HALL CREEK MULTIPLE-USE LAND MANAGEMENT PLAN

RAWLINGS DISTRICT, WYOMING

Berkeley, California
January 30, 1976

Note!

This is not an actual management plan. Rather it is an illustrated format or guide for preparing rest-rotation, multiple-use land management plans. Much information in the present writeup does not bear on the Hall Creek Area. Much is fictitious but has been presented to call attention to points and ideas that may be considered by the land manager and others in planning.

The format is in an early stage of development and by no means final. A practical working guide will be worked out over time with the help of other land management interests and on the basis of results obtained with management.

U.S. DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

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HALL CREEK MULTIPLE-USE LAND MANAGEMENT PLAN

Introduction

Hall Creek is a wildland area of about 18,500 acres near Lander, Wyoming. It is largely public land administered by the Bureau of Land Management. It produces many products and values of importance to local communities, the state and the nation. Among these are renewable resources such as wildlife, water, timber, and livestock and non-renewable ones such as minerals, gas, and oil. The area also has high esthetic, recreational, archaeologic, and historic values. The major land use has been and still is livestock grazing.

The Hall Creek area is important because of its capacity to produce renewable resources. These resources stem from soil and vegetation. Their yield and quality are determined by soil fertility and the plant composition.

Unfortunately both soil and vegetation on Hall Creek have been heavily deteriorated by man's activities in the last 100 years or so resulting in considerable reduction in the yield and quality of renewable resources. The main degrading land uses have been livestock grazing, cultural practices, and road building. The area is continuing to deteriorate and lose production capacity under present management.

A different type of management that promises to restore the production capacity of the land and maintain a high quality natural

environment is proposed for the area. It is outlined in this plan prepared by the Bureau of Land Management in cooperation with the following interests concerned with the management of wildlands.

Hall Creek Area land owners and land administering agencies

- Livestock grazing permittee
- Mining interests
- Ranchers
- Wyoming State Department of Lands

Other organized interests

Federal
- Geologic Survey
- Soil Conservation Service

State, county, municipal
- County planning and zoning commission
- Extension Service
- Fish and Game Department
- Highway Department
- University of Wyoming
- Wyoming Water Resources Department

Private
- Natural Resources Defense Council
- National Wildlife Federation
- Sierra Club
- Wilderness Society
- Wyoming Cattleman's Association
- Wyoming Sheepman's Association

The public

Description of area

Location

Approximately 17 miles southeast of Lander, Wyoming (fig. 1).

Land ownership or jurisdiction

Status	Acres	Percent
Federal		
Bureau of Land Management	15,000	81.0
Other	------	-----
State	1,400	7.6
Private	2,100	11.4
Total	18,500	100.0

See figure 2 for location of ownerships.

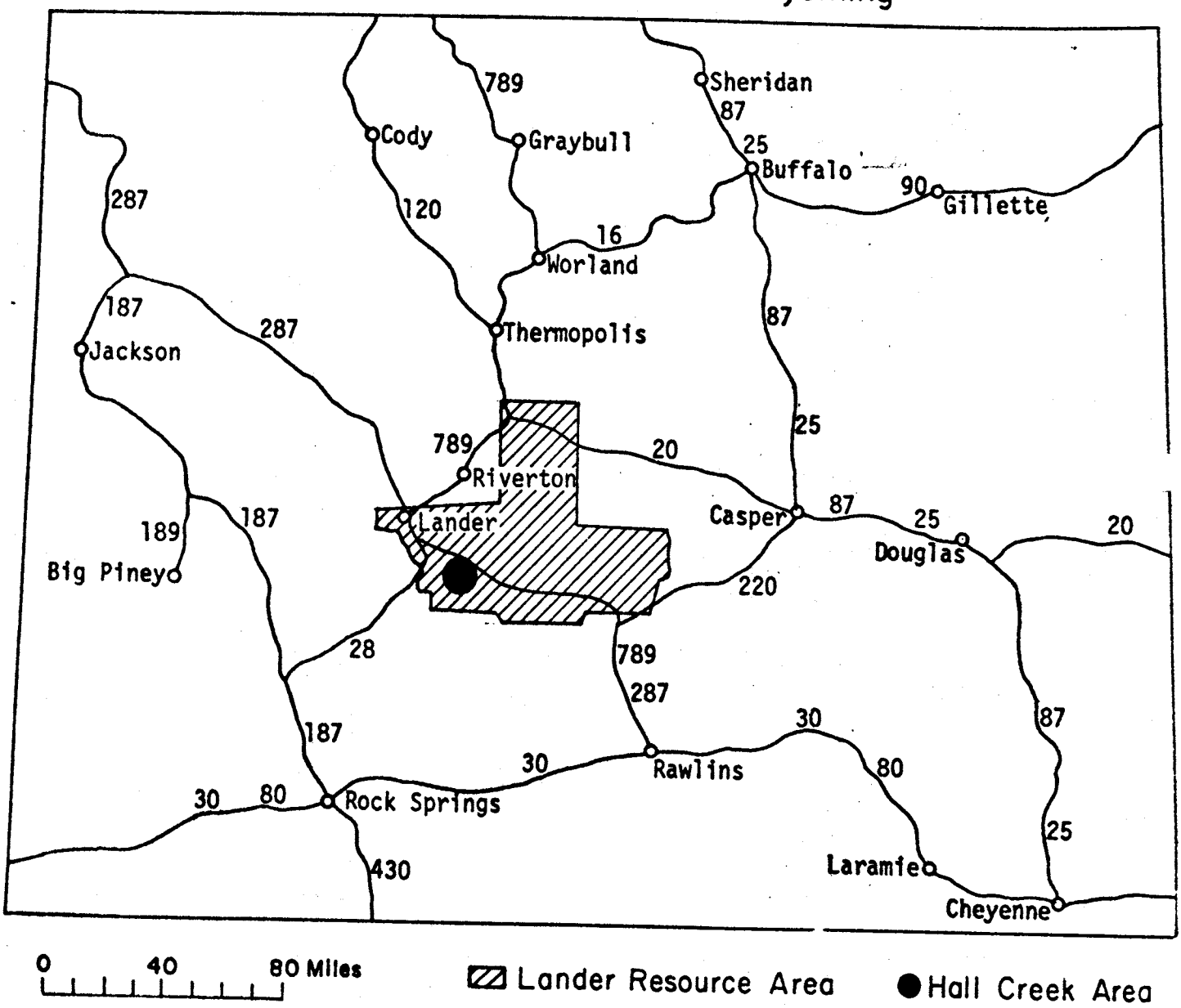
Management responsibility

By agreement of the land owners all but a small acreage of private land--mainly cultivated land--is managed by the Bureau. Responsibility for management rests with the Lander Resource Area Office of the Rawlins District of the Bureau in Lander, Wyoming.

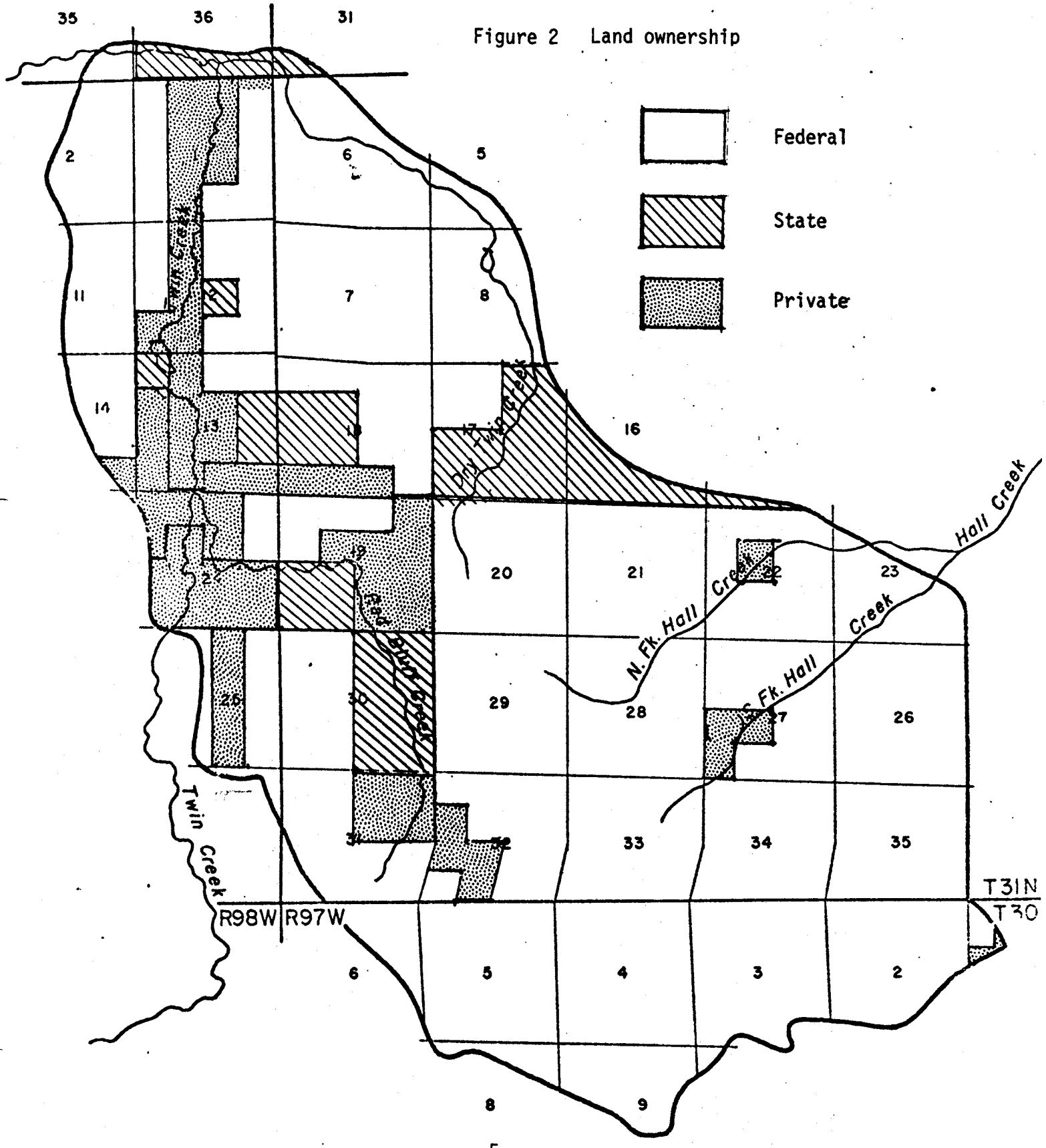
Topography

The area is faulted, eroded benchland. It is steep and rough in some places, but on the whole is only moderately rugged. Altitudes range from 5740 feet on the north and east boundaries to 7440 feet on top of Sheep Mountain on the southwest boundary (fig. 3).

