MONTANA LEGISLATIVE LIBRARY

10453 (EQC 1974-8)

Y
707
MT

RECEIVED

JUL 15 1974

ENVIRONMENTAL QUALITY
COUNCIL

Impact of Land Development Associated with Subdivision on Wildlife Habitat near Lolo, Montana

Brace Hayden

Progress Report to the Montana Environmental Quality Council

July 11, 1974

Table of Contents

		Pages
1.	Introduction	1
2.	The Study Area	2
3.	Routes	6
4.	Wildlife	11
5.	Findings	18
6.	References	30
7.	Appendix	32

1. Introduction

Outlines of the objectives, methods and procedures utilized in this study are contained in the proposal submitted to the Montana Environmental Quality Council (Willard and Hayden June 18, 1973) and in the progress report submitted to the same organization on September 20, 1973 (Hayden, 1973).

This study began on July 1, 1973 and will be finished not later than July 1, 1975. With the bulk of the course load for my master degree completed (23/30 units). I now have a relatively unhindered time period within which to complete my field investigations, map preparation, land owner interviews and related data gathering activites. I intend to begin writing my thesis no later than Nov. 1st 1974.

The contents herein are preliminary and are based on data gathered during the 1st year of the study. Much of this information I wish to verify with additional field investigations and land owner interviews during the summer and fall of 1974.

This report does not contain a literature review of the general problem area nor does it include a complete accounting of Lolo history as it affects wildlife. Also yet to be completed is a base map with acetate overlays showing native vegetation and changes in wildlife habitat within the study area between the years of 1937 and 1972. A tabulation of the total acres of wildlife habitat lost to subdivision land disturbance and to human related activities on lands adjacent to subdivisions will also be included in my thesis.

2. The Study Area

The community of Lolo lies at the lower end of Montana's Bitterroot Valley, 11 miles south of Missoula. Located near the confluence of Lolo Creek and the Bitterroot River (see Map A), the topography is composed of river and creek bottoms, flood plains, erosional terraces, and the steep slopes of the Sapphire and Bitterroot Mountain Ranges. Riparian forest, coniferous forest, pine savannah, marsh and grassland are the principle vegetative types in the area. Elevation ranges from 3100 feet at the Bitterroot River to 9096 feet atop nearby Lolo Peak.

The study area is 22 square miles in size (see Map) with approximately 10 square miles studied intensively. Areas studied intensively are those contained within or adjacent to the selected field investigation routes.

Historically Lolo has been an agricultural community with farms ranging in size from a minimum of about 80 acres to over 1000 acres. Principal commodities and livestock included: grains, sugar beets, apples, sheep, dairy and beef cattle. In recent years a heavy emphasis has been placed on raising hay and beef cattle. Virtually all farms in the area have some irrigated land as summers are hot and dry. Water is taken by irrigation ditch from Mormon Creek, Lolo Creek, and Carlton Creek via extensive ditch systems. Water for irrigating is also pumped from the Bitterroot River and from the water table.

In 1910, the 25.84 acre Delaney Subdivision was platted (Bugby 1972). Further platting of land did not occur until 1957. The completion of highway 12 leading from Lolo over Lolo pass in 1964 and the improvement (to 4 lanes) of highway 93 between Missoula and Lolo in 1968 have hastened subdevelopment in the area. Currently there are 24 subdivisions and 13 mobile home parks within 3½ miles of central Lolo (See Appendix A). Total

platted subdivision land now equals 436.273 acres, 51% of which has occurred in the last five years (Bugby '72).

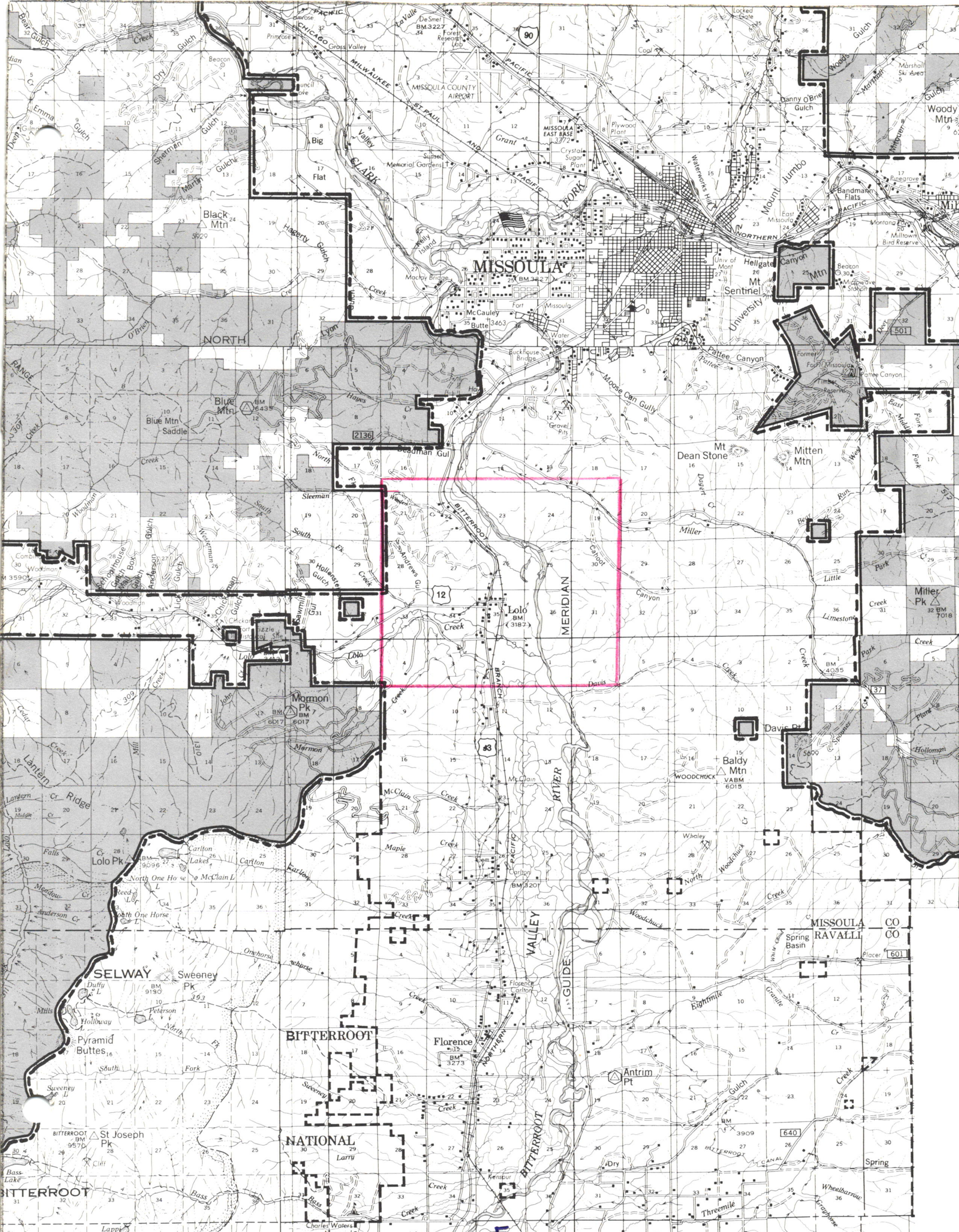
The town of Lolo is essentially a suburb of Missoula. The town has a small commercial district which provides a few local services in the form of gas stations, bars, and grocery stores (M.C.C.P.B. '73). Surrounding this central district are the subdivisions, trailer courts, small rural residential areas and agricultural land. Seventy one per cent of the household heads are employed outside of Lolo (M.C.C.P. B. 1973); 60% in Missoula.

