



The evolution of a foothill amenity zone : landscape change near Bozeman, Montana, 1954-1994
by Jeffrey Allan Copeland

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in
Earth Sciences

Montana State University

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Abstract:

High amenity rural landscapes of the Intermountain West are evolving from agricultural hinterlands to landscapes dominated in many ways by residential land use. Specifically, nonmetropolitan urban centers in the Intermountain West are attracting amenity-seeking migrants who are creating distinct amenity regions that are undergoing rapid landscape change. The foothills around Bozeman, Montana, exemplify the creation of one of these new amenity-based residential zones.

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MONTANA STATE UNIVERSITY

Bozeman, Montana

April 1997

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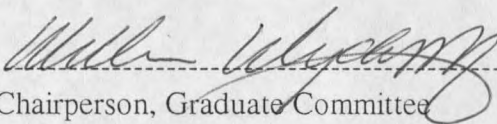
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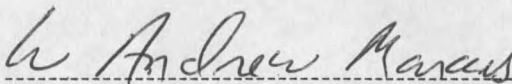


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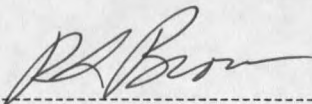


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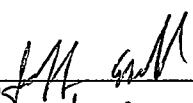
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ABSTRACT

High amenity rural landscapes of the Intermountain West are evolving from agricultural hinterlands to landscapes dominated in many ways by residential land use. Specifically, nonmetropolitan urban centers in the Intermountain West are attracting amenity-seeking migrants who are creating distinct amenity regions that are undergoing rapid landscape change. The foothills around Bozeman, Montana, exemplify the creation of one of these new amenity-based residential zones.

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Near Some Fair town, I'd have a private seat,
 Built uniform, not little, nor too great:
 Better, if on a rising ground it stood,
 On this side fields, on that a neighboring wood
 (Pomfret 1736)

FOOTHILL AMENITY ZONES OF THE INTERMOUNTAIN WEST

Immigration is contributing to rapid population growth in many rural and nonmetropolitan hinterlands in the American West. In the process formerly rural landscapes are witnessing rapid change. This study examines land ownership and land use changes in the foothills of mountains bordering on the Gallatin Valley near the growing community of Bozeman, Montana from 1954 to 1994. This case study of nonmetropolitan growth in the West examines changing patterns of land ownership, land uses, and infrastructure in two foothill amenity zones that are experiencing rapid population increases. The existence of these amenity zones can best be understood by examining historical patterns of land use and land ownership, the changing local cultural, economic, and political setting, and the non-local macro forces that drive these changes. This study reconstructs patterns of change, explains these changes in the context of on-site, local, and macro variables, and develops a model of foothill amenity zone development in the Intermountain West.

Defining Amenities and Amenity Zones

Amenities are playing an increasing role in residential location choices, which in turn impacts high-amenity nonmetropolitan areas. Indeed amenity is a significant factor in the growth of many American nonmetropolitan areas since 1945 (Ullman 1954; Zelinsky 1977; Cambell 1986; Coppack 1988; Fuguitt, Brown, and Beale 1989; Gober, McHugh, and

LeClerc 1993). Edward Ullman's classic article (1954) on regional growth began with this prophetic statement:

For the first time in the world's history pleasant living conditions-amenities-instead of more narrowly defined economic advantages are becoming the sparks that generate significant population increases, particularly in the United States (119).

After 1970, as amenity-based migration increased, geographers included amenity factors in their discussions of migration patterns (Zelinsky 1977; Coppack 1988). Lamb (1975) notes, however, that while it is easy enough to conclude that amenity factors play a role in growth patterns, it is difficult to define the elements and variables that result in a region or an area being perceived as having "superior amenity endowment" (10).

Several variables define such an area in the context of the Bozeman study and in the larger Intermountain West. Rural amenity zones typically lack undesirable characteristics that are common in larger metropolitan settings. Congestion, crime, and pollution are often cited as primary push factors for many who have left the city (Knox 1994). Conversely, rural amenity zones are also localities in which desirable amenity factors coalesce. Foothill amenity zones typically occupy private land in the foothills surrounding the nonmetropolitan urban center. Such foothill settings in the Intermountain West are often associated with unique natural and cultural landscape characteristics. The foothills are a transition zone not only in terms of land ownership and land use, but often in physiography and ecotones. In the semi-arid Intermountain West the lower tree line occurs in the foothills. The foothills also often mark the edge of viable agricultural holdings and therefore the edge of successful initial settlement. It is no coincidence then, that the borders of the vast federal holdings in these regions are often in the foothill zone (Price 1979). The foothills

location is thus situated between urban and mountain environments, with all the associated recreational, aesthetic, and practical amenities.

Four defining elements of these settings characterize the desirable attributes of foothill amenity zones in the West:

- 1) access to public land and recreational opportunities
- 2) viewshed
- 3) rural landscape attributes
- 4) spatial exclusivity

These characteristics reflect the perceived pull factors exhibited by the foothill landscape within the region (Cambell 1986; Fuguitt, Brown, and Beale 1989; Gober, McHugh, and LeClerc 1993). Because these factors, and the specific amenities offered by the foothill zone, are relative in nature and based on the perceptions of individuals a strict definition is not possible. The four foothill amenity zone features, while largely unquantifiable, are nonetheless defining characteristics that can be utilized to understand patterns of change across the temporal and spatial landscape.

(1) Access to public land and recreational opportunities: Because of the proximity of the foothill zone to public land in the American West, outdoor recreational opportunities are readily available. Such accessibility became more important after World War II as informal recreational access to private land became increasingly problematic. To increase recreational opportunities, the Forest Service began to purchase public corridors to its lands by the late 1970s. By 1995 all of the residential sites in the study areas were near Forest Service accesses, and many bordered on Forest Service land. The importance of public land access is reflected in real estate advertisements, which

often note proximity to forest service land in site descriptions of foothill property. Over time, as foothill areas are developed, public accesses to National Forests are sometimes donated or purchased. Local planning entities often require parkland dedication for subdivision approval, and in some cases public land access is included in subdivision approval, pushed through by residents and grass-root organizations. In other cases, public Forest Service access is obtained as the result of legal battles between landowners. Such evidence suggests the growing amenity value of public lands within these amenity zone settings.

(2) Viewshed: View is another pervasive amenity of the foothills. Rural areas in the United States often have high visual value, particularly in the American West with its high profile topography and open vegetation (Smardon 1986). This is particularly true in the foothills, because of the inclined landscape. The foothills stand between the valleys and mountains that generally comprise the Intermountain West's terrain. Viewshed includes both view from a residential property, and the view of the site. In some cases within the study area, homes occupy prominent sites seemingly chosen primarily for the view. In the local *Home Seekers*, real estate advertisements often include view as a selling point. Within the study area many developed subdivisions and individual homes offer a prominent view of the valley, the surrounding mountains, and in many cases the town of Bozeman. Increasingly during the study period view was emphasized in parcel and homesite selection, as well as in home design (Haynes 1995, Glick 1995). As other amenities such as rural landscape and spatial exclusivity become increasingly rare and expensive due to residential growth, view has become an important amenity due to its abundance in the foothills.

Early non-farm residential users, following traditional patterns

of rural farm settlement, often purchased homesites in a protected gully or low area, with timber and brush nearby (McIlhattan 1994; Nash Ja. 1995). Although these areas offered views, the views were secondary to other site features. By the late 1970s, however, as these sheltered areas became increasingly expensive, an emphasis on more expansive views developed. Indeed, recently homes have purposefully been built on steeper slopes, exposed ridges, and other more inaccessible areas in order to increase the view.

(3) Rural landscape: While the least quantifiable, the amenity of the rural landscape is perhaps the most significant variable in promoting residential development in these zones. Many former city dwellers look for vestiges of a country life of "pastoral quietude and safety" away from the crowds (Coppack 1988, 355). Much of the attraction of rural suburbs can be traced to America's nostalgia for rural values and traditions (Tuan 1974). Cambell (1986) has identified environmental quality/beauty as a primary location priority for residences in a fast-growing nonmetropolitan area. The physical landscape of the foothills includes a moderately sloped zone, with vegetation generally composed of a mixed mosaic of evergreens, brush, and grass/ sagebrush. The low density of homes has been identified by P. Johnson (1985) as a variable contributing to favorable impression of an area's rural character. The relatively large size of many rural residential properties is also a factor in preserving this amenity feature. Adding to the rural character of such zones is the presence of continuing agricultural operations in the vicinity. Livestock, barns, and agricultural equipment contribute to the "farmscape" even as fewer and fewer nearby residents actually make their living from the soil.

(4) Spatial exclusivity: This amenity addresses the degree to which the surrounding space is controlled by the resident. One of the

strongest motives for rural living is the desire for more elbow-room (Davis, Nelson, and Dueker 1994). Spatial exclusivity is a general term that encompasses private ownership of land, appreciation of the relative isolation and low population of an area, as well as planned residential areas that preserve open space.

In the more remote reaches of the Bozeman study area, spatial exclusivity is enjoyed due to the large expanses of open land, while closer to town some planned developments control viewshed and recreational resources for the exclusive use of residents. Private ownership of land, controlling access to public land, a limited number of homes on a given dead-end road, access to public space, and density of development are a partial list of the variables by which one could measure exclusivity. In the foothill zone, various stratagems and spatial patterns emerge as residents attempt to preserve their "rural shelter" (Louv 1983, 160). Indeed, one planned development southeast of town has a gatehouse for visitors to check in before entering.

Although these four variables define the foothill amenity zone, other factors remain important in determining land use patterns in such settings. These include the distance of a parcel from the urban center, its access to transportation infrastructure and other urban services, and its price per acre.

Setting

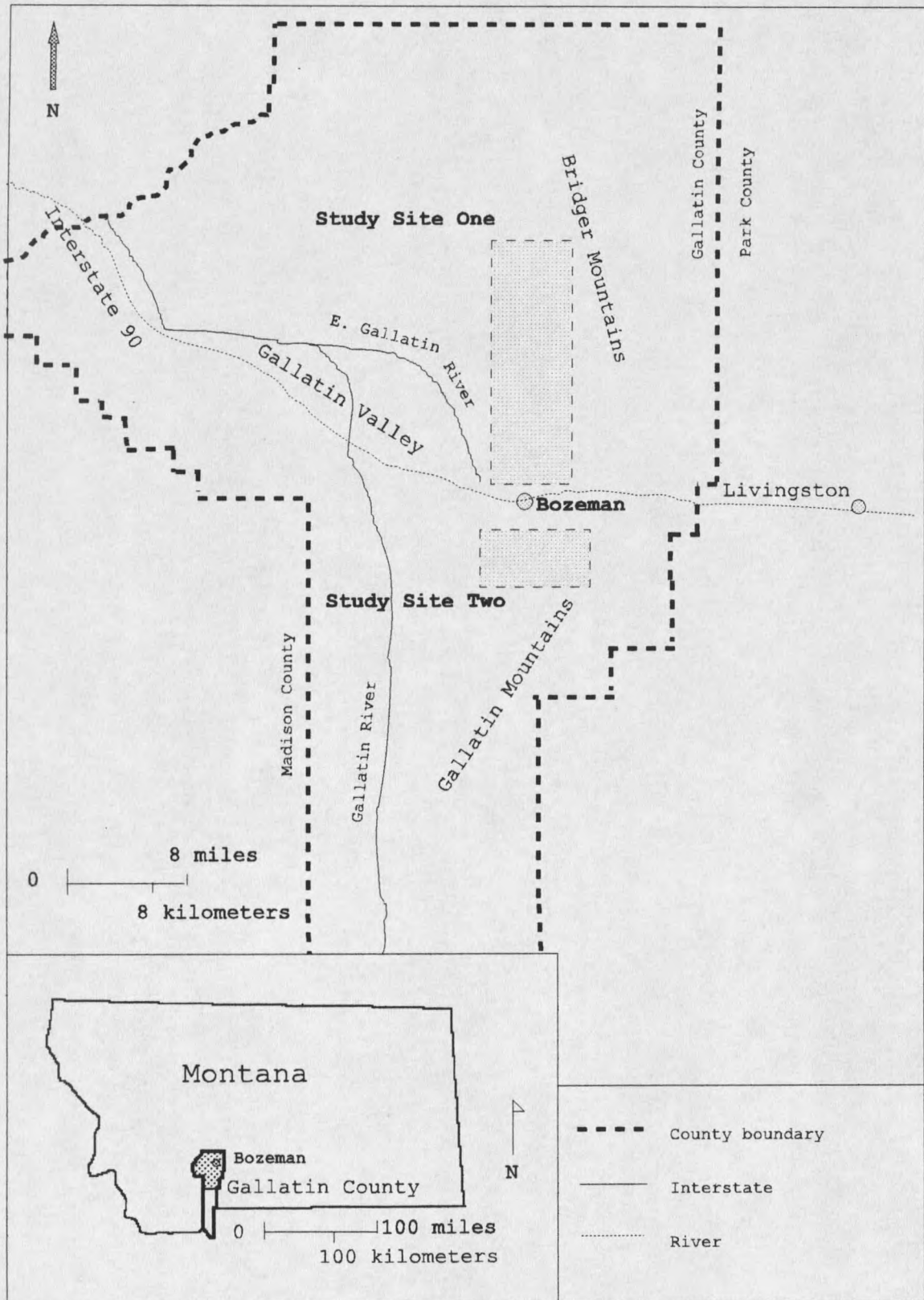
The community of Bozeman occupies the southeastern corner of the Gallatin Valley, near the base of the Bridger and Gallatin mountains. The Gallatin Valley is located in the northern Rocky Mountains of southwestern Montana, and is bordered by several mountain ranges. While the area was first visited by the Lewis and Clark Expedition in 1805, it was not until the 1860s, with the discovery of gold at nearby Alder

Gulch, that permanent Euroamerican settlement began. While originally an agricultural community serving the mining settlements, Bozeman's economic base soon diversified. Fort Ellis was erected near the town in 1867. The creation of Yellowstone Park in 1872 and the opening of The Montana State Agricultural College in 1893 furthered its growth. Indeed, the valley's agricultural potential and proximity to natural resources stimulated moderate growth into the mid-twentieth century. More recent accelerated growth, however, appears related to the amenities offered to in-migrating nonagricultural residents, and these variables loom increasingly important in changing patterns of future development.

The study area consists of two sites in the foothills fronting on the Gallatin Valley near Bozeman. The two foothill amenity zones form a semicircle around Bozeman, one zone on the west slope of the Bridgers and the other a zone on the north slope of the Gallatin Mountains south of Bozeman (Figure 1). The town of Bozeman lies at an elevation of approximately 4,800 feet. The accessible foothills nearby begin on the northeast and southeast edges of town and rise to approximately 6,000 feet, with more rugged mountains beyond ascending to around 10,000 feet.

The foothills occupy a commanding position over the valley, allowing an unfettered view of the mountains beyond. In turn, these foothills are the backdrop for the valley and town. They are generally modestly sloped and suitable for residential buildings. The vegetative covering is a mosaic of short grass, sagebrush, and mixed douglas fir and juniper, with occasional stands of aspen and brush in the drainages. The larger drainages have thick conifer growth on their northern exposures, with cottonwoods and brush along stream courses. Much of the foothill acreage was traditionally used as rangeland, with the flatter, less rocky sites devoted to dryland wheat and barley.

Figure 1. Study Area Locale



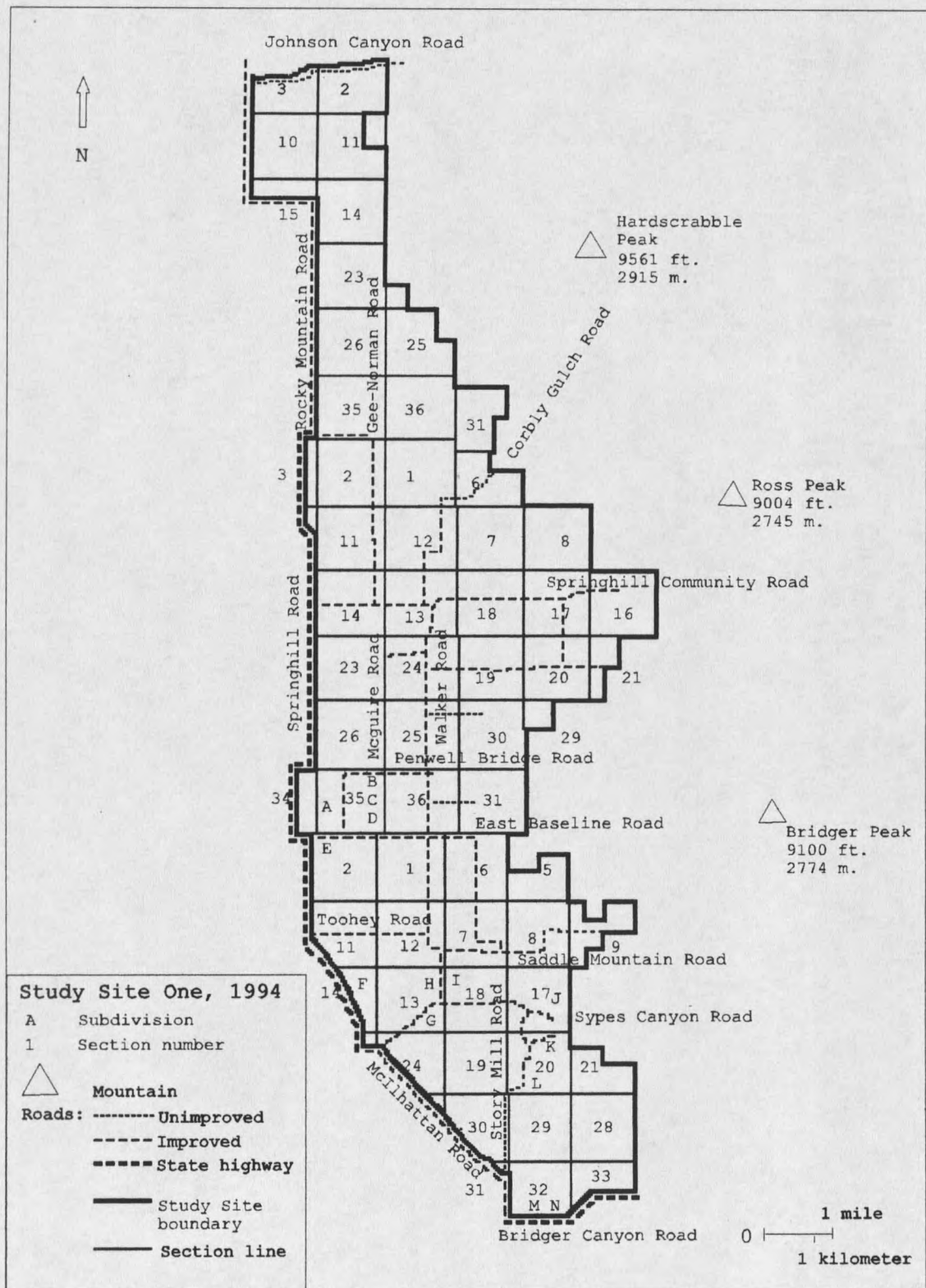
Irrigation from the major drainages to lower fields occurred in limited areas throughout the foothills (Water Resources Survey Part II, Gallatin County 1954).

The Bridger Mountains, rising 5,000 ft. above Bozeman, run in a north-northeasterly direction for thirty miles. Site One occupies 32,000 acres or 50 square miles of the foothills of the western slope of the Bridgers, an area eighteen miles long from north to south, and five miles at its widest from east to west (Figure 2). At the northern boundary, the site is over a thousand feet above Bozeman, at an elevation of 6,000 feet. This site is bounded by Springhill Road to the west, Gallatin National Forest and state land to the east, Johnson Creek Canyon to the north, and McIlhattan Road and Bridger Canyon Drive to the south.

These foothills contain exposed and generally treeless ridges and alluvial fans. For much of the year most of the streams issuing from the mountains are dry by the time they reach the foothills, either naturally or from irrigation draw off. Steeper rockier areas in the foothills are sparsely wooded with Douglas fir and juniper, with thick stands of timber occurring only on higher north-facing slopes. The few riparian areas are generally wooded with cottonwoods, alder, Douglas fir and aspen. The smaller and ephemeral drainages are lightly vegetated with brush such as chokecherry, Rocky Mountain maple, dogwood, and hawthorne.

Site Two is south of town in the foothills of the Gallatin Mountains, a mountain range on the southern boundary of the valley, between six and ten miles from Bozeman (Figure 3). This site is bounded by Gallatin National Forest and state land to the south, Hyalite Road to the west, Bear Canyon Road to the east, and public roads and section lines to the north. This smaller site is closer to town than much of Site One, but shares many of its amenity characteristics. Due to the

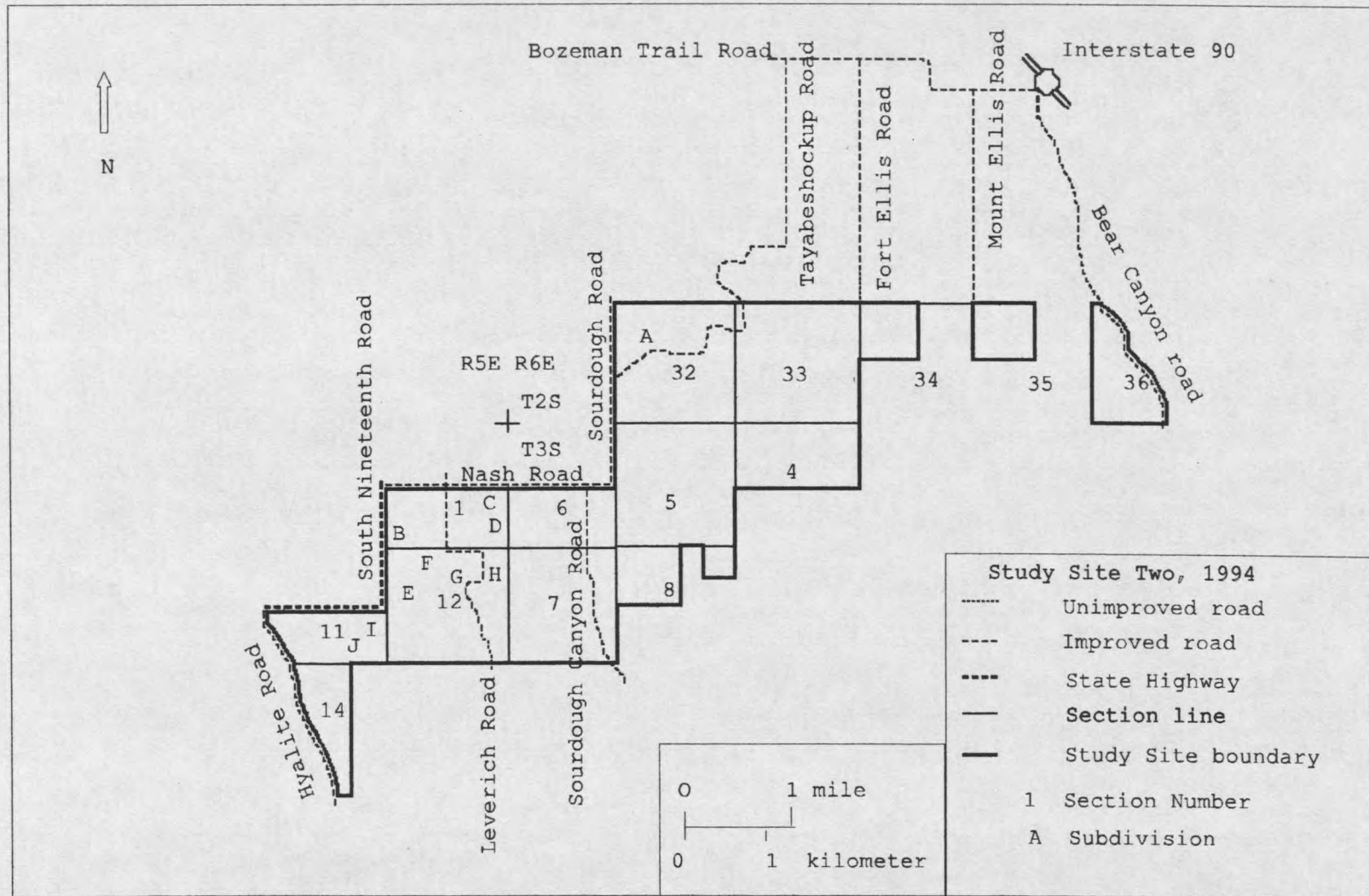
Figure 2. Study Site One, 1994



Key for Figure 2, Study Site One, 1994

- A. Ross Creek Subdivision
- B. Foster Park Subdivision
- C. Buffalo Creek Subdivision
- D. Buena Vista Acres Subdivision
- E. Sager Stimson Estates Subdivision
- F. Wheatland Hills Subdivision
- G. The Ranch Subdivision
- H. Summer Ridge Subdivision
- I. Harvest Hills Subdivision
- J. Sypes Canyon Subdivision
- K. Grandview I Subdivision
- L. Grandview II Subdivision
- M. Mount Baldy Subdivision
- N. Vogel Subdivision

Figure 3. Study Site Two, 1994



Key for Figure 3, Study Site Two, 1994

- A. Triple Tree Subdivision
- B. Fir Hill Subdivision
- C. Cross Roads Subdivision
- D. Haleys Subdivision
- E. Chief Joseph Meadows Subdivision
- F. Mystic Heights II Subdivision
- G. Mystic Heights III Subdivision
- H. Mystic Heights I Subdivision
- I. Aspen Heights Subdivision
- J. Hodgeman Canyon Subdivision

study site's general north-facing aspect, it gets less sun and is therefore more heavily timbered in the steeper areas. The lower timber line in the Gallatin foothills is distinct and sharp, with trees on the upper slopes obstructing the view to and from the site. Also, the Bear Creek, Sourdough Creek, and Hyalite Creek drainages contain thick stands of cottonwood, alder, aspen, willow, and various brush species.

The eastern portion of Site Two, specifically parts of Sections 4, 33, 32, 34, and 35, is located on a bench above Sourdough Creek and Bear Creek to the east. This area, generally known as Sourdough Ridge, sits at a higher elevation than the majority of the site to the west. This area is unirrigated and unsuitable for agriculture other than grazing and some hayfields (Water Resources Survey Part II, Gallatin County 1954). Further east (Section 36) is steeper and more densely-timbered Bear Canyon. The western portion of Site Two (Sections 1, 6, 5, and the northern portions of Sections 7, 12, and 11) is generally flat and arable land and much of it was at one time irrigated. The southern area of the study site is generally wooded and steep, unsuitable for agricultural use (Nash, Ja. 1995; Nash, D. 1995).

Literature Review

Amenity is acknowledged as a significant factor in the growth of nonmetropolitan areas (Ullman 1954; Zelinsky 1977; Coppack 1988; Fuguitt, Brown, and Beale 1989). By 1977 geographers included amenity factors in their discussions of migration patterns and regions (Lamb 1975; Zelinsky 1977). However, few authors have studied landscape change driven by amenity growth (Cambell 1986; Gober, McHugh, LeClerc 1993).

Macro-variables that help explain landscape change have been addressed by a number of authors. Muller and Wheeler (1986) examine the spatial components of the national economy, its stages of urban

expansion, as well as relevant patterns of agricultural economics which affect national land use patterns. More generally, Wolf (1981) examines land ownership, including traditions of speculation and real estate development in the context of American history. More specifically, Louv (1983) and others address the causes, as well as repercussions, of amenity-based rural residential growth throughout America (Bourne 1981). Louv concludes that owning land and a single family dwellings are compelling concerns for many Americans, dreams which became more possible after the postwar economic expansion experienced in the 1950s and 1960s..

The growth of edge cities and small towns within metropolitan areas has been significant enough in recent years to interest other urban geographers. Yeates (1990) addresses the general role of amenities in residential choice, as well as the role of planning and zoning in land use change. He is helpful in defining the significance of distance and accessibility factors in land use on the urban periphery. Knox (1994) defines the historical stages of expanding urban fields in Post World War II America. He identifies asylum suburbs, masterplanned communities, small towns, and exurbs as the refuge from the congestion and gridlock of metropolitan areas in the "Postsuburban Development" period, beginning in 1973. Hart (1991) adds to the Knox framework by proposing that the urban-rural fringe is a bow wave beyond the urban built-up area that, because of its location, is ripe for urban conversion. These authors, while emphasizing the urban field around larger metropolitan areas, also help identify important variables in landscape change on the fringe of smaller urban areas such as those found throughout the nonmetropolitan West.

Other studies have examined land markets, land prices, and population patterns, at the urban fringe (McMillan 1989, Dowall 1981,

Pyle 1985). They reveal that the growing number of people moving to exurban areas warrants a careful study of the land market. McMillan (1989) examines three types of land use at the urban fringe, including "agricultural", "residential", and "vacant". He concludes that vacant land is generally a transition pattern from agricultural to residential, and that residential land use occurs in a decentralized pattern. Pyle (1985) focuses on the real estate market in studying housing booms in rural areas. She points to rates of land ownership turnover as a significant element in the land use shift from agricultural to residential. Geographers as early as 1965 were also examining the demographic impacts of nonfarming populations in rural areas (Zelinsky 1962).

While a number of studies discuss rural land use changes near cities, most are only peripherally related to changes over time for a specific amenity zone. Stroub (1983) addresses environmental problems with large subdivisions but does so without an historical perspective. Rudel (1984) examines the incidence of rural land use planning in the 48 contiguous states and concludes that high rates of population increase are likely to correlate with the incidence of rural planning.

Nash, Abbott and others have specifically traced the growth of suburbs in the West (Nash 1973; Limerick 1987; Abbott 1993). Nash (1973) has recounted the rise of the suburbs and rural residential areas in the West since 1945. He concludes that the extensive suburbs and the scattered residential development on the fringe of western urban areas are defining characteristics of the region. Limerick (1987) identifies real estate as the emotional heart of western history, and the acquisition of land as a cultural imperative. She also discusses the "fine pedigree" of land speculation in the West. This perspective is helpful in addressing the importance of property ownership in the

transformation of the western landscape. Abbott (1993) describes the urbanizing of the West. He specifically addresses the 'low-rise' or horizontal sprawl preference seen in western urban residential growth. He suggests that "The openness of the natural environment in the West underlies and accentuates the horizontality of their built environments" (136). The cities of the West are often built on natural vantage points, as Abbott argues, "built to be seen".

A number of authors have focused on Montana in addressing historical landscape change. Malone and Roeder (1991) provide an important overview of cultural, political, and economic history. M. Johnson (1965, 1978, 1979, 1981) and Polzin (1979, 1991, 1992, 1993, 1995) summarize recent state economic and demographic trends, as well as offer explanations of these patterns. Wyckoff (1991) addresses five historical themes that are pivotal in the population dynamics of Montana, including the isolating and limiting environment, enduring economic colonialism in the state, technological advances, the presence of the federal government, and changing cultural influences. These themes are equally applicable to the other states comprising the Intermountain West. He argues that the valleys of western Montana are experiencing population increases due in part to recreational, life-style, and residential amenities that the area offers.

In a more local setting, Wyckoff and Hansen (1991) trace the environmental impacts of external economic, political, cultural, and technological change on a high valley in southwest Montana. They point to the "environmental amenities" of the Madison Valley which have encouraged population gains in the area (66). Rasker (1993) provides important demographic and economic analysis of the area comprising the Greater Yellowstone Ecosystem and concludes that tourism and other amenity based activities are playing a growing role in the regions

economy, and contributing to population growth. Jobes (1991) brings a different perspective to the study of rural growth in the American West by examining less quantifiable factors, such as aesthetics, recreation, and life-style concerns. He examines the exploitation of high amenity areas with falling rural farm populations by outside wealth. His vision for the future of the northern Rockies, while disheartening, is apt:

Scenic and recreational resources will be developed to levels demanding such extensive management that the revered concept, the "natural" will scarcely be applicable. Most people will only vaguely notice this process because the conditions upon their arrival will provide the reference point for evaluating changes around them. They will not have seen the area in its less exploited, more natural, state. So long as it is relatively less crowded and safer, prettier and cleaner than where they came from, Montana will seem pretty attractive. And for the foreseeable future the relative solitude and beauty of the northern Rockies are likely to create the delusion among migrants that they convey more than most other places in America (8).

Other authors address similar issues in exploring analogous areas outside of Montana. Loeffler (1965) examines the population increases within the Colorado Piedmont, focusing on "outstanding developments" in the region without defining a specific study area (26). P. Johnson (1985) examines "Urban Dispersal and Patterns of Rural Residential Development in Douglas County, Oregon." He traces the decline of farming in this rural county during the decades following World War II, the surge in population due to the lumber industry, and beginning in the 1970's, a surge in population associated with demographic, amenity, and urban push factors. Johnson cites the "desire to live in a rural environment where the additional benefits of amenities", such as mountains and forests, explain much of the population increase in the

unincorporated parts of the county between 1970 and 1980 (50). Cambell (1986), in response to the counterurbanization move away from the metropolitan areas that was observed in the 1970's, identifies ten location factors, including environmental quality/beauty and other amenity factors, in a survey of the residents of Bonner County, Idaho. The results of his survey show residential preferences are greatly influenced by proximity to high quality environments and nearness to friends and family. He suggests that the natural amenities of an area attract people and that regardless of socioeconomic differences the residents share these location priorities.