Figure 1 Location Hall Creek Area-Wyoming



HALL CREEK MANAGEMENT AREA



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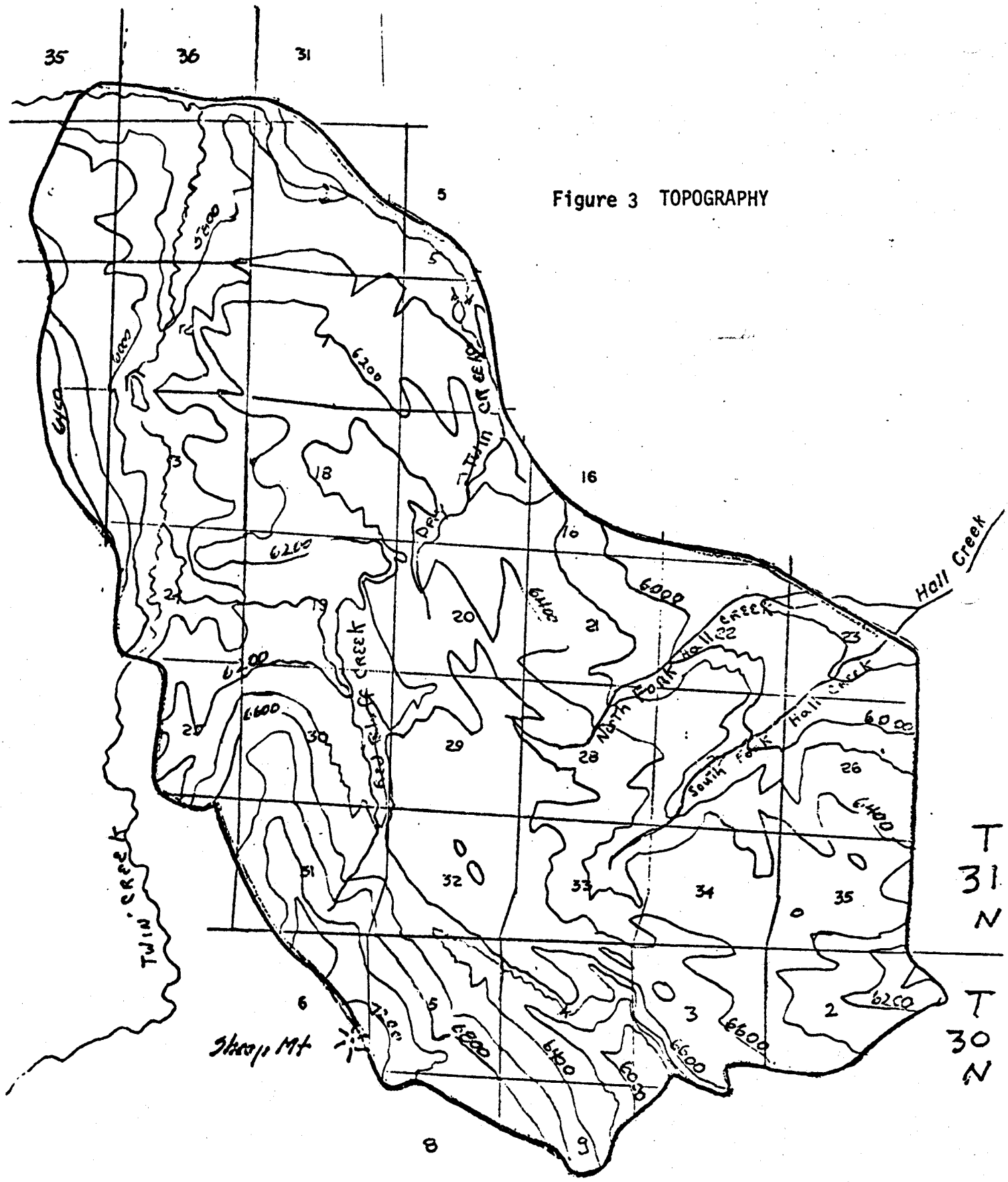


Figure 3 TOPOGRAPHY

Geology and minerals

Geologic formations include sandstones, shales, claystones, limestone, volcanic materials, and alluvium ranging from Mississippian some 350 thousand years ago to recent (fig. 4). Minerals on the area are bentonite, gypsum, phosphate, gold, and agate (fig. 5). Gas and oil may occur.

Water

Five live streams course through the area--Twin Creek, Dry Twin Creek, Red Bluff Creek, and the north and south forks of Hall Creek (fig. 6). Dry Twin Creek runs intermittently, the others yearlong. Twin Creek, the largest stream is only 5 to 10 feet wide. In addition, there are about twenty live springs on the area. There are no lakes. Water in abandoned gas wells indicate presence of underground water supplies.

Climate

Precipitation averages about 14 inches a year. A little more than half falls in springtime from March through June. The summers are relatively dry and warm and winters cold and snowy. Snow pack averages about 10 inches and covers the ground most of the time from November to March. Temperatures range from a minimum of about -20°F in winter to a maximum of about 105°F in summer. See tables 1 to 4 in Appendix B for precipitation and temperature records.

HALL CREEK MANAGEMENT AREA

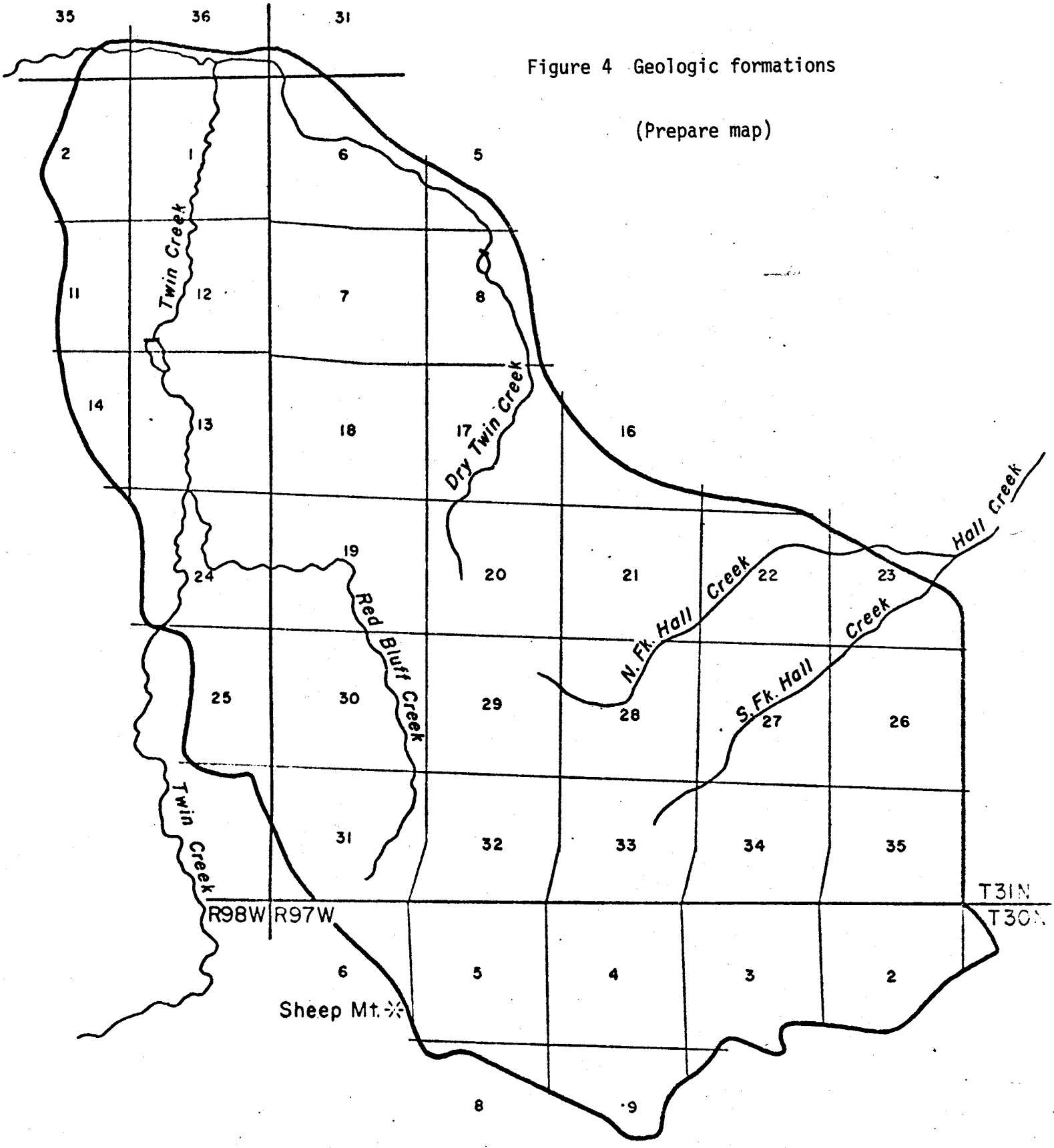
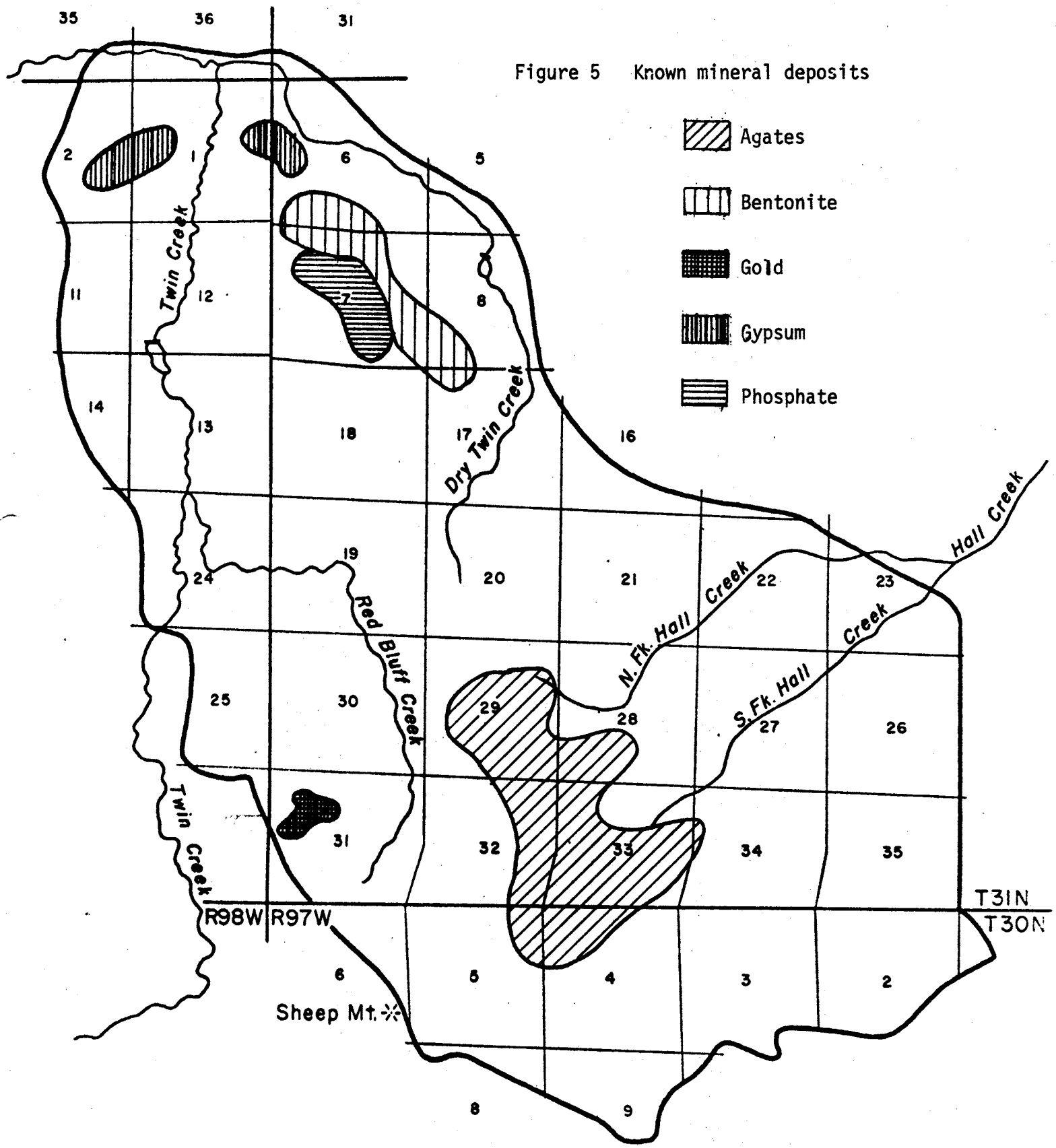


Figure 4 Geologic formations

(Prepare map)