Since 1968-69 the population of Lolo has been growing at the annual rate of 18%. (M.C.C.P.B. 1973). The population in September of 1973 was approximately 2000 individuals. As of May 1973 only 29% of the available lot sites within platted subdivisions were filled; indicating that even without platting of further subdivisions, Lolo's capacity to attract more people is considerable.

Problems in Lolo are really a reflection of the failure of Missoula to plan its growth (?)

Lolo is a bedroom of Missoula

Worden Creek
Worden Creek
Miller Creek
Cahoot Creek
Andrews Gulch
Sleeman Creek
Lolo Creek
Lolo Cr
Morgan Creek Estates
Creek
Plummers Slough
Doyles Slough
HAYDEN LAKE
Creek
Zumwalt
Davis
BITTERROOT
PIPELINE
NORTHERN PACIFIC
Malhauser
Gravel Pit
BM 3141
BM 3144
BM 3386
BM 3251
BM 3189
BM 3178
Valley Grove
Greenwood
Rodeo Ranchettes
West View
Lake View
Hughes
Lolo
Kurey
Delaney
Lolo Peak Vista
Vann Ostrand
Tucker Ranch
Route 1
Route 2
Route 3
Route 4
Route 5
Route 6
N
T12N
T11N
R20W
R19W
page 4


MISSOULA
MISSOULA COUNTY AIRPORT
MISSOULA EAST BASE
Big Flat
Black Mtn
Blue Mtn
Blue Mtn Saddle
NORTH
RANGE
Mt Sentinel
Univ of Mont
Hellgate Canyon
Pattee Canyon
Moose Can Gully
Fort Missoula
Mt Dean Stone
Mitten Mtn
Bandmann Flats
Marshall Ski Area
Woody Mtn
Mount Jumbo
Lolo
MERIDIAN
BITTERROOT
BRANCH
Miller
Canyon
Davis
Mormon Pk
Lolo Pk
Carlton Lakes
Davis Pt
Baldy Mtn
Miller Pk
McClain Creek
Maple Creek
Carlton
RIVER
VALLEY
GUIDE
PACIFIC
NORTHERN
MISSOULA CO
RAVALLI CO
Spring Basin
SELWAY
Sweeney Pk
Pyramid Buttes
BITTERROOT
NATIONAL
FOREST
Florence
Antrim Pt
St Joseph Pk
Eightmile
Threemile
Kenspur
Lone Rock
Bass Lake
Charles Waters Memorial

3. The Routes

For the sake of consistency and uniformity in my field observations, 6 routes were chosen. These routes were laid out in areas within and adjacent to Lolo residential areas. Each route was walked during the hours beginning no earlier than 6:30 A.M. and ending no later than 1:00 P.M.. The 6 routes are shown on the included map and overlay.

Route 1

Route 1 is located on the east side of the Bitteroot River, North of the Rodeo Ranchette Subdivision. Access to this area is quite resticted as the land belongs entirely to the Miller Creek rancher, Don Maloney. Of the 6 routes, route 1 is the least disturbed by man or livestock.

Route 1 begins in the Miller Creek valley, traverses the steep slopes immediately to the east of the Bitteroot River and returns through an area of riparian forest and backwaters.

The slopes above the flood plain are covered with bunch grasses or rock out-croppings on the steeper areas and by a Ponderosa Pine-Blue Bunch Wheat Grass (Agropyron spicatum) habitat type (Pfister et al 1974) on the moister and less steep areas.

The southern portion of route 1 is adjacent to, but across the river from the Greenwood subdivision. A steep slope separates the route 1 area from the Rodeo Ranchette subdivision. Dogs from the Rodeo Ranchette subdivision are occassionally seen in the area. In addition it is possible for dogs on the west side to swim the Bitteroot River to get to this area. During late summer and fall, the Bitteroot River is low enough for persons to wade the river to enter this area, but such activity was not observed.

Route 2

Route 2 is located on the east side of the Bitteroot River and includes

the Rodeo Ranchettes subdivision and adjacent land to the south. Access to the route is more restricted than any of the west side routes, but it is utilized more by humans, livestock and dogs than route 1. Excluding that part within Rodeo Ranchette subdivision, route 2 traverses land belonging to 4 different owners.

Route 2 begins on the slope to the east of the Rodeo Ranchette subdivision. As the route traverses the slope, it intersects 2 main vegetation types. Open areas contain Bitterbrush (Purshia tridentata), Big Sage (Artemisia tridentata) and Bunch grasses while drainages contain forests of the Douglas Fir (Pseudotsuga menzeisii)-Snowberry (Symphoricarpos albus) habitat type (Pfister et al 1974). The upper portion of route 2, south of Rodeo Ranchettes, is lightly grazed by domestic livestock on account of the steepness of the slope. The lower part of route 2 traverses dense riparian forest, open fields and passes along a narrow backwater area. Grazing by horses is quite heavy in the lower areas that are open.