Problem

As nonmetropolitan areas in the Intermountain West grow in population due to immigration, distinct amenity zones emerge in the rural hinterlands that offer particularly attractive living conditions. Amenity zone development in the environments of the West involves a complex process of land use changes that alter essentially rural landscapes into a more diverse set of land use activities. In this study I define an amenity zone through both physical and cultural landscape features in a region of amenity-driven high population growth and then reconstructs patterns of change. I then explain these changes in the context of local and macro variables and then develop a general schematic model of the impacts these changes have brought to the landscape of the nonmetropolitan American West.

Landscape and land use changes are often marked by a corresponding change of ownership and parcel size (Pyle 1985). I reconstruct spatial patterns of land ownership and land use change for the period from 1954 to 1994. These changes correlate with relevant spatial, economic, political, technological, and cultural factors that best explain these

changes. Both local and macro variables are addressed. These generalized findings are then used as the basis for a descriptive and schematic model of the evolution of rural foothill amenity areas near the urban fringe of growing communities in the West. Included in this model is a discussion of both historical and spatial patterns that accompany the evolution of these zones on the landscape. This model is based on the historical progression of a foothill amenity zone from agricultural land use to rural residential land noted in the study area. This model also suggests where residential development will occur, what time frame it will occur in, the patterns of change likely to occur there, and the relevant local and non local factors likely to influence the patterns of change, as well as describing a continuum of outcomes that have occurred in the foothill amenity zone settings between 1954 and 1994. This continuum ranges from examples of no change to the development of highly clustered residential neighborhoods.

Rationale

This study of foothill amenity zones can make three important contributions:

(A) It will contribute to a better understanding of changes occurring on the fringe of smaller non-metropolitan central places by examining the evolution of the cultural landscape in areas of rapid population increases. In 1950 The U.S. Census first recognized as "urban" the densely settled areas beyond central cities of more than 50,000 people which were formally considered rural (Zelinsky 1962). Although this refinement acknowledges the blurring of urban and rural landscapes, Zelinsky noted that the census still fails to acknowledge the urban nature of many areas still labeled rural, such as "the inhabitants of the urban fringes of cities of fewer than 50,000 and the

dispersed suburbanites who may reside in the open country but who earn their livelihood in cities" (494). While the urbanization of rural land at the urban fringe of metropolitan areas has been a focus of many case studies, the growth of rural areas outside of nonmetropolitan urban centers has not received the attention it deserves. This study focuses on this significant phenomena.

Geographers in the 1970s identified a related process they termed counterurbanization (Fuguitt, Brown, and Beale 1989).

Counterurbanization is the net movement of people from metropolitan to nonmetropolitan areas. This phenomena emerged in the 1970s, where, for the first time, rural areas gained population as a process of metropolitan population loss. While explanations for this phenomena abound, they generally point to both economic opportunities and a set of environmental and cultural amenities. While this trend reversed in the 1980s in some settings, it was a harbinger of population growth for many areas associated with high amenities (Gober, McHugh, and Leclerc 1993). Accompanying this trend was a growing public residential preference for increasingly low population densities and smaller and smaller towns (Louv 1983). This study, by examining nonmetropolitan growth, can add to our understanding of the counterurbanization phenomenon.

(B) The rural West in particular is changing rapidly and Bozeman is an excellent case study to model that process. The population of the West increased twice as fast as the national rate in the 1980s (Exter 1990). From 1990 to 1994 the Mountain states were gaining population at an even faster rate, with Montana ranked fifth in percentage population growth due to immigration from other states (Bozeman Daily Chronicle 1996, 28 January). While in 1992 Washington D.C. ranked number one for Allied Van Line shipments, the next six states with the most shipments were all in the West, with Montana ranked number three, up from twelfth

in 1990 (Schwartz 1992). By 1994 the Intermountain West was the most popular area for relocation for the fifth year in a row (Allied Van Lines Magnet States Report 1995). Many of these migrants arrived from California, driven by "economic crises, urban disorder, and costly natural disasters" (Starrs and Wright 1996, 417). Over 130,000 people transferred their drivers license's from California to the Intermountain West states from 1990 to 1994. A more specific manifestation of this movement, known as "equity exile", has led to thousands of Californians selling their homes and moving to the Rocky Mountains where residential land and homes are cheaper (Johnson, D. 1995).

While the western states have exerted a pull on urban Americans for a century or more, it is only in the late twentieth century that the region's economy allowed such a move for so many people. "For better or worse, satellites, fax machines, telephone lines and cellular service have removed these states from their splendid isolation and tied them into the rest of the country" (Stern and Gutner 1992). Along with improved transportation, including wide-bodied jets and other diverse technology, the telecommunication revolution has opened up the West to residential use. As a result, the economy of the West is growing along with the population.

The Intermountain states chosen for this study include Montana, Idaho, Wyoming, Colorado, Utah, and New Mexico. These states have experienced an annual regional economic growth rate of over five percent since 1991, compared to a one percent growth rate for the rest of the country (Bonfante 1993). Personal income grew at more than double the national rate for much of this area in the early 1990s, fueled by the fastest growth in real estate sales in the nation (Stern and Gutner 1992). A significant number of migrants opt for ranchettes of ten to twenty acres on the outskirts of an urban area. Too small for commercial

agriculture, these residential parcels come with a high public cost (Stroud 1983). The strain on public infrastructure includes increased road maintenance, police and fire protection, school-bus service, and postal service. Environmental and aesthetic concerns include loss of habitat, loss of open space and agricultural land, interruption of the viewshed, and depletion of the groundwater. Because of these and other costs, many of the western states, as well as numerous counties and communities, have passed more restrictive subdivision regulations (Heath 1995).

People are moving out West, and it is the rural areas surrounding nonmetropolitan urban areas that are changing dramatically as a result. The foothills are a zone that deserves particular attention due to rapid change in land use from predominantly agricultural to residential. This study addresses this important regional expression of nonmetropolitan growth, particularly as it is operating in the high amenity settings of the mountain foothill environment. In doing so this study will generate a model of a foothill amenity zone, useful in understanding amenity-related development in other analogous settings within the American West.

(C) Finally, this study contributes to a better understanding of local geographical change in the Gallatin Valley since 1954. From 1950 to 1990 the county's population more than doubled, with an acceleration of population growth in the early 1990s. From 1960 to 1970, while the population of the county grew by 4,200 people, the rural population actually declined by 50 people (Gallatin County Master Plan 1993). By contrast, from 1970 to 1980, the urban population grew by only sixteen percent while the rural population leaped by 63%. While the rural population grew, farm employment fell (Rasker 1993). The shrinking farm population and the growing rural population for these years suggests

that the distinction between town and country was blurring around Bozeman. The foothills around Bozeman were dramatically altered by this influx as people sought out high-amenity home sites. For example, the Bridger foothills to the north of Bozeman gained so many residences that the county committed all of its Federal highway money to the year 2002 to improve Springhill Road, the major arterial to Bozeman (Bozeman Daily Chronicle, 9 April 1992). The nature of this population growth, with the majority occurring in rural areas around Bozeman, is consistent with the amenity-based migration patterns discussed above.

The effects of this growth range from stress on the community's infrastructure and social fabric to impacts on environmental health and aesthetics (Bozeman Daily Chronicle 2 January 1995; 2 January 1994; 27 September 1992). The cumulative effects of development in the foothills on wildlife populations and environmental health is a growing concern in the community (Bozeman Daily Chronicle, 2 January 1994). A data base of the landscape changes in the nearby rural areas will help local planners, grass-root organizations, and the local community assess the consequences of this process in the Gallatin valley.

Derelict and abandoned farmsteads are a familiar sight in the West, suburban sprawl a relatively new one. In the Bridger and Gallatin foothills, land that for years appeared abandoned, with fields overgrown and reforesting, and farm buildings weathering, is becoming the site of suburban neighborhoods. As Hart (1975) notes:

Anyone who revisits a familiar rural area in the United States is impressed anew by a paradox: the countryside is becoming emptier, and the countryside is filling up. It is becoming emptier because many old familiar features are disappearing as ...land abandonment makes them derelict. It is filling up because hordes of onetime city dwellers are moving to the country (194).

This study documents that process in a particular high-amenity setting, as well as suggesting that the broader forces that caused these changes are at work in analogous localities throughout the nonmetropolitan American West.

METHODOLOGY AND SOURCES

Reconstructing and explaining land use and landownership patterns in a foothill amenity zone entailed a five part methodology: (1) Delineating the study area, and creating base maps; (2) Gathering land ownership and land use information; (3) Creating a narrative and an accompanying series of maps that describe the data; (4) Explaining the data with macro and local variables; and (5) Proposing a model for land use change in foothill amenity zones within the Intermountain West that identifies key patterns and processes observed in the southwest Montana study. A variety of sources were particularly useful in the study, including (1) aerial photos supplemented with existing maps; (2) Sewer Permit data, obtained from the Gallatin County Department of Environmental Health; (3) Clerk and Recorders archives; (4) various state, county, and city of Bozeman archival material; (5) Bozeman Daily Chronicle archives, located in the Montana State University Renne Library; (6) information obtained by personal interviews; and (7) field surveys of the study sites and adjacent areas.

Delineating the Study Area

The first step of the study entailed selecting study areas and creating base maps. I identified the general location of the foothill amenity zones around Bozeman based on personal observation, interviews, and local news sources. The theory and definition of foothill amenity zones in general evolved through research and field work in the foothills. Study site selection entailed choosing sites representative of foothill amenity zones that were large enough to encompass significant internal variations but small enough to be manageable for this study. Since the 'foothills' are the meeting place between

mountains and valleys, their lower and upper boundaries are partly defined by physical features. However, because the foothill amenity zone is a cultural phenomenon, cultural landscape features were also used to define the study site boundaries. Specific boundaries followed major roads when they coincided with the physical delineations of the lower boundary of the foothills and section lines when roads were unavailable. The upper boundaries of the study sites coincided with boundaries of state and federal lands.

Two study sites were chosen because two areas exist near Bozeman appropriate for a study of this nature. They included the foothills of the Bridger and Gallatin mountains (Figures 1 and 2). Examining patterns in both areas ensures that major land ownership and land use patterns were explored. Also, by choosing two sites, secondary patterns and distinct site-specific variations are revealed.

The second task involved creating a base map of the sites with reference points utilizing existing physical and political maps. Relevant physical and topographic features were obtained from U.S.G.S. topographic maps series 1:62,500, 1:24,000, and 1:100,000. Additional features, such as roads, government property boundaries, and Forest Service accesses were obtained from appropriate Forest Service, Department of Agriculture, Montana, Gallatin County, and City of Bozeman maps.

Gathering Land Ownership and Land Use Data

The second step involved collecting land ownership and land use data. Collecting land ownership data for 1954 and 1994 included determining the number of parcels per section, as well as the size, location, and date of the parcel's creation. The Certificates of Survey, registered with the Clerk and Records office for all parcels created

after 1973, proved an important source of land ownership information that contained a date and description of parcellation. Plat maps in that office are updated regularly, providing 1994 land ownership patterns through visual inspection. These data were utilized in determining the number of parcels and their size for each section of the study area, as well as in creating five detailed land ownership examples.

Although 1994 land ownership patterns are available from the County Clerk and Records office as plat maps, the large scale, complex nature of boundaries, and the size of the plat books themselves precludes copying and reducing at the size required by this study. The difficulty posed by the 1994 land ownership data was in mapping the patterns at a scale large enough so that the complex mosaic of land ownership is clear and also at a scale small enough to be presentable within the constraints of the thesis format. Instead, five representative two-section plots were selected for closer examination.

Reconstructing 1954 property boundaries was more involved because the more recent plat books, while accurate for current property boundaries, do not contain a complete list of old deeds. Deeds are filed for sales, leases, or exchanges of land or property rights, and are listed on the property in question in the plat maps. Therefore, to determine the land ownership boundaries for 1954, referral to the old plat books was required. The process entailed determining the date of an old plat map by looking up deed numbers written for parcels, until the oldest plat map with references more recent than 1954 was found. Next, utilizing the deed numbers on the correct historical plat map, each deed entry for each individual parcel was examined working backwards, until a pre-1954 reference was found. The property boundaries circa 1954 could then be mapped utilizing the most recent pre-1954 land ownership entry.

Recreating changing land use patterns was more problematic.

Although changing land ownership patterns predicate land use change, in that a parcel must be divided into smaller parcels to accommodate more homes, a change in land ownership is not a change in land use. Although a land parcel may be broken into small residential lots, it may still be used for farming within the pre-parcellation field patterns. Even with the presence of a residence, how much land around a residence is included in the non farm land use? Because of these difficulties in defining land use categories, an alternative approach was formulated, based on residential density. Utilizing aerial photographs, sewer permit data, and supporting sources, I developed an index which classifies land use into rural, transition, or suburban, based on the number of residences per quarter section (160 acres).

Rural density is defined as up to four homes per quarter section, based on the general minimum size of agricultural parcels in Gallatin County. A minimum of forty acres per cow or horse is traditionally required for a self-sustaining herd (Gilles 1977, Maxwell 1993). In 1954 95% of parcels were 40 acres or larger, which indicates the minimum size parcel that was cost efficient to parcel for agricultural purposes. A quarter of a quarter section (40 acres) is the traditional lowest denominator of farmland bought and sold early in the period, with parcels under this size generally the result of unique circumstances, often indicating an alternative to farm use (McIlhattan 1995; Nash D. 1995; Nash Ja. 1995). Five to eight homes in a quarter section indicates a transition to residential land use, with at least a portion of that quarter section no longer viable farmland. The suburban density of nine or more homes is based on the maximum size parcel of twenty-acres that could be subdivided without review up to 1993, creating the ranchette pattern of eight homes per quarter section. The presence of nine or more homes in a quarter section is the result of a subdivision or residential

development that generally results in more residential growth in a cluster around the original development.

This study utilized aerial photographs, available for the years 1954, 1965, 1979, and 1990, as a primary source to determine residential density. The photographs provided house locations necessary for tracing residential density patterns at the scale of a quarter section. The dates of these photographs also provided the temporal framework for this study by creating three stages of change. Aerial photographs for the study sites were obtained from the Federal Soil Conservation Service in Bozeman.

The Gallatin County Address System Maps, while not useful in counting and placing residences due to address inconsistencies, are helpful in conjunction with the aerial photos in placing new residences on the land use maps. The county address maps have the approximate location of all homes with addresses in the county and include subdivisions and most large planned development names and lot boundaries. Starting with the 1954 aerial photos, residences were located and counted, then marked on the Gallatin County Address System map. Using a different symbol for each subsequent series of aerial photos, new residences were marked on the county address maps. These data were then transferred to the land use maps.

In some locations timber obstructed the view of residences. This was a problem in Bear Canyon, where timber made home counting difficult in the 1954 photos. While this continued to be a problem in the more recent photos, the newer access road scars were usually visible. Access road condition was also helpful in deciding if a homestead was occupied or abandoned in 1954; if the road looked used and not overgrown or obscured with growth, then it was likely the home was occupied. Subsequent interviews with 1954 residents of the area revealed that in

one case a home was abandoned by 1954, but the access road was used by a farmer to get to a field (McIlhattan 1995). Determining residential land use after the 1990 photos also involved utilizing other sources, primarily sewer permits and field surveys. Field work was utilized to complete the number and location of residences for the 1994 time period. Cross checking the field survey with the sewer data and the county address system created a more accurate count and map of residences in the study sites for the 1990 to 1994 period.

Gallatin County Environmental Health Department sewer permits, required since 1968 for all residences not hooked up to a municipal sewer system, are contained in a data base that is indexed by name of original permit holder and location. The location data contains the section and road the residence is on, but the addresses are vague. For example the data do not designate what side of a road the residence is on. The sewer data are not accurate in counting the number of residences for sections only partially within the study area. However, only a small percentage of the homes are in these border sections. Also, the addresses include the subdivision name for which the permit was issued. The majority of the homes in border sections are in subdivisions located within the study area, thereby including most homes built within the study area in the partial sections but excluding homes outside the study area.

Utilizing these sewer data for 1968 to 1993, a yearly count of home building by section for the study area was created. This yearly count, presented in the form of histograms, reveals interim patterns of land use change, including the surge in home building in the late 1970s, as well as the slowdown in home building in the early 1980s. By adding aerial photo data from 1954 and 1965, the histograms provide a more accurate and complete picture of the growth of residential land use

throughout the period. Analysis of these data also revealed important internal variations within the study area.

Creating a Narrative and Accompanying Maps

The third step entailed creating a narrative which described the changes in land ownership and land use between 1954 and 1994, accompanied by a series of graphs, maps, and photos. In order to discuss internal differences within the study sites, Site One was divided into southern, central, and northern townships, with each township further north of Bozeman. With each township further away from town, examining the effects of distance on land ownership and land use was simplified.

Trends in the size and shape of parcels were assessed by comparing 1954 and 1994 land ownership characteristics. Interim patterns examined include the rate of parcellation as well as the evolution of residential parcellation. In particular this section examines multi-unit parcellation including subdivisions and the roles of planning and zoning in the area.

The land use section summarizes land use change including yearly home building trends for the study period. Also, this section contains a history of subdivisions in the study area. The residential density maps display three categories of residential density based on the number of homes per quarter section at different time periods. These three categories of residential densities can be further broken into categories that reflect land ownership patterns.

A micro site was also selected from each study site to address land ownership and land use change in greater detail than was practical for the larger study area. This includes a chronological account of land ownership and land use changes in the two two-section micro sites. The micro sites have a number of characteristics that justify their closer

scrutiny at a larger scale. Micro Site One contains one of the most parcelled and densest suburban areas in Study Site One. A portion of Micro Site Two is also among the most parcelled land in Site Two, as well as containing the densest suburban cluster. Much of the remainder of the micro site remains in large parcels. Relying heavily on personal interviews, this narrative describes the role of individual decision making in the creation of a foothill amenity zone. Histograms of parcellation and home building on a yearly basis accompany the narrative, distinguishing between subdivision and non-subdivision activity. Also, this narrative summarizes the evolution of homesite requirements and amenities by comparing pre-1965 and post-1979 homesite characteristics.

Explaining Patterns of Change

Macro and local variables, as well as individual behavior helped to explain the observed patterns of land ownership and land use change. Macro variables include historical trends in politics, economics, technology, and popular culture, at national, regional, and state levels. Local variables focused on site specific factors, including distance and access from Bozeman, physical setting, changing local amenities, as well as the local political and economic environment, including the evolution of planning institutions and regulations.

Explaining land ownership and land use patterns required utilizing a wide range of published and non-published sources. A large literature on the American West, urban growth, and amenities was instrumental in understanding the macro variables at work. Local factors were explained by utilizing the archives of the city and county planning departments and by interviewing politicians, government employees, site residents, and key local individuals. Also important were Gallatin County Planning

Office records of planning and zoning decisions and ordinances, including subdivision and zoning district histories, minutes of relevant planning meetings, and other documents that help explain the patterns of change in the study sites. The Bozeman Daily Chronicle was another important source for examining patterns of change, as well.

Individuals who were part of or witnesses to land ownership and land use transactions and changes since 1954 were interviewed. The interviews, conducted in person or over the telephone when necessary, proved an invaluable tool in exploring the interactions of local and macro variables that influenced the decisions of individuals. These interviews emphasized land ownership and land use change within the micro sites in order to create a more complete and integrated time line of events than was practical for the larger study area.

Amenity Zone Modeling

The final step entailed combining observed historical and spatial patterns with significant macro and local variables to create a general model for foothill amenity zones in the Intermountain West states of Montana, Idaho, Wyoming, Colorado, Utah, and New Mexico. This was accomplished by: 1) generalizing the three historical stages of change noted in the study, with each stage shown conceptually on a schematic diagram; 2) surveying census data and relevant literature to determine where in the Intermountain West similar local patterns can be observed.

An evolving schematic foothill zone model was constructed to summarize general patterns change in such settings. The model included major variations in land ownership, parcellation, roads, and land use.

The second step involved identifying areas of the Intermountain West with foothill amenity zones similar to those found near Bozeman. A summary of census data comparing 1980 and 1992 data was utilized in

selecting nonmetropolitan counties with above average amenity-driven population growth (more than 10%) (U.S. Bureau of the Census 1994). The resulting counties comprise the nonmetropolitan Intermountain West amenity region which might be expected to reveal patterns similar to those found in the Bozeman area study.

RESULTS

From 1954 to 1994 the Gallatin Valley changed from a moderately growing community supported by agriculture and Montana State University to a rapidly growing and more economically diverse regional center. Reconstruction of evolving land ownership and land use patterns in a developing foothill amenity zone reveals an increasing rate of parcellation and subsequent homebuilding beginning in the mid to late 1970s. In the early 1980s rates of parcellation and homebuilding slowed, with only a gradual recovery through the decade. By the early 1990s, as home building and associated land use conversion increased, regulations increasingly affected the type and rate of parcellation. Patterns of public and private land conservation also emerged, while elsewhere agriculture remained the primary land use. Land ownership and land use changes in the study area during this time cannot be understood merely by comparing statistics from the beginning and the end of the era. One also needs to examine changes on the cultural and physical landscape. The changes, while uneven both spatially and temporally, cumulatively transformed a landscape. The following sections describe the patterns of land ownership and land use change in the foothill amenity zone study sites from 1954 to 1994.

Changing Patterns of Land Ownership, 1954 to 1994

The following discussion of changing land ownership patterns between 1954 and 1994 focuses on parcellation patterns, including the history of subdivisions. In 1954 the 37,197 acres comprising both study sites were divided into 122 parcels, with a mean parcel size of 305 acres. The smallest parcel, under one acre, was located north of McIlhattan Road on the southern boundary of Site One, and the largest

parcel, the 1,600 acre Wright Ranch, was located on the eastern boundary of the Springhill area of Site One (Figures 4 and 5). Most of the land was divided along the survey boundaries of the Township and Range survey system, with rectilinear parcels, often quarter section (160 acres) or quarter quarter sections (40 acres), constituting the majority of parcels (Table 1). No subdivided lots and only one odd-shaped residential lot occurred in the study area. Other non-rectangular surveyed acreage included parcels in the Springhill Community area, land owned by the City of Bozeman, and an occasional parcel with a road or physical feature as a boundary. Many farmers owned noncontiguous fields, so although 122 parcels were located within the study area, less than 122 landowners determined patterns of land use.

Table 1. Number of parcels per size category in Sites One and Two, 1954 and 1994 (figures in parenthesis are percent of total).

Parcel Size (acres)	1954	1994
-2	1	478(30) small
2-9	0	522(32)
10-19	0	169(10) medium
20-39	5(4)	312(20)
40-160	37(30)	72(4) large
+160	79(65)	59(4)
Total Parcels	122	1,612

In contrast, by 1994, 1,612 property parcels divided up the same 37,197 acres, with a mean parcel size of only 23 acres. Most of these parcels were residential lots of less than ten acres, with 45% of the parcels consisting of subdivided residential lots. Subdivision lots were increasingly non-rectangular, with shape determined by other factors, including maximizing amenities such as view and access. The smallest parcels, many less than one acre, were in the Summer Ridge Subdivision in Study Site Two and Mystic Heights I and Triple Tree subdivisions in

Figure 4. Land ownership patterns
for Study Site One, 1954

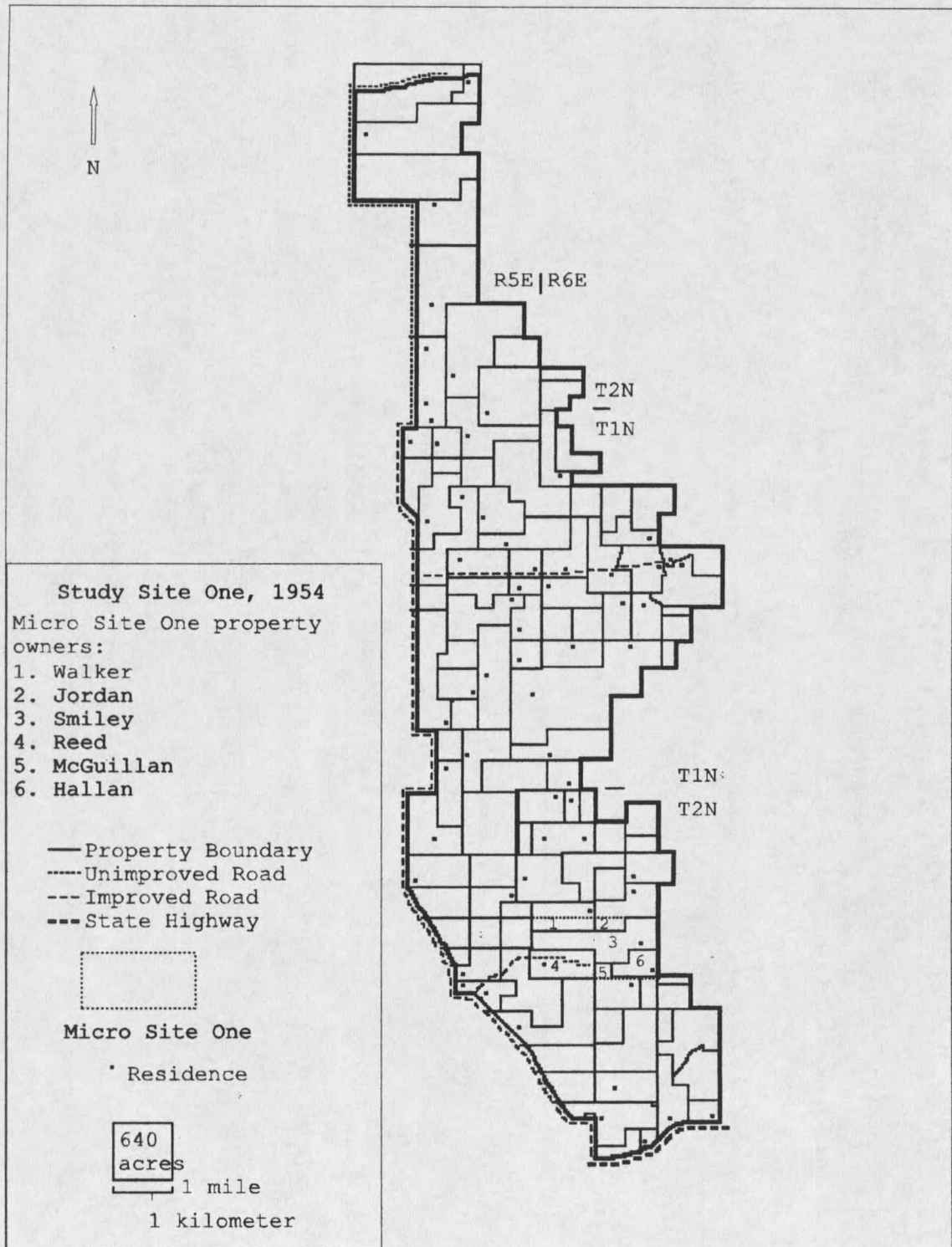
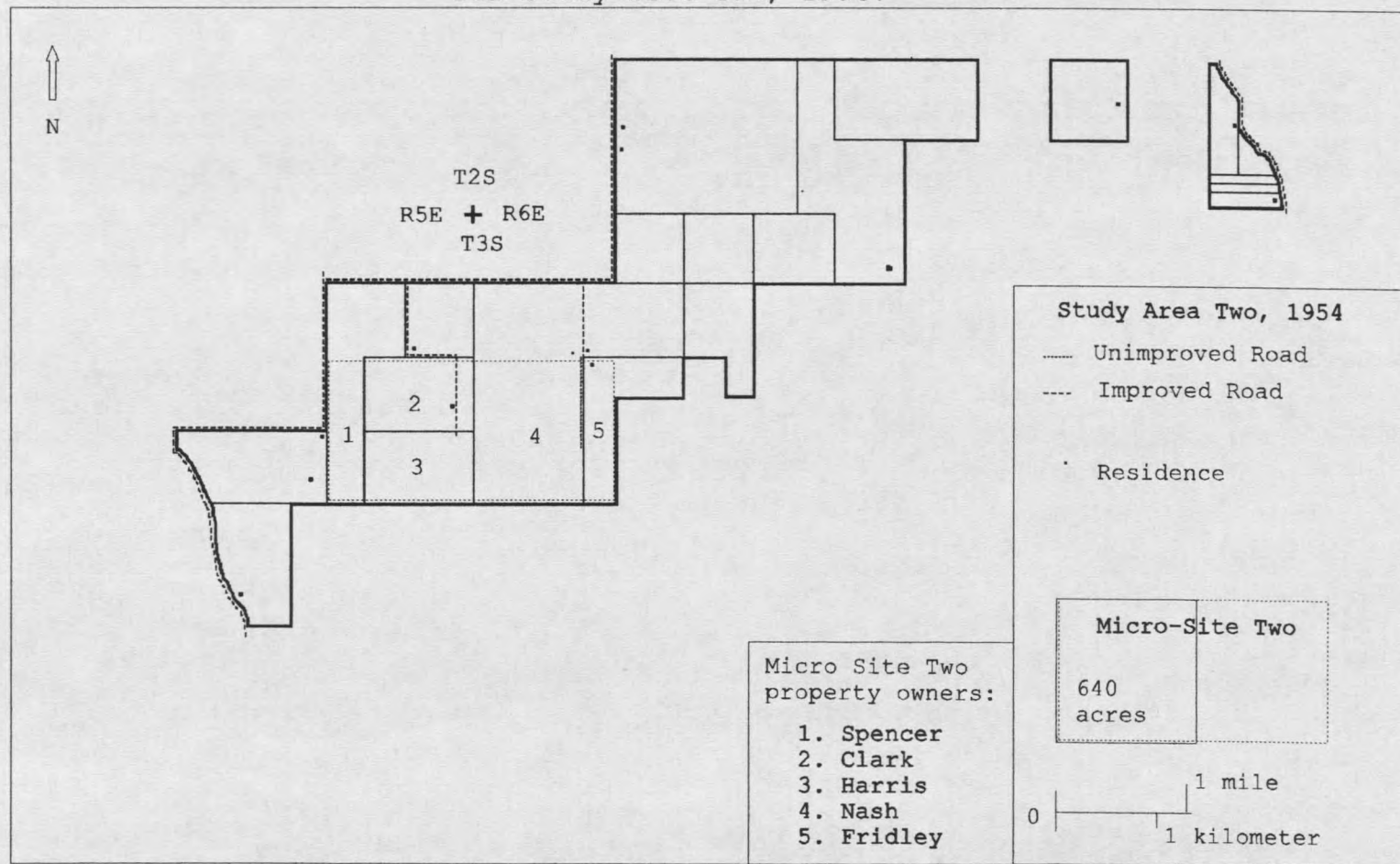


Figure 5. Land ownership patterns
for Study Site Two, 1954.



Study Site Two. The largest parcels were generally farms and ranches with property boundaries intact from before 1954, although partial ownership rights were in some cases sold to land trusts or government agencies. In limited instances residential users purchased adjoining lots to create larger high-amenity parcels.

Land ownership patterns between 1954 and 1994 offer many examples of land conversion from agricultural into residential parcels through parcellation and subdivision, often involving multiple and incremental transactions that create smaller and smaller parcels. Often within the boundaries of a large parcel many smaller parcels of different sizes remain, ranging from more than 40 acres to less than one acre in size. Less often, inheritance or land transfer retained parcel size and shape. Transfers of land or partial property rights to government or private conservation organizations also shaped evolving patterns of land ownership. Due to the complex nature of land ownership patterns, five two-section examples were used to examine changes over time in greater detail. These 1994 land ownership samples contain various residential parcellation patterns and suggest that parcel size generally increased with travel time from Bozeman (Table 2).

Table 2. Land Ownership Patterns in 1954 and 1994 for selected areas.

Location (Township and Range)	Parcels 1954	Parcels 1994
1) T1SR6E 17 & 18	7	140 (Micro-Site One)
2) T1NR5E 35 & 36	6	92
3) T1NR5E 13 & 14	7	31
4) T2NR5E 10 & 11	2	30
5) T3SR5E 12 & T3SR6 17	5	142 (Micro-Site Two)

Site One: The Bridger Foothills

Site One in the west-facing foothills of the Bridgers occupies

32,033 acres. In 1954 this site contained 102 parcels of land with a mean parcel size of 317 acres. By 1994 the area was divided into 1,152 parcels. Of this total, 638 (55%) were subdivision lots. This level of subdivision is much higher than for the county overall, where only 10% of the total parcels are subdivision lots (Westesen 1995). Site One can usefully be divided from south to north into three areas, defined along township lines. As one moves north from Bozeman each of these areas exhibit distinctive patterns of parcellation, home building, and other discernable landscape features.

The northern area of Site One (T2N R5E and T2N R6E) is from sixteen to 21 miles by road from Bozeman. The 6,565 acres composing this area was divided into thirteen parcels of land in 1954, with an average size of 505 acres. During the 1950s and 1960s land transactions usually involved parcels of 160 acres or greater, often including transfers of complete farms within families or sales to adjacent landowners. Between 1974 and 1979 small residential parcels of marginal or edge land were divided off from larger parcels. By the late 1970s the creation of smaller residential parcels concentrated along the southern boundary of the area. While very few land transactions occurred through the 1980s, parcellation again increased in the 1990s, with a surge of twenty-acre parcels throughout the area.