HALL CREEK MANAGEMENT AREA



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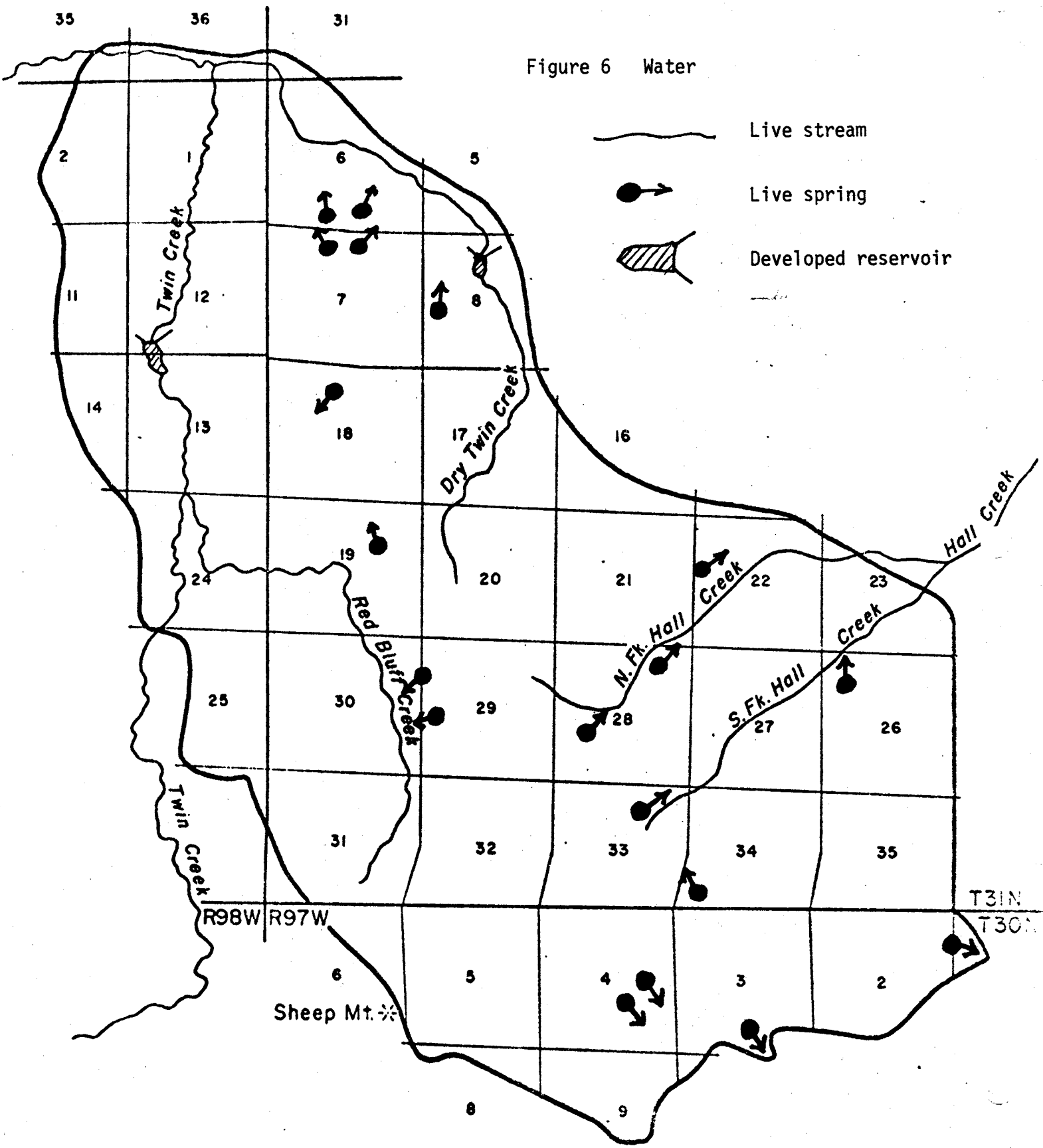


Vegetation

Over 100 species of plants have been found on the area, table 5 (Appendix B).

Types

The general aspect of the plant cover on the area is sagebrush-grass (fig. 7). However, some eight different types occur on the area (table 1). The location of these is shown in figure 8. The species composition of each type is listed in tables 6 to 13 (Appendix B).

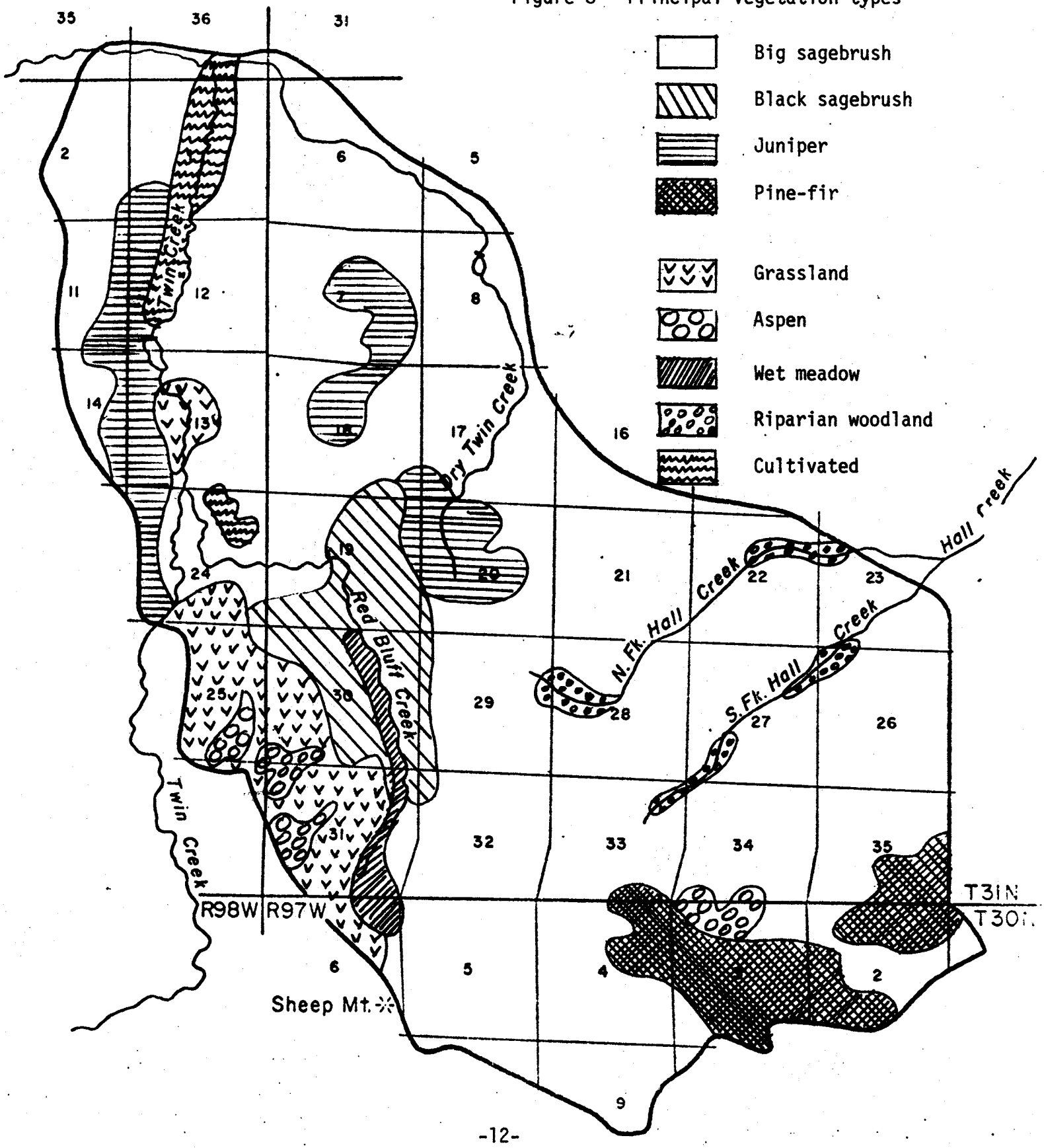
Figure 7 More than 80 percent of the area is covered by sagebrush--grass types.

Table 1 Principal vegetation types, Hall Creek Area

Type	Symbol	Acres	Percent of area
Big sagebrush	ARt	10,500	56.8
Black sagebrush	ARg	3,500	18.9
Juniper-pinyon	JP	1,150	6.2
Pine-fir	PF	1,100	5.9
Grassland	G	700	3.8
Aspen	A	550	3.0
Wet meadow	Wm	100	0.5
Riparian woodland	Rw	50	0.3
Cultivated	C	300	1.6
Waste	W	550	3.0
		18,500	100.0

HALL CREEK MANAGEMENT AREA

Figure 8 Principal vegetation types



Commercial timber

The pine-fir and aspen types have commercial value (table 2).

Table 2 Commercial timber acreage, Hall Creek Area

Type	Acres
Pine-fir	800
Aspen	350
	1150

See figure 9 for location of commercial areas. The pine (ponderosa pine) and fir (white fir) yield high quality saw timber. The aspen is used mainly for production of specialty products, including excelsior. Posts and firewood are obtained from the juniper-pinyon type.

The pine-fir and aspen types both have high esthetic and recreation values as well as timber values (fig. 10).

Figure 10 Area of quiet beauty. Pine-fir type, Crest Ridge, Hall Creek Area.

HALL CREEK MANAGEMENT AREA

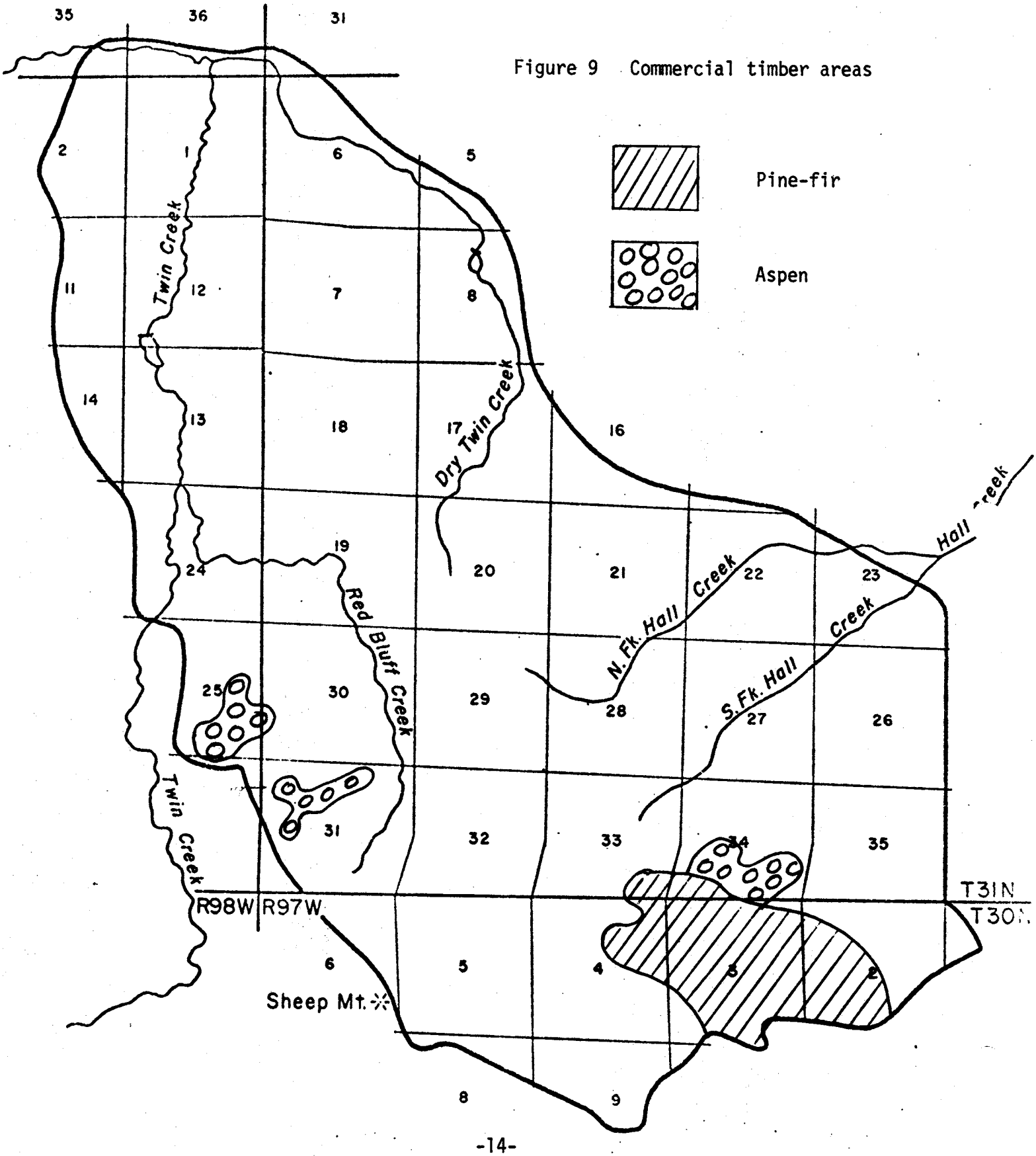


Figure 9 Commercial timber areas

Rare and endangered plant species

Two plants, checker mallow (Sidalcea campestris), a perennial forb, and 5-toothed grass Orcuttia pilosa), a perennial grass, classified as rare and endangered, occur on the area (fig. 11).