Route 2 is separated from the Lake View and Greenwood subdivisions by the Bitterroot River and by a long, rather narrow, strip of riparian forest on the west bank of the river. Dogs, however, are commonly observed wading the river in this vicinity. In the fall of the year, the backwater area in the N.W. corner of S 36 (T 12N R 20W) is rather heavily hunted for water fowl by both the owner of this area and by trespassers.

Route 3

Route 3 is located on the west side of the Bitteroot River to the northwest of the Lake View and Greenwood subdivisions. In designing route 3, emphasis was placed upon observation of wildlife use of the Bitteroot River and Plummers Slough. Access to route 3 is restricted only by fences. Dogs, children, fishermen, and hunters were observed along the route.

Route 3 passes through riparian forest, hay meadows, marsh and alongside

Plummers Slough. Much of the land is currently in agricultural usage, with sheep, beef cattle and alfalfa hay (Medicago sativa) being the forms of enterprise. Route 3 is also entirely within the 100 year flood plain of the Bitterroot River; much of this route was inundated during the June flooding in 1974.

Route 4

Route 4 is located on the west side of the Bitterroot River and also lies largely within the 100 year flood plain of the Bitterroot River. The route includes lands within and adjacent to the Greenwood, Lake View, Larsons Lolo Tracts, Hughes and Lolo Peak Vista subdivisions.

Access to route 4 is the least limited of the 6 routes. Trespass by humans and free roaming dogs was commonly observed. Especially heavily used were the portions of land between Hayden Lake and the Bitterroot River and between Lolo Peak Vista and the Bitterroot River.

The geography and vegetation of the land within route 4 are similar to those within route 3 with the noted addition of the land disturbed by the included subdivisions. The pasture land and riparian forest within route 4 are moderate-heavily grazed.

The S½ of Sec. 36 (T12 N, R 20W) is state owned and is leased to a local rancher for livestock grazing. Hidden among the trees in this section lie numerous boggy areas and small ponds.

Route 5

Route 5 is located partly upon the lower slopes of the Bitterroot Mountains and partly within the Mormon Creek drainage. Route 5 begins in the farmyard of the Gerald Tucker ranch and leads up the ridge separating the Bitterroot Valley from Mormon Creek. After crossing the ridge, this route traverses the eastern slope of the Mormon Creek drainage for about ½ mile;

crosses Mormon Creek and then traverses the western slope of the Mormon Creek valley.

The open hills to the southwest of the Tucker ranch and to the west of Mormon Creek are heavily over grazed. Cheatgrass (Bromus tectorum) and spotted knapweed(Centaurea maculosa) have in many spots displaced the native bunch grasses. The wooded draw southwest of the Tucker ranch contains Aspen (Populus tremuloides) and Cottonwood (Populus trichocarpa) in the lower sections and grades into a Ponderosa Pine - Snowberry habitat type (Pfister et al 1974) towards the top. The ridge to the east of Mormon Creek is quite steep and is composed of Douglas Fir-Snowberry and Douglas Fir-Ninebark (Physocarpus malvaceous) habitat types(Pfister et al 1974).

Dogs from the Vann Ostrand and Mormon Creek Estates subdivision as well as from local ranches were observed roaming in the Bitterroot foothill areas near these subdivisions. Trepassing was not observed in this area although in the Fall, local landowners complain of hunters on their property without permission. Forest Service roads make the lower slopes of the Bitterroot mountains in this area accessible by walking down hill onto private property from such roads.

Route 5 was designed to assess the wildlife within and adjacent to a low density housing area. The lower part of Mormon Creek (above Mormon Creek Estates subdivision) has but 4 residences. The property owned by the persons living in such residences ranges from 40 to 120 acres. Thus the Mormon Creek area serves as a good comparison to the more densely settled residential areas of Lolo.

Route 6

Route 6 is located west of the Bitterroot river in the foothills of the mountains known as the Groves Range. Beginning within the West View subdivision, Route 6 traverses the slope in the direction of the Valley Grove

subdivision, eventually circling back to its point of origin.

The open slopes along route 6 contain bunch grasses. Grazing is light to moderate. The draws and upper slopes in this area contain coniferous forests of the Douglas Fir - Snowberry and Douglas Fir - Ninebark habitat types (Pfister et al). Route 6 is bounded to the West and North by rather extensive coniferous forest areas.

Route 6 occurs entirely upon private land, however free roaming dogs and trespass by humans was evident during all seasons of the year. The route 6 area contained far less human use than routes 3 and 4. however.

4. Wildlife

In this study, it is not possible to cover all wildlife species so I have restricted my investigations to but a few birds and mammals. These include the elk (Cervus canadensis), the white tailed deer (Odocoelius virginianus), the coyote (Canis latrans), the red fox (Vulpes vulpes), the striped skunk (Mephitis mephitis), the beaver (Castor canadensis), the ruffed grouse (Bonasa umbellus), the pheasant (Phasianus colchicus), the canada goose (Branta canadensis) and the mallard duck (Anas platyrhynchos). Species considered to a lesser extent include the Moose (Alces alces), the Black Bear (Ursus americanus), the muskrat (Ondatra zibethicus), the blackbilled magpie (Pica pica), the crow (Corvus brachyrhynchos) and numerous species of perching birds (Order: Passeriformes).

Undoubtedly changes have occurred among the aquatic inhabitants of the Lolo area as well as the terrestrial and arboreal. Many acres have been drained or filled for agricultural purposes or for homesites. Backwater areas have been dredged, Lolo creek has been straightened in spots and portions of both Lolo creek and the bitterroot river have been diked or rip rapped. Such man caused degredations of natural areas tend to reduce diversity and hence simplify aquatic ecosystems.

alterations in aquatic system

In trying to establish a baseline for species abundance and diversity in the Lolo area, information concerning game species populations were the most bountiful. This caused an overemphasis on changes in game animal populations which is unfortuanate in light of the recently expressed need on the part of various wildlife resource agencies to conserve nongame as well as game habitat.