By 1994 the northern area of the Bridger foothill study site contained 113 parcels, with a mean size of only 58 acres per parcel. However, the majority of land in the northern area remained in large agricultural holdings, including the Maher Ranch, occupying steep and rough hillsides along the eastern boundary of the site. No subdivisions were created, although 67 parcels of twenty acres or less covered over a quarter of the northern area. Section 35 was the most highly parcelled section in the northern area, containing 26 parcels, mostly less than

twenty acres in size. These parcels were concentrated in the southwest quarter of the section. Most of this non-subdivision residential parcellation occurred in the late 1970s. After a period of virtually no parcellation in the early 1980s, parcellation again accelerated in Section 35. A small number of large, high amenity parcels were also carved out of rangeland or steeper timbered slopes in other sections of the northern Township after the early 1980s (Figure 6). However, in the early 1990s, the dominant parcellation pattern for the township was the creation of twenty-acre parcels.

The surge in twenty-acre parcels in the early 1990s reflected the desires of landowners to avoid restrictions on future land use, rather than an immediate desire to sell residential lots (Peck 1995, Jelinski 1995). During this time the Montana legislature was debating changing the minimum size of parcel that could be created without subdivision review by the county commission from twenty acres to 160 acres, creating an incentive to parcel land before the restrictions were implemented. For example, the owner of Section 36 parcelled the complete section into 32 twenty-acre lots in 1993. Over a quarter of the land in the southern sections of the township were similarly parcelled. The majority of land in the northern area remains in large agricultural holdings.

The Springhill area (T1N R5E and R6E) is nine to fifteen miles from Bozeman. Covering around 13,840 acres, this area lies in the central portion of Site One. In 1954 it contained 44 parcels of land, with parcel size averaging 315 acres. The smallest parcels were quarter of quarter sections until the late 1960s. Parcellation surged in the late 1970s, with clusters of twenty-acre tracts, along with smaller lots, appearing throughout the Springhill area. Many of these parcels were created as planned developments. The largest consisted of twenty twenty-acre parcels in the south half of Section 18 T1N R6E, within the

Figure 6. Land ownership patterns
for Sections 10 and 11 T2N R5E, 1994.

Patterns include large (40+ acres) agricultural parcels, large high-amenity residential parcels, and twenty-acre parcels created in response to threatened legislation restricting parcellation rights.

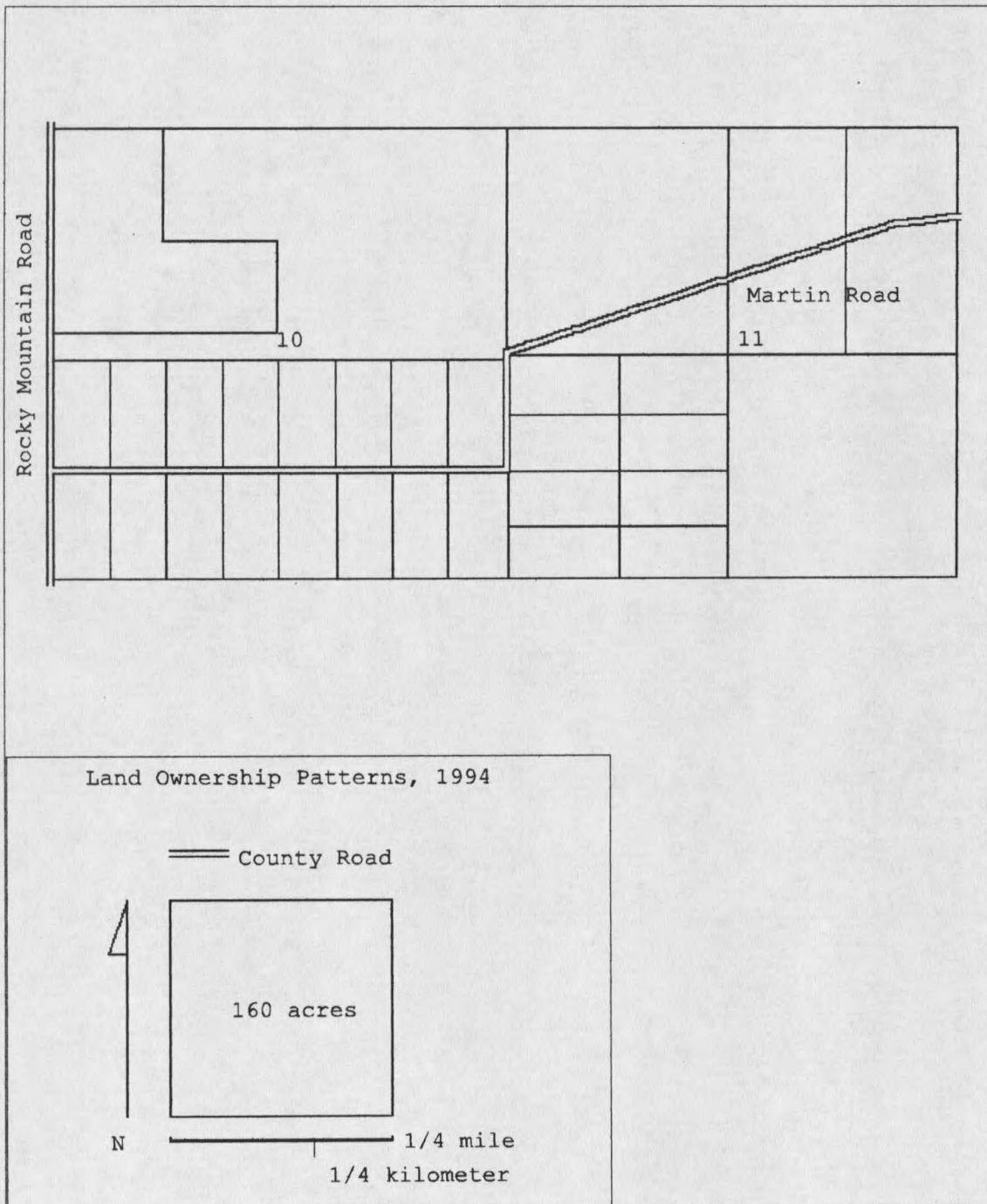
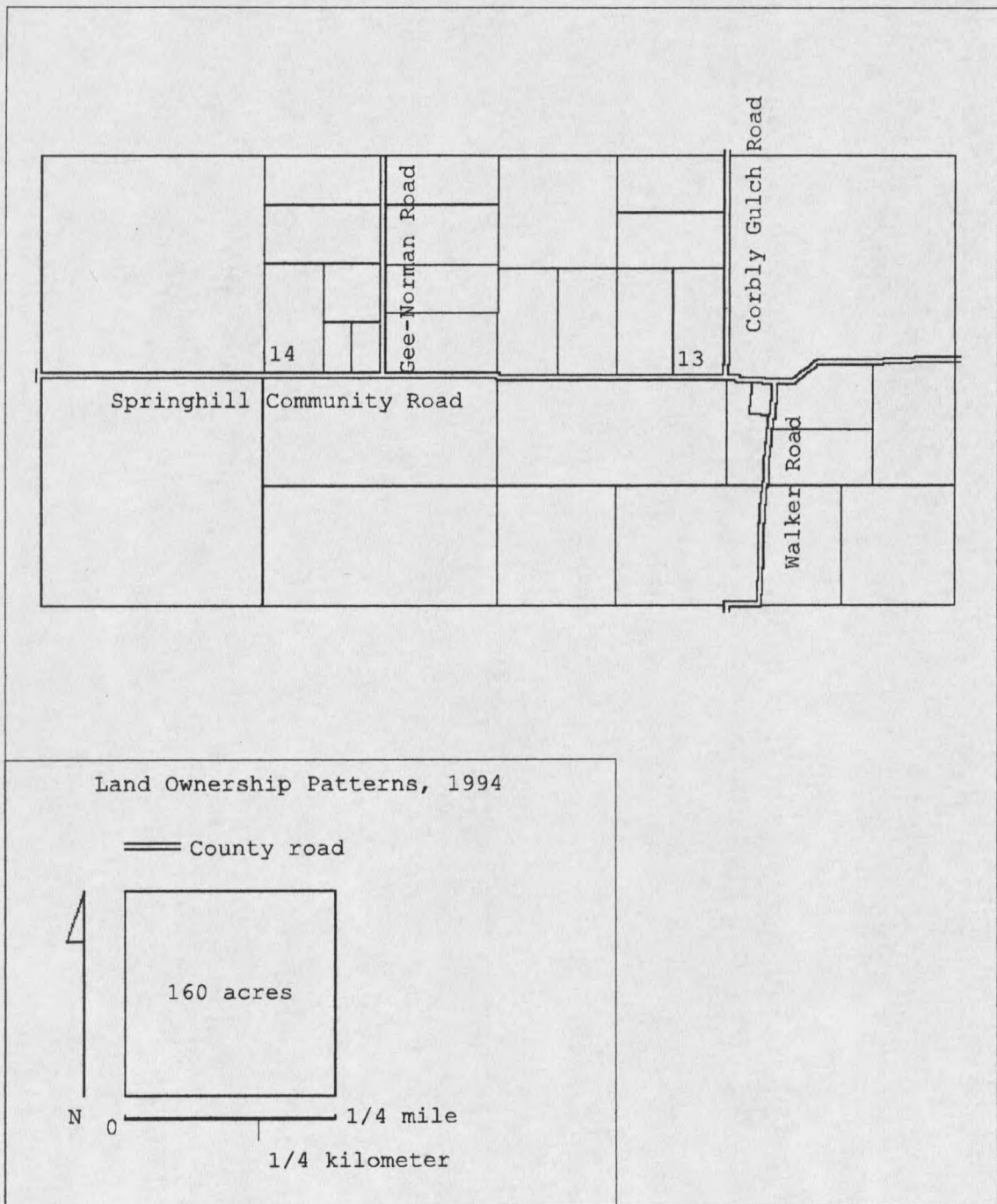


Figure 7. Land ownership patterns
for Sections 13 and 14 T1N R5E, 1994.

Land ownership patterns include parcels of five, ten, twenty, 40, 80, and 160 acres parcelled utilizing the Township and Range survey system, as well as remnant non-Township and Range parcels from the former Springhill community.



old Springhill Community area. Many lots of less than twenty acres were created through loopholes in the subdivision regulations, many of which were then reparcelled into even smaller lots over time (Figure 7).

The Ross Creek Subdivision, the first in the Springhill area, was approved in 1973 (Table 3). This was a linear subdivision, with each rectangular lot fronting on county roads (Figure 8). Most of these parcels started at ten acres in size, but fifteen were further parcelled into thirty five-acre lots. The Buena Vista Subdivision, approved only two years later, contained eight five-acre rectangular lots fronting on a dead end subdivision road. In 1979 the Foster Park Subdivision followed the same pattern. These subdivisions in Sections 34, 35 and 36 of T1N R5E, mark the northern range of subdivisions in the Bridger foothills. The Ross Creek Subdivision was located along Springhill Road, the main arterial to the area, while the later subdivisions were located directly to the east (Figure 2).

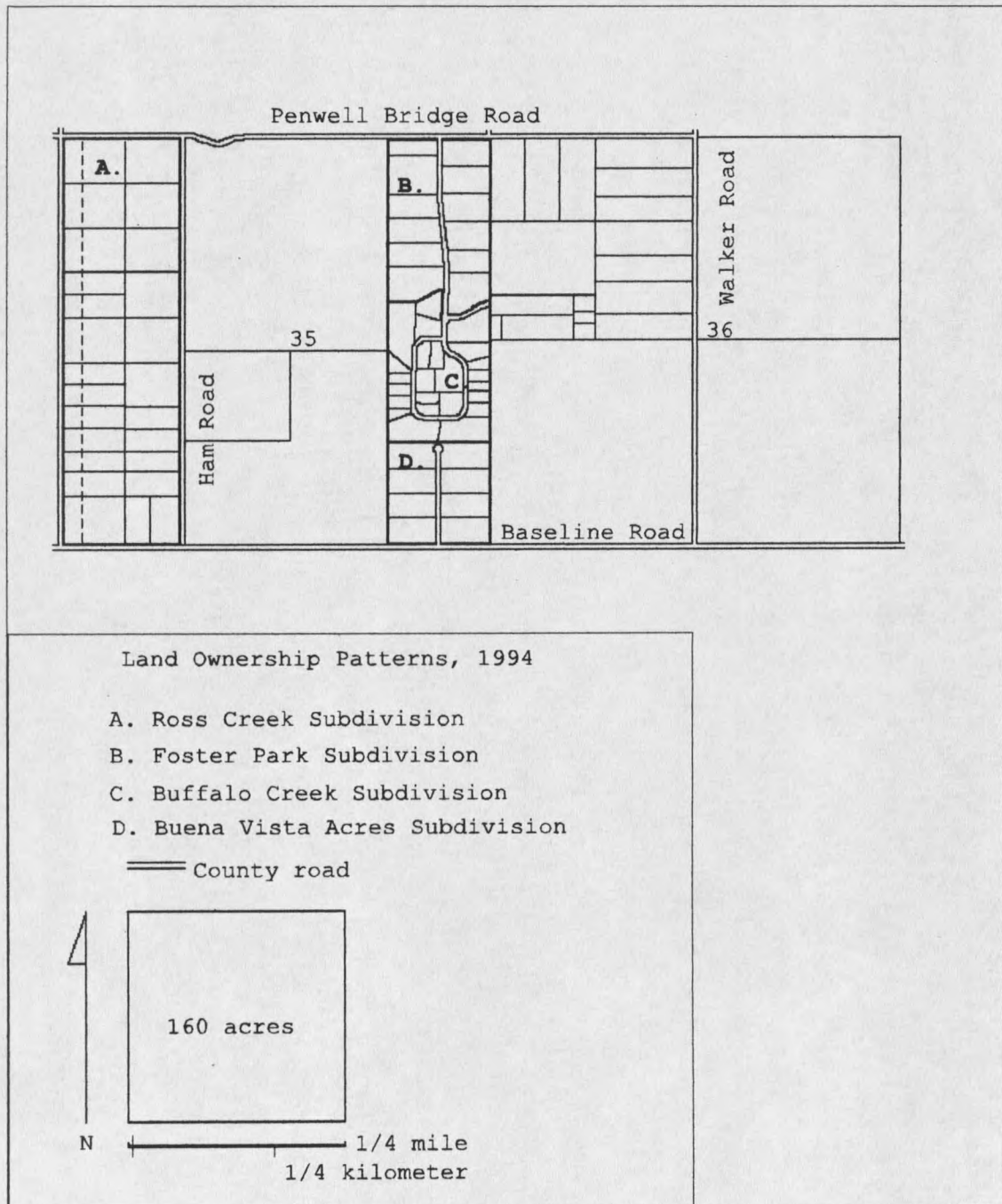
Table 3. Subdivisions in the Springhill area of Site One.

Year	Name	Lots	Area (acres)	Lot Size (acres)
1973	Ross Creek	48	554	10
1975	Buena Vista Acres	8	41	5
1979	Foster Park	13	65	5
1985	Buffalo Creek	14	32	-2

Parcellation in the Springhill area slowed in the early 1980s. Following a pattern occurring throughout the study area, developers generally avoided the increased costs and regulations of subdividing. Instead of subdividing, developers generally opted for fewer and larger parcels that fit within the legal loopholes after 1980. For example, in 1990 ten residential lots between five and twenty acres were created in Section 31 T1N R6E, adjacent to the cluster of existing residential lots. The Buffalo Creek Subdivision was an exception to this trend and

Figure 8. Land ownership patterns for Section 35 and 36 T1N R5E (Springhill township, Study Site One), 1994

These patterns include residential parcels divided along the Township and Range survey system, including subdivision lots, many of which were subsequently reparcelled into smaller lots. Other newer subdivision lots are small and tailored to maximize amenities and reduce traffic congestion on public roads.



was approved in 1985. This subdivision, reflecting the increased planning and regulation of parcellation, as well as changing amenity perceptions, had lot boundaries that did not conform to the north-south oriented lines of the Township and Range survey system. Instead, the boundaries were designed to fit the fourteen lots into 23 acres all fronting on an interior circular drive (Nash, Jo. 1995).

By the early 1990s parcellation of twenty-acre lots accelerated in the Springhill area as incentives to create residential parcels increased. In 1991 and 1992, the Norman and Crouse families, two of the largest landowners in the study area, anticipating that the proposed Springhill Zoning District would severely limit their land-use rights, divided 560 acres into 28 twenty-acre parcels to the north of Springhill Community Road (Peck 1995). By 1994 the Springhill townships were divided into 304 parcels, reducing the mean parcel size to 46 acres. Of these 304 parcels, 83 (27%) were subdivision lots, all in the southern tier of sections. Section 35 T1N R5E, the core of the residential lot cluster, contained 70 lots by 1994, 23% of the total parcels. The remainder of the Springhill area remained in large parcels, including the Maher Ranch, although partial landownership rights were sold in 1993.

Nearest to Bozeman, the southern area of Site One contains 11,948 acres. Residential parcellation occurred in four historical phases in the southern area, reflecting the increased complexity of land ownership near the urban center. First, early (pre-1970) subdivisions were created along main arterials leading out of Bozeman. Second, there was a surge in subdivisions, starting in the early 1970s and extending into the early 1980s. Third, non-subdivision residential parcellation occurred, continuing at a slower rate through the recession of the early 1980s until the subdivision legislation of 1993. Finally, more recent

subdivisions and planned developments took shape in a more planned and legislated environment, with increased community involvement.

In 1954 this southern area contained only 44 parcels, with a mean of 254 acres per parcel. Land along Bridger Canyon Road was subdivided soon thereafter, with the creation of the Vogel and Mount Baldy Subdivisions (Table 4). Each subdivision consisted of 47 lots that were 50 feet wide and fronted on Bridger Canyon Road. This early subdivision activity was followed by almost two decades of only minor and intermittent parcellation, mostly involving large agricultural tracts. A small number of residential parcels were created in the southern sections during the late 1960s and early 1970s, mostly carved from the margins of larger agricultural holdings. Between 1973 and 1979 parcellation accelerated, including Sager Stimson, Wheatland Hills, Grandview I and II, and Harvest Hills Subdivisions. By 1979, with the initial success of Wheatland Hills as an incentive to subdivide, the southern area contained 369 subdivision lots.

Table 4. Subdivisions in the Southern area of Site One

Year	Name	Lots	Area (acres)	Lot Size (acres)
1956	Vogel	47	16	.3
1957	Mount Baldy	47	16	.3
1973	Sager Stimson	16	158	10
1974	Wheatland Hills	84	149	1-3
1974	Grandview I	59	237	2-4
1979	Grandview II	56	158	2-4
1979	Harvest Hills	60	83	1-2
1981	Sypes Canyon	27	57	1-2
1982	The Ranch	62	73	1-2
1993	Summer Ridge	97	155	1-2

While the initial success of early subdivisions spurred parcellation in the late 1970s, home construction and investment in residential land slowed in the early 1980s. Landowners and developers

responded by reducing parcellation, especially through the more expensive subdivision process. Parcellation rates never climbed back to the high mark in the late 1970s, even as home building increased in the mid to late 1980s. The two subdivisions approved in the early 1980s were exceptions, originally planned during the surge in home building of the late 1970s. The Sypes Canyon Subdivision (1981) was located at the end of Sypes Canyon Road at the mouth of Sypes Canyon. Half the lots were located in a field that once produced hay and grain. The other half of the lots were located on a partially timbered sage and brush-covered hillside bordering public land. The Ranch (1982) was located further west on Sypes Canyon Road, with lots on either side of the road and on the adjacent ridges on land composed of hay and wheat fields.

South of Sypes Canyon Road parcellation utilizing loopholes in subdivision legislation continued in a reduced fashion through the 1980s, including multi-unit developments with lots over twenty acres. The Brass Lanterns Estates, created in 1983, consisted of eight lots just over twenty acres in Section 33 T1S R6E above Bridger Canyon Drive. These high priced lots overlooking Bozeman and the valley remained undeveloped until the early 1990s (Haynes 1995). Bridger Mountain Estates was created in 1985 and consisted of 27 lots over twenty-acres in Sections 21 and 29 T1S R6E. Because of poor roads these lots remained relatively inaccessible.

However, by the early 1990s home building and parcellation again increased. Summer Ridge (1993) was approved after a surge in home building in the surrounding subdivisions. Located adjacent to The Ranch and Harvest Hills subdivisions on a flat and barren ridge uphill from the popular Wheatland Hills Subdivision, Summer Ridge contained 97 small well-tailored lots emphasizing view. By 1994 the 735 parcels in the southern area included 555 subdivision lots, as well as many small (<10

acres) non-subdivision lots (Figure 9). The majority of small residential lots, especially subdivision lots, were located in the Sypes Canyon drainage or in the hills immediately north, extending from Springhill Road east to the public land boundary, reducing the mean parcel size for the entire area from 254 acres in 1954 to sixteen acres in 1994. Although the majority of lots throughout the southern area were subdivision lots, the majority of acreage remained as larger residential lots or agricultural parcels, even within the residential cluster along Sypes Canyon Road.

Site Two: The Gallatin Foothills

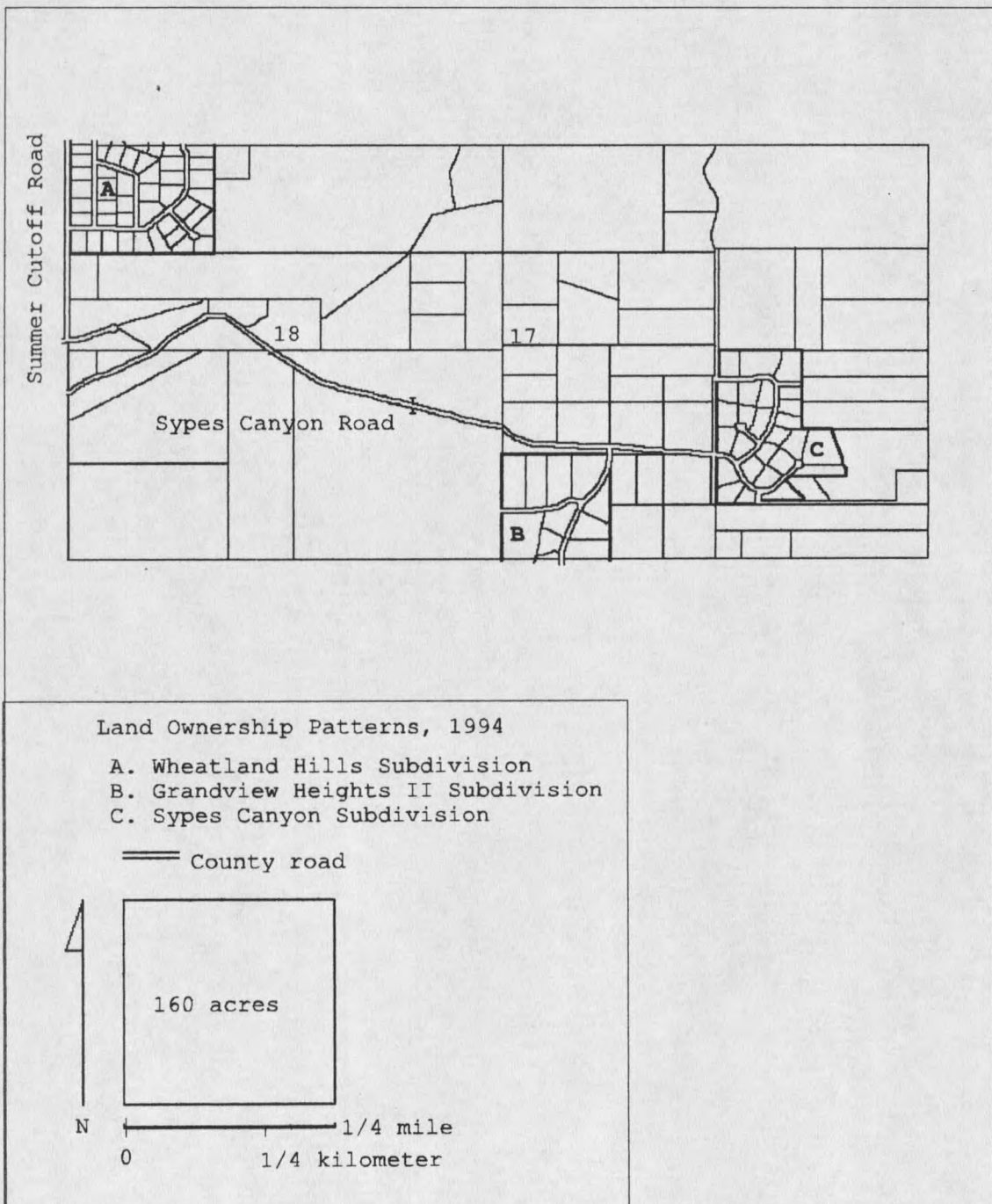
In 1954 Site Two (5,164 acres) had eighteen parcels of land, with a mean size of 287 acres. Only Bear Canyon in Section 36 on the eastern boundary of the study site had comparatively small home sites, with three linear lots of 20 to 40 acres, each fronting on Bear Canyon Road and running up the hill into the timber to the section line (Figure 5). The recreational opportunities in this canyon and its proximity to a small ski area contributed to its early development.

The historical patterns of land ownership in Study Site Two parallel those in the middle and southern areas of Site One, with the transition from larger agricultural parcels to smaller residential lots occurring throughout the area. As in Site One, a primary residential lot cluster developed in Site Two that was easily accessible from Bozeman year round, yet offered high amenity homesites.

Unlike Site One, few twenty-acre parcels were created in Site Two in response to changing regulations. By the late 1970s the demand for residential parcels in this area compelled many landowners to create subdivisions and planned developments, or alternatively, conservation easements. Much of the land suitable for residential parcels was already

Figure 9. Land ownership patterns for
Micro Site One, Sections 17 and 18 T1S R6E 1994.

These patterns include small residential parcels, both subdivision and nonsubdivision, as well as remnant large agricultural parcels, in a portion of the primary residential cluster along Sypes Canyon Road.



slated for residential use or preserved for open space by the early 1990s, limiting the amount of land available for twenty-acre parcellation.

Site Two's earliest subdivision, Fir Hill I (1965), was a linear development with cardinally-oriented rectangular home sites facing South Nineteenth (Table 5). This trend continued for the Crossroads, Mystic Heights I, Haley's, and Chief Joseph Meadows Subdivisions. Fir Hill II (1972) was an exception to this pattern, with lots facing inward toward a circular access road. Hodgeman Canyon and Aspen Heights offered a degree of privacy rare in the mostly open land of the study area. Hodgeman Canyon's upper lots bordered Forest Service land and were partially timbered with Douglas Fir, Engelmann Spruce, and Aspen. The smaller Aspen Heights Subdivision also had lots in the timber on a relatively steep slope. These parcels emphasized privacy, vegetation, and available water, all important amenities for early non-farm residential users in Site Two. These parcels were situated just off South Nineteenth, the main arterial to Bozeman, another important feature of the more successful subdivisions through the study period.

Table 5. Subdivisions in Site Two

Year	Name	Lots	Size (acres)	Lot Size (acres)
1965	Fir Hill I	18	43	2
1969	Hodgeman Canyon	24	110	3-8
1972	Fir Hill II	8	23	2-3
1973	Aspen Heights	5	12	2-3
1973	Crossroads	4	9	2
1973	Mystic Heights I	40	31	1-3
1975	Haley's	8	21	2-3
1977	Chief Joseph Meadows	17	36	2
1978	Mystic Heights II	27	59	1-3
1981	Mystic Heights III	31	90	3-4
1993	Triple Tree	114	605	1-4

The next phase of subdivision activity, beginning in the late

1970s, involved larger tracts of land fitted into residential parcels emphasizing view and privacy. The newer subdivisions were characterized by curved property lines and roads ending in cul-de-sacs. Mystic Heights II occupies the land between Chief Joseph Meadows and Mystic Heights I, with lot boundaries tailored to the terrain (Micro Site Two) (Figure 10). Mystic Heights III has larger lots with a more inclined aspect higher up the slope. These lots were suited to the high-amenity buyer willing to pay more for view (Haynes 1995). Altogether, eight subdivisions were located in the north half of Section 12 and the south half of Section 1 by the early 1980s, forming a dense residential lot cluster that was even more concentrated than the Sypes Canyon cluster in Site One.

Acreage east of Sourdough Canyon and Sourdough Road underwent less parcellation than the land to the west. Sourdough Ridge, which runs from Main Street in Bozeman up to Forest Service land where it meets a steep and heavily timbered hillside, is a major physical feature of Site Two. Real estate agents in the first wave of rural residential development during the late 1960s and early 1970s envisioned one-acre homesites running all the way up the ridge to Forest Service land (Haynes 1995). While changes in subdivision regulations put a stop to uncontrolled development, this ridge has always been targeted as prime land for residential use, while at the same time it has been viewed as important to the conservation of open space and viewshed, especially by neighboring landowners (Bozeman Daily Chronicle 24 June 1994, 6 December 1993).

Much of the part of Sourdough Ridge within Site Two was contained in Triple Tree Ranch property. Covering 605 acres in Sections 4, 5, and 32, the Triple Tree was a working cattle operation until 1994. The Triple Tree Subdivision, proposed by the owners for years, was the most expensive, most carefully planned, and most litigated subdivision in the

study area (Bozeman Daily Chronicle, 8 December 1993). Beginning in the late 1970s the owners of the ranch looked for a buyer. In 1989 the first potential buyer, "Hurricane" Harry Grant, proposed an expensive development including a golf course (Bozeman Daily Chronicle, 11 October 1989). While approved by local planning authorities, this plan ultimately fell through due to financial difficulties in 1991. In 1993 the land was again proposed for subdividing (Bozeman Daily Chronicle, 6 December 1993). After an even more bitter and litigious battle between potential developers and various opposing groups, the subdivision was approved in late 1994. Soon after, the roads were bulldozed and paved. Within weeks of the approval over a third of the lots were bought, even though these lots were the most expensive subdivision lots to sell in the county thus far (Haynes 1995).

Further east parcellation patterns were dominated by planned developments utilizing parcels of twenty acres and more, with variously sized residential lots created piecemeal under loopholes in the subdivision laws. Eagle Rock Preserve (1986) was a planned development of 38 lots of twenty acres parcels on 800 acres. Much of the land was placed in common easement devoted to open space. Roads accessing these lots are private, unlike subdivision roads which are deeded to the county. A sign at the entrance requests visitors to check into the gatehouse, making this development the most private multiple unit development in the study area.

On the eastern boundary of Study Site Two, Bear Canyon continued to be utilized as a high amenity residential area. However, the land was divided into relatively large residential lots in the earlier period and subsequently underwent various incremental parcellations. This unreviewed parcellation continued until the passage of the 1993 Subdivision and Platting Act, so that the original four lots in 1954 had

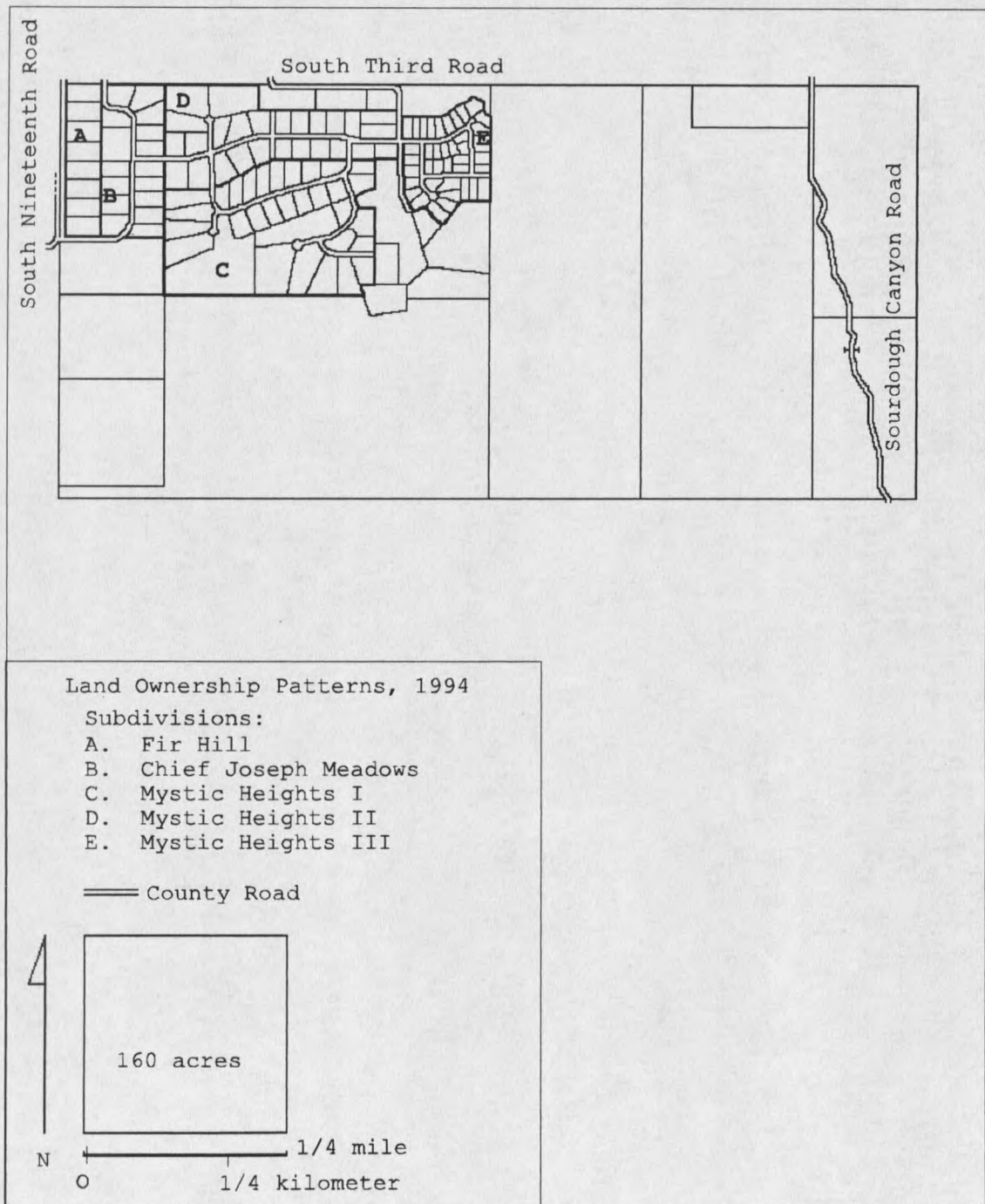
been divided into eighteen lots by 1994.