Harmful species

Tall larkspur has caused serious losses in cattle at times. It poses a considerable management problem. It is widely scattered at higher elevations (fig. 12). Two other species, death camas and needle-and-thread grass are also of concern (table 3).

Table 3 Plants harmful to livestock, Hall Creek Area

Name	Abundance[1]	Livestock	Effect
Death camas	Light	Sheep	Poison
Needle-and thread grass	Moderate	Sheep, cattle	Puncture wounds
Tall larkspur	Moderate	Cattle	Poison

[1]Scarce, light, moderate, heavy

Several plants on the area are harmful to humans. Some can cause death (table 4).

Table 4 Plants harmful to humans, Hall Creek Area

Name	Abundance[1]	Effect
Death cup (mushroom)	Scarce	Poison (deadly)
Homey mesquite	Heavy	Puncture wounds
Poison oak	Light	Skin irritant
Water hemlock	Scarce	Poison (deadly)

[1]Scarce, light, moderate, heavy

Edible plants

Table 4A Edible plants, Hall Creek Area

Common name	Scientific name	Part and use
Biscuit root	Lomatium ambiguum	Roots. Meal.
Chokecherry	Prunus demissa	Berries. Jams, jellies.
Indian ricegrass	Oryzopsis hymenoides	Seeds. Flour, gruel.
Skunk bush somac	Rhus trilobata	Seeds. Beverage.
Yellow salsify	Tragopogon pratensis	Roots. Cooked, baked.

HALL CREEK MANAGEMENT AREA

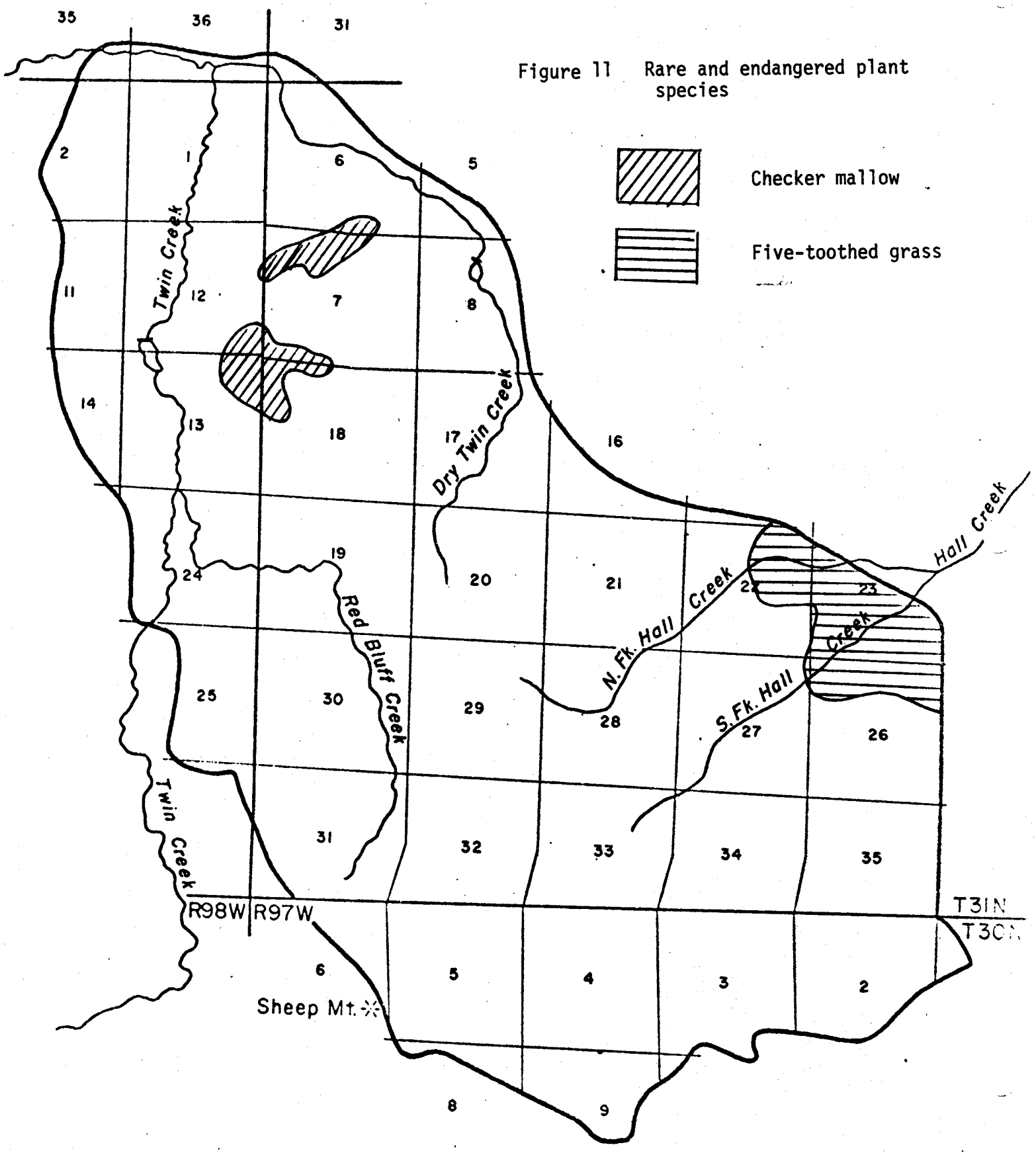


Figure 11 Rare and endangered plant species

HALL CREEK MANAGEMENT AREA

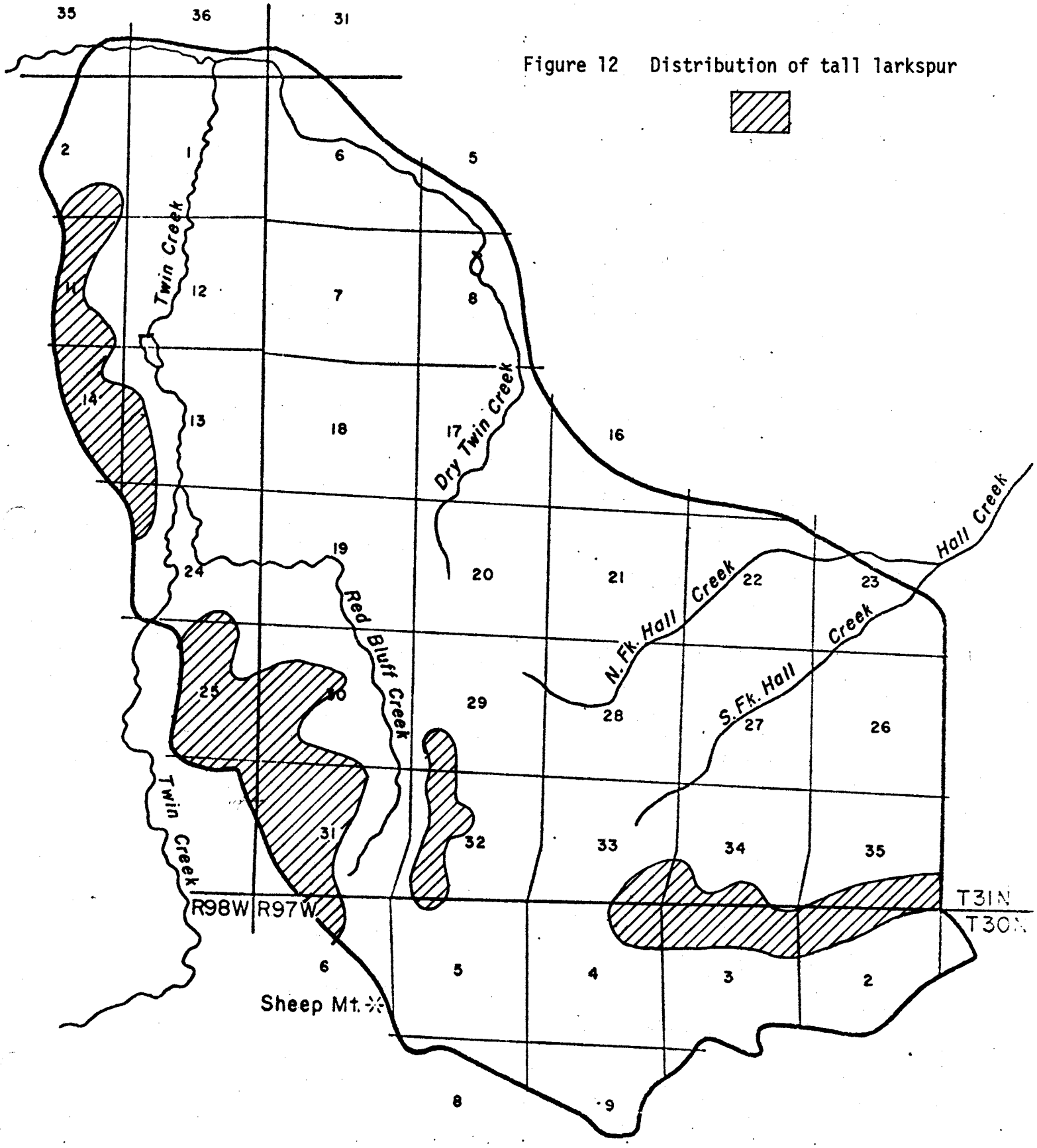


Figure 12 Distribution of tall larkspur

Soils[1]

The principal soil types on the area are listed in table 5. More complete descriptions of each type appear in table 14 (Appendix B). The location of the types is shown in figure 13.

Table 5 Principal soil types, Hall Creek Area

Name	Color	Depth (inches)	Fertility	Plant cover species
Patterson stony loam	Brown	16-30	High	Pine, fir
Bieber gravelly loam	Gray	6-18	Low	Sagebrush
Pit clay loam	Black	20-36	High	Aspen
etc.				

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[1]Note on soil information--

Type map

Delineate non-soil areas (steep slopes where there has been no soil development). On areas where there has been some soil development delineate soil types within vegetation types.

Type descriptions

Get the following general information on each soil type. More technical information can be obtained later if needed.