The Montana Fish and Game Department and the U.S. Forest Service wildlife data for the Lolo area are utilized mainly for background and reference purposes. Such data show trends for areas much larger than that within the boundaries of the study area and hence wildlife population fluctuations reported by these

agencies cannot be pin pointed to subdivision pressures alone.

The persons most able to report trends in wildlife populations are the residents of Lolo or those whose employment necessitates familiarity with the Lolo area. Accordingly, I am interviewing such people as local ranchers, and other residents, active and retired forest service employees, government trappers, Montana fish and game biologists, and others familiar with the Lolo area. In order to better validate the responses given by such people, I am currently designing a questionaire to be given out to Lolo residents later this summer.

Elk

Aerial censuses by the Montana Fish and Game Department (1955-present) show elk populations dropping in recent years in the Lolo Creek drainage while remaining stable in areas between Miller Creek and 8 Mile Creek (east of Bitteroot River) and between Mormon Creek and One Horse Creek (west of Bitteroot River).

Two groups of elk were identified on the study area. One population winters on the points north of Lolo Creek. Local ranchers estimate the size of this herd at between 150-250 animals as late as the mid 1950's. During the spring months, portions of this population were often times seen on lower slopes feeding on the Spring greenup.

In recent years this elk population has dwindled in size. Estimates now range from 12-25 animals. Twice last winter I observed members of this herd on the hill to the N.E. of the West View subdivision. Both occurrences were at a time following intense cold spells which may indicate that the elk are utilizing the lower slope areas adjacent to West View and Valley Grove subdivisions only when forced to for warmth or hunger reasons. On only two other occassions were fresh elk tracks evident in this area (route 6) and both were but solitary tracks. Numerous pellet groups were found on the

ridge to the east of Andrews Gulch however. Valley Grove and West View and to a lesser extent Rodeo Ranchettes are all built on historic elk (and white-tailed deer) winter range.

The second elk population on the study area is the herd found between Mormon Creek and One Horse Creek. Aerial surveys by the Montana Fish and Game Department have counted 30-50 elk in this group in recent years. Since aerial surveys rarely count the total number of animals utilizing an area, this herd is probably considerably larger. During the winter months and the spring greenup, this herd is often seen grazing on the lower slopes of the Bitterroot mountains to the southwest of the town of Lolo. Occassionally in recent years elk or fresh elk tracks have been seen on the property of the land owners in the lower Mormon Creek Drainage (Section 4, T 11 N, R 20W).

Elk are not commonly seen today on the part of the study area to the east of the Bitterroot river. Members of the group of elk located between Miller Creek and 8 Mile Creek do not often frequent the steep lower slopes of the Sapphires east of the town of Lolo. Very few pellet groups were discovered in this area in walking routes 1 and 2.

White tailed Deer

Whitetails are certainly the most ubiquitous game animal on the study area. Like the elk however, whitetails appear to occur in greater numbers on that portion of the study area east of the Bitterroot River, however on every route deer sign was observed. As recently as 1969 approximately 60 whitetails were counted in one bunch on the hill to the east of Rodeo Ranchettes.

During the winter of 1973-74, it was common to oberve up to 12 whitetails grazing on the steep slopes immediately north of Rodeo Ranchettes. According to one long time landowner in the area, this particular group of whitetails crosses the river during the spring and summer months to feed in the adjacent

hay fields and browse the young growth of the willows (Salix spp.) and alders (Alnus tenuifolia).

Other whitetails (up to 15) were commonly observed on the level area and in the wooded draws just south of the Rodeo Ranchettes subdivision. Despite harassment by dogs, members of both groups feed in the gardens and hayfields within the Rodeo Ranchette subdivision.

Whitetails and whitetail pellet groups were also particularly heavy in the Mormon Creek area (route 5) and in the wooded draws near the Valley Grove and West View subdivisions. By comparison, the fewest deer and deer pellet groups were observed in that portion of the study area in the Bitteroot bottoms west of the river and adjacent to the Lolo Peak Vista, Lake View and Greenwood subdivisions.

Coyotes

Coyotes are also ubiquitous in the Lolo area. A greater number of tracks, pellet groups, and callings were noted on the lower slopes of the Bitteroot mountains above the Tucker Ranch and on the slopes above the West View and Valley Grove subdivisions than elsewhere. The larger number of coyotes on the lower slopes of the Bitteroots is possibly due to the sheep raised in this area.

Like the white-tailed deer, coyotes appear to prefer using the wooded draws more than the open areas when frequenting areas adjacent to subdivisions. Coyotes tracks were far less common in the Bitteroot bottoms than elsewhere. Virtually every landowner interviewed in the study area agreed that coyote populations have increased in recent years.

Red Fox

The red fox has increased in recent years in the Lolo vicinity as well as in all of Montana (Hoffmann and Pattie 1968). Forty years ago, the red fox

was rarely noted in the Bitterroot Valley, today it is common. Most Lolo residents interviewed have sighted the red fox in their neighborhood. Chickens, pet and wild ducks, and pheasants are but some of the prey reportedly taken by the red fox in the Lolo study area.

The red fox population appears to be heaviest in the Bitterroot bottoms east of the river (routes 1 and 2), but fox sign was recorded on every route. A trapper removed 7 foxes (and 2 coyotes) this past winter from the hillside above the Tucker ranch (NW ¼ S 3). Three other foxes were trapped last winter by one resident of the Rodeo Ranchette subdivision on land adjoining the southern portion of this area.

Striped Skunk

Like the red fox, the striped skunk has apparently suffered no decline in recent years in the Lolo area. Skunks, or skunk tracks were noted most heavily in the Bitterroot bottom routes (especially route #4) and in the area above the Tucker Ranch (route #5). The striped skunk is considered a nuisance in the study area on account of its large numbers and predatory habits.

Beaver

Beaver numbers have declined in recent years in the Lolo study area. Both Lolo Creek and the Bitterroot river as well as the abundant backwaters in the area have historically contained beaver. However, in walking the routes I have observed but one sign of recent beaver activity, a recently gnawed on cottonwood (*Populus trichocarpa*) located in the riparian forest between Lolo Peak Vista and the Bitterroot river. Three beaver lodges were located in the backwater area south of the Rodeo Ranchette subdivision (Sect. 36) but all were apparently inactive.