By 1994 the original eighteen parcels of land in Site Two were divided into 460 parcels, reducing the mean parcel size from 287 acres to eleven acres, the smallest in the study area. Of these 460 parcels, 292 (63%) are subdivision lots, again much higher than the county average of 10%. Other land divisions involving parcels of less than twenty acres also occurred during the time period, but again slipped under the loopholes in the subdivision laws. The result has been a patchwork of odd residential lots along the interstices of larger parcels and subdivisions (Figure 10). The majority of the remaining 140 parcels are in planned developments with lots of twenty acres and over, such as the exclusive Eagle Rock Preserve and Sky Ridge Estates. Mystic Heights I and Triple Tree have the smallest parcels in Study Site Two. The largest parcel in Study Site Two is an 882 acre residential parcel comprised of three separate parcels purchased in the 1980s and 1990s.

Within the study area, variations in patterns of land ownership occur based on factors including distance from town, road condition, and other physical and cultural landscape features. Between 1954 and 1994 four major land ownership patterns dominated the study area. These include: (1) parcel stability, (2) occasional and limited parcellation, (3) multi-unit parcellation, often involving subdivision, and (4) parcellation in response to pending restrictive legislation. Over 90% of the parcels created since 1954 are under twenty acres, with subdivision lots, typically clustered together, constituting 45% of the total lots by 1994. Although the majority of parcels were twenty acres or less by 1994, the majority of land remained in large (>40 acres) parcels. In addition, many of the twenty-acre parcels, especially those created in response to pending legislation remain undeveloped as residential land and continue as integral parts of larger agricultural holdings.

Figure 10. Land ownership patterns for
Micro Site Two, Sections 12 T3S R5E and Section 7 T3S R6E, 1994.

Patterns include large (40+ acres) agricultural and high-amenity residential lots, as well as small (~10 acres) subdivision lots comprising the primary residential cluster in Study Site Two.



Changing Patterns of Land Use, 1954-1994

In 1954 agriculture dominated land use patterns in the study area. Accordingly, the residential densities were low, with homes generally located on family farms. This is consistent with traditional residential patterns in the agricultural hinterlands of the American West. These homes were primarily farm residences or homes occupied by those employed in the agricultural sector of the local economy (McIlhattan 1995; Nash, D. 1995; Nash, Ja. 1995). In 1954 the study area contained 80 dispersed residences, 66 on the 102 parcels of land in Site One and fourteen on the seventeen parcels in Site Two (Figures 4 and 5). Non-farm land uses included a church, a cemetery, a municipal water supply reservoir, and two gravel pits. Internal differences in 1954 were generally based on distance from town and differences in agricultural practices.

By 1994, 818 residences occupied the study area, an increase of 780% in 40 years. However, the study area remained quite agricultural in its appearance if not use, with the majority of actual acreage remaining in large (+40 acres) agricultural fields. Even the two upper sections of Sypes Canyon (Micro Site One) had over 65% of their acreage devoted to agriculture. Section 12 in Micro Site Two, though it contained one of the densest neighborhoods, also had over 50% of its acreage in large open fields.

While much of the land remained agricultural, a significant amount had been converted to residential and associated public and commercial land uses. Due to differences within the study area, including amenity features, distance and access from Bozeman, as well as the role of individual land owners, the land use changes in the region occurred non-uniformly. However, three significant land use patterns emerged as the foothill amenity zone developed. These included zones of continued agricultural use, zones of transition from agricultural to nonfarm

residential uses, and zones of more exclusive non farm residential land use. A secondary pattern of commercial and municipal land use also occurred in limited areas close to the urban center.

From 1954 to 1965 only 39 homes were built in the study area, limited to the southern area of Site One and portions of Site Two. From 1965 to 1979 the number of homes grew by 185% (Table 6). This surge in home building began in the early 1970s and increased in the late 1970s (Figures 11 and 12). Home building slowed in the 1980s, only to surge again in the early 1990s. Most of the new homes were built in the two primary residential clusters located in the southern area of Site One and in the most accessible portion of Site Two. However, even some newly-parcelled areas experienced slow rates of actual home building, so that by 1994 the majority of land in these areas remained rural, with only scattered homes.

Table 6. Residences in Sites One and Two (figures in parenthesis are percent increases)

Year	Site One	Northern Area	Middle Area	Southern Area	Site Two
1954	66	9	33	24	14
1965	98 (40%)	8	33	55	21 (83%)
1979	261 (142%)	16	88	153	109 (400%)
1990	437 (67%)	19	124	289	148 (35%)
1994	646 (48%)	30	172	436	171 (15%)

The relationship between land use and residential density can be summarized in three patterns including 1) land that remained rural, 2) land in the transition from rural to nonfarm residential, and 3) land that contained higher suburban densities of homes (Table 7). Each of these categories can be further subdivided based mainly on parcellation patterns and agricultural land use. For example, even areas with "rural" density contain both farm and nonfarm residences. Farm residences in

Figure 11. New homes Study Site One,
1954-1993

(Gallatin County Sewer Permits 1995)

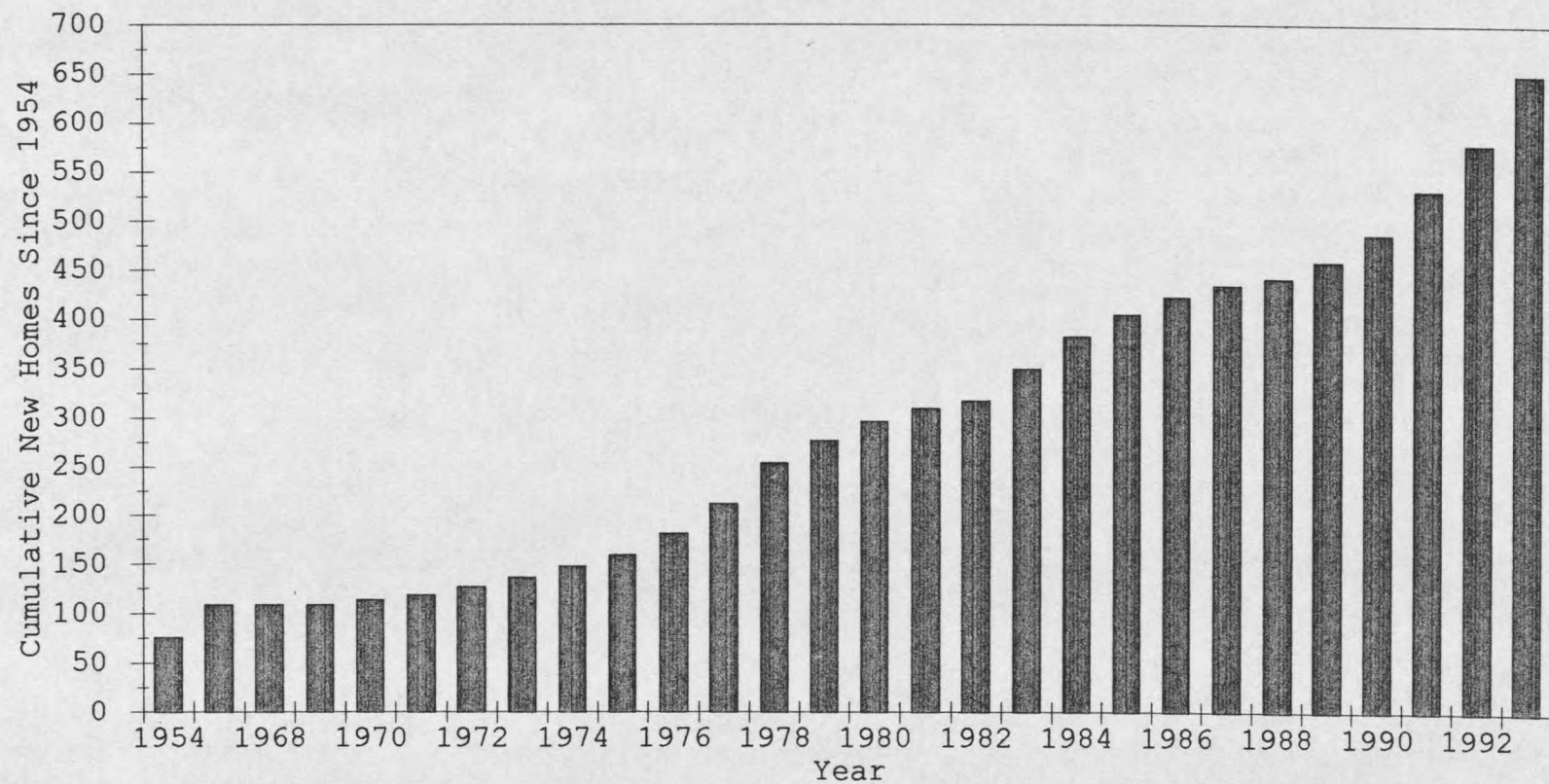
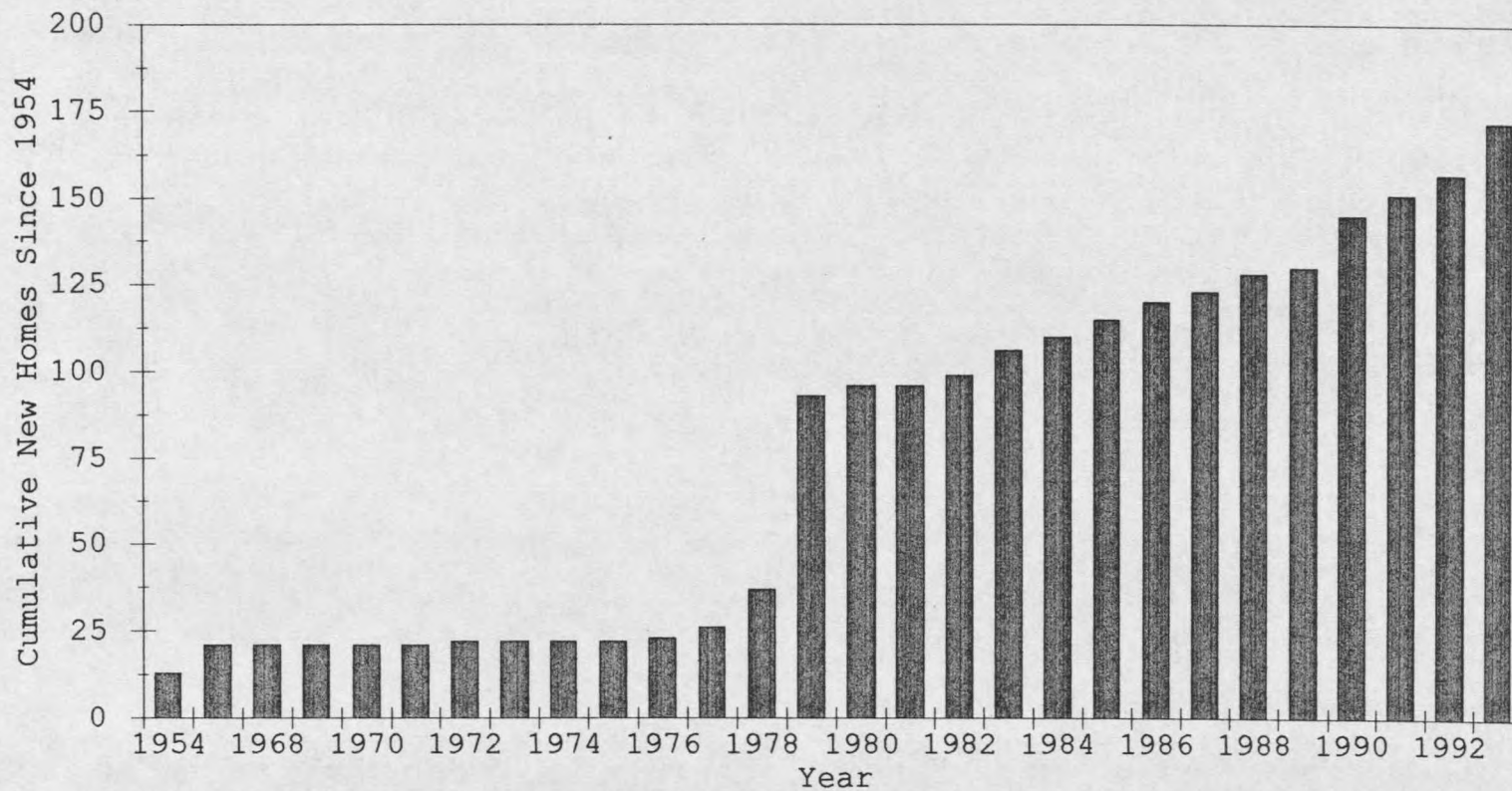


Figure 12. New homes Study Site Two,
1954-1993
(Gallatin County Sewer Permits 1995)



such settings were generally more spread out than four per quarter section, due to the large size of most farms (Figure 13). However, these rural residences were sometimes clumped together due to road access and limited suitable homesites. Non-farm rural residential land use involves the acquisition of a small parcel on the edge of or within larger agricultural parcels (Figure 14) or the acquisition of large parcels by affluent nonfarm residential users (Figure 15).

Table 7. Land Use Based on Residential Density.

Land Use	Residences per 160 acres
Rural	Up to 4
Transition	5-8
Suburban	9+

Transitional residential areas occur in three patterns including a patchwork of remnant farm lands and small residential parcels, often involving subdivision lots (Figure 16), ranchette type residential lots of twenty acres or larger (Figure 17), and a quarter section containing five to eight residences amongst undeveloped lots in a subdivision or development (Figure 18).

Suburban densities generally consist of clusters of subdivision lots, often with more than thirty homes within a quarter section (Figure 19), or with homes built on a collection of small incrementally created non-subdivision lots (Figure 20). Even these denser suburban settings often contain small vestiges of agricultural use including horse pens and gardens. Many of the subdivisions also have dedicated parkland, which is often left as open space. In addition, remnant agricultural fields within suburban areas continue to be farmed or leased to operating farmers nearby (Nash D. 1995, Liebman 1996, McIlhattan 1995).

Figure 13. Rural-farm residential land use

Pictured is a farmhouse, outbuildings, and surrounding farmland in Section 11 T1S R5E (southern township, Study Site One). Although few farms existed in the study area by 1994, a majority of the total land remained in large parcels with some agricultural land use. [Authors collection (1995).]



Figure 14. Rural non-farm
residential land use composed of homes on large parcels

This pattern consists of four or fewer homes on large (+40 acres) parcels. Pictured is the northernmost home in Study Site One. This home is located on an open ridge in a 120-acre parcel carved from rangeland in Section 10 T2N R5E (northern township, Study Site One). The remainder of the section, as well as much of the township, contain no homes. [Authors collection (1995).]



Figure 15. Rural non-farm residential
land use composed of homes on small parcels in rural areas.

This pattern consists of homes on small (-10 acres) parcels on the edge of or within larger agricultural parcels. Pictured is a home built between 1979 and 1990 located along McIlhattan Road in Section 24 T1S R5E (southern township, Study Site One). This parcel's location on the edge of a field and on steeper ground near the road cut is an example of residential land use that had little impact on agricultural land use. [Authors collection (1995).]



Figure 16. Transition density residential land use composed of homes on a mosaic of small residential lots and large agricultural parcels.

Pictured is a portion of Section 14 T1S R5E (southern township, Study Site One) containing a pre-1954 farmhouse, outbuildings, and remnant fields along Springhill Road, with homes in the Wheatland Hills Subdivision in the hills beyond. [Authors collection (1995).]



Figure 17. Transition density residential land use
composed of homes on 20-acre ranchettes.

Pictured are homes in the Sky Ridge Estates at the intersection of Sourdough and Nash roads, Section 5 T3S R6E (Study Site Two). This is an example of the more stable of the transition areas, requiring further parcellation in order to increase the residential density beyond one home per twenty acres. [Authors collection (1995).]

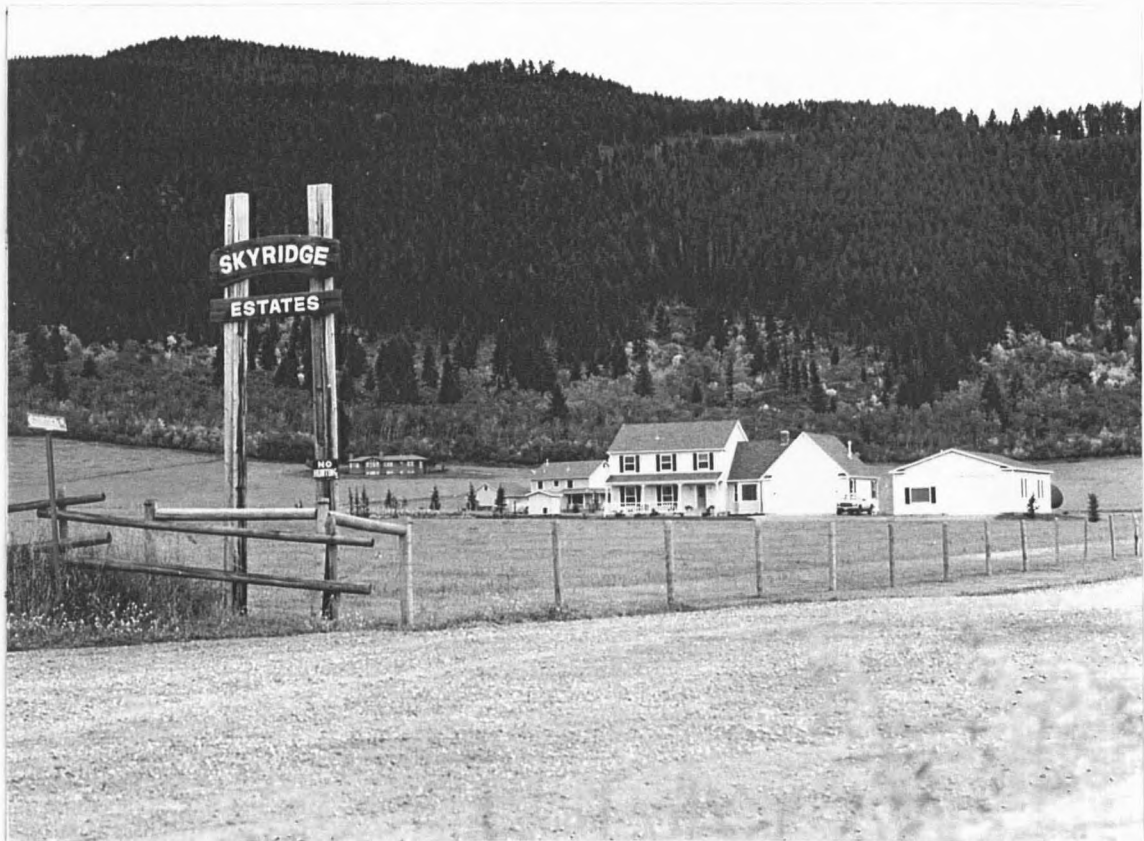


Figure 18. Transition density residential land use consisting of five to eight homes amongst undeveloped lots.

Pictured are homes under construction in Grandview Heights I Subdivision, Section 20 T1S R6E (southern township, Study Site One). These lots, while ignored during earlier booms in home building, are sprouting homes after the paving of Sypes Canyon Road in 1993. [Authors collection (1995).]

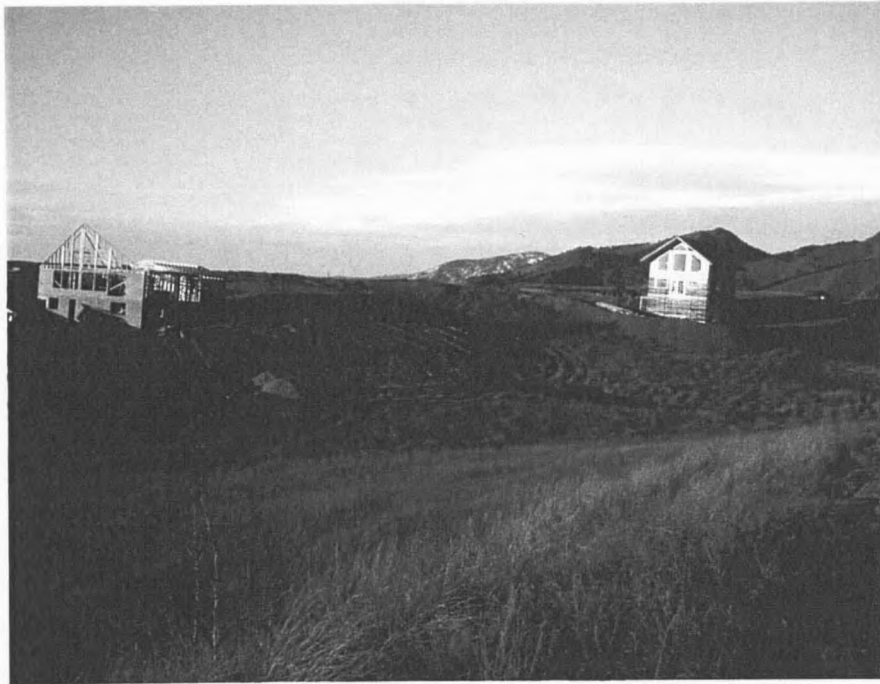


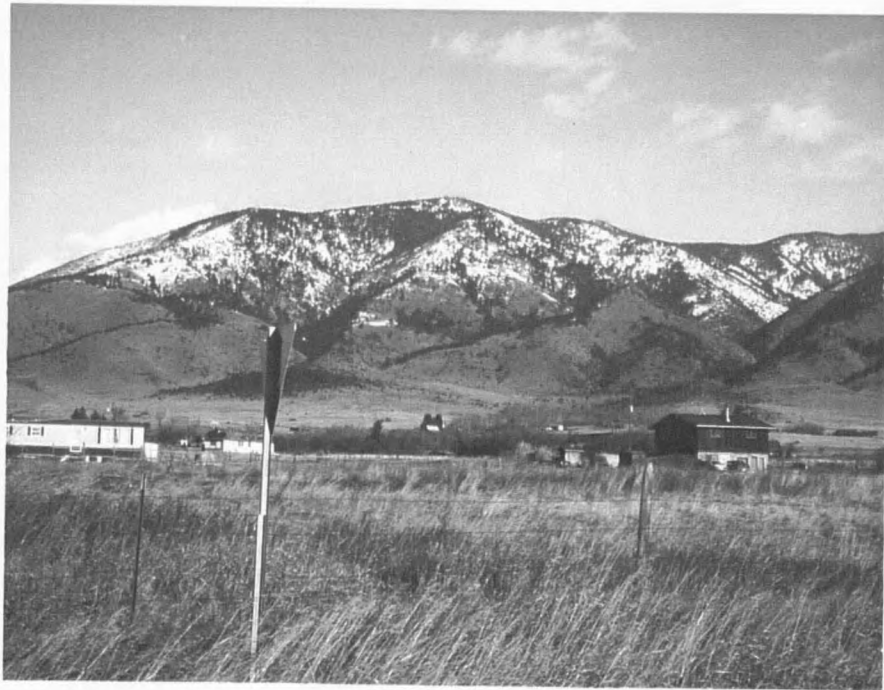
Figure 19. Suburban density residential land use
consisting of homes on subdivision lots

The most popular residential parcels in the study area, subdivision lots concentrate the majority of homes into two primary clusters with densities of up to thirty homes in a quarter section. Pictured are homes in the Ranch Subdivision along Sypes Canyon Road in Section 13 T1S R6E (southern township, Study Site One). [Authors collection (1995).]



Figure 20. Suburban density residential land use
consisting of homes on non-subdivision lots

Pictured is a portion of the residential cluster in Section 35 T2N R5E (northern township, Study Site One), composed of a variety of house types on odd shaped incrementally created lots ranging in size from two to twenty acres. [Authors collection (1995).]



Land Use Patterns in 1954:

Most of the northern area of Site One was rangeland in 1954, with sparse timber on the steeper slopes at higher elevations and hay and wheat fields in the flatter acreages. Only a small number of these fields were irrigated (Water Resources Survey Part II, Gallatin County 1954). The area consists of a hill which gains 700 feet of elevation from the start of Rocky Mountain Road at the southern boundary of the township to the northern limits of the site at Johnson Canyon Road. This area contained only nine residences in 1954, four of which were located at the base of the hill along the southern boundary of the township (Figure 4). The low residential density of the northern area was typical of non-irrigated rangeland agriculture, with a mean of only one residence per 729 acres, the lowest residential density of the study area.

To the immediate south in Site One, the Springhill township contained more irrigated land, as well as many acres of dryland wheat, and supported more farm residences than the rangeland to the north. With 35 residences in 1954, Springhill was the most populated area in Site One, having a mean residential density of 346 acres per residence. Residences were generally dispersed throughout the area, although many of the farms were located near the Springhill Community Road, including three residences clustered close together at the end of the road, along with remnants of the former community of Springhill. The Springhill Community was incorporated in 1871 and a Post Office operated there until 1904 (Bates 1994). The smaller and irregularly shaped parcels (metes and bounds description) in Sections 16 and 17 T1N R6E are surviving land ownership patterns of this community. Other remnants include the Springhill Pavilion (a privately owned banquet hall) and the Ryan Mill, abandoned in 1953, located at the end of the road in Section

16. Other surviving landscape features were spread out along the Springhill Community Road and include the Springhill Cemetery in Section 17, the Springhill School in Section 18, and the Springhill Church in Section 13 (Figure 4).

The southern township in Site One was characterized by a mix of fields and scattered nonfarm uses. In 1954, 24 residences occupied the southern area, a mean of 427 acres per residence. The residences were generally dispersed throughout the site, although some residences were clustered together at the intersections of roads (Figure 4). At this time the only commercial land use other than farming was a gravel pit at the intersection of Springhill and Sypes Road. In addition, the City of Bozeman utilized the water from Lyman Canyon, with a reservoir built in 1917 on a twenty-acre parcel in the northeast corner of Section 32. The city also owned another 480-acre parcel of land at the mouth of Lyman Canyon in Sections 21 and 28. Although downtown Bozeman was just a mile from the southern boundary of the site, the area remained overwhelmingly rural in 1954.

Site Two was mainly rangeland and supported few residences. Twelve homes were located on 5,164 acres, with a residential density of 344 acres per residence. These residences were generally dispersed through the site, although a concentration of six residences occurred on irrigated land in the western portion of the site (Figure 5) (Water Resources Survey Part II, Gallatin County 1954). Also, two non-farm homes were built in Bear Canyon before 1954.

Evolution of an Agricultural Landscape, 1954-1965

From 1954 to 1965 land use in the study area and overall patterns of residential density changed very little. The number of residences increased significantly only along Bridger Canyon Drive on the southern

border of Site One and to a lesser degree in scattered locations within Site Two. From 1954 to 1965 the agricultural land in the northern area of Site One supported only eight residences as the most remote farmstead was abandoned. The number of homes in the Springhill area remained static while the southern township on the outskirts of Bozeman surpassed it as the most populated in Study Site One. By 1965, 55 residences occupied the township, with 32 homes built and one old farmstead abandoned. The Vogel and Mount Baldy Subdivisions, totaling 94 lots, accounted for 29 of these homes. This created a suburban neighborhood in Section 32 with homes fronting on Bridger Canyon Road. This neighborhood developed early in the period due to its location on the growing fringe of Bozeman along a major arterial. The number of residences in the Vogel and Mount Baldy Subdivisions remained constant to 1994, because many of the original owners purchased two or more lots.

Residential development also occurred in Site Two after 1954, with seven new homes built by 1965. Three of these were non-farm homes built in forested Bear Canyon. Two others were on timbered sites along similar dead end access roads including Hyalite Road and Nash Road. These homes were built on small residential lots on steep, rocky, flood prone, or otherwise marginal farm land. The other two residences were built along Sourdough Road south of the Triple Tree Ranch buildings. These homes were built on residential lots around ten acres broken off from continuing farm operations. Due to the dispersal of these rural non-farm homes all of Study Site Two remained at low rural densities through the period.

Creation of a Foothill Amenity Zone, 1965-1979

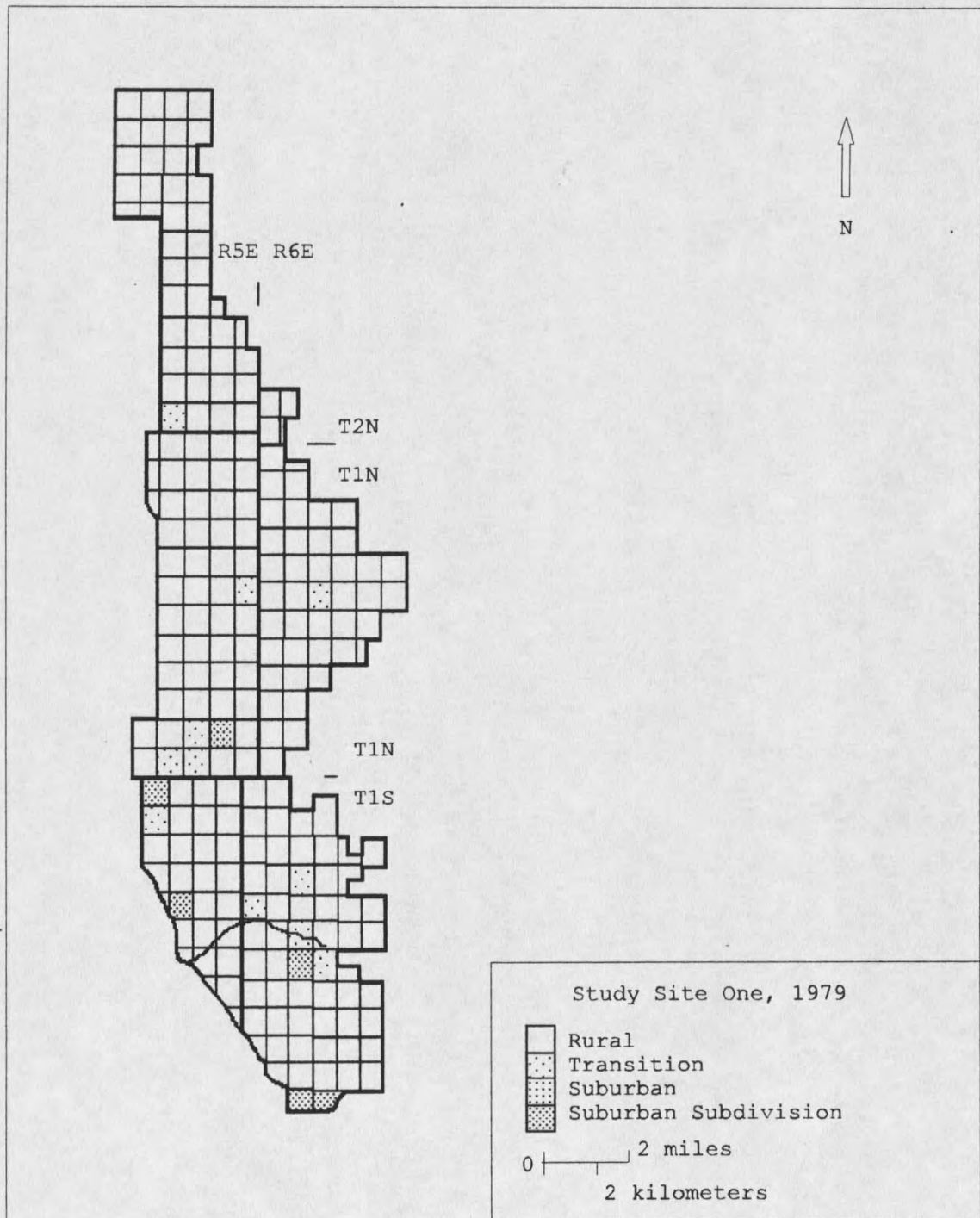
From 1965 to 1979 the study area gained 241 residences, an increase of 65%, with home building increasing dramatically throughout

much of the study area (Figures 11 and 12). By 1979, a majority of the new homes were built on subdivision lots so that 183 (49%) of the residences were in subdivisions. Most of these homes were built in Site One, which grew by 142% in 14 years. Site Two grew by 400% in the same period, with most of the homes built on subdivision lots. The primary residential lot clusters gained the most homes, although the middle and northern areas of Site One also more than doubled in residences.