1. Soil profice
   Color, texture, depth (total and horizon A) drainage (poor, good, excellent), p^H
2. Sheet erosion (accelerated)
   None = not recognizable
   Light = recognizable
   Moderate to heavy = obvious
3. Rockiness
   None = area could be plowed
   Light = area could be disced but not plowed
   Heavy = area could not be worked with machinery
4. Slope
   Flat
   Gentle to moderate = could be traversed with ground machinery
   Steep = could not be traversed with ground machinery
5. Plant cover
   Dominant species

HALL CREEK MANAGEMENT AREA

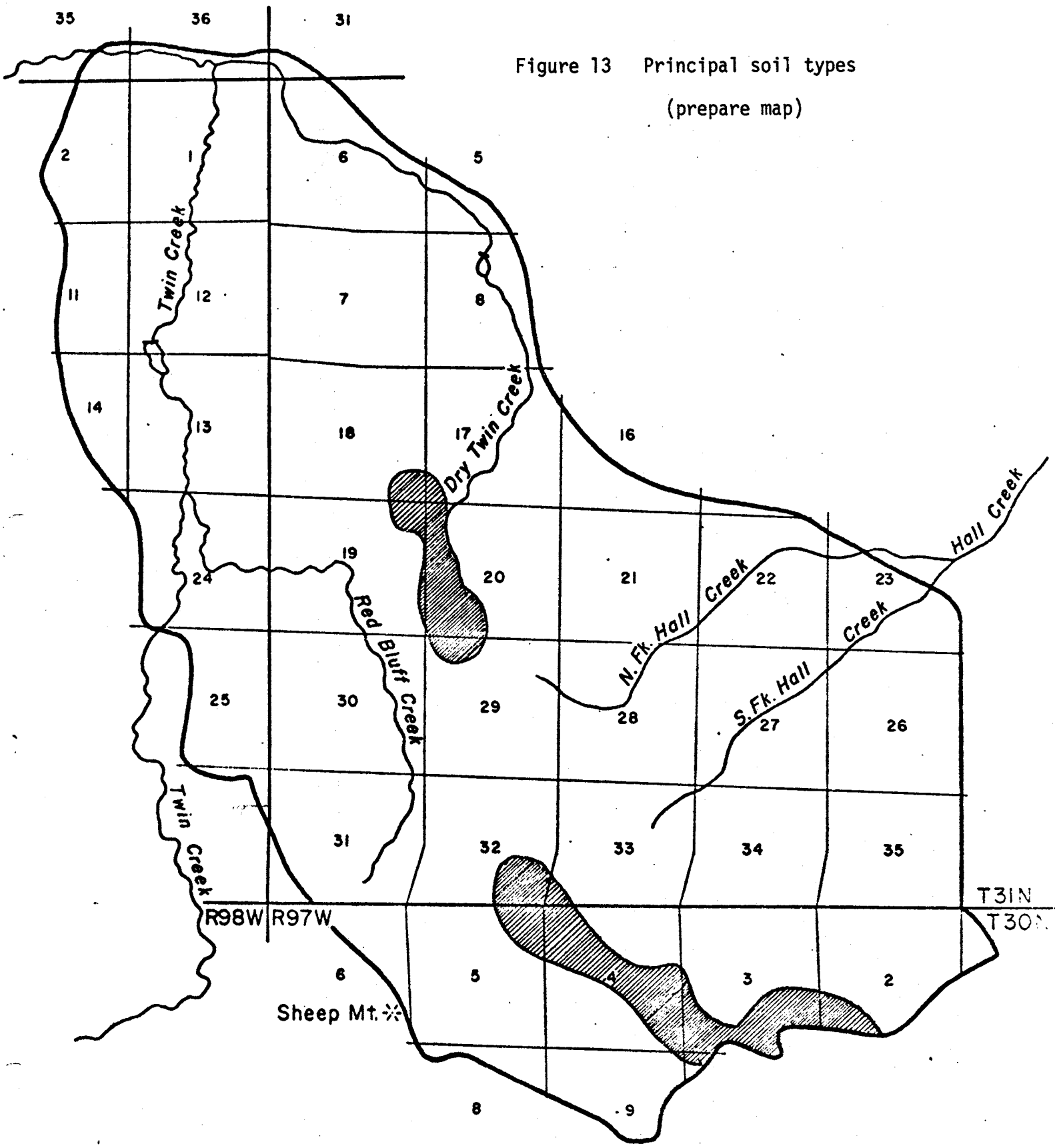


Figure 13 Principal soil types

(prepare map)

Wildlife

More than 100 species of animals have been identified on the area, table 15 (Appendix B).

Game species

A variety of game occur on the area (table 6). Their habitat areas cover practically the entire Hall Creek acreage (figs. 14 to 20).

Table 6 Principal game species, Hall Creek Area

Name	Abundance			
	Past		Present	
	Number	Description[1]	Number	Description
Big game				
Antelope				
Deer				
Elk				
Upland birds				
Chukar				
Sagegrouse				
Water fowl				
Canada Goose				
Mallard				
Teal				
Fish				
Brown trout				
Rainbow trout				