According to the Montana Fish and Game Department and local residents, beaver are still trapped in both the Bitterroot river and Lolo Creek. Illegal

trapping (out of season, exceeding the legal limits) is perhaps one cause that has continued the downward trend of beaver numbers in the Lolo area.

Beavers have also suffered considerable habitat destruction in the area of Lake View and Greenwood subdivisions. Here, cottonwoods and alders were removed from the periphery of Hayden's Lake (formerly named Doyles Slough). In addition Doyles Slough was dredged, and lengthened. Rocky material was removed from the slough bottom and deposited on its perimeters, covering most of the native vegetation ringing the slough's shores. In addition to the beaver, other species suffering habitat destruction in this area include the muskrat, ducks, and shorebirds.

Ring-necked Pheasants

Pheasants have declined in numbers on the study area in recent years as they have in the entire Bitterroot Valley. Pheasants occur in agricultural areas and are most common where grain fields are interspersed with weedy, brush and cattail cover (Hand 1969). The decrease in grain fields, drainage and filling of marshy areas, and increase in harassment by the domestic dog and cat have all contributed to the demise of the pheasant in the Lolo vicinity.

In the 1930's and 1940's it was reported by several landowners to be common to shoot ones limit of pheasants in one morning in several parts of the study area. Today one only occassionally sees the pheasant.

Records of successful nestings in the study area are few in number in recent years. Mr. Murphy who owns land in the NE ¼ of Sec. 35 (T 12 N R 20 W) reports 2 successful broods on his property in the spring of 1973. Others have occurred in the Tucker ranch vicinity (Section 3 T 11N R 20W) and in the NW ¼ of Section 25 (T 12 N R 20W).

Ruffed Grouse

Historically the ruffed grouse has been common in the Bitterroot bottoms and on the lower slopes of the Bitterroot and Sapphire mountain ranges. Within the study area, the ruffed grouse were observed on all six routes, however there were markedly fewer sightings in routes 3 and 4 than in the others. Routes 3 and 4 lie within or close to the most heavily subdivided portion of the Lolo study area. In walking the Bitteroot bottoms on the David Maclay ranch, south of the study area, ruffed grouse were more frequently observed than on similar habitat within the study area.

6. Findings

Rapid subdivision is but one of several factors affecting wildlife numbers and diversity in the Lolo area. Before addressing the question of subdivisions and wildlife, it is important to briefly look at all the land use changes that are occurring within the study area. By land use changes I shall include both physical changes as well as human use changes.

Physical changes in the Lolo area fall into three main categories: 1.) agricultural to agricultural (ie wheat - irrigated pasture) 2.) agricultural to non-agricultural (ie pastureland to residential) and 3.) land modification (ie marsh drainage or streambank riprapping). These three categories are not always independent of one another. For example, subdivision of agricultural land for homesites might involve land filling or brush removal or terracing of hillsides.

Agricultural

Agricultural changes in the Lolo area show a trend from a diverse form of agriculture to one dominated by hay and beef cattle. In checking aerial photographs of the Lolo area shot in 1937, 1964 and 1972, a pattern is observed of increasing field sizes and decreasing interspersion of crop varieties. Apple orchards, potato and sugar beet fields, and over a large area, wheat fields have all disappeared from the study area. As the trend towards less heterogeneity in agricultural land use continues, the edge effect of mixed farming is lost (Caslick 1972) resulting in lower carrying capacity for animals within the farm fence boundaries. These changes have been particularly tough on pheasant populations within the entire Bitterroot Valley (Stu Burns - discussion).

In general, a more intensive type of agriculture is now practiced in the Lolo area. Alfalfa fields have replaced grains and hence the number of annual cuttings on such fields have increased from once to twice and sometimes three

times. The marked increase in beef cattle numbers, leave fence rows grazed clean and many hillsides over-grazed. Even areas within the riparian forest are in places heavily grazed. The net affect for most (not all) species utilizing such agricultural lands has been less food and less cover and hence a decline in quality and availability of habitat. This is especially true for upland game birds such as the pheasant and the ruffed grouse.

Recreation

When the recent boom in subdevelopment began, Lolo had already experienced a significant increase in the number of people utilizing the lands within and surrounding the study area. Lolo's recent growth has merely swelled an already large number of recreationists. As Missoula has grown, the hills surrounding Lolo have become increasingly popular for weekend outings. Increasingly, the hillsides adjoining Lolo are used by hikers, trailbikers, horseback riders, hunters, snowmobilers and kids just having a good time. The Mormon Creek area S.W. of Lolo and the Graves Range N.W. of Lolo were both laced with logging roads in the 1950's and 1960's and thus access throughout these areas was improved.

The forrested lands surrounding Lolo are owned by the U.S. Forest Service, the State of Montana, U.S. Plywood Company, Burlington Northern Railroad, large private and a few small private owners. Often times access to private lands on the hillsides above the Bitterroot River and Lolo Creek valleys is gained by using Forest Service roads and then crossing fences to get onto privately owned lands. Such trespass usually occurs without the owners knowledge as the trails used are hidden by the tree line. An exception appears to be the private land above the West View subdivision where snowmobile tracks were oberved leading from this subdivision onto private land.

The Bitterroot river also has received increased recreational usage in

recent years. Streambank residents report that during the Spring and Summer it is not uncommon to count up to 20 rafts and canoes in a single day. Geese and duck broods scatter when a canoe or raft come upon them. It is unknown how permanent the affects of such harassment may be.

The physical loss of habitat resulting from the size and location of subdivisions in the Lolo area does not appear to have affected local wildlife populations as much as has the influx of people. As already stated, this influx cannot be attributed solely to the proliferation of Lolo subdivisions. Platted subdivisions represent less than 10% of the land within the study area. From the standpoint of total acerage, the study area is still dominated by agricultural land uses, however the few dense residential enclaves within the study area have an affect that extends far beyond the outer edges of residential area boundaries.