The northern township in Site One had sixteen residences by 1979, with nine homes built in Section 35 and one farm abandoned. The new nonfarm residences were built in the late 1970s on residential parcels of less than twenty acres, creating a transition density neighborhood (Figure 21). The most remote residence in the northern township, located along Rocky Mountain Road in Section 10, was abandoned in the early 1960s. This had the effect of further clustering most of the residences of this township in Section 35, leaving only three farms to the north.

From 1965 to 1979 55 new homes were built in the Springhill township, an increase of 135%. Most of these homes were built in the late 1970s on subdivision lots, although a smaller number of homes were built previously on scattered non-subdivision lots. The result, particularly in the southern portion of the township, was a sprawling residential area consisting of suburban and transition density homes (Figure 21). The Ross Creek Subdivision grew by twelve residences, many built on lots split from the ten-acre original subdivision lots. Foster Park in its first year of existence had five houses built on it, while the older Buena Vista had six houses built on its eight lots. Active home building on non-subdivision lots in the northern half of Section 36 accounted for the single suburban density non-subdivision area in the township, consisting of a linear neighborhood with most homes fronting

Figure 21. Residential density patterns
for Study Site One, 1979.



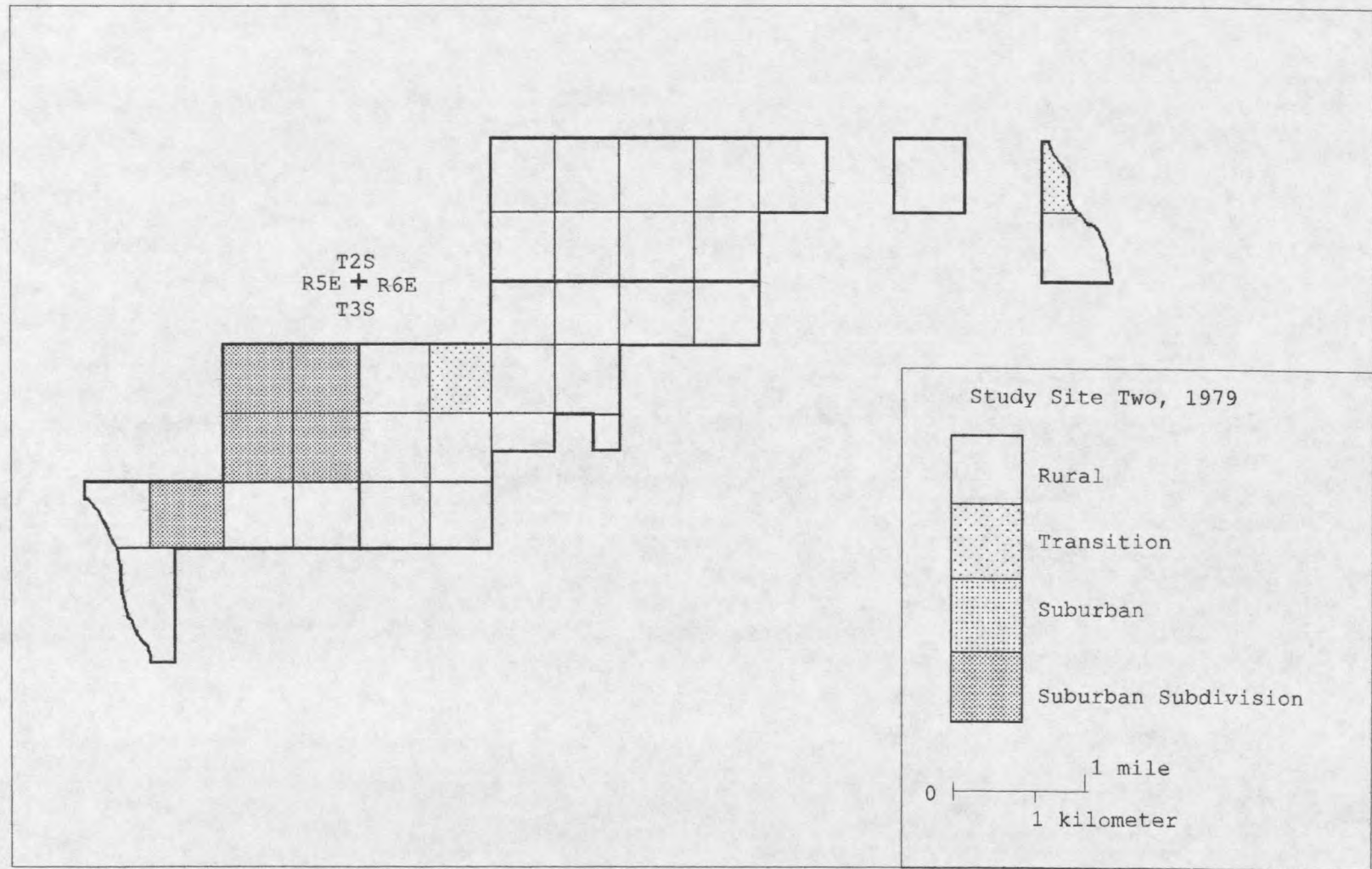
directly onto Walker and Penwell Bridge Roads.

During this period the southern township in Site One underwent a major residential land use conversion, with home building increasing steadily after 1973. By 1979, 153 homes occupied the township, a 159% increase. These homes were built on parcels scattered throughout the area including activity in five subdivisions (Figure 21). For example, Sager Stimson gained eleven homes by 1979, Grandview I fifteen homes, Wheatland Hills 31, and Harvest Hills (approved in 1979) gained two homes. Walker Road, paralleling Springhill Road and easily accessed by East Baseline Road, had six homes built in a quarter section stretch, mostly on twenty-acre lots. This created an initial transitional density residential area that would later expand along the road. With the increased residential use, more land was also devoted to public and commercial uses. In 1969, the 200-acre Bozeman City Landfill opened in Section 30 to the west of upper Story Mill Road. An automotive repair shop opened in a barn along Sypes Canyon Road in 1975.

For Site Two, the era saw increased home building, with the majority constructed in the late 1970s, much like the pattern in the southern area of Site One (Figure 12). By 1979, 88 new homes were built, including 61 (69%) on subdivision lots. Home building was more localized in Site Two, with 72 of the 88 new homes located in Sections 1, 11, and 12 along South Nineteenth Road, creating a suburban density residential neighborhood in the lot cluster created earlier in the decade (Figure 22).

During this period many of the subdivisions in Site Two approached full capacity. Fir Hill I became a strip neighborhood with eleven homes fronting on the access road paralleling South Nineteenth Road. Chief Joseph Meadows had six homes built, while Mystic Heights I had fifteen new homes built in the time period. The one-year-old Mystic Heights II

Figure 22. Residential density
for Study Site Two, 1979.



Subdivision had six homes built. Subdivisions to the west grew as well, with more houses constructed in the Hodgeman Canyon and Aspen Heights Subdivisions.

To the north and east, homes were also built, although at a much slower pace. A farm located on the north half of Section 32 along Sourdough Road was abandoned. However, it remained on the physical landscape, with abandoned farm equipment and accouterments a reminder of a farming past. Four more homes were built in Bear Canyon in this period, creating a transition density residential area of eight homes.

Alternative land uses also increased in this period. In 1969 the City of Bozeman bought eighty acres along Sourdough Road in Section 7 for a water reservoir and water treatment facility. Other land was transferred to non-profit groups for conservation. In 1979 near the southern end of South Nineteenth Road, the Kirks donated 40 acres of steep timbered land above the remnants of the family farm to Montana State University for public natural science education, and the creation of a new National Forest access.

Amenity Zone Restructuring and Consolidation, 1979-1990

By 1990 a total of 596 residences occupied the study area, a 38% increase over eleven years. Only 225 homes were built from 1979 to 1990, down from the earlier period. However, 162 of these homes were constructed on subdivision lots, up from 154 in the earlier period. As a result, 58% of homes were clustered in subdivisions, which in turn formed suburban density neighborhoods that were surrounded by and interspersed with less dense areas of transition and rural land uses.

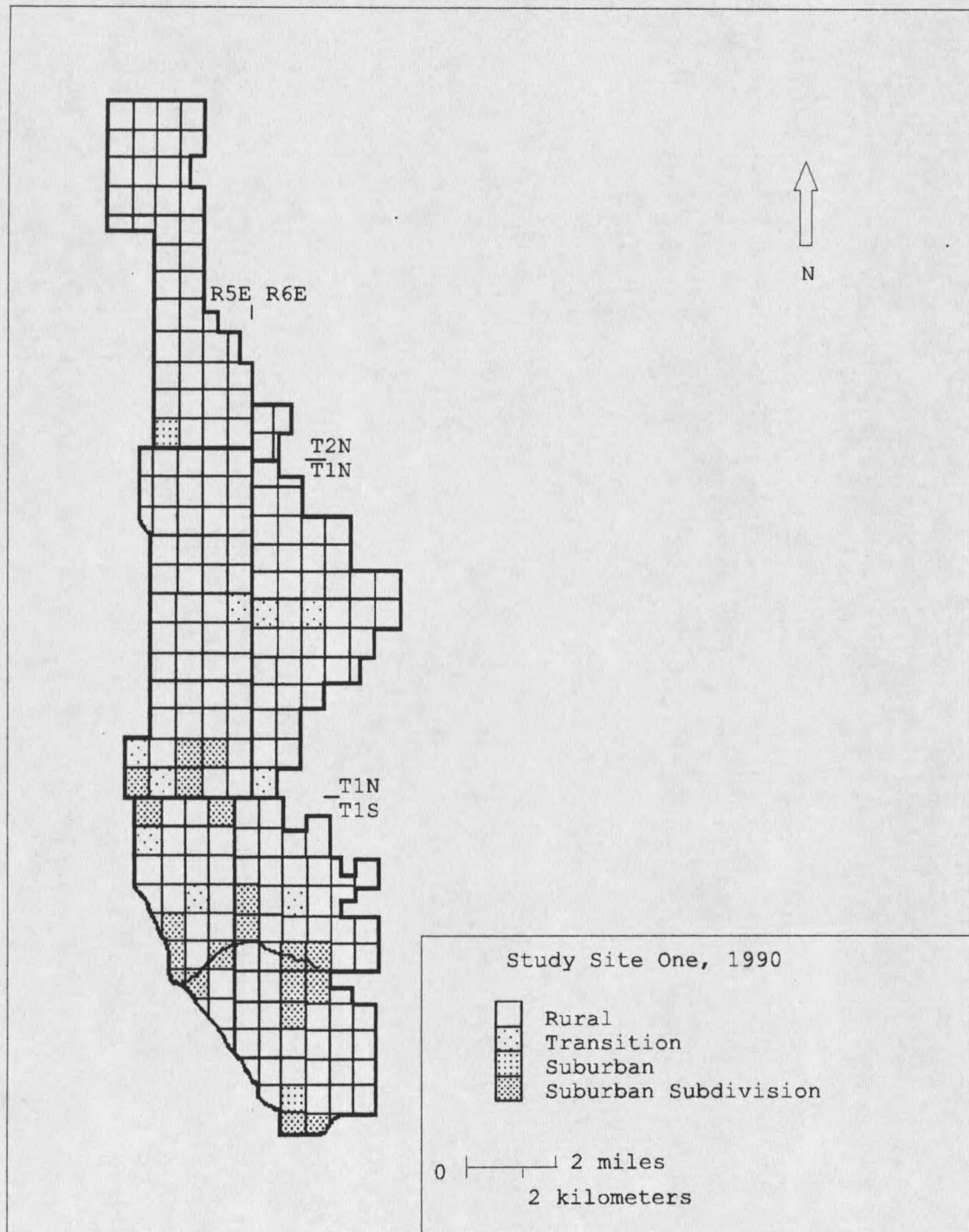
Only three homes were built in the northern township during the period. These included the most northerly home in the study area, built on a prominent windswept ridge just to the south of Johnson Canyon Road,

a site that emphasizes view (Figure 14). This home sits on a 120-acre parcel carved from the surrounding pasture land (Figure 6). The other two homes were built in the residential area of Section 35, so that this section had thirteen of the seventeen residences in the township by 1990, thus forming a non-subdivision suburban density neighborhood (Figure 23).

By 1990, 36 more homes had been built in the Springhill area, with twenty of these homes concentrated in the more densely settled southern tier of sections. Transition density areas developed mainly in the Ross Creek Subdivision with its larger lots, while suburban density areas developed to the east in the subdivisions with smaller lots. Foster Park gained four homes, while the Buffalo Creek Subdivision (1986) had nine homes erected by 1990. The remainder of the homes were built in the northern sections on non-subdivision lots of ten to twenty acres, including four in a twenty-lot planned development near Springhill Community Road.

By 1990 a total of 289 homes occupied the southern township of Site One, an increase of 136 residences. Of these, 98 (72%) were built on subdivision lots, so that by 1990 a total of 214 residences were located on subdivision lots. The early Mount Baldy and Vogel Subdivisions didn't grow during this period, but the 1970s-era subdivisions continued to fill in with new homes. Grandview Heights sprouted fourteen new homes, Wheatland Hills eighteen homes, and Harvest Hills 22 homes. The subdivisions approved after 1979 were also being developed by 1990, with fourteen homes built in Wheatland Hills II, and 22 new homes in The Ranch. Sypes Canyon Subdivision and Grandview Heights II were exceptions to this growth: by 1990 only eight homes had been built in the two subdivisions. Poor road quality, as well as a no dog law in the case of Sypes Canyon, contributed to this lack of growth.

Figure 23. Residential density patterns
for Study Site One, 1990.



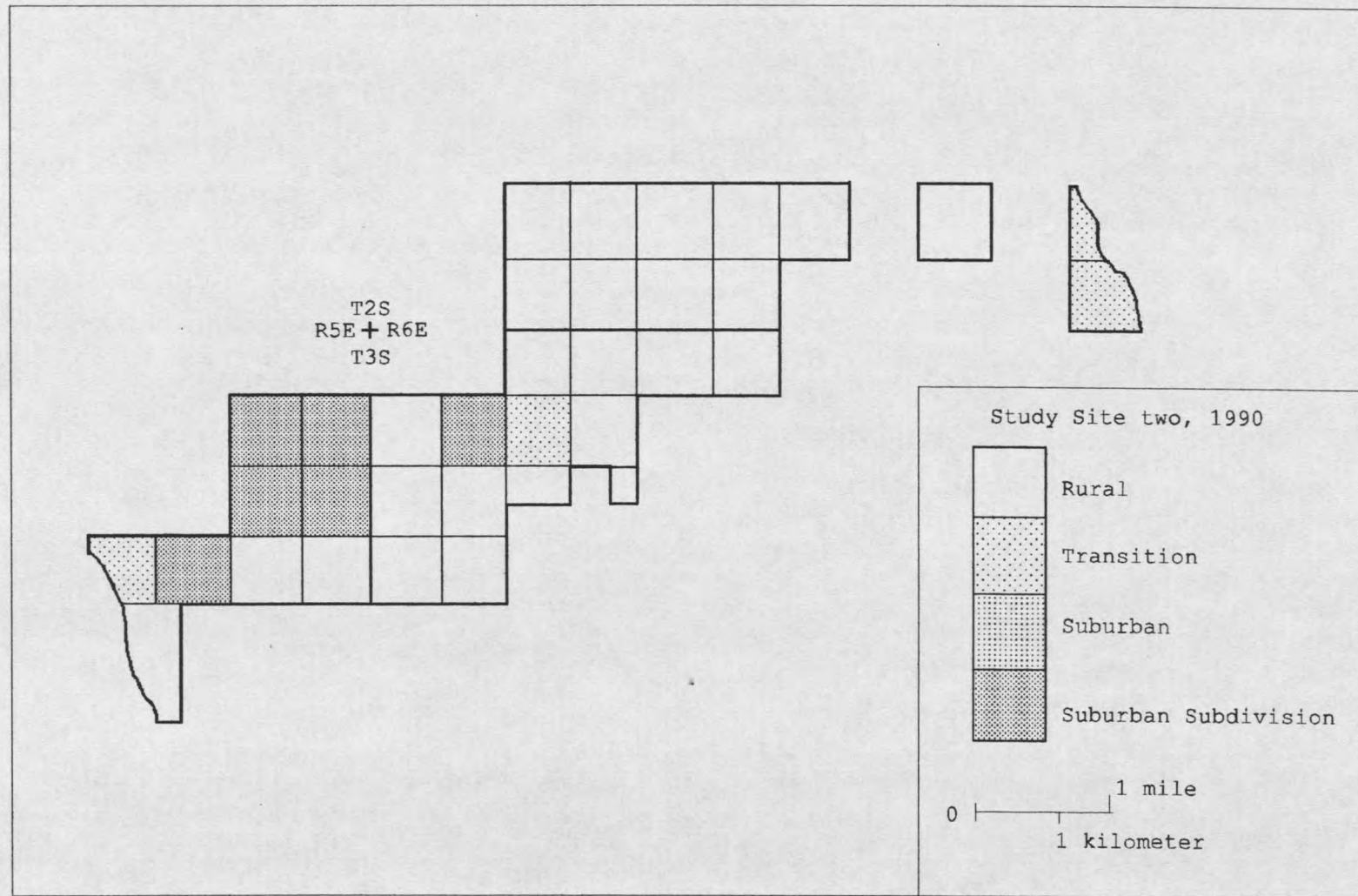
A number of non residential land uses accompanied the residential growth in Site One. A new church was located along Springhill Road amidst the Wheatland Hill Subdivision and a horse training arena was constructed near Story Mill Road in Section 32. By 1980 a homeowner along Walker Road started a custom meat and game packaging business. This was the first of five home businesses that opened their doors in the linear residential area along Walker Road. By 1990 the area's commercial gravel pit moved across Sypes Canyon Road to the intersection of McIlhattan and Sypes, and had greatly expanded from the growing local demand for construction gravel.

By 1990, 149 residences occupied Site Two. Although this was an increase of 39 residences, it marked a 50% reduction in growth from the rates of the earlier period. The rate of growth from 1979 to 1990 was generally stable although a slump occurred in the early 1980s (Figure 12). In 1990, the mean residential density of 32 acres per residence was the lowest in the study area. Most of these homes were built on lots of less than twenty acres, including 26 homes built in subdivisions. Overall, 55% of residences in Site Two were in subdivisions by 1990. Most notably, a cluster of subdivision activity took shape in the vicinity of Nash and South Nineteenth Roads (Figure 24).

The older subdivisions in Site Two grew more slowly during this period as they reached capacity, while subdivisions approved in the late 1970s and 1980s grew at a more rapid rate. Hodgeman Canyon, with only five homes built on its eighteen lots between 1969 and 1979, gained four homes in the 1980s. Mystic Heights I had only three homes constructed while seven homes were built on lots in the newer and more elevated Mystic Heights III.

In addition, thirteen homes were constructed on non-subdivision lots, with the largest concentration consisting of four homes built on

Figure 24. Residential density patterns
for Study Site Two, 1990.



twenty-acre parcels in the Sky Ridge Estates at the intersection of Nash and Sourdough Roads. This development bordered public land, with large homes built in a field at the edge of the lower timberline.

The pattern of land conservation also continued to develop during this period. For example, owners of a 230-acre parcel in Section 7 east of Sourdough Road built a home and placed a conservation easement on their land in 1981, limiting residential development to their single dwelling. This was the first of a number of conservation easements utilized by landowners, a strategy which often helped offset the increasing costs of owning land.

Amenity Zone Evolution and Expansion, 1990-1994

Even as the pace of parcellation slowed, actual home building accelerated in much of the study area between 1990 and 1994. Home building increased dramatically in Site One, while increasing only moderately in Site Two (Table 4). From 1990 to 1994 over 232 homes were built in the study area with over half of these (124) on subdivision lots. By 1994 818 residences occupied the 1,612 parcels comprising the study area with 57% of homes built on subdivision lots. Although the majority of these new homes were built in the suburban density clusters of Site One, surges in construction within planned developments occurred throughout the study area.

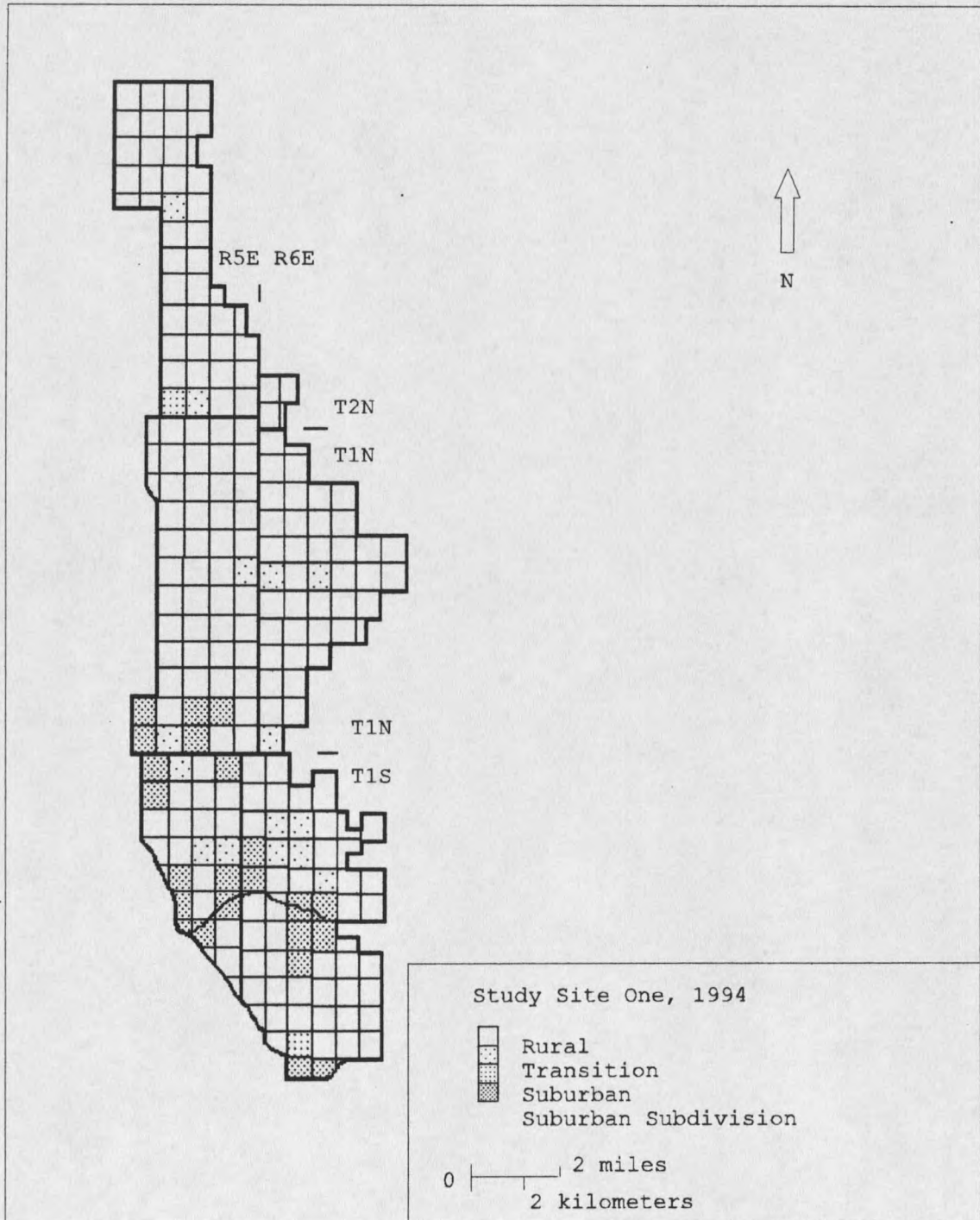
In 1994, the northern area of Site One area remained agricultural, with residential land use limited to two minor clusters and a few scattered homes. Only 30 homes occupied the 113 parcels of the northern township. Lower sections remained in hay or grain crops, while much of the steeper land to the east and north served as rangeland. Of the eleven homes built in the northern area between 1990 and 1994, nine were in Section 35, adding to the residential cluster in that area (Figure

25). This cluster consisted of non-subdivision parcels created piecemeal and incrementally, and it included residences which ranged from trailers on lots of less than one acre to large homes on lots of over twenty acres (Figure 20). Beyond the existing homes, many twenty-acre and smaller parcels, ripe for residential conversion, also covered portions of the northern township. These lots were as yet unsold, and remained agricultural in nature, although they suggested that future rural nonfarm population increases were likely.

This was also a period of increased home building for the Springhill area, especially for the existing subdivisions in the southern sections. Overall 48 new homes were built, 22 of them on subdivision lots. Ross Creek grew by nine homes, dispersed amongst five-acre and ten-acre lots. To the east, home building continued as subdivisions approached capacity. In the northern sections of the Springhill township home building was less concentrated, although three more homes were built along Springhill Community Road within the planned development in Section 18. However, most of the areas twenty-acre lots, many created in the early 1990s in response to threatened legislation, remained undeveloped with, with no roads or homes yet built to break up the large agricultural fields.

Alternatives to residential development were increasingly utilized by landowners for conservation purposes. In 1993, owners of the two and a half section Maher Ranch sold a conservation easement to the Montana Department of Fish, Wildlife, and Parks, limiting land use to only one additional residence. They also allowed public access for hunting on their ranch (Bozeman Daily Chronicle, 22 September 1994). In 1994 two adjacent landowners placed conservation easements on their property. This included a 160-acre parcel in T1N R5E. The easement provided for four homesites on approximately thirteen acres, including two existing

Figure 25. Residential density patterns
for Study Site One, 1994.



residences. The remaining 147 acres was reserved for agricultural use.

Home building increased dramatically in the southern area of Site One during this period, with 147 homes built, 102 on subdivision lots (Figure 11). The already-established residential cluster experienced significant infilling and expansion in the early 1990s. Much of this home building occurred in The Ranch Subdivision, with 29 homes built on small lots, as well as in the Summer Ridge Subdivision (1993), accessible by recently improved and paved Sypes Canyon and Summer Cutoff roads (Figure 18). Suburban density land use also increased further up Sypes Canyon Road once the route was paved in 1991. Freed from its no dog law in 1990, the Sypes Canyon Subdivision added nine more homes in the following four years. Closer to the mountains, building proceeded much more slowly as steep hillsides and poor access roads limited development opportunities in areas such as Grandview Heights II Subdivision and Bridger Mountain.

More homes were built on lots to the south, including two of the five twenty-acre tracts in the Brass Lantern Estates. These homes sit just below the 'M' Forest Service Access and are among the most visible signs of landuse change in the foothills area as seen from Bozeman (Figure 26). But while such prominent sites in the Bridger foothills were increasingly dominated by new and expensive homes, the nearby city-owned lands in the Lyman Creek drainage changed very little in the 1990s (Figure 27).

Conversion to other nonagricultural and nonresidential land uses also accelerated in the southern area of Site One, with at least twelve commercial or public land uses apparent by 1994. The gravel pit was greatly expanded, and a custom cabinet shop, a black powder supply store, and a classic car restoration shop had opened their doors along Walker Road. Along with these non farm commercial land uses, a cattle

Figure 26. Home on a high-amenity twenty-acre lot emphasizing view

Pictured is a home in the Brass Lantern Estates, Section 28 T1S R6E (southern township, Study Site One). Lots in this development overlook Bozeman and until the early 1990s were the most expensive parcels in the study area. [Authors collection (1995).]

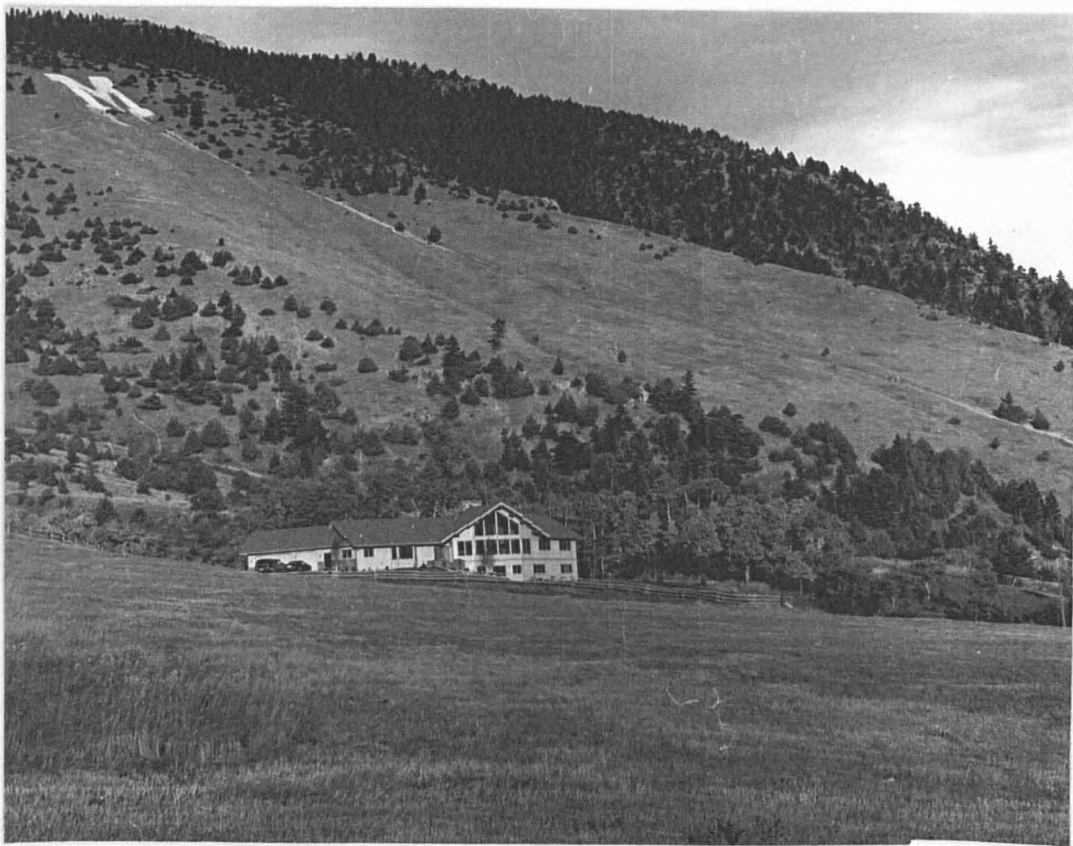


Figure 27. Lyman Canyon in 1994

Land preserved as open space due to ownership by the city of Bozeman for a municipal watershed. Pictured in the middle ground is land located in Sections 21 and 28 T1S R6E (southern township, Study Site One). The home on the right margin is located in the Brass Lantern Estates. [Authors collection (1995).]



inseminating business operates along the road. During this period more amenity-oriented businesses also located in the area, including a bed and breakfast in Section 18 along Sypes Canyon Road. By early 1995, construction began on a club house and golf course in Section 31, just down the hill from the city dump.

Unlike Site One, home building and associated land use conversion in Site Two continued at the slower rates of the 1980s (Figure 12). The Site gained only 23 residences from 1990 to 1994, including sixteen built on subdivision lots. Because new homes clustered in already developed areas, the ground pattern of residential density remained unchanged from 1990 (Figure 24). Mystic Heights III experienced the greatest growth, gaining nine homes by 1994. Other developments and odd lots continued to be built on during this time, including four residences in the Eagle Rock Preserve and one in the Sky Ridge Estates. The Triple Tree Subdivision, approved in late 1994, had three houses under construction by early 1995, with over half the lots already sold (Haynes 1995). Indeed, the central area of Site Two, occupied by the Triple Tree Subdivision and the Eagle Rock, Saddle Ridge, and Sky Ridge Estates developments, appeared destined for transitional or suburban-level densities in the near future.

Only minor nonresidential land use changes were associated with Site Two. By 1995 two bed and breakfasts, one in Bear Canyon and the other at the Kirk farm near Hodgeman Canyon, suggested the increasingly amenity-oriented nature of the area. In the future, commercial land uses may well increase as the area's overall population continues to rise. The Hyalite Zoning District was created in 1993, and it included plans for a small gas and grocery store to cater to the increasingly suburban neighborhood in the vicinity.

Micro Sites

Two more detailed case studies illuminate evolving land ownership and land use patterns in selected portions of the study area (Figures 2 and 3). These micro sites contain land ownership patterns ranging from clusters of small residential lots to larger agricultural lots that were created prior to 1954. The sites reveal how a variety of residential densities developed, with the majority of residences clustered in subdivisions. However, parcellation has out-paced homebuilding with the creation of subdivisions and planned developments (Table 8).