[1]None, scarce, light, moderate, heavy

HALL CREEK MANAGEMENT AREA

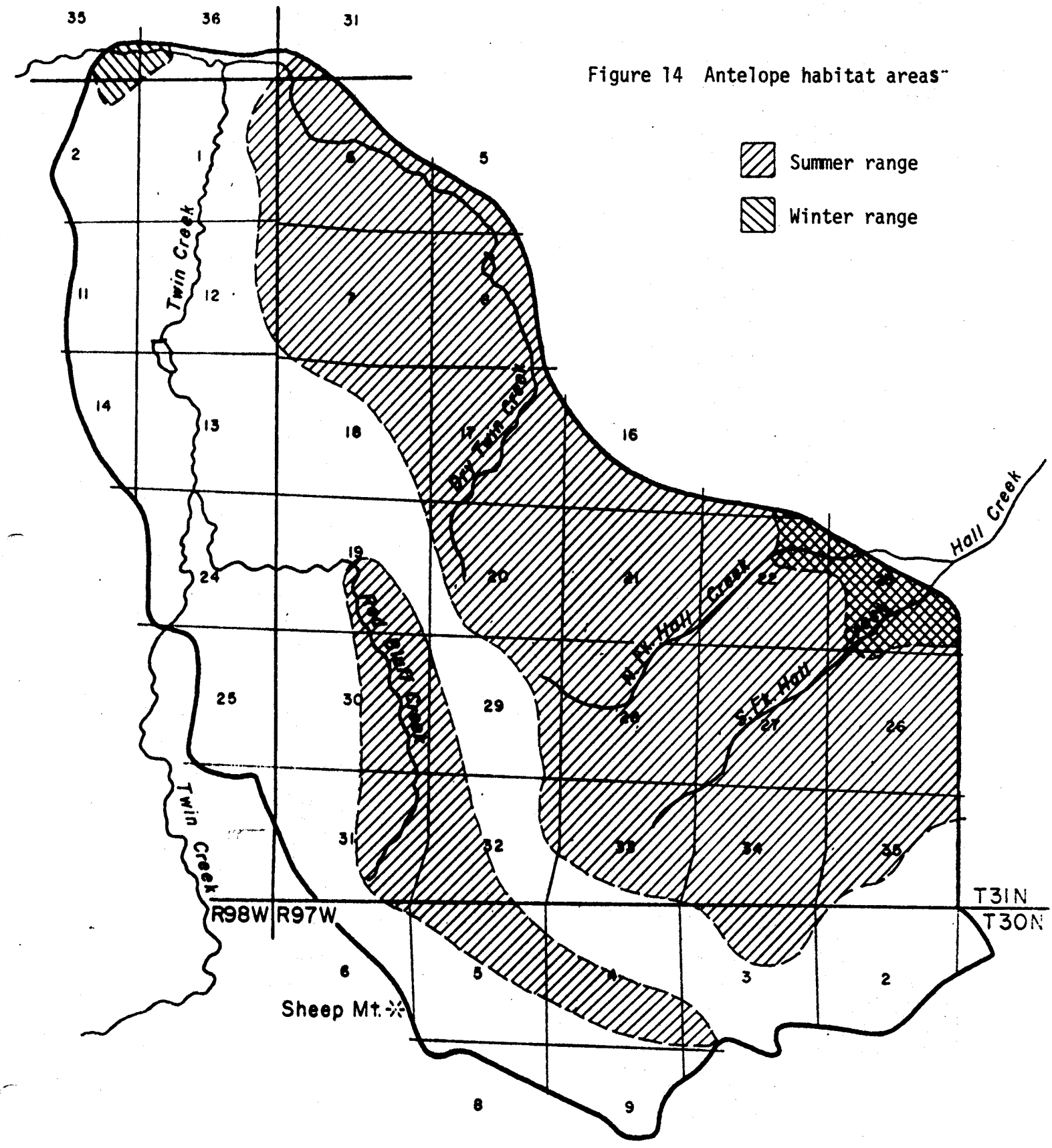


Figure 14 Antelope habitat areas

Summer range

Winter range

HALL CREEK MANAGEMENT AREA

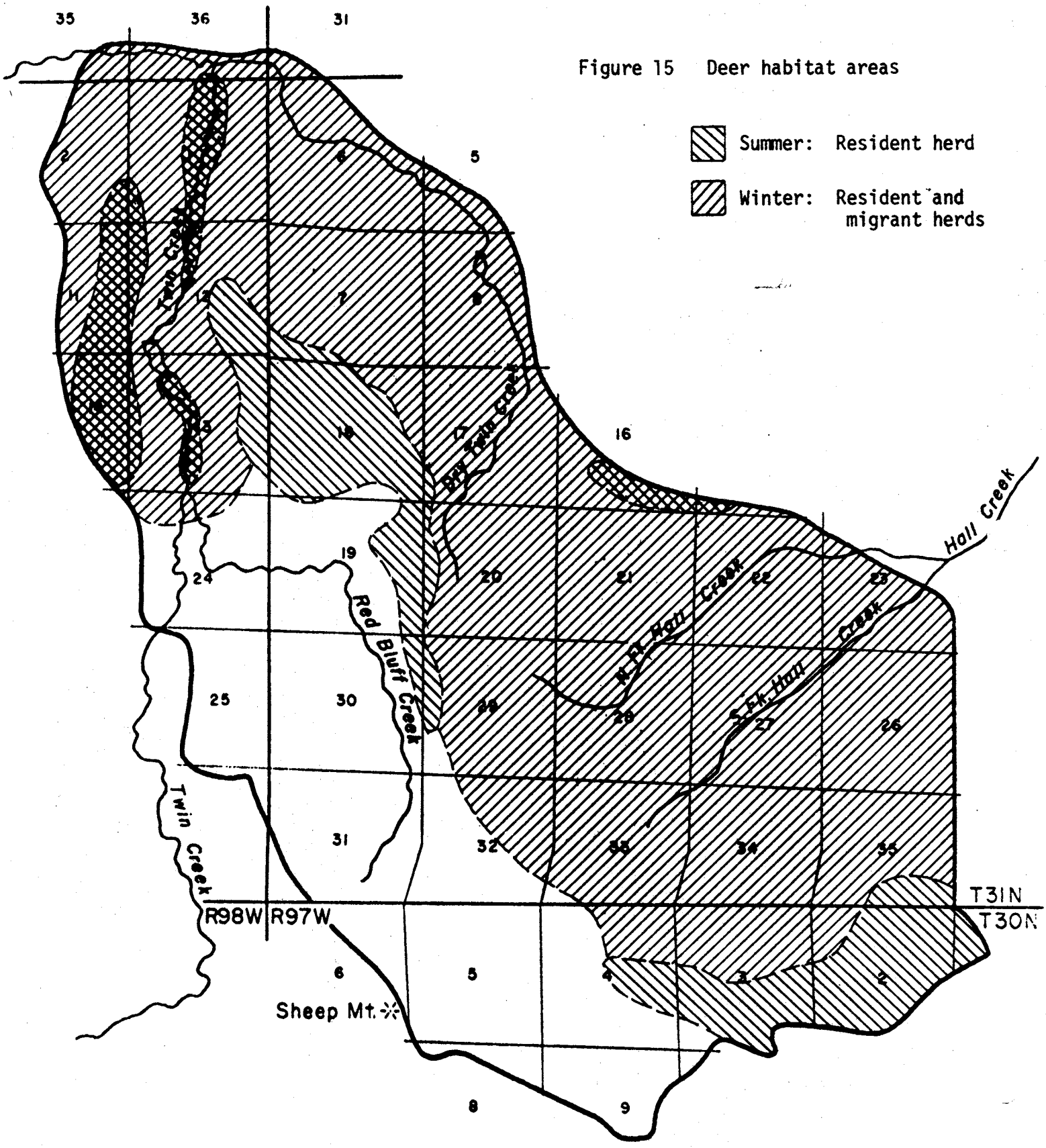


Figure 15 Deer habitat areas

Summer: Resident herd

Winter: Resident and migrant herds

HALL CREEK MANAGEMENT AREA

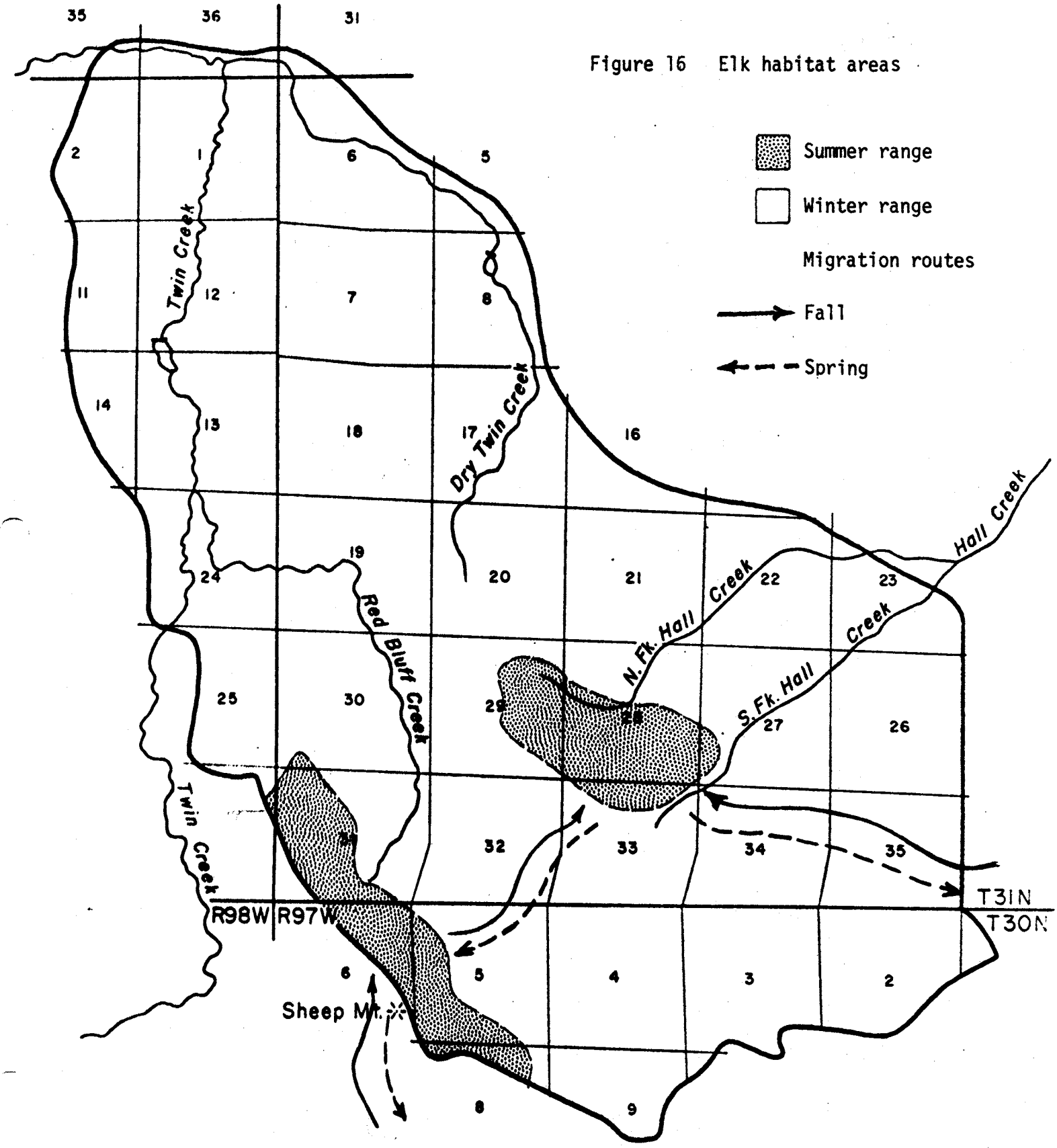


Figure 16 Elk habitat areas

HALL CREEK MANAGEMENT AREA

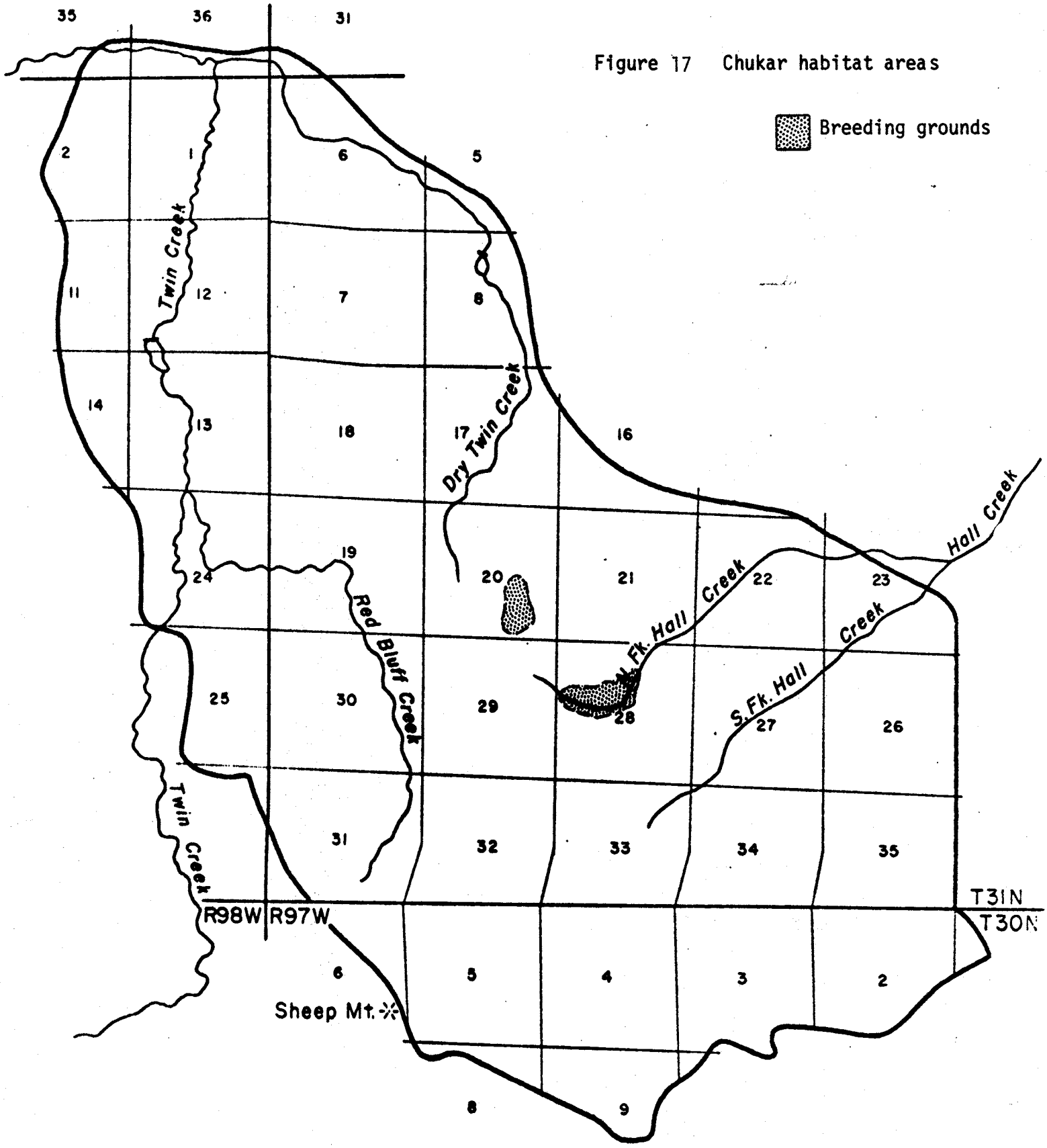


Figure 17 Chukar habitat areas

Breeding grounds

HALL CREEK MANAGEMENT AREA

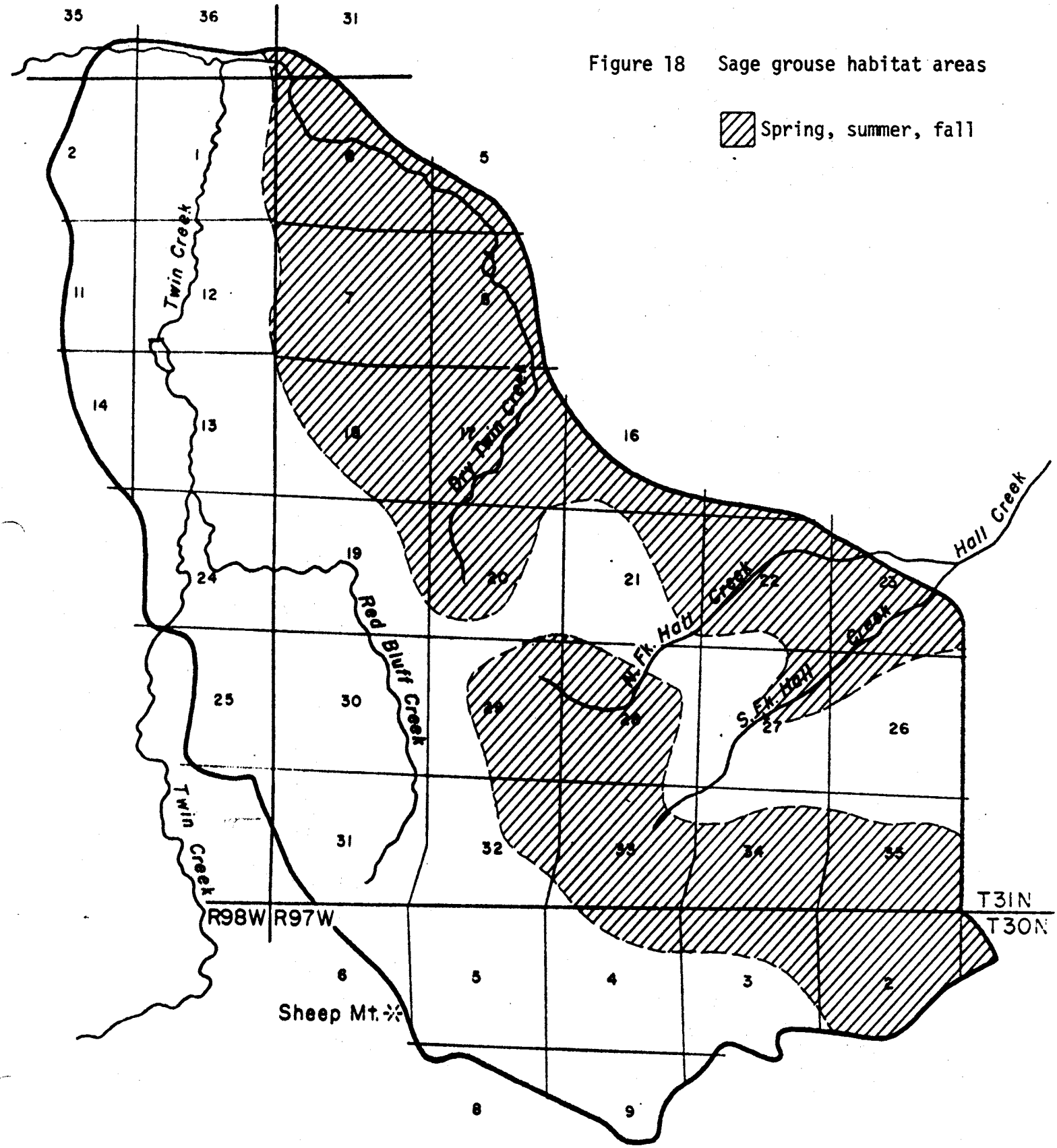


Figure 18 Sage grouse habitat areas

Spring, summer, fall

HALL CREEK MANAGEMENT AREA

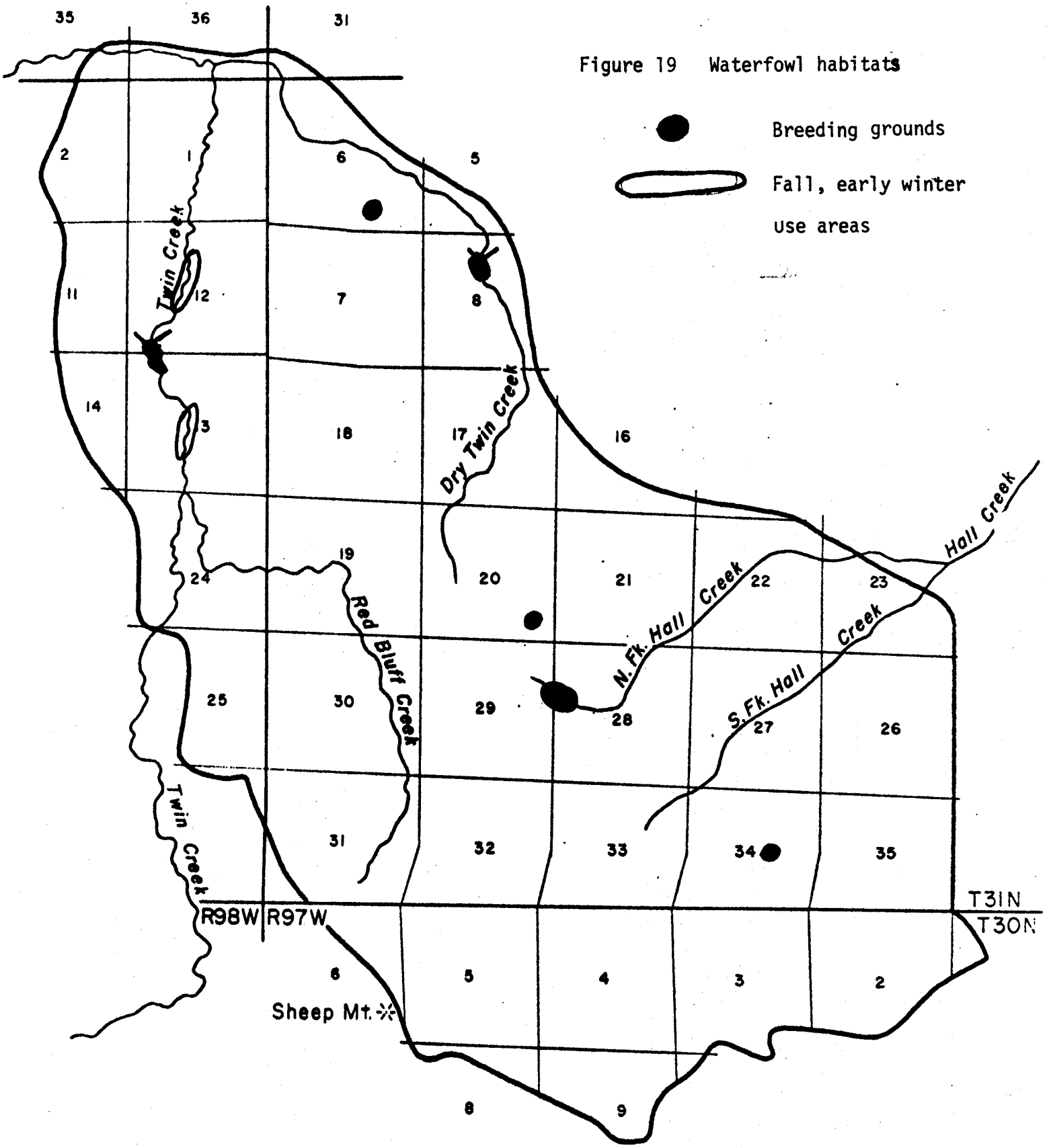


Figure 19 Waterfowl habitats

HALL CREEK MANAGEMENT AREA