Dogs

Probably the most serious of these affects is that of dogs. Free roaming dogs have long been observed chasing deer in the Lolo area. One rancher saw dogs pursuing deer in the Andrews Gulch area (Sec 28 T 12N R 20W - see map) as early as World War II. During the construction of a logging road in upper Mormon Creek in the 1950's a group of 3 dogs were observed chasing deer for several days (eventually all were shot).

As the Lolo population has grown so has the number of local dogs. As might be expected, reports of dogs chasing deer have been increasing in recent years. It is important to note however that most Lolo residents keep their dog penned when they are not out with them. Possibly as few as 15 dogs roam free within the study area as I would often encounter the same dogs when walking the routes.

In many parts of the United States (including Montana), the free

roaming dog has been accused of causing serious damage to deer. However, few scientific studies have been undertaken to document the extent of such damage and the little research that has been conducted does not settle the controversy. (Perry et al 1970, Corbett et al 1971).

In a study in North Carolina for example (Corbett et al 1971), researchers found that dogs kill some deer in mountainous terrain, but point out that it was not conclusive that such dogs were killing enough deer to limit the size of the population. Furthermore it was found that most deer killed by dogs were already predispositioned to mortality by old age, injury or severe parasitic damage.

Besides killing deer, there are other effects that free-roaming dogs may have on deer that can lead to death. In western Montana, during periods of the winter, the deer are already under physiological stress because of low energy intake (poor and limited food) combined with high energy expenditures (deep snow, cold). Harrassment by dogs in such a situation could very likely tip the energy scales so as to cause the deer to freeze or starve to death. There is also the danger of deer being injured during a chase which may cause fetal abortion in females or death at a later time.

Free roaming dogs were frequently seen about the West View, Mormon Creek Estates, Rodeo Ranchettes, and Lolo Peak Vista subdivisions. Though I never observed dogs chasing deer, I twice suspected that such was the case due to the nature of dog barking heard in the nearby hills and canyons.

Dogs, (as well as coyotes), were observed feeding on 4 calf carcasses (the calves died from other causes) on the hillside above the Tucker ranch in January 1974. Two of these dogs were followed back to the Vann Ostrand subdivision.

In the Bitteroot bottoms, one rancher repeatedly saw two dogs chasing

deer this past winter. These dogs would swim the Bitteroot River in pursuit of deer and eventually killed two does in a rocky draw that adjoins the river (Sec. 1 T 11 N R 20W).

The continued presence of free roaming dogs, such as those found around a newly developed rural subdivision may permanently displace the local deer population from their home range. This could make the possibility of deer death from natural causes greater, due to the fact that deer are being forced to inhabit unfamiliar territory. It is important to note that in the previously mentioned studies (Perry et al 1970, Corbett et al 1971) that their research was conducted in areas where the habitat of deer was not being seriously enroached upon, other than by the affect of free roaming dogs. A subdivision in a western Montana valley (such as those in Lolo) however is often situated right in the middle of white-tailed deer winter range (Rodeo Ranchettes, and West View subdivisions). Thus deer are already displaced to adjacent and often higher altitudes. Dogs in affect make a less than optimum habitat even less desirable.

In addition to deer, free running dogs will at times kill game birds and destroy the nests of such ground nesting species as pheasants and ducks. Evidence of such acts exists in the Lolo area.

Prior to the development of the Lake View subdivision, this area contained a corn field. Richard Rossignal who owns land just to the north and south of the cornfield, resorts that dogs from the Hughes subdivision would hunt pheasants that fed in the field and nested in its perimeters. Nests were observed to be destroyed by such dogs.

Geese nesting in the Bitteroot bottoms part of the study area are probably less harrassed by dogs than are nesting ducks and pheasants. A recent study (Flath 1970) showed that better than 70% of the geese nesting along the

Bitterroot river did so in trees. Furthermore, geese within the study area were observed nesting on islands within the Bitterroot river.

Free running dogs, in the Lolo area are sometimes shot. Several ranchers reported shooting dogs observed harrassing livestock. One resident of the Rodeo Ranchette subdivision reportedly shot at dogs last winter when such dogs were seen chasing deer in the vicinity of the subdivision.

Trespass and Poaching

Harassment of animals by dogs in habitat adjacent to subdivisions is one way in which the continued utilization of the habitat for many species is jeopardized. Another is harassment by humans.

Ranchers in the study area report that it has been increasingly difficult in recent years to prevent children and hunters from trespassing. There appears to be a feeling among some former city residents living in Lolo, that property boundaries are not to be respected as they are in the city. A barbed wire fence that encloses an alfalfa field or horse pasture is less of a deterrent than a picket fence adjoining a city sidewalk. Fences are cut, haystacks are trampled and game is poached on private lands adjoining subdivisions. Typical of the worst trespass and poaching examples are the following:

Otto Wornath, a rancher who leases the S½ of Sec. 36 (T 11N R 20W) reports that 3 of his sheep were shot in this area by 2 boys from the Lake View subdivision. The boys were seen running from the area with rifles. This account was verified by other residents in the area who knew of the boys and mentioned other malevolent acts on the part of the youngsters.

Mr. McMahon who owns the NW ¼ of Sec. 1 (T 12 N R 19W) reports that he must repeatedly warn kids from the Lolo Peak Vista subdivision that they are trespassing upon his property. Often such children are reported to carry

rifles.

In August 1973, seven whitetailed deer were shot and skinned in the section of riparian forest lying between Greenwood subdivision and the Bitteroot River (Section 26 T 12N R 20W). Numerous laws were thus broken: deer were shot out of season and were not tagged, whitetail hunting in the Bitteroot Valley bottoms is allowable by archery only, not by rifle, and the deer were shot on private property without the land owners permission for entry. To shoot 7 whitetails in one bunch is quite a feat and one can only hazard a guess as to how this was accomplished. One possibility is that whoever shot the deer knew the area well and knew where to locate the whitetails at night. Most probably the deer were 'blinded' by a bright light so that they would momentarily freeze. This incident perhaps helps account for the fact that fewer whitetails and whitetail sign were seen along routes 3 and 4 than elsewhere.

Cover

Food, water, and cover are the 3 basic components of habitat for all wildlife species. These components, of course, vary both quantitatively and qualitatively from species to species. Some species, such as the ring-necked pheasant, have more specific habitat requirements than other, such as the Starling (Sturnis vulgaris). Cover to a greater extent than food or water is the habitat requirement that has been most limited as a result of the recent subdevelopment activity in the Lolo area.