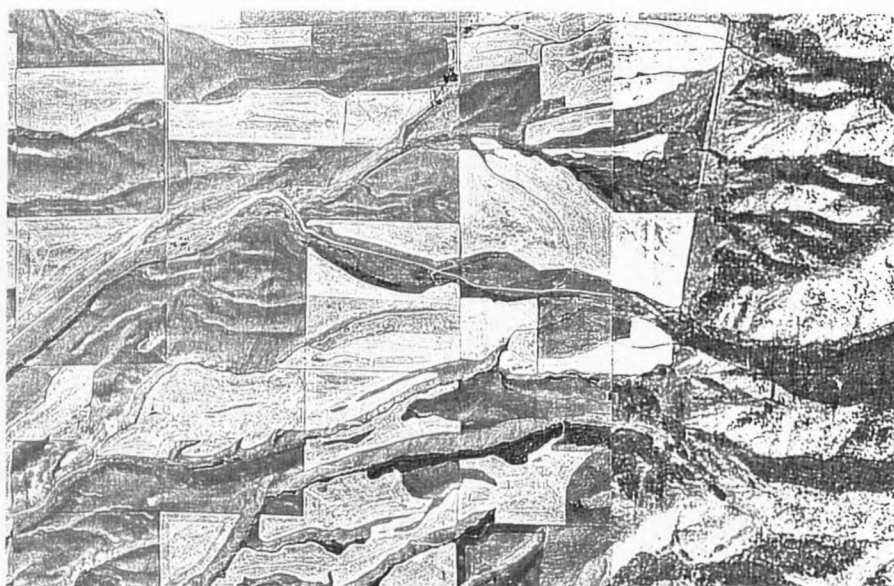
Table 8. Parcels and residences in 1954 and 1993 for Micro Sites One and Two.

	1954		1994	
	Parcels	Residences	Parcels	Residences
Micro-Site One	7	5	140	76
Section 17	4	2	73	39
Section 18	3	3	67	37
Micro-Site Two	5	2	142	68
Section 7	2	1	6	3
Section 12	3	1	136	65

These patterns to a large degree parallel the patterns noted for the study area as a whole. However, examining land ownership and land use patterns at the scale of the two-section micro sites allows discussion of the history of parcellation and corresponding land use changes for individual parcels. This includes a chronology of the process of parcellation that transforms an agricultural tract into residential lots of various sizes. Also, a visual comparison of homesites in 1954 and 1990 is possible at this scale by examining aerial photographs (Figures 28 and 29). By 1990, the large fields of 1954 have been invaded by clusters of homes and access roads. In some cases farmhouses have been enveloped by suburban neighborhoods, although

Figure 28. Micro Site One in 1954 and 1990

A) Aerial photograph of Micro Site One and surrounding area in 1954 (1:41818). [Soil Conservation Service (1954).]



B) Aerial photograph of Micro Site One and surrounding area in 1990 (1:41818). [Soil Conservation Service (1990).]



Figure 29. Micro Site Two in 1954 and 1990

A) Aerial photograph of Micro Site Two and surrounding area in 1954 (1:41818). [Soil Conservation Service (1954).]



B) Aerial photograph of Micro Site Two and surrounding area in 1990 (1:41818). [Soil Conservation Service (1990).]



nearby much of the land remains in large agricultural parcels. A comparison of 1954-era homesites with post-1979 homesites also reveals an evolution of desirable site criteria from utilitarian concerns to more amenity-based considerations. The five homes in Micro Site One and the two homes in Micro Site Two in 1954 were all located near drainage bottoms, although in the foothills these drainages are often shallow (Figures 28 and 29). Such areas, often wetter and more vegetated than the steeper slopes above, offered protection from the weather, as well as easier access to groundwater. Also, houses were built on relatively flat sites, a practical concern for farm operations and access.

Preferred home sites for the amenity-oriented nonfarms were often similar to the farm sites, although flat ground was increasingly not a requirement. Of the 63 homes built in the micro sites from 1979 to 1994, nineteen were built on steeper slopes emphasizing view and four were built in thicker timber on steeper slopes. The remainder were built within or at the mouth of a drainage, in similar locations to the pre-1965 farmhouses, although often in less protected and vegetated areas, as well as further up the slopes to emphasize view.

The difficulties posed by poor roads, as well as the availability of high-amenity lots closer and more accessible to Bozeman, initially limited the number of homes built on steeper slopes. Later, such settings were increasingly used as high amenity sites that offered privacy, timber, and view. Most purchasers were limited to subdivision or planned development lots that offered view and access, while compromising amenities such as privacy and spatial exclusivity. As the more desirable lots were purchased, subsequent buyers faced increased costs for less attractive lots (Haynes 1995).

Micro Site One

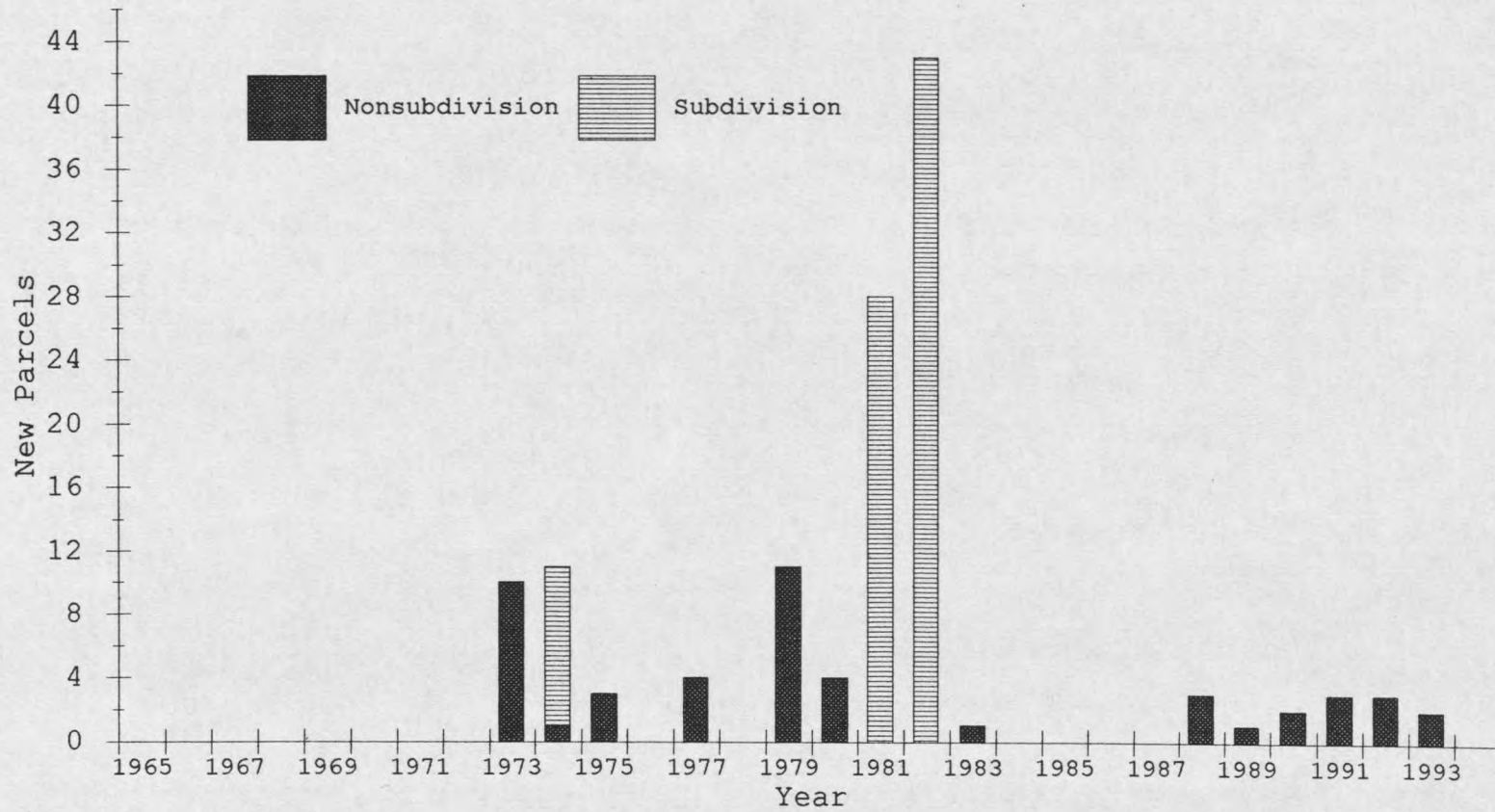
In 1954 the Sypes Canyon area (Study Site One, Sections 17 and 18 T1S R5E) was divided into seven parcels (Figure 5). This was generally open country used as rangeland for cattle and horses (Figure 28). The lower part of Section 18 to the west, which is flatter and more evenly contoured, had tilled fields (McIlhattan 1995). Section 17 is steeper and rockier, with sparse timber on the slopes and brush along the ephemeral stream bed.

The seven parcels comprising these two sections in 1954 were broken into 140 parcels by 1994. Of the 140 parcels 67(48%) were subdivision lots, 66 (47%) were created under exemptions of the 1973 Subdivision and Platting Act, and seven (5%) were remnants of parcels created prior to the 1973 legislation requiring Certificates of Survey. The majority of these lots, including subdivision lots, were created by a small number of landowners in conjunction with investments by land developers and local businessmen.

Four phases of parcellation are evident between 1973 and 1994. First, by the early 1970s, as the demand for residential land increased, some landowners began selling off small parcels (Figure 30). Next, larger lots and complete farms were sold intact or parcelled into residential lots, often in the form of subdivisions. Parcellation peaked by the early 1980s, followed by a third phase of slower change for the remainder of the decade. Most recently, a modest increase in non-subdivision parcellation marks yet another distinctive phase in the evolution of the micro site.

Home building patters in the micro site, although related to parcellation patterns, remained more stable through the period. Since 1968, 76 homes were constructed, including 53 (84%) on subdivision lots

Figure 30.
Parcellation patterns, Micro Site One



(Table 8) (Gallatin County Sewer Permits 1995). In the 1970s, few homes were built in the Micro Site, although unlike much of the study area, home building continued through the recession years of the 1980s (Figure 31). Construction on non-subdivision lots created by Jordan and other large landowners accounted for ten homes along Sypes Canyon and Summer Cutoff Roads by 1975 (King 1995). These early nonfarm residents were generally seeking rural-based foothill amenities, although they generally commuted to Bozeman for work (King 1995, Alexander 1995). By 1990 residential development and associated road building and landscaping had transformed the Micro-Site (Figure 28).

In the 1990s, as home building surged, real estate prices rose drastically, so that only the wealthiest purchasers could afford the increasingly rare parcel of over a few acres in size. As a result few homes were built on non-subdivision lots (Haynes 1995, Glick 1995). Instead, the more economical subdivision lots, many of which had been purchased years before, were the focus of home building in this period. Construction also increased in the more remote Section 17, including the Sypes Canyon Subdivision, once the road was paved in 1992. As a result the narrow corridor comprising the Sypes Canyon Forest Service Access was hemmed in by houses by 1995 (Figure 32).

Micro Site Two

Micro-Site Two encompasses Sections 12 T2S R5E and 7 T2S R6E (Study Site Two). From south to north, the micro site includes a mix of steeply-sloped timbered canyons, foothill tracts, and flatter acreage. In 1954 the site included five parcels of land, although only two were contained completely within the site. By 1994, 142 parcels were found in the site including six in Section 7 and 136 in Section 12 (Figure 10). Over 90% of these parcels were subdivision lots. This parcellation

Figure 31.
New Homes, Micro Site One
(Gallatin County Sewer Permits 1995)

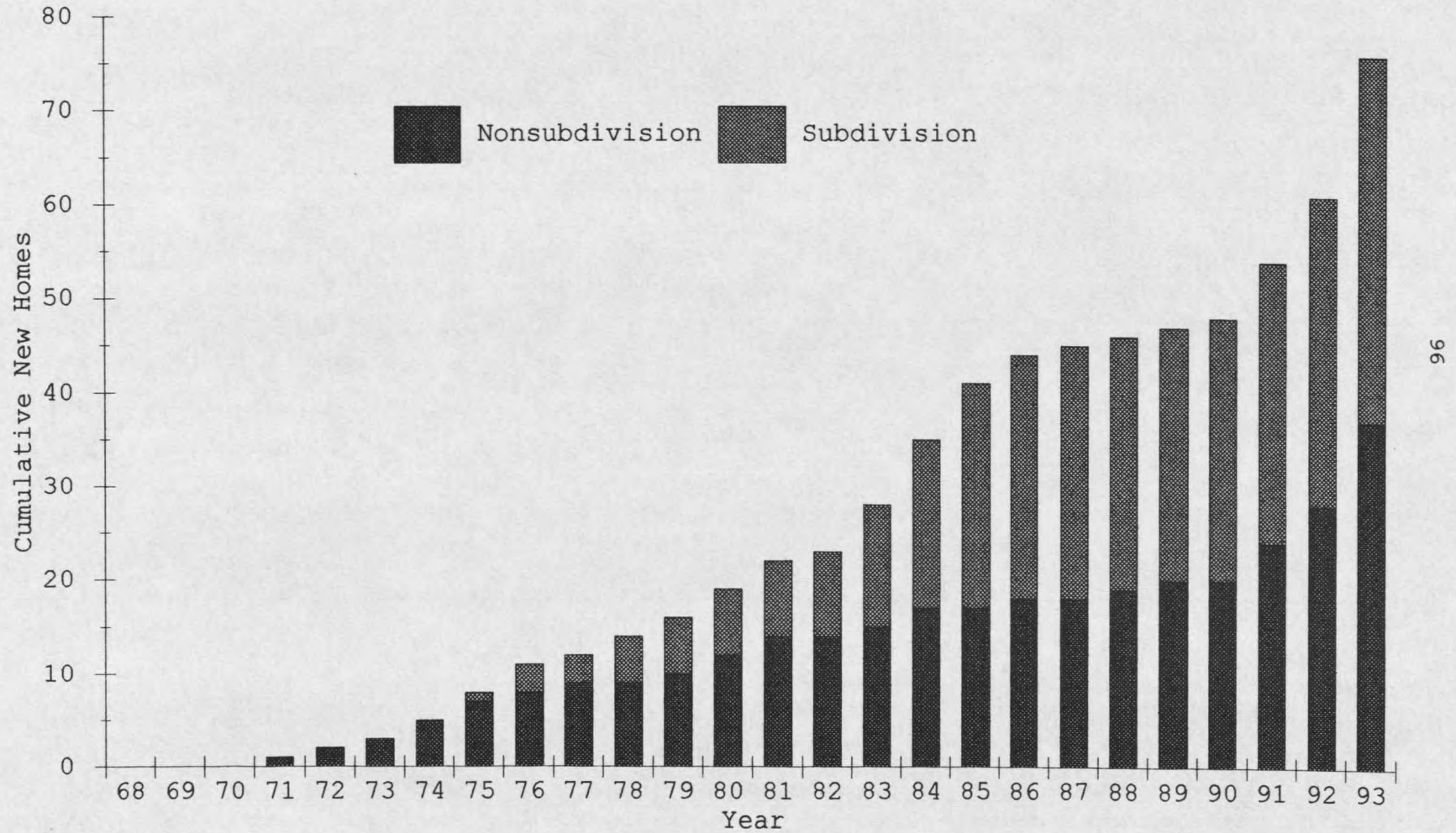
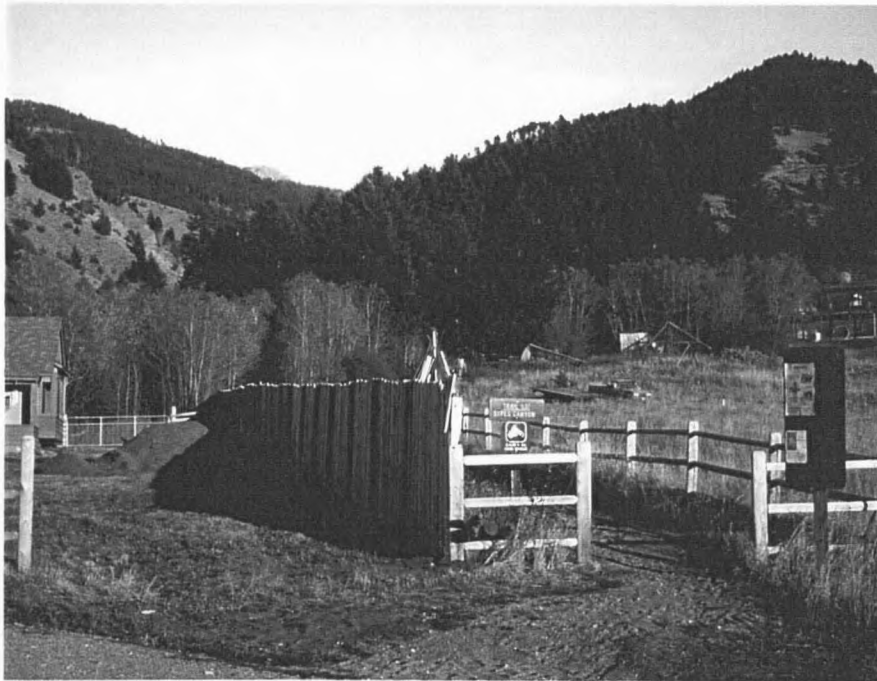


Figure 32. Sypes Canyon Forest Service Access, 1995

This photograph of the Sypes Canyon Forest Service Access corridor in Section 17 T1S R6E (southern Township) illustrates the suburban nature of residential development in the primary residential cluster of Study Site One. This land was donated as a condition for the approval of the Sypes Canyon Subdivision. [Authors collection (1995).]



occurred during the 1970s and early 1980s, with the last subdivision approved in 1981 (Figure 33). These subdivisions created an abundance of high-amenity home sites. By 1994 the majority of the Micro Site remained in large parcels, including all of the more rugged portions of Section 7 and the southern half of Section 12. Beyond the formal subdivisions, only eight homes were built on non-subdivision lots, two of which were old farms.

The history of parcellation for the 136-lot cluster in Section 12 involves numerous sales and transfers of land. Most of the parcels and all of the subdivision lots, were created by the Kirk and the Clark families, often in conjunction with local developers. The Kirks purchased the Spencer Ranch in the early 1960s. They created the Fir Hill I (1965) and II (1972) Subdivisions. Chief Joseph (1977) was soon created as the earlier subdivisions proved successful. The Clarks subdivided their own farm into lots in a similar manner. By 1994, Section 12 had a mean parcel size of only 4.5 acres, although the mountainous southern half remained in three large parcels.

In 1954, Micro Site Two contained only two farm residences, one in each section. Most of the flatter land consisted of large hay and grain fields. The steeper wooded slopes were unoccupied. From 1954 to 1967 no new residences were built in the micro site, but that pattern changed abruptly thereafter. From 1968 through 1993 a total 68 homes were built, including 62 (93%) on subdivision lots in Section 12 (Figure 34). Because of the availability of affordable and accessible subdivision lots, Micro Site Two experienced very little non-subdivision home building. The remaining land was owned by a small number of landowners who either retained ownership through the period or sold parcels intact.

Figure 33.
Parcellation patterns, Micro Site Two

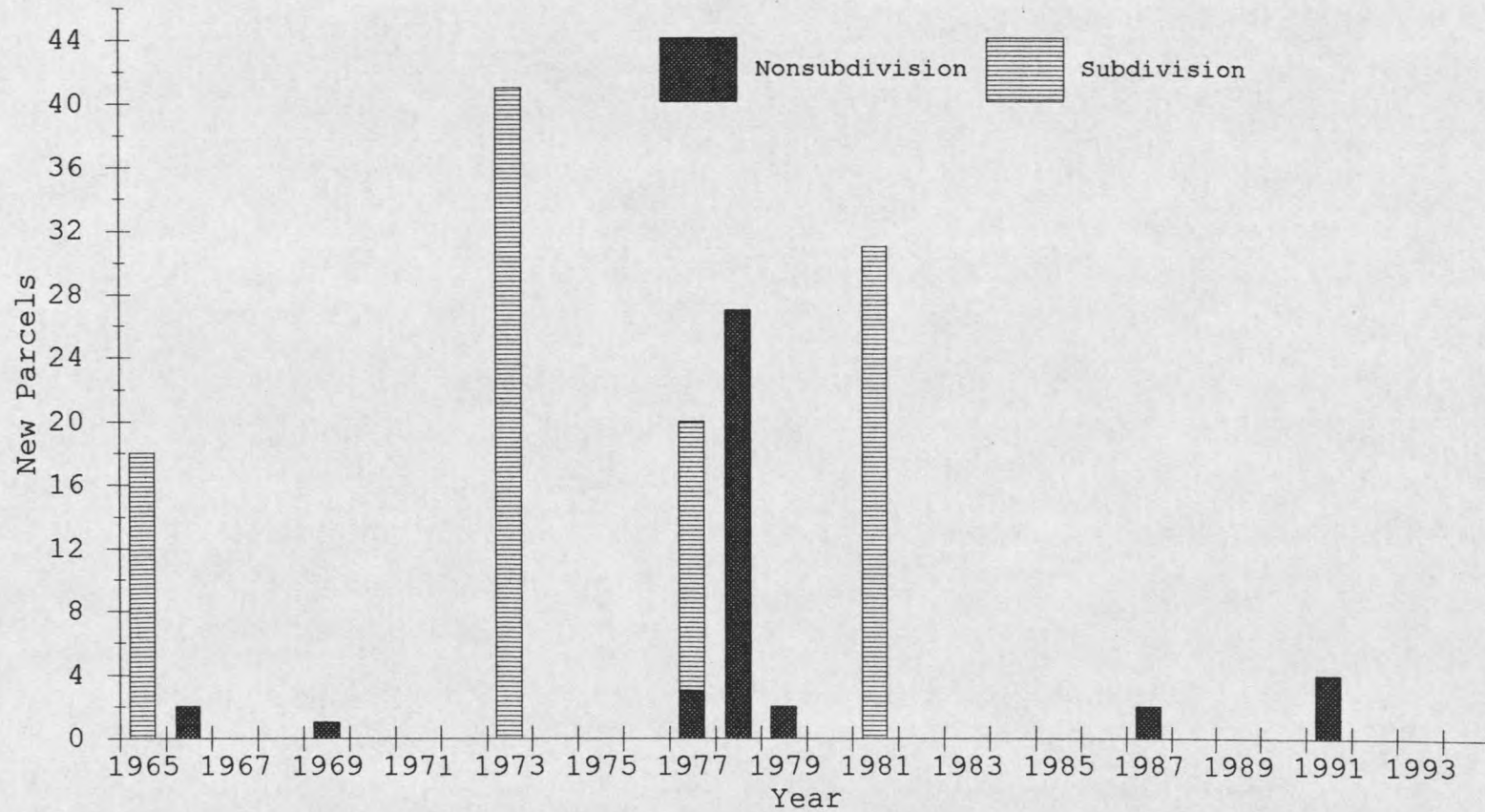
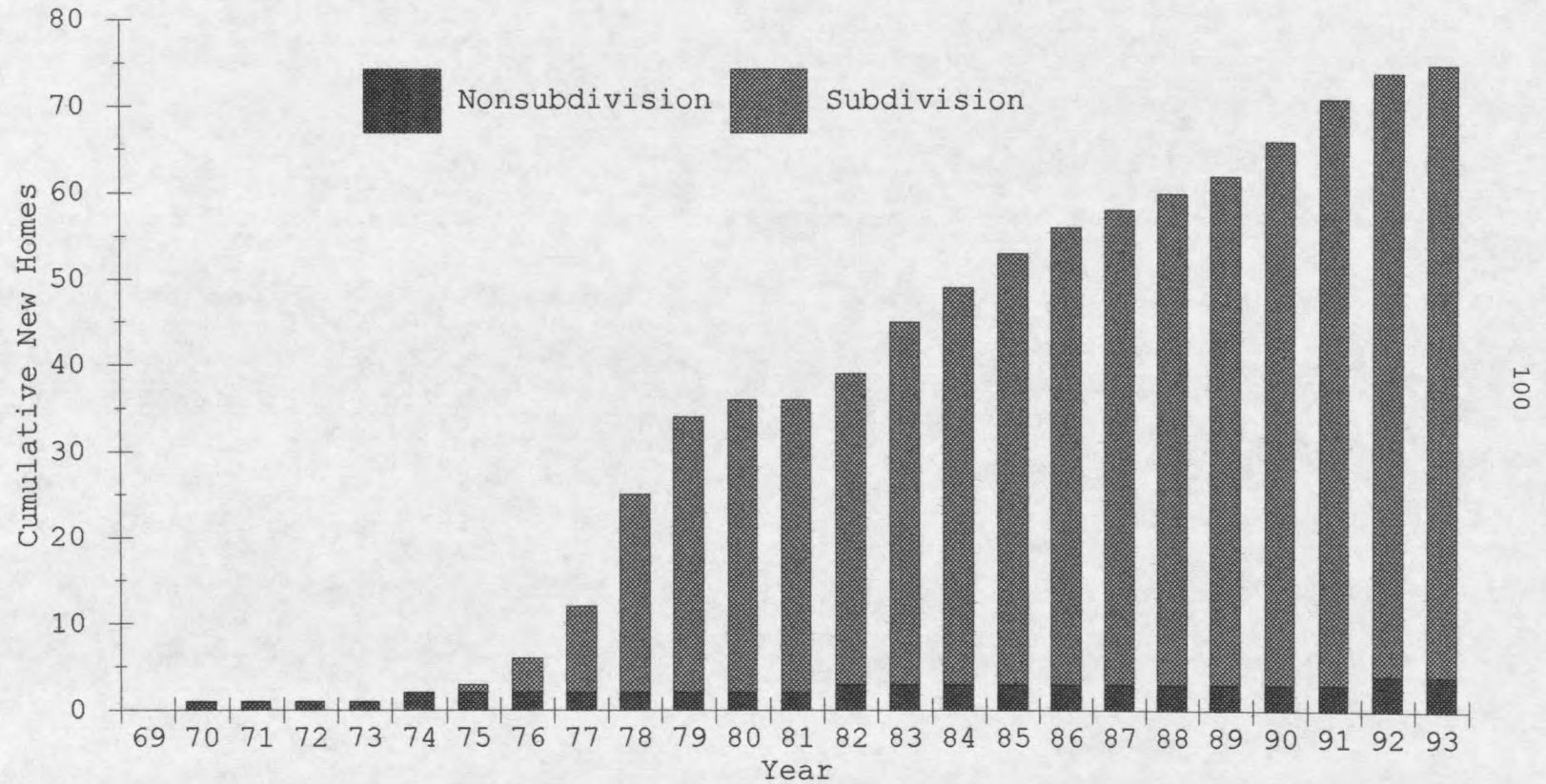


Figure 34.
New Homes, Micro Site Two
(Gallatin County Sewer Permits 1995)



Other land use changes occurred during this time in response to the growing population of the area. A series of legal maneuvers produced the Leverich Canyon Forest Service access in 1985. Nearby, the Fridley family sold 80 acres to the City of Bozeman for a water treatment facility and also sold an easement to the Forest Service to allow public access to Sourdough Canyon.

ANALYSIS

Bozeman's foothill amenity zones evolved from a predominantly agricultural landscape in 1954 to one dominated in many areas by residential land use. Changes in land ownership consisted generally of transferral, parcellation, subdivision, and various forms of conservation. Changes in land use patterns consisted of shifts between agricultural, residential, commercial, and governmental land uses. Although dynamic processes of landscape change are not limited to this time period or to the limited area of the study sites, this period witnessed drastic landscape alteration.

Key Macro and Local Variables

This chapter assesses the significant variables, both macro and local, that explain these patterns. The macro-variables, which include demographic, economic, political, technologic, and cultural components, form a template by which local variables operate. For example, the macroeconomic setting of capitalistic land markets places high priority on private property. This model, defined by various legal, political, and cultural institutions, limits the role of government in influencing land ownership and land use decisions. Within this framework, large-scale migrations to the agricultural hinterlands as a result of the growing popularity of rural homes are transforming high amenity areas of the modern (post World War II) West (Malone and Roeder 1991; Wyckoff 1991; Robbins 1996). The American cultural imperative of land and home ownership has long been appreciated. As Hart (1991) notes "Throughout American history owning land has been a primary goal for most people (50)." Home ownership is even a more basic goal (Bourne 1981). American identity is defined partially by the desire for a single family dwelling

on private property. The notion of "Jeffersonian" democracy and independence is dependent on such a notion (Louv 1983, p.71). This includes a predisposition for dispersed rural living that is again surfacing in the foothill amenity zones on the edge of the urban West.

Post World War II prosperity was another macro-variable which made land and home ownership increasingly possible, as well as dramatically increasing the amenity-generated mobility of the American family (Ullman 1954; Zelinsky 1977). Amenity migration was also facilitated by an economy that encouraged speculation on the increasing value of real estate (Wolf 1981). In addition, improvements in physical infrastructure and applicable transportation and communication technologies made rural hinterlands increasingly accessible (Knox 1994). Expanding automobile ownership proved particularly important and by the 1970s new suburban areas reached even further into rural districts surrounding both large and small urban areas in the American West and elsewhere (Hart 1975; Wolf 1981; Fuguist, Brown, and Beale 1989). Interregional amenity-driven migration into the West increased greatly after World War II. Such migration patterns, slowed by a national recession in the early 1980s, accelerated in the 1990s.

Bozeman was influenced by the post-World War II emphasis on amenity housing in ways similar to larger metropolitan areas. In the 1950s and early 1960s the urban fringe grew a set of contiguous suburbs. By the late 1970s a surge in the rural nonfarm population around Bozeman occurred as part of an overall economic and population boom. Slowed by the recession of the early 1980s, Bozeman was again booming by the early 1990s, fueled by increasing tourism and national media attention. The local variables that help explain the location and timing of this population increase include an expanding economic base, growing planning and zoning controls, as well as the changing perceptions of the local

inhabitants. As populations grew through migration, the demand by various groups for zoning and planning controls also increased. Newcomers were generally more interested in local government control over land use, while long-time inhabitants were often less enthusiastic (Healy 1981). Within the study area the role of individual decision-making was another key variable in explaining why things did, or more often, did not change. Continuing farm use in residential areas of the study area is attributable to individual decision-making, often based on non-economic criteria. In other instances, the willingness of agricultural operators to subdivide their lands or to sell out to developers produced rapid changes on the landscape.

Evolution of an Agricultural Landscape, 1954-1965

The 1954 Setting

In 1954 post World War II cultural, economic, and technological trends were slowly filtering into rural America and increasingly transforming even more thinly-settled portions of the West. Home-ownership for the average American family was becoming increasingly possible. A series of Federal programs affirmed the goal of home ownership, beginning with the Federal Home Loan Program in the 1930s. By 1955 56% of American families owned their own homes (Lou 1983; Miles 1986). In a related development, the increasing ownership of automobiles accelerated the horizontal sprawl of single-family housing, with residential growth increasingly found distant from the urban center, especially in the West (Knox 1994). Renewed real estate speculation, a familiar theme in western history, was also a major component of the western economy in the post World War II period (Wolf 1981; Limerick 1987).

While the urban field was expanding, the agricultural hinterlands

were changing as well. Mechanization reduced the agricultural workforce while increasing the amount of land one farmer could work (Gilles 1977; Hurt 1994). Improved seeds, animal breeds, chemical fertilizers, and herbicides increased productivity and profits. However, these changes increased costs. The result was farm consolidation, the weeding out of marginal farms, and the increasing availability of farmland for other uses.

After World War II, major population patterns were increasingly influenced by amenities as more families gained the ability to migrate to a greater number of high-amenity western settings (Ullman 1954). However, in the 1950s more traditional factors generally determined residential location for most Americans, including accessibility to employment and proximity to relatives (Oakley 1986). Also, many rural areas of the country remained beyond the amenity migration range for the majority of migrants, including most of the nonmetropolitan Intermountain West. However, changes in economics, technology, and culture were planting the seeds of amenity migration to these more remote areas.

Overall, Montana, because of its remoteness and lack of services, gained little population from amenity migration in the 1950s and early 1960s (Malone and Roeder 1991). Instead, the 1950s were a time of economic development and population expansion based on the growing extractive industries and the general post-war prosperity in the West (Montana Almanac 1957; Montana Almanac 1958; M. Johnson, 1965). Montana remained a rural state in 1950, with only 43% of the population living in urban areas. However, the rural population was decreasing as many surplus agricultural workers left for urban jobs. Conversely, rural nonfarm populations increased, particularly in the vicinity of growing urban centers (Montana Almanac 1957).

Gallatin County, with a population of 24,700 in 1950, was 51% urban, with 21% rural farm and a 27% rural nonfarm populations (Montana Almanac 1957). Bozeman had a population of 11,000 and was "one of the most stable and substantial communities in the state," with over 50 new houses built in 1954 (Bozeman Daily Chronicle, 6 November 1954). While agricultural labor demands fell, other sectors of the local economy grew, resulting in more jobs and an increase in urban and rural nonfarm populations (Montana Almanac 1957). Bozeman's growing role as a trade and service center for the region was encouraged by increasing enrollment at Montana State College (as it was then named), a five million-dollar bond program for education-related construction, as well as by other government spending programs (Montana Almanac 1957, Montana Almanac 1958). The study area remained an agricultural hinterland of Bozeman in 1954, although a few nonfarm residences and municipal land uses occurred close to town.

