnesota River in 1835, but gave little indication of fauna in early historic descriptions in the immediate area of the fort. However, the environment was viewed with acclaim from the perspective of a sportsman. Post Surgeon Nathan Jarvis wrote of the following in 1834:

What a country this is for a sportsman! In hunting grouse if you have a good horse you need never dismount except to pick up your game. The prairie in which they abound being as level and unbroken as a smooth lawn. In one hour a good sportsman will kill within a mile of the Fort as many as will last our mess 2 days (N. Jarvis to W. Jarvis, 3 August 1834, N.Y. Academy of Medicine).

A year earlier Jarvis also wrote "The epicurean can enjoy almost everything we can desire. Game in abundance of every description; our mess table is supplied every day with the finest woodcock and in the fall we will live upon duck, deer livers, grouse, &c" (N. Jarvis to W. Jarvis, 18 June 1833, N.Y. Academy of Medicine).

Evident in the above descriptions, the region around Fort Snelling contained bountiful natural resources ripe for exploitation. Because of the lack of suitable nearby stands of timber for construction, a contingent of soldiers was sent to the Rum River (20 miles north of the fort) to cut and raft logs to the mill at St. Anthony Falls. Trees of all types were cut for firewood since nearly 1,400 cords were necessary to heat the buildings in the winter. Henry Schoolcraft, during a visit to the fort in 1820, indicated that approximately 90 acres were under cultivation by soldiers at the fort (Schoolcraft 1966 [1821]). Ash was used for making roof shingles, and oak was used for the post-and-sill-constructed Long Barracks and Officers' Quarters and for sills, plates, and lintels in stone buildings. The use of timber in the immediate fort vicinity posed three advantages to the military: 1) building materials became available from a local source of supply, 2) obstructions and hiding places were removed for increased defensive capabilities, and 3) areas were cleared for cultivation (Clouse 1996).

Alteration of the vegetative patterns resulted in a transformation of the landscape. Timber resources were renewable, but the limestone, shale, and sandstone used to construct the fort were not. These items, so important to the nature of the fort as it was constructed, were plentiful to the early builders. These quarrying activities changed forever certain topographic features resulting in altered drainage patterns through bluff cutting in some locations including a quarry near the southeast corner of the Locality.

The limestone surface upon which Fort Snelling sits and from which the original fort was built, as well as the bedrock that underlies the Camp Coldwater Locality has been categorized as the Platteville formation (Austin 1972; Bain 1905; Mossler 1972). The Platteville and other local rock formations were formed during the Ordovician Period dating between 425 and 500 million years ago. This same limestone continued to be used for foundations throughout this region until the early part of the 20th century as exhibited in a number of surviving buildings at the fort. The limestone also serves as a relatively impermeable layer for water and it is near its surface at bluff and terrace edges that springs issue forth. The Glenwood shale formation, lying directly under the Platteville, was the source of clay for the

manufacture of hand made bricks used in the fort's initial construction. This stratum was nearly impervious to upper level ground water and was another reason a high water table was maintained. Later brick construction relied on commercial sources of brick from neighboring communities that also obtained their resources from this same formation.

While renewable aspects of the environment were intensively used, e.g., wood, which denuded the area of arboreal vegetation, it was not exploited to the point of permanent environmental damage. Restoration efforts in the area of the natural environment in the latter 20th century have succeeded in returning much of the present Fort Snelling area to its condition prior to the arrival of Euroamerican settlement.

The undulating topography and dissected uplands in the Camp Coldwater Locality provided an amiable setting in which to build homes. It was almost assuredly wooded at the time of initial occupation by the military, but likely cleared shortly thereafter from exploitation for construction and firewood. Some of that cleared land, according to historic documents, was used for farming and grazing by squatters who later occupied the area. The Coldwater spring feeds a small, clear creek that runs about one-quarter mile with a bedrock bed before dropping over a precipice to the Mississippi River below. Some perched wetlands, likely spring fed, are indicated on some of the historic maps. The springs as well as the creek would have provided a ready source of water to local residents.