Cover includes such animal use components as shelter, nesting or fawning sites, escape routes, and sanctuary. In Lolo, these animal needs are satisfied in such areas as hayfields, fence rows overgroun with shrubs, dense riparian and coniferous forests, river islands, and cattail (Thypa spp.) marshes. In looking at aerial photographs of Lolo shot in 1937, 1964 and 1972, each of these areas except for the river islands and coniferous forest have

decreased in total acerage as a result of land subdivision for homesites.

Much of the cover areas within the study area that do remain are utilized less today by certain species than in the past. For example whitetailed deer, and ruffed grouse living in the Bitteroot bottoms west of the river are today seriously reduced in number compared to earlier years. The reasons for such decrease in usage includes many of the topics already discussed; harassment and predation by domestic dogs, increased illegal hunting, heavier livestock grazing intensity and the like.

One component of cover that has become particularly limiting in recent years within the study area is sanctuary. Sanctuary are those areas where an animal can hide or seek shelter and be free from harassment. Where sanctuary areas remain, game is still present in considerable abundance. For example the area of route 1, the least accessible of the six routes, still contains a large and diverse number of birds and mammals. Approximately 50 mallards, 12 whitetailed deer and unknown numbers of great horned owls (Bubo virginianus) foxes, raccoons, and coyotes are present in this area during all seasons of the year. This was the only part of the study area where I saw the hooded merganser (Lophodytes cucullatus) and it is only one of 2 areas where the wood duck (Aix sponsa) was seen. These latter two species are migratory.

Another example of sanctuary areas are the forrested slopes and canyons of the Bitteroot Mountains to the S.W. of the study area. This area borders the Selway-Bitteroot Wilderness area. Elk populations appear to be at least holding their own here in recent years.

A few landowners within the study area who are more zealous that others in keeping dogs and trespassing humans off their property have managed to maintain small populations of deer and pheasants. Mr. McMahon for example (NW ¼ Sec. 1 T 11N R 20W) has had a whitetailed doe raise a fawn or a pair

of fawns on his property for the three Springs prior to 1974.

The density of homesites affects the amount of food, water and cover remaining within a residentially developed area. A comparison of the Mormon Creek area above Mormon Creek Estates (with 4 homes in the valley proper) to that of the more densely populate Lake View area (with up to 4 homes per acre) serves as a case in point. Whitetailed deer, and ruffed grouse are commonly seen in the Mormon Creek area. Such species may actually have increased in recent years on account of the greater amount of food and cover now available. Prior to the sale of such land to the current owners, this valley was heavily grazed by livestock. Comparatively little food, water or cover remain within the boundaries of the Lake View subdivision.

Comparison between the East and West sides of the Bitteroot River

Within the study area, riparian forest, backwater areas, hay meadows, and marshland all have greater total acerages west of the river. Yet more abundant populations of geese, ducks and whitetailed deer are found in such bottomland areas east of the river. There are several possible reasons for this observation.

Land ownership parcels are generally larger and tend to be more intact on the east side. Within 1 mile of the river, excluding platted subdivisions and parcels of land smaller than 3 acres, there are 7 different land owners, while there are approximately 17 on the west side.

Subdivision activity is concentrated on the west side. Six platted subdivisions (totaling 276acres) occur within 1 mile west of the river while only 1 (totaling 108acres) occurs east of the river.[1]

Related to subdivision is the availability of access. The one subdivision

[1] These subdivision totals include all the various 'plattings' of the same subdivision.

east of the river (Rodeo Ranchettes) is accessible via a long gravel road; commuting distance from central Missoula is approximately 30 minutes and only 10 of the approximately 75 lots in this subdivision have houses on them. The 6 bottomland subdivisions west of the river are accessible via paved streets and highway 93, commuting times is considerably shorter and each of these subdivisions is at least 50 percent complete with houses. If a bridge were ever built across the Bitterroot River connecting the west side with the east, subdivision platting and homebuilding would be given a boost on the east side.

As the situation in the Bitterroot bottoms exists today, the Bitterroot River acts as a restrictive barrier to people and dogs seeking access to the east side bottomland areas. Furthermore, the bottomlands east of the river are given additional protection by the steep slopes that rise immediately to the east of such areas.

The forementioned differences suggest two possible ways to preserve wildlife habitat within areas experiencing subdivision:

1.) It is preferable to have a few areas of rather large subdevelopment, surrounded by extensive open land than to have many small subdivisions surrounded by less extensive open land. Widespread subdivisions in a narrow valley such as the Bitterroot tends to create small "islands" of wildlife habitat within which wildlife is more vulnerable to harassment than in larger areas of wildlife habitat.

2.) If wildlife is to be preserved in areas experiencing subdivision, natural barriers such as rivers or steep slopes should be utilized to divide subdivided from unsubdivided areas within the general area being subdivided.

<u>Differential Adaptability to the Pressure of Humans</u>

Different species of wildlife within the study area have experienced population size fluctuations of different magnitudes and directions since the

subdivisions boom began. Thus the crow, blackbilled magpie, skunk, red fox and coyote have all increased in number or have remained about the same. The whitetailed deer population has declined, though less than might be expected considering the harassment incurred by this species; while the elk, ruffed grouse and mallard duck appear to have declined in numbers to a much greater extent. Thus, some wildlife populations appear to be more resistant to loss of or harassment within their habitat.

In other areas of the country researchers (Larson 1972) have noted that when animals are protected about rural subdivisions, some will actually increase in numbers. This appears to be the case with the beaver and the black bear in northern New England.[2]

Loss of wildlife habitat containing all the necessary components (see section entitled 'cover') and the resulting decline in certain wildlife populations happens gradually. Such a gradual decrease may mask the true reasons for this decline. For example, land use changes from agricultural to residential use as has occurred on some of the agricultural land within the Lolo study area are not sudden. In Lolo the majority of such changes have occurred over the past 10 years as more and more homes have been built in platted subdivisions. Often times land that is subdivided retains its native cover long after it is sold because the owners do not build immediately or because they are merely keeping the land for speculative purposes. This is what is happening to many ofthe lots within the Rodeo Ranchette subdivision and to a lesser extent within the West View subdivision.