An Expanding Urban Field 1954-1965:

From 1954 to 1965 much of the study area remained agriculturally based, while limited rural residential parcellation and home building occurred in the southern area of Site One and scattered areas of Site Two. The urban field of Bozeman expanded to the southern boundary of Site One with the creation of a linear neighborhood along Bridger Canyon Drive.

A number of postwar macro trends were already altering American patterns of migration and residence. The nation was still enjoying business expansion, low unemployment, and low inflation between 1954 and 1965, interrupted by a short-term economic recession in 1958 (Johnson, M. 1965). While population shifts during this period were generally based on economic opportunity, amenity-based migration to rural areas

was already affecting population trends (Zelinsky 1977; Ullman 1954). More important in remoter areas of the nation such as Montana, changes in agriculture were affecting the rural hinterlands. Increased efficiency through mechanization decreased the workforce necessary for farming at the same time that it increased the amount of land practical for one farmer to manage (Jackson 1977). The surge in agricultural productivity following World War II led to a decrease in prices for farm products. This occurred as the market internationalized, became increasingly competitive, and resulted in the failure of more marginal farms (Hurt 1994). The withdrawal of many small-scale farmers created available farmland for expansion (Gilles 1977; Jackson 1977). Nationally, rural farm population decreased 18.5% from 1950 to 1960, while in Montana it fell an average of four percent a year, with even steeper declines in the 1960s (Johnson M. 1965).

Reflecting national, regional and state growth in the 1950s, Gallatin County's population grew along with its economy, while the rural-farm population declined. From 1950 to 1960 the economy expanded by 18% and continued to grow in the 1960s (Johnson, M. 1965). Most of this growth was focused on Bozeman. As the town grew, adjacent rural areas attracted residential users. Also, the demand for recreational land increased. As a result the rural farm population grew by 2.5% in the 1950s and more rapidly thereafter. The overall population of the study area increased as nonfarm residents occupied homes and land vacated as farm populations declined. In many cases the same individuals and families changed occupations and remained in the study area (Nash, D. 1995; McIlhattan 1995).

Within the study area, land ownership patterns were stable with residential development limited to the southern area of Site One and a few new homes in Site Two. Some farms grew in size with larger

operations benefitting from economies of scale. Farm expansion often involved the purchase of smaller marginal operations nearby. For example, in Micro Site One, two land purchases in the 1950s and 1960s enlarged the boundaries of the Jordan farm. These included the purchase of the 400-acre Smiley Ranch from ownership who lived in another state (King 1995). In Micro Site Two, property boundaries were maintained, although parcels changed hands as some farms failed (Nash, D. 1995; Nash Ja. 1995).

As farmland was consolidated and rural farm populations decreased, some homes were abandoned, while others were occupied by the growing rural nonfarm population (Nash D. 1995; Berry 1995; Haines 1995). For example the Nash farmland, much of it in Site Two, was inherited by three brothers, one of whom became a local attorney but kept the family land and leased it to relatives or neighbors (Nash, D. 1995; Nash, Ja. 1995). Similar processes shaped Site One, with the Springhill community witnessing changing occupational structure without significant population change.

Land use patterns emphasized low residential densities consistent with the rural farm economy. However, two important developments reflected early amenity-oriented shifts within the study area. The most significant was the development of a suburban residential area along Bridger Canyon Drive. These homes were built to satisfy the demand for single family dwellings brought on by the modest urban population growth of the period. The main arterials to town attracted more intensive land use, which included Bridger Canyon Drive. Ed Vogel, a local farmer, saw the demand for residential sites on the outskirts of town and subdivided his land along Bridger Canyon Drive (Nash, D. 1995). This is consistent with urban expansion in the 1950s, which generally extended along main arterials as the result of automobile ownership (Muller and Wheeler

1986). A third subdivision, Fir Hill I, also was approved by the end of the period. This subdivision in Study Site Two was the first in a series of subdivisions that converted large agricultural parcels into rural residential areas. While isolated from town, this cluster offered accessibility and short commuting time to town, a requirement at the time when many roads in the study area were unpaved and poorly maintained. The lots were sold in affordable two-acre parcels, decreasing the cost, and yet they were separated from town by intervening agricultural land (Haynes 1995). More scattered examples of rural non-farm residences were found in Bear Canyon, Sourdough Canyon and along Bridger Creek. They clustered where trees offered obvious amenities. This pattern was consistent with sites selected for many of the older farm houses.

During this period planning and zoning at local and state levels played only a minor role in land use changes. Extending Bozeman's suburbs in an orderly manner without infringing on access to other property was a primary concern of the County Commission (Planning Studies: Bozeman Montana Planning Area 1967, Nash, D. 1995). Most voters and county commissioners felt that land use should only be regulated to protect public safety and property access. However, the city of Bozeman and the City-County Planning Commission produced a number of planning studies, starting with a city planning report in 1958. This was the first state-funded city planning study in Montana (Bozeman Daily Chronicle, 8 August 1957). In 1960 another planning report recommended a county-wide subdivision and zoning ordinance, but the ordinances were not approved because of potential higher taxes and fears of too much government control (Bozeman Daily Chronicle, 6 September 1971). The City-County Planning Board, created in 1957, also routinely reviewed subdivisions within its jurisdiction following state law. However, this

applied only to large subdivisions with parcels of less than ten acres, thereby affecting only the two subdivisions along Bridger Canyon Drive. Fir Hill I was also approved by the county commissioners without significant public debate. This was among the last of the subdivisions approved with individual lots accessing public roads directly. Subsequently, road congestion and safety became concerns that planning institutions addressed.

Creation of a Foothill Amenity Zone 1965-1979

From 1965 to 1979 home building increased dramatically throughout much of the study area. A majority of these new homes were built on subdivision lots that offered paved and plowed roads to town, although a significant number of homes were built throughout the study area. Many post World War II trends affecting American metropolitan areas also impacted smaller urban areas such as Bozeman during this period. This occurred as older suburbs of large cities became increasingly congested and suffered the same disamenities that had earlier affected the central cities themselves (Wolf 1981). In response, many people fled the older suburbs for the safety and quiet of "asylum suburbs" (Knox 1995, p.138). The "counterurbanization" movement, which dominated the 1970s and early 1980s was a surprising movement of people to nonmetropolitan areas and constituted one of the most significant locational shifts in the United States population during this period (Fuguitt, Brown, and Beale 1989; Beale 1990). Traditional economic pull factors were also responsible for population growth in economically vibrant nonmetropolitan areas, with many of the new and more affluent migrants opting to live in nearby rural areas (Healy 1981). Also, the leading edge of the baby boom generation was just reaching the age of home purchasing, adding to the increasing demand for housing in high amenity areas, within Montana and

elsewhere (Polzin 1993). The growing demand for single family dwellings was spurred by real estate activity, especially in rural residential property, as the dramatic population movement to nonmetropolitan areas in the 1970s increased the value of undeveloped land (Clawson 1971; Bourne 1981; Healy and Short 1981). This fueled the growing mystique of land ownership, especially as a financial investment, with 30-60% of buyers of rural subdivision lots purchasing the tracts for speculative reasons in the early 1970s (Wolf 1981).

Montana's economy expanded during the 1970s, with an increase in the number of new jobs and a decrease in unemployment (Johnson, M. 1979). During the 1970s over 35% of the population in Montana were of the baby boom generation and just entering the home buying market. As Polzin (1993) notes, over 25% of existing housing units today in the state were built between 1970 and 1979. Increasing tourism also brought Montana more into the American mainstream (Malone and Roeder 1991). Montana's population grew in the early 1970s, mainly due to immigration. Whereas in the 1960s over 58,000 people left the state, in the 1970s the population increased by over 11%, greater than for the nation as a whole (Johnson, M. 1977). Also, for the first time the state's urban population increased more slowly than its rural population (Polzin 1979).

Gallatin County mirrored state and national trends towards counterurbanization. From 1960 to 1970 the county's population grew from 26,000 to 32,500, a 24% increase, while the rural population fell by 6%. From 1970 to 1980 the county's overall population grew another 32%, with non-urban growth surging by 63% (Gallatin County Master Plan 1993). Overall, the county's economic growth exceeded statewide trends. Although farm-related employment fell, significant expansion in tourism and education buoyed the economy (Bozeman Growth Study 1977; Johnson, M.

1981). The completion of Interstate 90 through Bozeman in 1972 also increased its regional accessibility and attractiveness as a tourist destination (Unsworth 1996). Indeed, Bozeman was the fastest growing community in Montana in the 1970s (Bozeman Growth Study 1977). The town had 1,418 homes constructed between 1970 and 1977, with many others built in the surrounding rural areas. Areas outside the city limits of Bozeman grew at twice the rate of the city. Some of this is attributed to the lack of land zoned residential within the city limits. More importantly, cheaper lots and better financing for rural lots attracted new home buyers (Haynes 1995). Indeed, by the early 1970s, many rural landowners chose to sell to developers and speculators rather than continue to farm or lease to neighbors.

Government planning and zoning exerted a growing influence on local patterns during this period. Montanans, beginning in the late 1960s, showed a greater interest in community and the environment (Malone and Roeder 1991). There was growing criticism of the original 1947 subdivision legislation requiring review of subdivisions under ten acres, resulting in subdivision legislation in 1971 which strengthened the enforcement mechanism (Montana Subdivision and Platting Act: An 18-Month Perspective 1974). The 1972 State Constitutional Convention also recognized this growing concern over quality of life and environmental health. The new constitution included a Subdivision and Platting Act (1973) which changed the minimum size of parcels that could be created without county review from ten to twenty acres, effective in 1975 (Montana Codes Annotated 1993). Not surprisingly, the act encouraged developers to divide land into ten-acre parcels before the law took effect (Bozeman Daily Chronicle 13 January 1975). The 1972 Montana Constitution also authorized counties to zone areas of land greater than 40 acres if 60% of the landowners petition the county to do so. In

so. In addition, counties were allowed to create county planning boards to regulate subdivisions and manage zoning districts. (Montana Codes Annotated 1993).

At the county level, increased planning was not well received. In 1971 voters again rejected an attempt at county-wide zoning, an issue put to a county vote under the new act (Bozeman Daily Chronicle, 31 September 1971). Most people, including most county commissioners, believed that land use should be regulated only to protect public safety and very little else (Nash, Jo. 1995). Many rural landowners voted against the zoning because they feared too much interference in their private property rights (Bozeman Daily Chronicle, 31 September 1971). However, the county commissioners did succeed in creating a county planning board and enforcing the state-imposed subdivision regulations (Arkel 1995). The board addressed the concerns of local organizations and citizens who were interested in obtaining parkland and more public access to recreational lands in the area.

Within the study area a surge in residential parcellation and home building occurred, especially in subdivisions, in portions of the study area closer and more accessible to town. Speculative purchasing and parcellation increased in the study area as the demand for residential sites increased. At the same time, the study area was also affected by the generally increasing size and influence of Bozeman. The new city dump in Site One and a city water facility in Site Two, on land purchased in 1969, were some of the more physical manifestations of nearby urban growth.

The Bozeman case revealed many elements of the counterurbanization phenomena, including the tendency for individuals to seek high amenity rural areas for residential use. Early in the period several local individuals sought parcels of land for residential conversion (Alexander

1995; King 1995; Hathaway 1995; Berry 1995). Although some of these residents moved to the Bozeman area because of job opportunities, their choices of the study area for residence were based on its amenities. The rural nature of the study area attracted these new inhabitants, at least in the early years of the period.

Initial increases in rural nonfarm populations, especially in the foothills, also resulted in individuals creating planned developments and subdivisions for speculative purposes. Subsequent subdivisions were created by speculators who saw early projects succeed. During this period and into the next, many farm owners created residential lots of twenty acres and less utilizing loopholes in the subdivision legislation. Other farms were sold to developers intact or parcelled off, often after farming owners died. In other cases, more civic-minded inheritors of intact farming tracts donated land to non-profit organizations.

Interestingly, while the number of residential lots and subdivisions created in the early 1970s increased greatly, the surge in actual home building did not begin until 1977. The early appearance of such planned developments, in some cases three or more years before homes were built, was due in part to the arrival of real estate speculators from areas already experiencing rapid residential conversion of rural hinterlands (Copeland 1995; Haynes 1995). Generally the same developers, in conjunction with local landowners, were responsible for these early subdivisions, although in some cases landowners created subdivisions on their own. For example, Wheatland Hills and Sypes Canyon were established by landowners, whereas Grandview Heights I and II were created by Gene Cook, a local developer responsible for many subdivisions and developments throughout the county since the early 1970s. Other landowners no longer involved in farming chose alternative

methods of land disposal. Margarite Kirk gave a portion of her family land to Montana State University, creating a nature reserve and public land access in Study Site Two. Mrs. Fridley gave her property to the Montana State University Endowment Foundation and the Girl Scouts of America. Unlike the Kirk donation, this civic charity ultimately resulted in residential development, as these organizations sold the land to residential users.

Bozeman increasingly affected the study site during this period as the urban area grew. In Site Two the purchase of six acres along Sourdough Creek by the city of Bozeman, as well as the construction of a water line from Hyalite Creek to the Sourdough water facility, exemplified how the city's expanding infrastructure impacted the surrounding rural area due to increases in urban population. The growing urban population of Bozeman also utilized the improved roads in the nearby foothills for recreation (Bozeman Urban Transportation Plan 1993). This prompted land owners to close land to hunting and to burn old homesteads to discourage partying (McIlhattan 1995).

State-level land legislation directly shaped patterns of change within the study area. While land subdivisions were first regulated in 1947, it wasn't until 1971 that revised legislation required counties to review and approve subdivisions of land under ten acres (Montana Subdivision and Platting Act: An eighteen-Month Perspective 1974). The new Montana Subdivision and Platting Act of 1973 provided for public review and regulation of subdivisions and it increased the accuracy of public land records, as well as changed the minimum size that could be parceled off without county review from ten to twenty acres. It required environmental assessments describing the natural setting and the potential effect of the development upon community services. The act had certain exceptions, including an "occasional" sale of a single parcel

every twelve months, and special conveyances to family members (Montana Code Annotated 1993). Significantly, however, the act only applied to land division involving parcels of less than twenty acres. Included in the Act were minimum requirements for sewage disposal and water supply. These requirements theoretically could limit residential land use. In practice, however, adequate supplies of water and proper drainage for septic systems existed throughout the study areas during this time period.

The new county regulations for subdivisions did, however, result in greater public participation in the review process (Nash Jo. 1995). Subdivision lots were increasingly tailored to the land with a wide range of concerns considered by the public and potential purchasers. The nature of subdivisions changed as local planning institutions switched priorities from protecting access to mitigating the negative externalities of residential development. For example, the early Ross Creek, Crossroads, and Haleys Subdivisions, with lots fronting on public roads, were required to donate a public road easement around the subdivision to insure public access to land beyond the subdivisions (Nash D. 1995). Later subdivisions were instead required to limit direct access to county roads, with internal subdivision roads dedicated to the county as well as providing access to adjacent lands. Growing demands for private and secluded homes sites coincided with this concern and resulted in home sites with cul-de-sacs and dead end roads, usually with one internal road becoming the primary access through the subdivision where required (Jelinski 1995).

Neighbors, concerned local groups, and developers became more heated in debating land use issues during the review process by the county commissioners. Indeed, in some cases conflicts were taken to civil court. The issues included sewage disposal and water supply, home

density, location of home sites, preservation of view, and public access (Jelinski 1995; Nash Jo. 1995). In 1975 the county commissioners finally adopted new subdivision regulations, although these minimum regulations merely reiterated state concerns over water, sewage, and traffic. These regulations also required park dedication equaling one/ninth of the total land in the subdivision if the lots were less than five acres, and one/twelfth of the total if the lots were over five acres in size (Gallatin County Subdivision Regulations 1975). Much of this regulation involved insuring proper water and sewage disposal, while other regulations addressed the external costs of subdivisions. County commissioners generally approved developments if they met minimum standards of water, sewage, and access (Nash Jo. 1995). In limited cases the commissioners imposed regulations beyond the state requirements, in some cases creating public land accesses as part of required park dedications. For example, the Sypes Canyon Subdivision was approved, although local wilderness groups, neighbors, and the Montana Fish and Game Department argued the development would destroy important winter grazing for the mule deer population in the Bridgers (Bozeman Daily Chronicle 4 June 1979; 18 September 1979; 16 September 1979). In response, the commissioners required a public access to Sypes Canyon and a unique no-dog law that slowed lot sales.

Amenity Zone Evolution and Expansion, 1979-1994

Parcellation slowed dramatically in the study area in the early 1980s, with home building rates stabilizing through the decade. While parcellation rates remained low after 1990, home building accelerated. During this era, the study area was most influenced by the growing demand for amenity-based rural housing, although a national recession in the early 1980s hit the Intermountain West especially hard. Agriculture

suffered in Montana, not only from crop surpluses and falling prices, but also from severe drought, which made more land available for residential parcellation (Gilles 1977; Malone and Roeder 1991). Also, cyclically high interest rates had a negative impact on construction, both at state and national levels (Polzin 1993).

Although counterurbanization reversed nationally in the 1980s due to the recession, certain nonmetropolitan high amenity zones, especially in the West, continued to grow modestly from immigration (Polzin 1993; Johnson and Beale 1994). Continued migration by relatively young, educated, higher income "footloose individuals" as well as by baby-boomers moving out of their starter homes created a growing demand for high-amenity homes (Wyckoff 1991, p.31; Polzin 1993). Indeed, the Intermountain West grew faster than any other region during the early 1990s because of immigration. The region was perceived to be relatively unspoiled, with clean air and water (Stern and Gutner 1992; Money 1994). The foothills, above the increasing urban haze and congestion, proved especially attractive (Glick 1995).

By the early 1990s the U.S. population was once again decentralizing at an increased rate. Post-recession economic restructuring and the growing importance of telecommunication and transportation technologies de-emphasized the importance of large urban areas and encouraged decentralization based on amenities (Jahrig 1995; Knox 1995). These changes lessened Montana's isolation, even during the recession years. By the early 1980s, Interstate 90 was completed throughout the state, and provided better access to Bozeman from both the east and west coasts (Unsworth 1995). More locally, ownership of four-wheel drive vehicles also increased. Four wheel drive not only opened up otherwise difficult-to-reach areas and home sites, but also allowed people without winter driving skills to live in the foothills

and commute to town more dependably and safely.

Still, a stagnant local economy as the result of a national recession during the early 1980s slowed parcellation and home building in the Bozeman area. Although the local economy remained somewhat insulated from the recession, the area was still impacted. Farm employment declined drastically, and non-farm labor income increased at a reduced rate compared to the 1970s (Polzin 1993; Bozeman Area Master Plan 1993). High interest rates and a slowdown in growth sectors of the economy created uncertainty, which reduced spending. The recession affected parcellation and home construction as the result of perceived lowered "consumer expectations" (Polzin 1991). Single family home construction in the county dropped considerably in the early 1980s. Airline boardings at Gallatin Field, while growing during the late 1970s, fell by over 7,000 from 1980 to 1982 (Gallatin Development Corporation Annual Report 1993). However, unlike other areas of the West, Bozeman's economy recovered quickly, buoyed by the more stable sectors of the economy.

Employment grew faster than population in the 1980s, with the economy fed by the growing number of affluent immigrants (Bozeman Area Master Plan Update 1989). Unlike the state as a whole, Gallatin County did not have a history of boom and bust economy, due to the importance of the university and the federal government. By 1988 these sectors accounted for 34% and 12% respectively of the local economy (Polzin 1991). Montana State University grew in the early 1980s and then remained stable through the period, while the number of government jobs grew more slowly than population through the decade (Polzin 1991). Importantly, tourism became the fastest growing sector of the local economy and by 1988 it accounted for 14% of county income (Gallatin Development Corporation Annual Report 1995).

By the late 1980s, the earlier slowdown in parcellation and home building was replaced by a gradual increase in these activities within the study area. The shift accelerated further after 1990, paralleling the resurgence of the local and state economy. The population of Gallatin County sharply increased after 1990, with a 3.4% annual growth rate, the highest in the state (Polzin 1995). Housing starts in Bozeman increased from 92 in 1990 to 233 in 1993, but these trends were even more rapid outside the city (Gallatin Development Corporation Annual Report 1995; Gallatin County Master Plan 1993). At the same time the affluence and selectivity of new home buyers was increasing. Indeed, most of the new homes built in and around Bozeman after 1990 cost more than the average Bozeman family could afford (Great Falls Tribune 1993, 9 August).

By the 1990s, although Montana was still remote compared to many areas in the Intermountain West, this relative isolation became an actual selling point, an amenity in itself (Kirn 1996; Shilling 1996). National magazines and large metropolitan newspapers included Bozeman in travel and special interest stories on Montana (Allen 1992; Bonfante 1993; Dellios 1993; Pardee 1996). As a result, the Bozeman area's reputation in offering migrants high-amenity residential areas grew considerably in the 1990s. The impact of expanding tourism on subsequent migration patterns also was considerable (Jobes 1991). The number of annual airline boardings at Gallatin Field grew by another 45,000 from 1990 to 1994. By 1994 the 170,000 annual boardings compared quite dramatically with only 80,000 in 1980 (Gallatin Development Corporation Annual Report 1995). Other indicators of growing tourism, such as non-resident fishing licenses, skier days, hotel occupancy, and Yellowstone National Park visitor numbers, also increased significantly.

Within the state, there was a growing awareness of the rapid rural growth which accompanied the post-1990 economic gains. The Montana Subdivision and Platting Act was revised in 1993, in response to concerns about residential growth in rural areas. Its purposes included "preventing overcrowding of land; to lessen congestion in streets and highways; to provide for adequate light, air, water supply, sewage disposal, parks and recreation areas, ingress and egress, and other public requirements" (Montana Code Annotated 1993). The most important change raised to 160 acres (from 20 acres) the minimum size that could be parceled off without invoking the review process. The act also ended the occasional sale and family sale exceptions. While this law raised the cost of parcellation and slowed the process, knowledge of the ensuing legislation prompted "a flurry of twenty-acre land divisions because developers fear the legislature will close loopholes in the subdivision law" (Bozeman Daily Chronicle 13 April 1991). In fact, over ten percent of the lots in the study area were created in anticipation of the new subdivision review.

Another focus of concern in the state and within the study area centered on the availability and quality of water. By 1995, fears of declining water levels and quality in portions of Site One were rising, although no formal studies had been undertaken (Bozeman Daily Chronicle 2 January 1994; 21 June 1995). However, regulations requiring adequate water supply and drainage for septic systems did not stop construction due to adequate supplies of water and drainage throughout the foothills. As a result, state regulations had little effect on slowing growth during the period, although they significantly influenced the size and shape of lots within a subdivision. Neighbors, grass-root organizations, and various political entities contested some developments, resulting in various non-uniform regulations and requirements. However, following

earlier patterns, the majority of parcellation and residential growth remained relatively unhindered (Peck 1995; Jelinski 1995). Voter resistance to county-wide zoning continues to limit the role of planning and zoning.

Land use changes in Bozeman's foothill amenity zone became more of a public issue with various interest groups creating an atmosphere of contention and discord (Peck 1995). Concerns included increased traffic, pollution, crowding, loss of view and open space, and environmental degradation. Conversely, other landowners resisted restrictions on land use. For example, the proposed Middle Cottonwood Zoning District in Study Site One was conceived of by local land owners who wished to limit development to one home per 160 acres and to designate certain areas as protected view sheds and open space (Alexander 1995). But this group was vigorously opposed by landowners who wished to retain their broader property rights (Jelinski 1995).

Even with the rising land prices and the growing number of regulations after 1990, Bozeman's foothill amenity zone appealed to a variety of new residents. Some newcomers desired privacy and remoteness. Their home sites were often on oddly shaped lots surrounded by agricultural land or natural vegetation beyond the denser residential areas. The limited area available for these parcels, their larger average size, and their relative inaccessibility limited the number of these parcels and increased their costs. Alternatively, other new residents sought suburban neighborhoods with the accessible convenience of urban services that still retained rural amenities, particularly views (Haynes 1995; Glick 1995).

Specific growth rates after 1990 often varied by subdivision. The slow growth of the Sypes Canyon Subdivision was at least partially due to the no-dog regulation enacted by the county commissioners during the

approval process. Subdivision residents, due to concerns over winter deer range, were not allowed to keep dogs. This unique restriction significantly affected land sales in this subdivision, with high amenity home sites sitting vacant as a direct result. The law was overturned by the courts in 1990, just in time for a surge in home building (and dog ownership) (Copeland 1995). The paving of Sypes Canyon Road in 1992 and budgeting an improvement project for the unmaintained Story Mill Road coincided with increased homebuilding in Sypes Canyon and other nearby neighborhoods.

The newest subdivisions in the study area reflected the increased emphasis on amenities as well as the continuing importance of access to Bozeman. Summer Ridge (Study Site One), while emphasizing access and view, offered small comparatively inexpensive lots. This subdivision, though surrounded by suburban home densities, still offers excellent views due to its location on an exposed ridge. Triple Tree Subdivision (Study Site Two), while even closer to Bozeman, focused on high amenity sites, spatial exclusivity, a rural setting, and nearby recreational areas. This is due to the subdivision's physical setting in an open drainage with a mixture of rangeland and aspen, cottonwood, and various brush species along the bottoms, and nearby heavily-timbered public lands. Triple Tree lots are the most expensive and fastest-selling in the study area.

The role of local planning and zoning authorities increased through the period, although their affect on parcellation remained limited. Early in the period the state zoning regulations were utilized by individual landowners to prevent restrictive zoning of their land by a larger zoning district. At least two of the three small, single owner, zoning districts were created to protect the owner from more restrictive zoning at a future date, including the Sypes Canyon Zoning District in

1979 (Copeland 1995). The ensuing lawsuits and public reaction, especially by neighbors, ended this practice. Subsequent attempts to create small districts have ballooned in size as concerned neighbors join the district (Peck 1995). This arose as residential development in high density areas was blamed for increased traffic, noise and pollution, as well as lowering of well levels and water quality. Instead of the small single owner zoning districts seen in the earlier period, larger community districts were formed to protect property values and lifestyle. As a result of these zoning districts greater land use control was exerted by planning boards. For example a minor subdivision in the proposed Middle Cottonwood Zoning District was denied because of concerns over water and deer winter range (Bozeman Daily Chronicle 1993, 8 December).

The Springhill Zoning District (1992) limited to 160 acres the minimum size that could be parceled without review a year before the state legislation. However, due to the limited areas covered by these districts, the overall number of parcels or residences throughout the study area was not affected. These districts caused parcellation before the size restrictions could take place, as well as increasing parcellation outside the districts (Peck 1995). However, zoning districts represent attempts by local inhabitants to control growth and preserve amenities.

Although home building surged again in the early 1990s, much of the study area remained rural in residential density and used for agriculture, with over 60% of the total acreage in the study area composed of parcels 40-acres and larger. Three reasons emerge for this phenomena; (1) the abundant amount of land contained in the foothill zone; (2) the desire of individuals to maintain open land; and (3) alternative uses such as municipal watershed land which preserve large

parcels as open space. Other owners sold their parcels intact for various personal reasons. Generally, the biggest factor in the preservation of large parcels was the reticence of landowners to subdivide, whether third generation farmer or new affluent owners.

Technology changes at the same time allowed people to live in remote locations in a lifestyle that was once unsuited for these areas. While most of the homes in the study site are readily accessible most of the year, in the further reaches of the sites winter access is difficult. For example, the road accessing the nine upper lots of the Bridger Mountain Estates is steep, and accessible only by four wheel drive much of the year (Merkle 1995). Still, by the early 1990s, many of these formerly inaccessible lots had homes perched on them.

Summary

In 1954 the study area was a rural agricultural hinterland, with external forces beginning to weaken the traditional agricultural community. By 1994 the study area was a diverse and rapidly growing rural residential area intermixed with agriculture. Inexorably, a succession of external factors created a foothills amenity zone. In some cases local changes unfolded gradually while in others the transitions were swift and dramatic. The basic residential patterns of the amenity zone were established by the 1970s. By the early 1990s as the national economy improved, the foothill zone continued to expand and infill. Given the local pace of population growth, the foothills around Bozeman were destined for residential use as a result of the decentralization of housing following World War II and the pursuit of rural amenities associated with postindustrial society (Coppack 1988). Although facilitated by improved automobiles and roads, communication technologies, and an increasingly postindustrial economy, the demand for

high amenity residential land best explains the development of the foothill amenity zone.

The amenity features of the foothills that attracted increasing numbers of people during the period included access to public land, viewshed, rural lifestyles, and spatial exclusivity. These features were available in the foothills early in the study period due to the topography and biogeography of the foothills, the area's rural agricultural land use, and the small number of dispersed homes. Home site selection in the study area increasingly emphasized amenities. Freed from the need for level ground for farm operations, nonfarm homes could emphasize view and other amenities.

The importance of access to Bozeman varied over time. For example, daily access to the city during the agricultural period was not essential for farmers. Early in the suburbanization process, however, access to the urban area was important for the rural nonfarm resident who often worked in Bozeman. Then, with the increase in four wheel drive ownership as well as an improving rural road infrastructure, suburban development in the late 1980s expanded into formerly less accessible portions of the study area.

For most suburban residents, the cost of rural land remained a primary concern. As a result, over 55% of the homes in the study area by 1994 were built on subdivision lots, while over 60% of the total land remained in parcels of 40 acres or more. The suburban density of homes reached in most subdivisions by 1994 limited spatial exclusivity, the openness of the rural landscape, and the quality of the views. Increasing parcellation and improved roads thus allowed increased residential density, which in turn increased traffic, reduced view shed, the quality of rural landscapes, and degrees of spatial exclusivity.

In reaction, there were attempts to preserve amenities as well as

a redefinition of amenity features. Both residents and nonresidents of the study area became concerned about the growth of home building. Many county residents believed that rural populations significantly reduced the quality of views (Gallatin County Master Plan 1993). As a result, protecting views has been increasingly a goal of planning and zoning regulations. In addition, as the foothills gained population, new landowners often closed private land easements to public lands. As a result, access has been a growing concern of Gallatin County residents (Schoufeild 1996). In response, local and federal organizations acquired public access, by purchase, private donation, and legally acknowledging historical public easements.

Above all, land use is determined by individuals. For example, acreage along McIlhattan Road remained in large agricultural parcels even though nearby Sypes Canyon filled with suburban residents. Some farmers are reticent to sell to developers (Fay 1995; McIlhattan 1995). Another similar and increasingly common phenomenon involves affluent landowners who retain large agricultural parcels intact for amenity reasons. In other cases, partial ownership rights are purchased by those interested in preserving certain elements of the rural landscape. In other areas, open space is preserved as a function of continuing agricultural land use. The overall importance of agriculture throughout the study area is partially a measure of the resolve of individuals and a cohesive agricultural community. As Pyle (1985) notes, "Farmers who are committed to agriculture for their livelihood seem able to cope with pressures to urbanize the land (42)." Accordingly, although farm land is more expensive in the study area than comparable farmland in more rural areas of Montana, some people continue to farm.

Although traditional theories of concentric land use zones around urban areas are not generally applicable in this study, distance from

urban center does play a role in ownership and land use patterns. This is due to the continuing importance of accessibility and travel time throughout the period, which places the northern area beyond the range of the convenient commuting zone (Yeates 1990). The northern township lagged behind in home construction, even though residential lots existed, due to its distance from town and the steep hill ascended by unpaved Rocky Mountain Road as it approaches the township from the south.

More of the study area is poised for residential conversion if the population and affluence of the Bozeman area continues to increase. Problems of access in the higher, steeper and rockier portions of the study area are being overcome through road improvements and four-wheel drive ownership. Improvements in road infrastructure have already decreased travel time to the northern reaches of Site One. For some of the more affluent residential users, amenity features such as privacy and rural lifestyle outweigh questions of commuting and access. Bozeman's more visible national reputation is likely to continue attracting such migrants.

Although much of the land in the study area remains agricultural, parcellation and land use conversion has been dramatic. The study area's 118 parcels in 1954 are now broken into over 1,600 tracts, with over 60% of these parcels less than ten acres in size. At the same time, the 92 residences occupying the land in 1954 has leaped nine fold to over 800 residences today. A continuing lack of planning authority over all but the most narrowly-defined development limited the ability of planners to control home building in the foothills. While individuals and groups have resisted parcellation and residential development in some areas, other land becomes available as the economic incentives increase. The steadily increasing value of amenity parcels thus exceeds the increased

costs imposed by regulation, which therefore increases the incentive to divide and develop land. By the 1990s, most rural land around Bozeman was priced according to amenity factors such as view, privacy, trees, and recreational opportunities (Haynes 1995). Foothill land was generally higher priced due to its inherent amenities. Given a continuation of the current macro variables at work in the West, foothill amenity zones will grow in rural residential suburbs such as those around Bozeman, even in the face of increased land costs and regulations. The number of residential lots will stay ahead of demand with the creation of extensively-planned and accessible subdivisions for those of more modest means, and larger, more exclusive, high-amenity residential parcels for the very affluent.