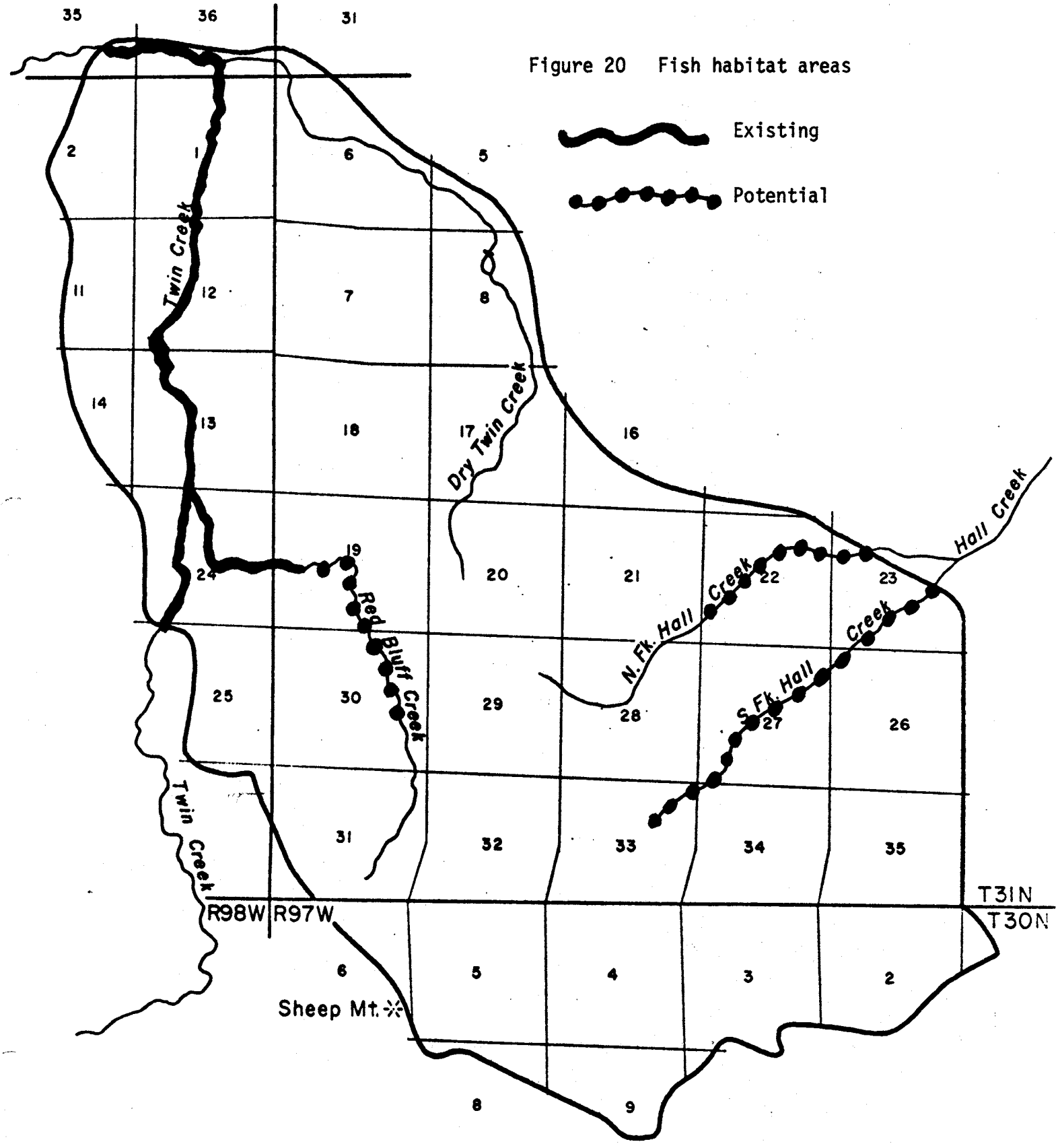


Figure 20 Fish habitat areas

Existing

Potential

Wild horses

About 60 head of wild horses range over portions of the area summer and winter (fig. 21).

Rare and endangered species

Three rare and endangered species occur on the area (table 7).

Table 7 Rare and endangered animal species, Hall Creek Area

Name	Abundance	
	Past	Present
	Number or Description[1]	Number or Description
Blackfooted ferret		
Desert tortoise		
Prairie falcon		

[1]None, scarce, light, moderate, heavy

The habitat areas of these species cover nearly one third of the Hall Creek Area (fig. 22). The desert tortoise (fig. 23) still occurs in appreciable numbers, but is threatened by man's activities.

Figure 23 The desert tortoise is threatened by off-road vehicles and pet collectors, Hall Creek Area.