A California researcher (Gerstung 1970) noted that in low density subdivisions, mule deer (Odocoelius hemionus) may benefit from activites that open up dense conifer stands or old brush fields. Such benefits are nullified however as

[2]This is attributed as much to the regrowth of woodlots in abandoned agricultural fields as it is to wildlife protection.

building density increases and lawns replace the native vegetation.

Yearly changes in the weather and in hunting pressure are other factors that affect the size of wildlife populations residing in subdeveloped as well as unsubdeveloped areas.

References

1. American Society of Photo Grammetry, Manual of Photographic Interpretation, GeorgeBanta Publishing Company, Mensha Wisconsin, 1960.

2. Bugby, Bruce, Lolo Housing Study, Missoula-Mineral Regional Planning Office, 1972.

3. Caslick, James W., Measurement of Long Term Wildlife Habitat Changes in Thompkins County New York with Time Lapse Aerial Photography, New York Cornell University, unpublished Phd. thesis, 12 pages, 1972.

4. Corbett, R.L. and R.L. Marchington and C.E. Hill, "Preliminary Study of the Effect of Dogs on Radio-Equipped Deer in a Mountainous Habitat", 25th Annual Conference of South Eastern Game and Fish Commissioners 1971 Proceedings, Vol. 25 1971.

5. Flath, D.L., Reproductive Success of Canada Geese in the Bitterroot Valley, Montana, University of Montana, unpublished M.S. thesis, 1970.

6. Gerstung, Eric, A Brief Summary of the Impact of Subdivision Activity on the Fish and Wildlife Resources of Nevada County, California Dept. of Fish and Game, Resources Agency, 1970.

7. Hand, Ralph, Distributional Checklist of the Birds of Western Montana, Zoology Department, University of Montana, mimeographed, 1969.

8. Hayden, Brace, Impact of Land Development Associated with Subdivision on Wildlife Habitat, Progress Report to E.Q.C., Sept. 20, 1973.

9. Hoffman, Robert S. and Donald L. Pattie, A Guide to Montana Mammals, A.S.U.M. Store, Univ. of Mont. Forest Conservation and Experiment Station and U. of M. Foundation, 1968.

10. Larsen, Joseph S., "Man and Wildlife in the Modern Northeastern Landscape," Agricultural Science Review, Vol. 10 #1 pp. 1-6, 1972.

11. Missoula City County Planning Board, Lolo Comprehensive Plan, July 1973.

12. Montana Fish and Game Department "Wildlife Investigations - District 2" and "Statewide Wildlife Survey and Inventory", Big Game Survey and Inventory, Clark Fork Unit Recheck, 1955-1972.

13. Perry, Mathew C. and Robert Giles Jr., "Studies of Deer Related Dog Activity in Virginia", 24th Annual Conference of South Eastern Fish and Game Commissioners 1970 Proceedings, Vol. 24 1970.

14. Pfister, Robert O., Bernard L. Kovalchik, Stephen F. Arno, and Richard C. Presby, Forest Habitat Types of Montana, Intermountain Forest and Range Experiment Station and Northern Region, U.S.F.S., Missoula Montana, May 1974.

15. United States Forest Service, Lolo National Forest, "Aerial Photographs", July 7, 1937 and July 7, 1972.

16. ~~United States Soil Conservation Service~~ U. S. Agricultural Stabilization + Conservation Service, Bitterroot Valley, "Aerial Photographs," August 6, 1964.

17. Willard, Earl and Brace Hayden, Impact of Land Development Associated with Subdivision on Wildlife Habitat, research proposal submitted to the Montana Environmental Quality Council, Energy and Land Use Studies, The Montana Forest and Conservation Experiment Station, in conjunction with the School of Forestry, June 18, 1973.

18. Conversations with:

Stu Burns - Bitterroot National Forest

Terry Solberg and Roger Lund - Lolo National Forest

Fred Hartkorn and Revel Jenson - Montana Fish and Game Department

The following Lolo area residents:

Sherman Denton	Vic Miller
Dean Douglas	Charles Parker
John F. Hayden	Richard Rosignol
Robert Laing	Dave Schraeder
David McClay	Gerald Tucker
Mr. McMahon	

Appendix A

Subdivision	Date Filed	Total Acres	Original Vegetation Type
1. Delaney	6/6/10	25.84	riparian forest, wet meadow
2. Vann Ostrand	8/22/57	72.00	riparian forest, wet meadow
3. Valley Grove	9/22/60	48.00	coniferous forest & bunch grass
4. Hughes	10/10/60	23.00	bunch grass
5. Kuney	10/21/60	20.20	riparian forest, wet meadow
6. Larson's Lolo Tracts	11/7/60	15.40	wet meadow
7. Mulhauser Acres	11/7/60	19.30	wet meadow, bunch grass
8. Kuney #2	8/31/61	5.426	riparian forest, wet meadow
9. Kuney #3	4/23/62	8.25	riparian forest, wet meadow
10. Lolo Peak Vista #1	9/24/63	6.88	riparian forest, wet meadow
11. " " " #2	2/16/65	14.80	" "
12. " " " #3	4/21/66	13.90	" "
13. " " " #4	9/14/65	3.21	" "
14. " " " #5	8/11/66	11.54	" "
15. " " " #6	4/24/67	5.00	" "
[illegible]. " " " #7	12/29/67	6.62	" "
17. " " " #8	12/30/68	18.87	" "
18. Mormon Creek Estates	4/9/69	9.60	riparian forest, bunch grass
19. Lake View	1/18/69	98.133	marshland, wet meadow
20. Rodeo Ranchettes #1	6/18/69	19.24	shrubs, bunch grasses
21. Rodeo Ranchettes #2	12/2/69	88.78	shrubs, bunch grasses
22. Greenwood	4/18/70	28.01	riparian forest, marshland
23. West View	1/5/71	81.79	bunch grasses
24. Lolo Peak Vista #9	7/22/71	10.94	riparian forest, wet meadow

from "A Lolo Housing Study" by Bruce Bugby, Missoula Mineral Regional Planning Office