MODEL AND CONCLUSION

The evolution of the foothill amenity zones around Bozeman occurred in three stages, with different patterns of parcellation, home building, and road development in each successive stage. In the agricultural stage of development the foothill area was a rural landscape dominated by agricultural land use. During the transitional stage of development the foothills attracted increasing numbers of non-farm residents, resulting in increased parcellation, home building, and road building. In the suburban stage of development residential land use dominated the landscape of the study area, resulting not only in a decrease in rural amenities as the population increases and open land is parcelled and developed, but in various stratagems to preserve these amenities. Related changes include increased land values and land use controls, as well as an increase in competing land uses as the urban area expands its influence into the hinterlands.

The forces that explain these stages of change range in scale from the land use decisions of individual landowners to local and state land use controls to national economic and cultural trends. For example, parcel size in the Bozeman study was influenced by a number of factors, including increasing market demand for residential land in the foothills and the desire of individuals to preserve larger parcels. The large number of twenty-acre parcels within the study area is mainly the response to state-wide legislation. In other states, a similar demand for rural residential land, as well as parallel responses of market forces and government regulation, creates similar landscapes, although the actual size of typical residential lots may differ.

Due to the larger forces at work shaping high amenity rural areas, the three-stage historical progression of the foothill amenity zone in

the southwestern Montana study is applicable to foothill amenity zones throughout the Intermountain West. Although changes are uneven in space and time because of local landscape differences, individual decision making, and other variables, the same cultural, political, and economic forces that produced Bozeman's foothill amenity zones are shared to varying degrees by similar settings elsewhere in the Intermountain West. Amenity migration and rural settlement is indeed transforming the rural landscape of the entire region.

Foothill Amenity Zones in the Intermountain West

American culture has long been infused with an underlying proclivity for single family dwellings in rural areas within commuting range of an urban center. This spurred the growth of the ubiquitous single family suburban dwelling as automobile ownership boomed. In turn, as the economy and culture of the United States entered a post-industrial era, rural areas beyond the suburban fringe gained the attention of more mobile home buyers. By the 1970s the countryside was growing faster than the cities, as the new economy, enabling technologies, and a growing infrastructure allowed increasing numbers of the middle class to move beyond the metropolitan penumbra in search of high-amenity homes.

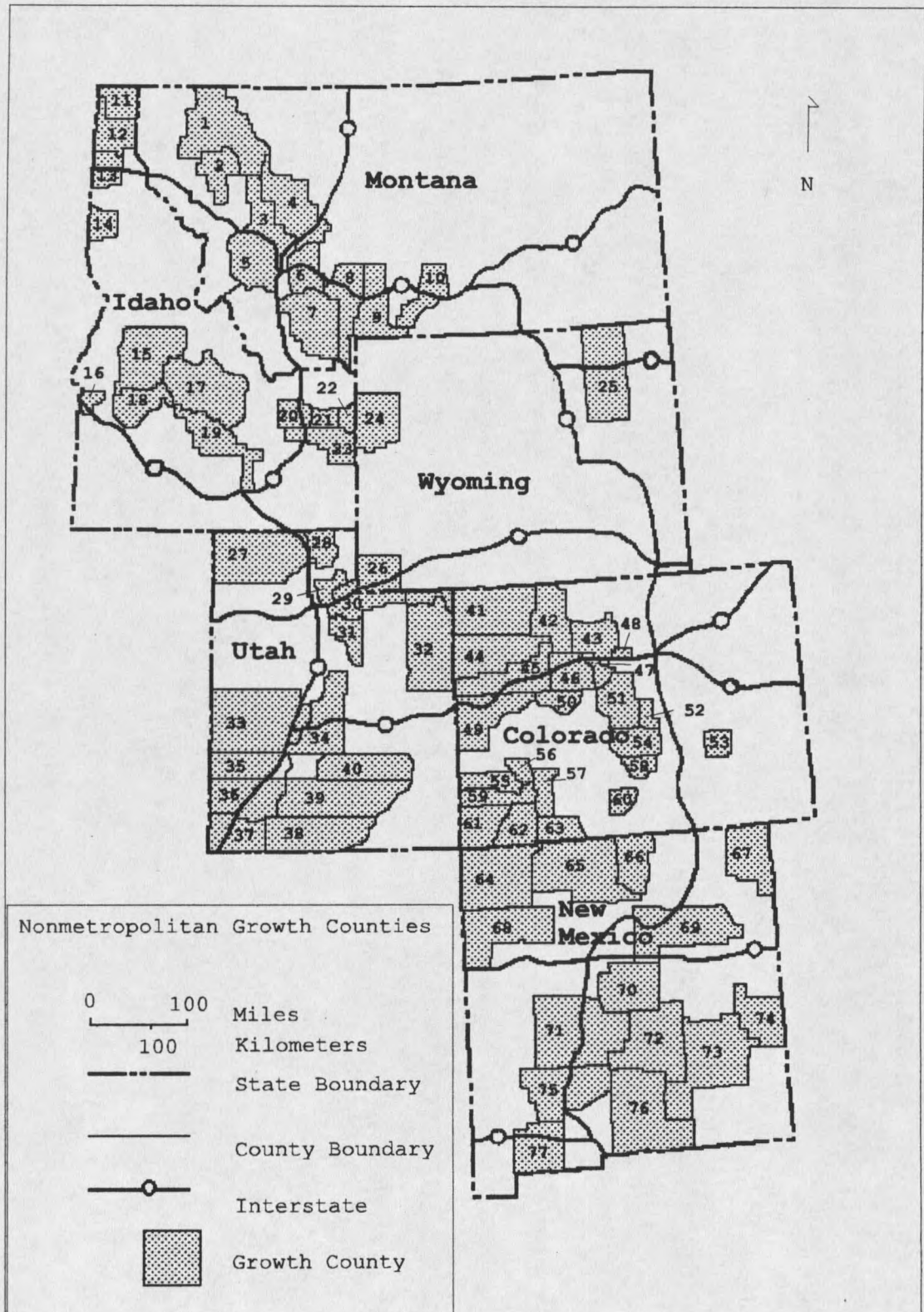
Although counterurbanization reversed by the early 1980s, the population of retirement and recreation areas in rural America continued to increase (Johnson and Beale 1994). By the early 1990s a significant increase in the population of high-amenity rural areas was noted. These growth areas are the fastest growing regions of the country in both population and economy (Davis, Nelson, and Dueker 1994). Push factors, such as pollution and crime, as well as pull or amenity factors such as scenery and recreation, are important in drawing droves of the more

adventurous middle class that make up the bulk of this movement.

The six Intermountain West states of Montana, Wyoming, Idaho, Utah, Colorado, and New Mexico contain numerous high amenity areas attracting large numbers of migrants. As a result the Intermountain West was the fastest growing region in the country, both in terms of population and economy, in the late 1980s and early 1990s (Stern and Gutner 1992). Within this region the nonmetropolitan counties (counties without a central city of $> 50,000$) were growing at various rates, with high-amenity counties contributing significantly to this growth while other counties lost population. To assess where other regional examples of foothill amenity zones might be found, I defined the "nonmetropolitan growth counties" in the six-state area based on county census data from 1980 to 1992 to include only nonmetropolitan counties growing from migration during a major economic recession and its aftermath. I excluded counties that grew less than 10% during this period, which tended to exclude counties dominated by boom and bust economies associated with nonrenewable energy extraction, logging, and mining. I also excluded counties with predominantly Native American populations where higher birth rates produced population increases unrelated to amenity-oriented growth. Even in the 1980s, as the farm, mining, and timber-based economies of much of the West stagnated and populations declined, the high amenity counties offering recreation and scenic beauty continued to grow.

Although located throughout the Intermountain West in mountainous or plateau country, such growth counties are concentrated in the southern portion of the region along major transportation links (Figure 35). These counties gained population through immigration during the recession of the early 1980s, unlike other flatter, less scenic, or more isolated counties. The states with the highest populations, near large

Figure 35. Nonmetropolitan Growth Counties
of the Intermountain West



Key for Figure 35. Nonmetropolitan Growth Counties
of the Intermountain West

Montana:

1. Flathead
2. Lake
3. Powell
4. Lewis and Clark
5. Granite
6. Jefferson
7. Madison
8. Gallatin
9. Park
10. Stillwater

Idaho:

11. Boundary
12. Bonner
13. Kootenai
14. Latah
15. Valley
16. Payette
17. Custer
18. Boise
19. Blaine
20. Jefferson
21. Madison
22. Teton
23. Bonneville

Wyoming:

24. Teton
25. Cambell
26. Uinta

Utah:

27. Box Elder
28. Cache
29. Morgan
30. Summit
31. Wasatch
32. Uintah
33. Millard
34. Sanpete
35. Beaver
36. Iron
37. Washington
38. Kane
39. Garfield
40. Wayne

Colorado:

41. Moffat
42. Routt
43. Grand
44. Rio Blanco
45. Garfield
46. Eagle
47. Summit
48. Gilpin
49. Mesa
50. Pitkin
51. Park
52. Teller
53. Crowley
54. Fremont
55. San Miguel
56. Ouray
57. Hinsdale
58. Custer
59. Dolores
60. Rio Grande
61. Montezuma
62. La Plata
63. Archuleta

New Mexico:

64. San Juan
65. Rio Arriba
66. Taos
67. Union
68. McKinley
69. San Miguel
70. Torrance
71. Socorro
72. Lincoln
73. Chaves
74. Roosevelt
75. Sierra
76. Otero
77. Luna

metropolitan areas, and close to California grew the most during the 1980s and early 1990s, in large part due to growth in high-amenity areas. Accordingly, the majority of the growth counties, as well as the bulk of the migrants, are concentrated in Utah and Colorado, followed by New Mexico. For example, Washington County, Utah, located along the major transportation link between Southern California and Salt Lake City, is among the least isolated and most popular of these growth counties. It is centered on the popularity of St. George as a retirement community. Northern Idaho, Montana, and Wyoming are more isolated, with lower overall numbers of migrants (Larmer and Ring 1994). Wyoming has gained the least people due to amenity growth, although the Jackson Hole area is a notable exception due to its national prominence as a high-amenity recreation area.

Nonmetropolitan growth counties in the Intermountain West generally contain larger (+30,000) nonmetropolitan urban areas, with primary highways connecting them to larger cities. These amenity areas offer recreational and scenic opportunities, as well as a developed community infrastructure including health care facilities and arts and entertainment opportunities. The fastest growing of the counties often contain a superior amenity endowment such as a large ski area or major golf courses. The southern Intermountain states also contain more growth counties due to their higher populations as well as their access to larger metropolitan areas and transportation links. In addition, their warmer winter climates continue to be a major factor in greater immigration (Ullman 1954; Johnson and Beale 1994).

As nonmetropolitan urban areas located in the high amenity counties of the Intermountain West grew in the 1970s, the demand for high amenity home sites in the rural areas around these communities increased. This in turn encouraged parcellation and subdivision of land.

Foothill amenity zones became widespread through the Intermountain West as the rural hinterlands around the nonmetropolitan urban areas were increasingly utilized for high amenity home sites. Increasing consumer demand for elevated home sites emphasizing view in the rural areas within a short commute to the urban area has resulted in the expansion and evolution of these zones. The locations of these growth counties also suggests where the foothill amenity zone phenomenon is likely to persist in the future.

Model of a Foothill Amenity Zone

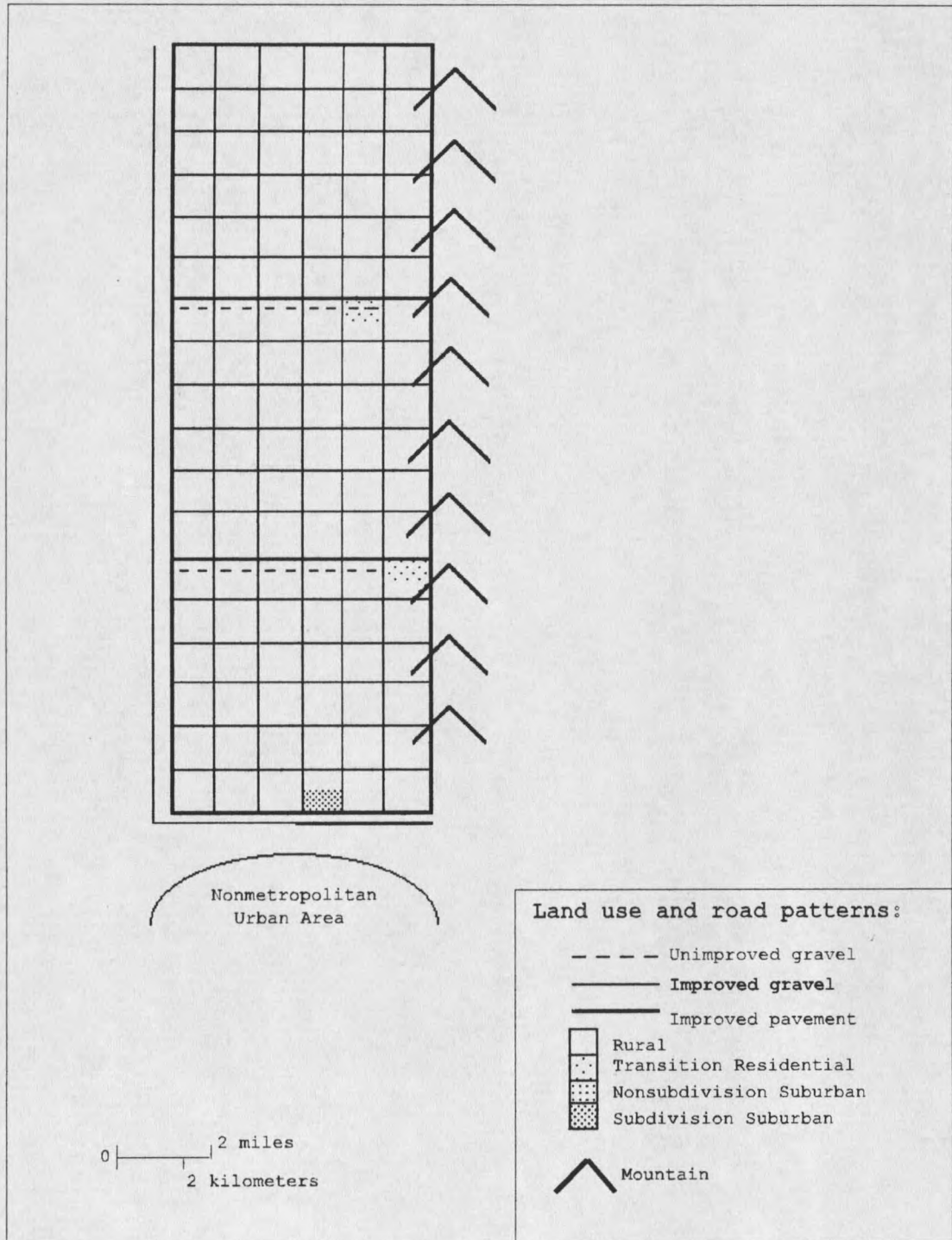
Although amenity migration is recognized as a significant regional demographic pattern transforming the landscape of amenity areas of the Intermountain West, actual landscape change as a result of these forces is less understood. Based on my findings for the Bozeman area, as well as through exploring similar processes elsewhere in the Intermountain West, I constructed a three stage model to summarize patterns of change for foothill amenity zones throughout the Intermountain West. The model includes changes in land use, land subdivision, and road infrastructure within a theoretical foothill amenity zone. The model summarizes land use into three categories based on the dominant parcellation and home density patterns for each successive historical stage. Based on the larger external factors that influence change in high amenity settings of the intermountain West, this model does not include state and local factors, such as subdivision and zoning regulations, nor can it include distinct landscape features, which would alter the temporal and spatial development of such a zone.

Land use patterns in the model include rural, transition, and suburban-level residential densities. Both subdivisions and remnants of earlier agricultural patterns are portrayed, as well. Also shown are

other relevant land ownership patterns including conservation easements. The three land use categories are based on the number of homes for a quarter section of land (160 acres). The growth of the road infrastructure is also displayed. Although the three land use categories are based on residential density, the actual number of homes per quarter section for each category may vary throughout the Intermountain West. This is due to the various parcellation and subdivision regulations of each state in the region, as well as minimum land requirements for farming and ranching based on physical setting and the agricultural economy. Also, the precise duration of these three stages can vary. In the southwestern Montana study, it took forty years for Bozeman's foothill amenity zones to take shape. Elsewhere, depending on local patterns of growth as well as a variety of larger-scale variables, the evolution of the foothill zone may differ significantly from the Bozeman experience. For this reason exact time intervals are not included in the model describing the creation of a hypothetical foothill amenity zone. Rather, the model displays general patterns of evolution to be expected as a foothill amenity zone evolves in three hypothetical townships located on the edge of a nonmetropolitan urban center.

During the first stage the dominant land use is agricultural. Accordingly, the majority of parcels are forty acres and larger and residential densities are low. The agricultural stage depicts the foothill zone with large agricultural parcels and dispersed rural farm residences (Figure 36). Vestiges of the earlier pre-mechanized farm era consist of a church and cemetery, as well as a former farm community that created parcels under 40 acres. In the township nearest the nonmetropolitan urban area, a small suburban neighborhood along the highway represents residential sprawl contiguous to the town that is associated with automobile ownership and a growing urban population. A

Figure 36.
Foothill Amenity Zone Model
Agricultural Stage



small transitional residential area also takes shape further from town, perhaps because of proximity to a specific amenity, such as a ski area or golf course. The road to this residential area is improved as a result of increased population. Generally, the small amount of nonfarm residential use that does occur develops along improved roads. The basic road system, while in place during the agricultural era, is rudimentary in the further reaches of the amenity zone, with county road easements used mainly by the local residents.

During the transition stage of residential development, various types of nonfarm residential neighborhoods develop, including homes on twenty-acre parcels, and suburbs in slowly growing but densely-parcelled areas (Figure 37). These residential clusters consist of lots of less than twenty acres, along with a mosaic of larger, cardinally oriented, residential lots (20-40 acre) and associated homes. However, most land remains agricultural. A smaller nonfarm residential cluster develops in the more inaccessible but higher amenity area adjacent to public land. This cluster represents a more extreme permutation of the counterurbanization movement, emphasizing rural amenities over access and urban amenities. Urban expansion and increased population during this period results in land donated or sold to public institutions. While perhaps initially intended as watershed land or for other municipal uses, the public demand for recreational land and open space increasingly controls the use of this public land. During the transition era the road system is improved in areas of increasing population and expanded in some outlying areas. Primary arterials are paved as far as the residential clusters that are concentrated about six miles out of town (Figure 37). The road remains unimproved to the secondary residential cluster in the middle township.

During the suburban stage of development residential land use has

Figure 37.
Foothill Amenity Zone Model
Transition Stage

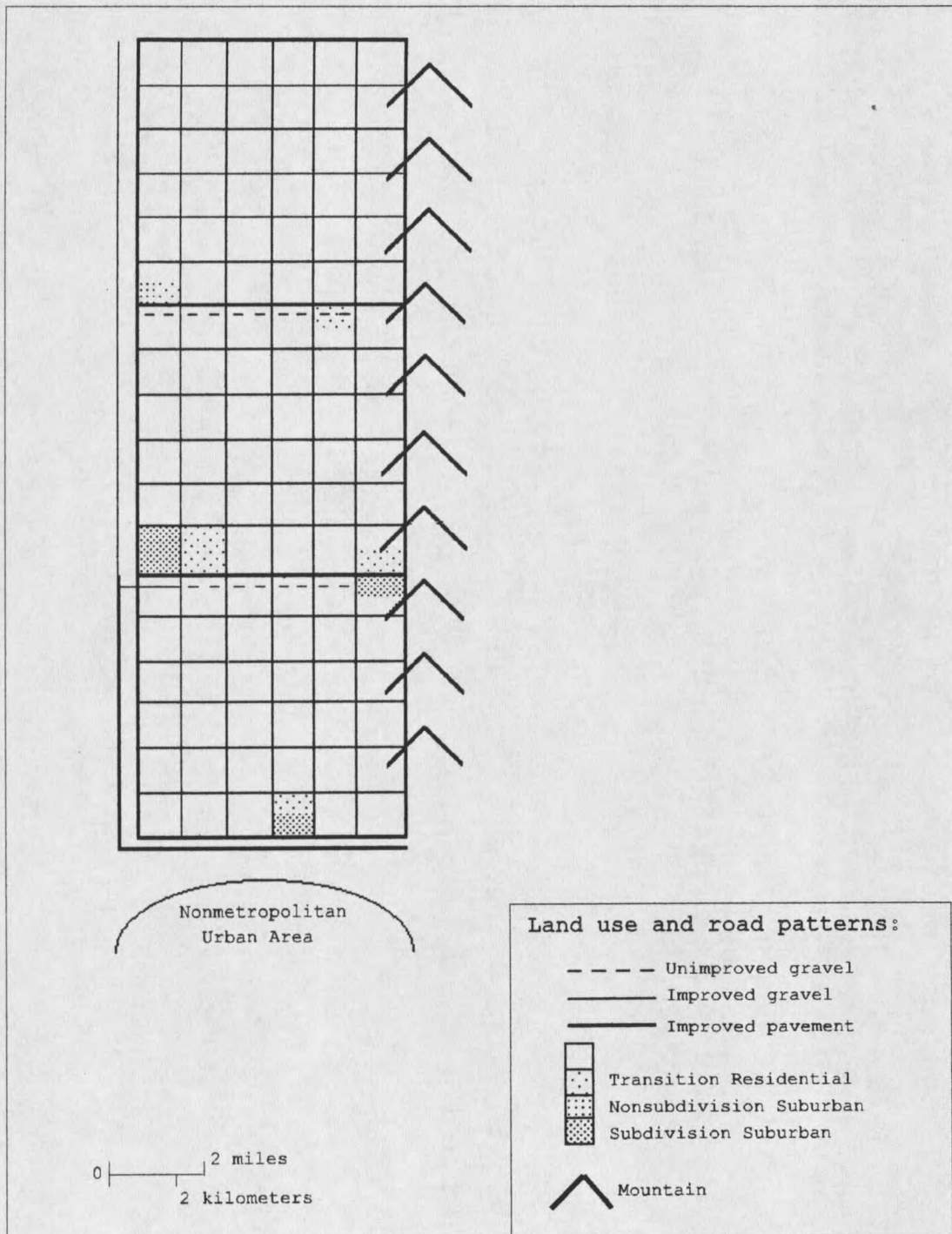
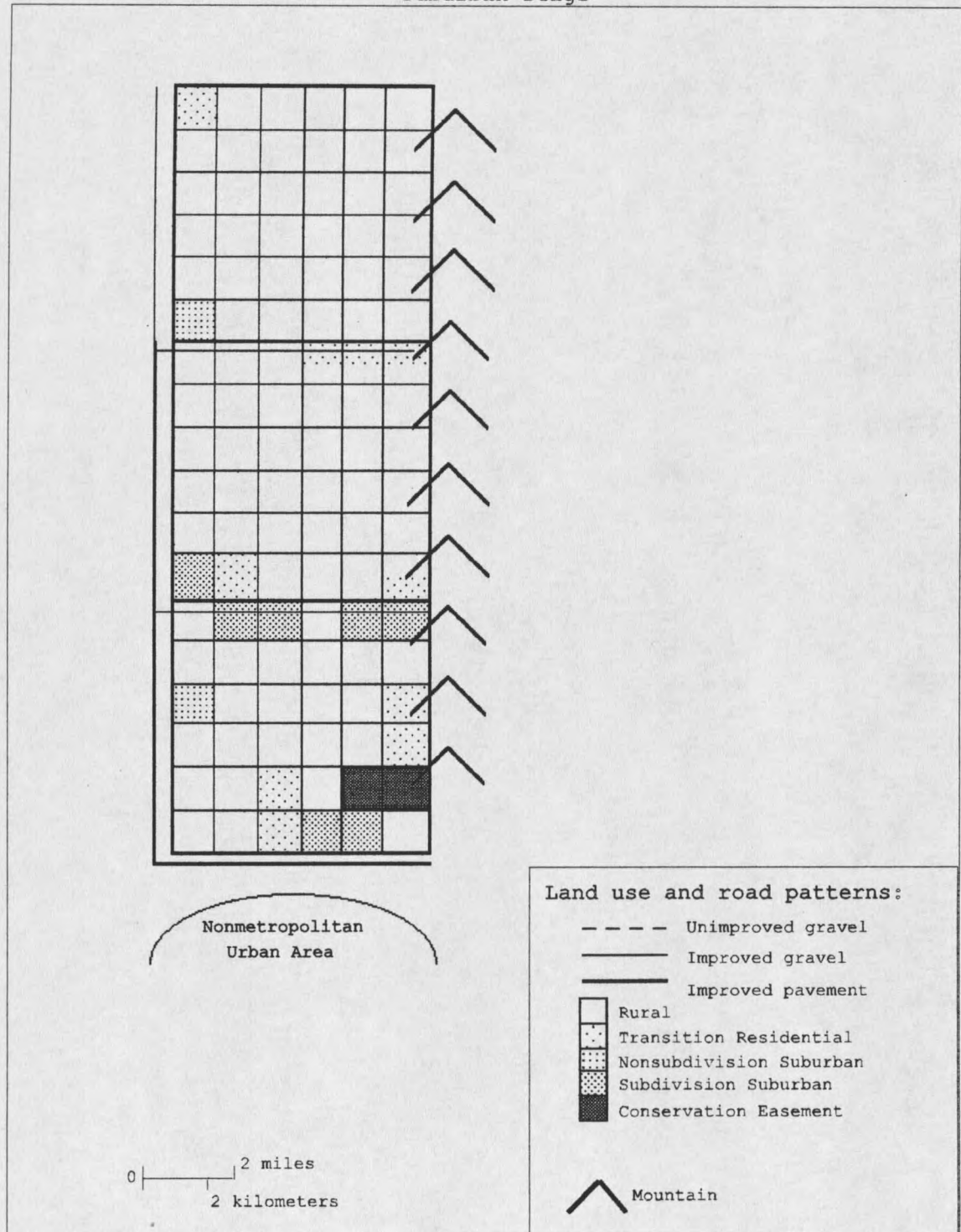


Figure 38.
Foothill Amenity Zone Model
Suburban Stage



spread dramatically through the foothill zone, with a corresponding rise in amenity-based property values, and increases in the amount of planning and zoning. Many quarter sections feature nine or more homes (Figure 38). The majority of land remains in larger (40+ acres) agricultural tracts, often the result of persisting farm families or affluent nonfarmers who resist market forces to subdivide. Larger high-amenity parcels may have partial land ownership rights transferred through easements to protect rural and open space and various other natural resources. The majority of subdivision parcels are small (1-9 acres) residential lots. Most residences are clustered, often in subdivisions or planned developments. As populations increase, new strategies are employed to preserve spatial exclusivity, such as developments with shared open space. During this stage the closing of traditional accesses to public land through private property is offset by the purchase of public easements and access corridors. Home building surges in the secondary residential cluster in the middle township after the access road is improved and paved. The main arterial is paved to the north end of the middle township in response to increased use. This demonstrates the dynamic nature of residential growth in rural areas, which seems both responsible for and dependant on the condition of the transportation infrastructure. The main arterial remains unimproved gravel beyond the second township although a small, transition density, residential area emerges beyond the improved stretch of road. This highlights the growing emphasis on rural amenities as advances in technology and infrastructure allow a growing number of foothill residences to bring former urban amenities to the hinterlands. The historical progression of a Foothill Amenity Zone, while influenced by state, local, and internal factors for both temporal and spatial development, generally occurs in the three stages discussed above. These

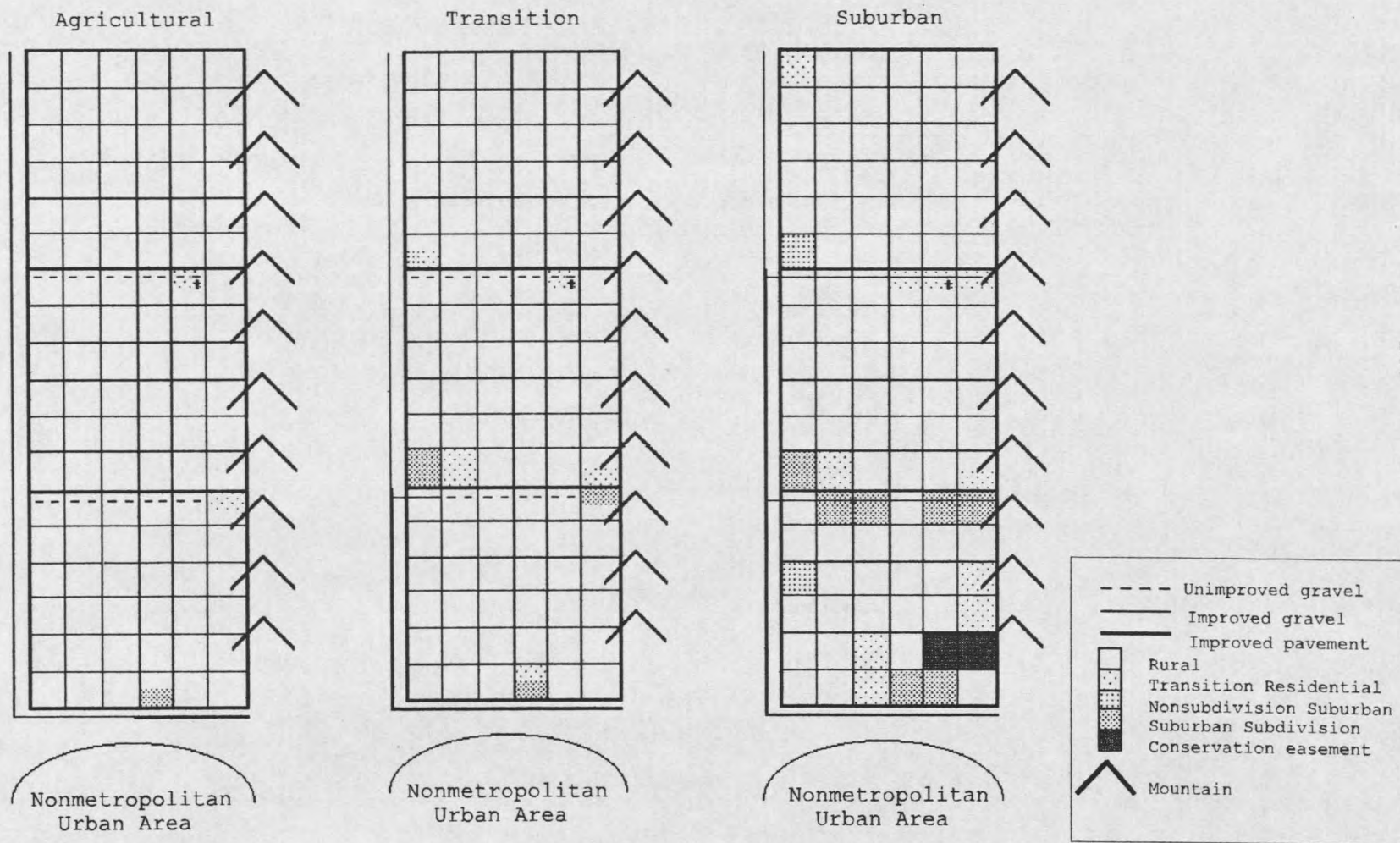
stages, when compared visually, reveal the general landscape changes likely to occur as not only Foothill Amenity Zones, but other types of amenity areas, develop (Figure 39).

Final Remarks

This study addresses land use and land ownership changes associated with the amenity migration phenomenon. In doing so the study isolates a particular landscape undergoing rapid change. It also identifies a list of amenities attracting migrants and the necessary conditions for the development of such an amenity zone. The evolution of the foothill amenity zone is explained as a three-stage historical process that changes an agricultural landscape into a high amenity rural residential landscape through external forces of change. The resulting template of the changes and forces of change are also applicable to the study of landscape change in other amenity zones of the Intermountain West, such as riparian areas near rapidly growing nonmetropolitan areas.

Explaining landscape changes in a foothill amenity zone with significant external variables contributes to our understanding of the larger forces that influence change throughout the nonmetropolitan growth counties of the Intermountain West. Various authors have concluded that amenity-based migration is profoundly affecting the rural landscape (Ullman 1954; Hart 1975; Zelinsky 1977; Coppack 1988; Davis, Nelson, and Dueker 1994; Robbins 1996). However, few studies have explored actual landscape change as the result of larger migration patterns (P. Johnson 1985; Cambell 1986). This study concludes that amenity plays a significant role in the growth of nonmetropolitan urban areas of the Intermountain West. More specifically, the amenities of the foothills around these growing urban areas attract amenity based migration. At the same time, as Coppack (1988) suggests, other factors

Figure 39.
Three Stage Schematic of the Foothill Amenity Zone Model



influence the growth of these urban areas. These factors create the necessary conditions for a threshold level of residential growth in the rural hinterlands around these urban areas. These necessary conditions include a degree of economic vitality in the urban center and growing transportation and communications infrastructure that in turn transforms the surrounding landscape. The longer historical evolution of high-amenity landscapes, while briefly explored herein, needs further study. Overall, the rural hinterlands of the American West are within the residential field of increasing numbers of migrants. This study has shown how the cultural landscapes of these peripheral areas evolve, often from the creation, exploitation, and evolution of new amenity zone environments, and the study suggests that such settings will play an ever larger role in shaping the region's character in the future.

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