HALL CREEK MANAGEMENT AREA

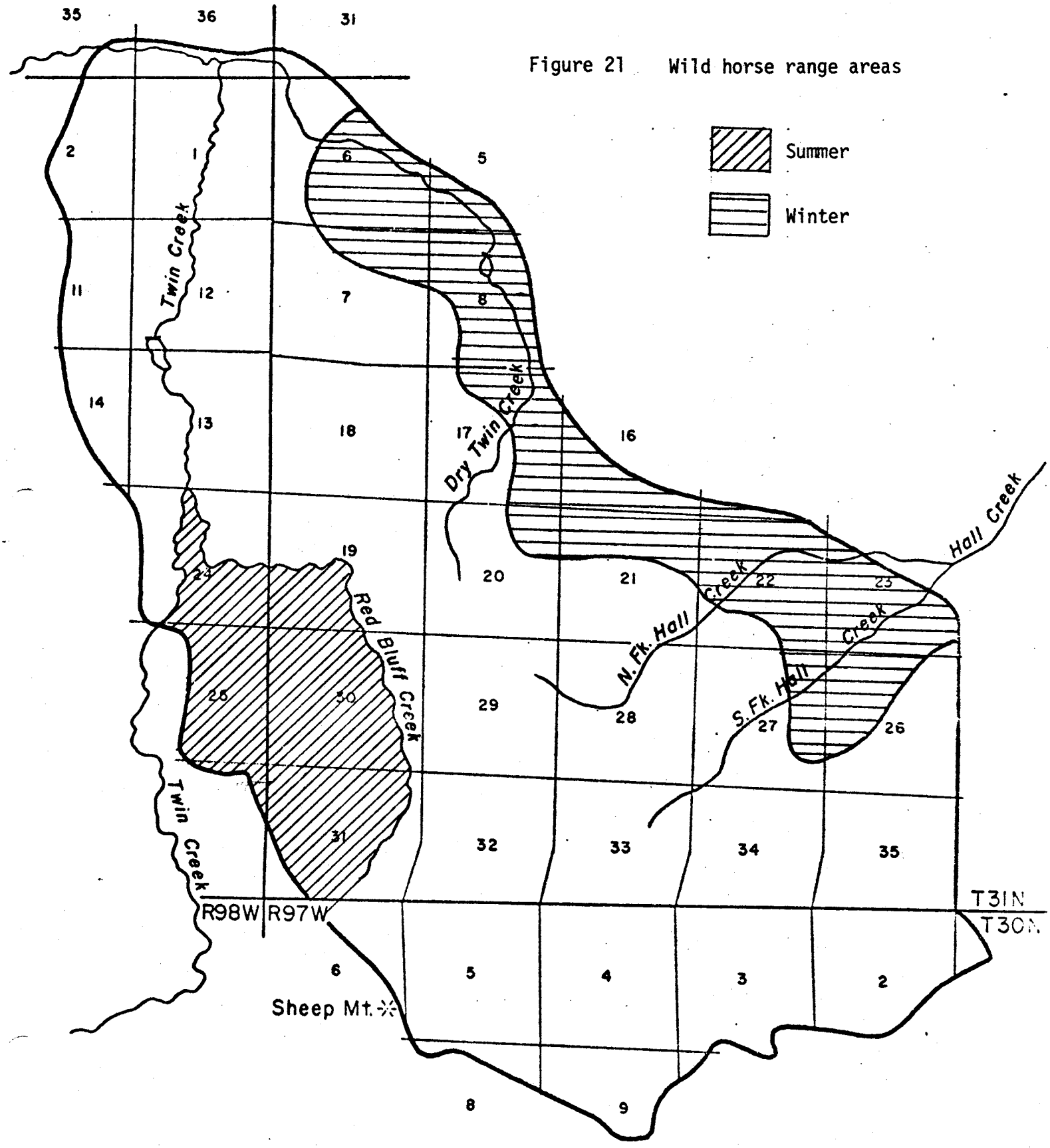
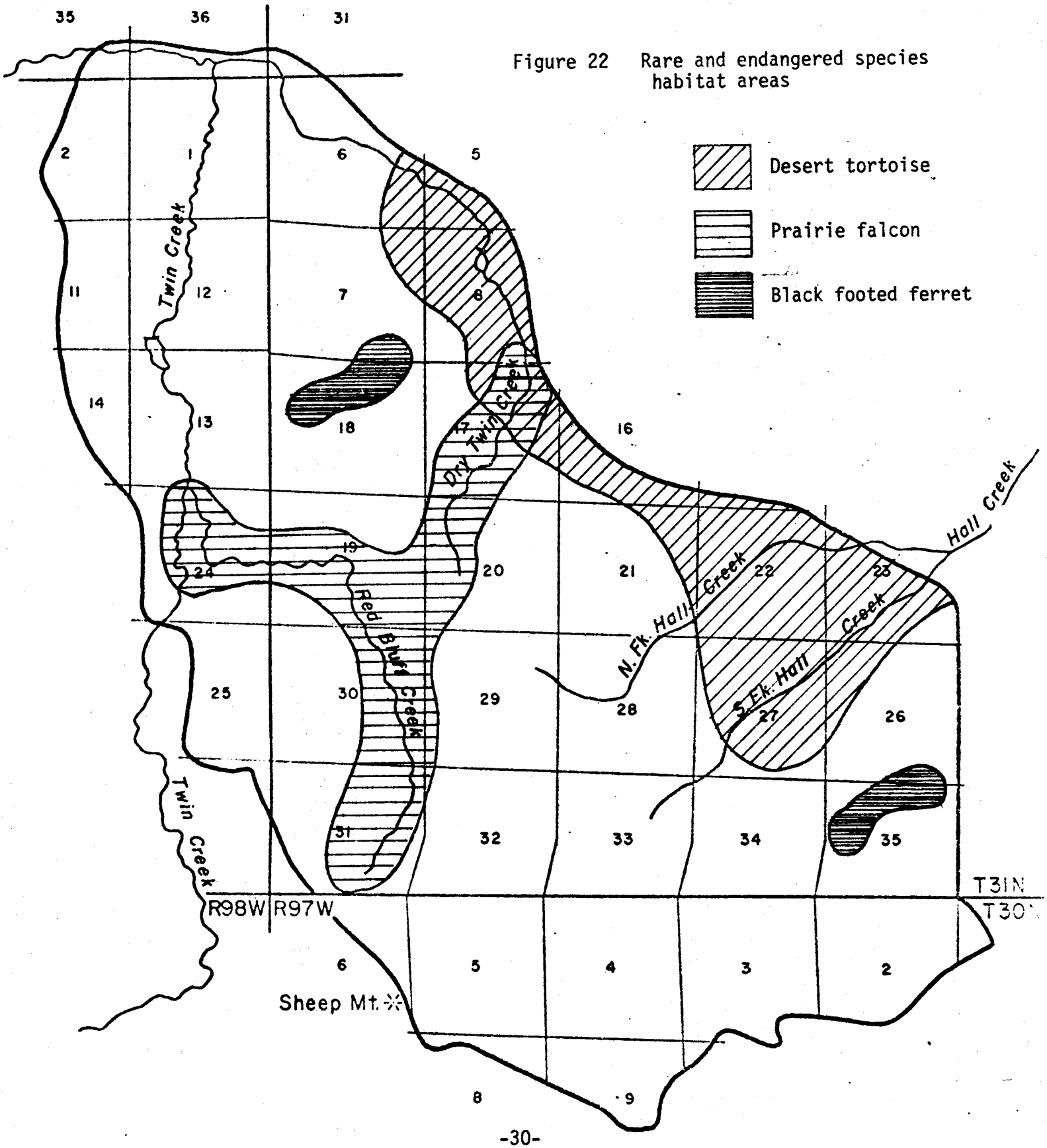


Figure 21 Wild horse range areas

HALL CREEK MANAGEMENT AREA



Fur bearers

Five fur bearers occur in significant numbers on the area (table 8). The badger is most abundant.

Table 8 Principal fur bearers, Hall Creek Area

Name	Abundance			
	Past		Present	
	Number	Description[1]	Number	Description
Badger				
Beaver				
Fox				
Muskrat				
Skunk				

[1]Scarce, light, moderate, heavy

Large predators

The coyote and bobcat are fairly common on the area (table 9).

Table 9 Large Predators, Hall Creek Area

Name	Estimated numbers	
	Past	Present
Black Bear		
Bobcat		
Cougar		
Coyote		
Fox		

Birds of prey

These useful birds occur in appreciable numbers on the area (table 10).

Table 10 Birds of Prey, Hall Creek Area

Name	Abundance	
	Number	Description[1]
American Osprey		
Golden Eagle		
Gray Hawk		
Redtail Hawk		
Sparrow Hawk		

[1]Scarce, light, moderate, heavy

Harmful species

A few species of animals on the area are potentially harmful to humans (table 11).

Table 11 Animals species potentially harmful to humans, Hall Creek Area

Name	Abundance[1]
Black widow spider	
Scorpion	
Rattlesnake	
Skunk	
Spotted fever tick	

[1]Scarce, light, moderate, heavy

Esthetics

High esthetic values are generated on the area by the particular kind of topography, geologic formations, vegetation, water bodies, and natural settings found here (figs. 24 to 28).

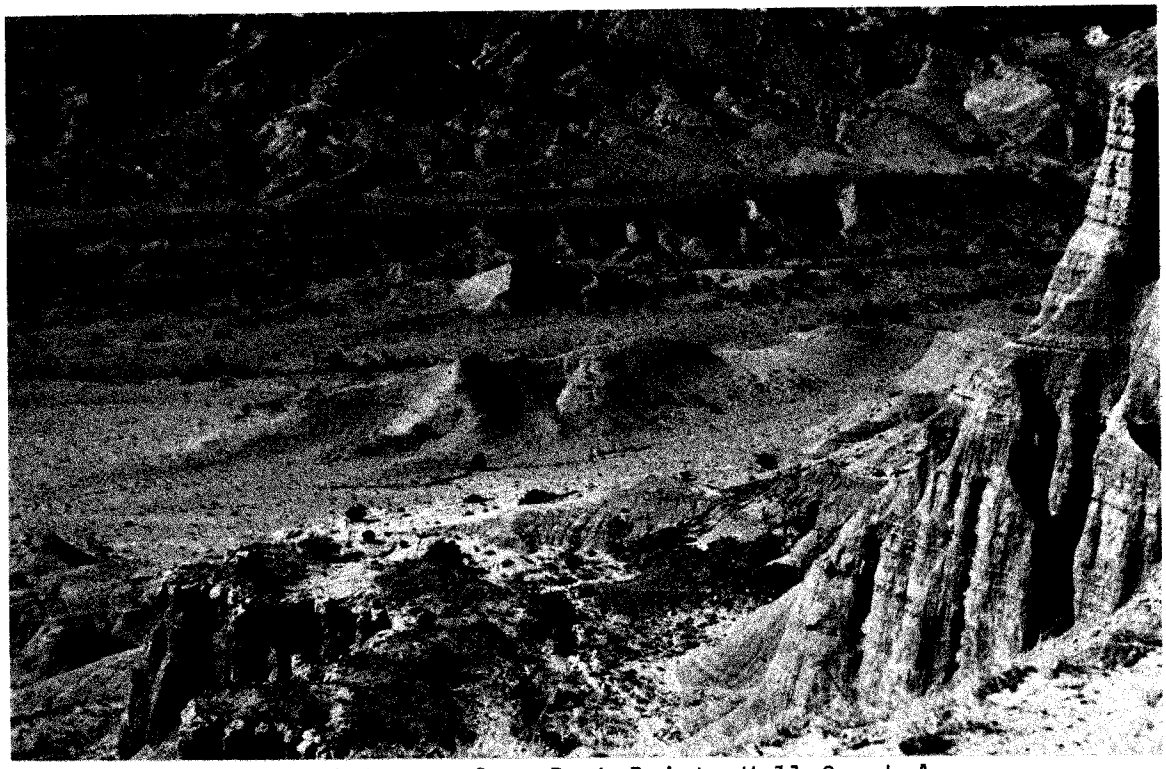


Figure 24 Red Bluff Canyon from Rock Point, Hall Creek Area.

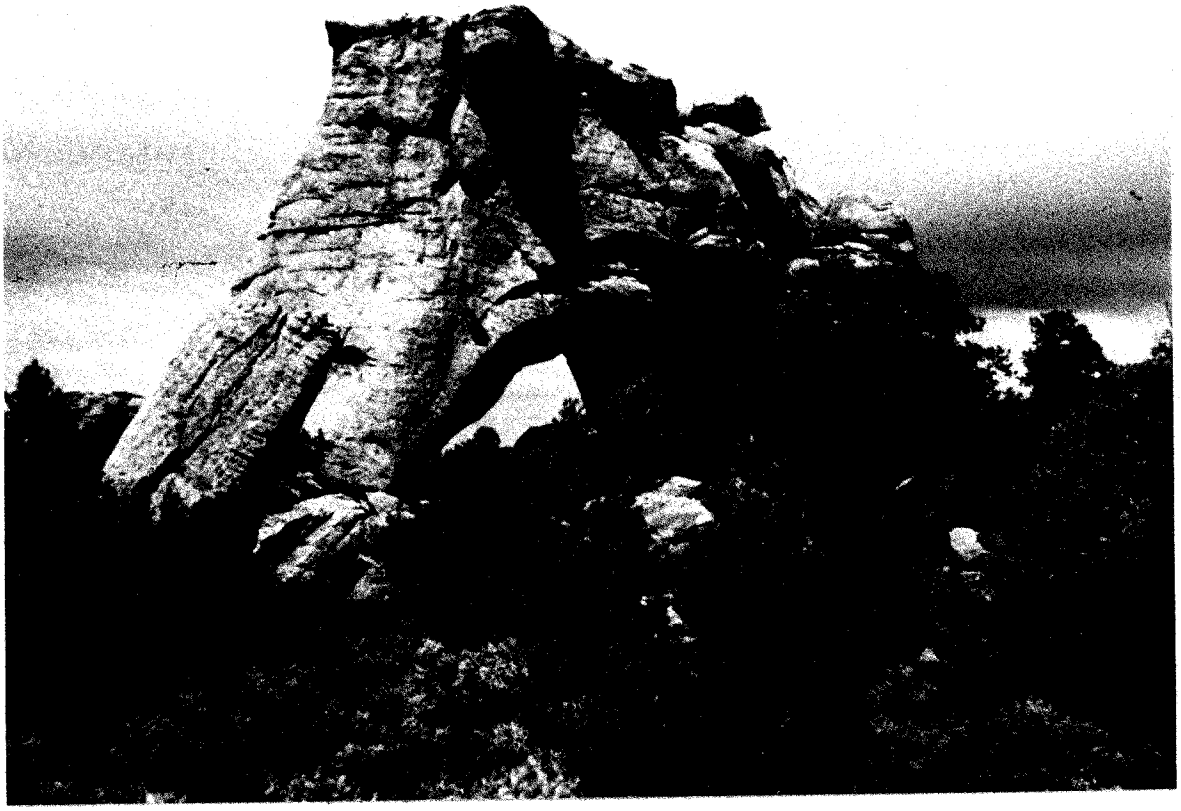


Figure 25 Jasper Arch on Long Bench, Hall Creek Area.

HALL CREEK MANAGEMENT AREA

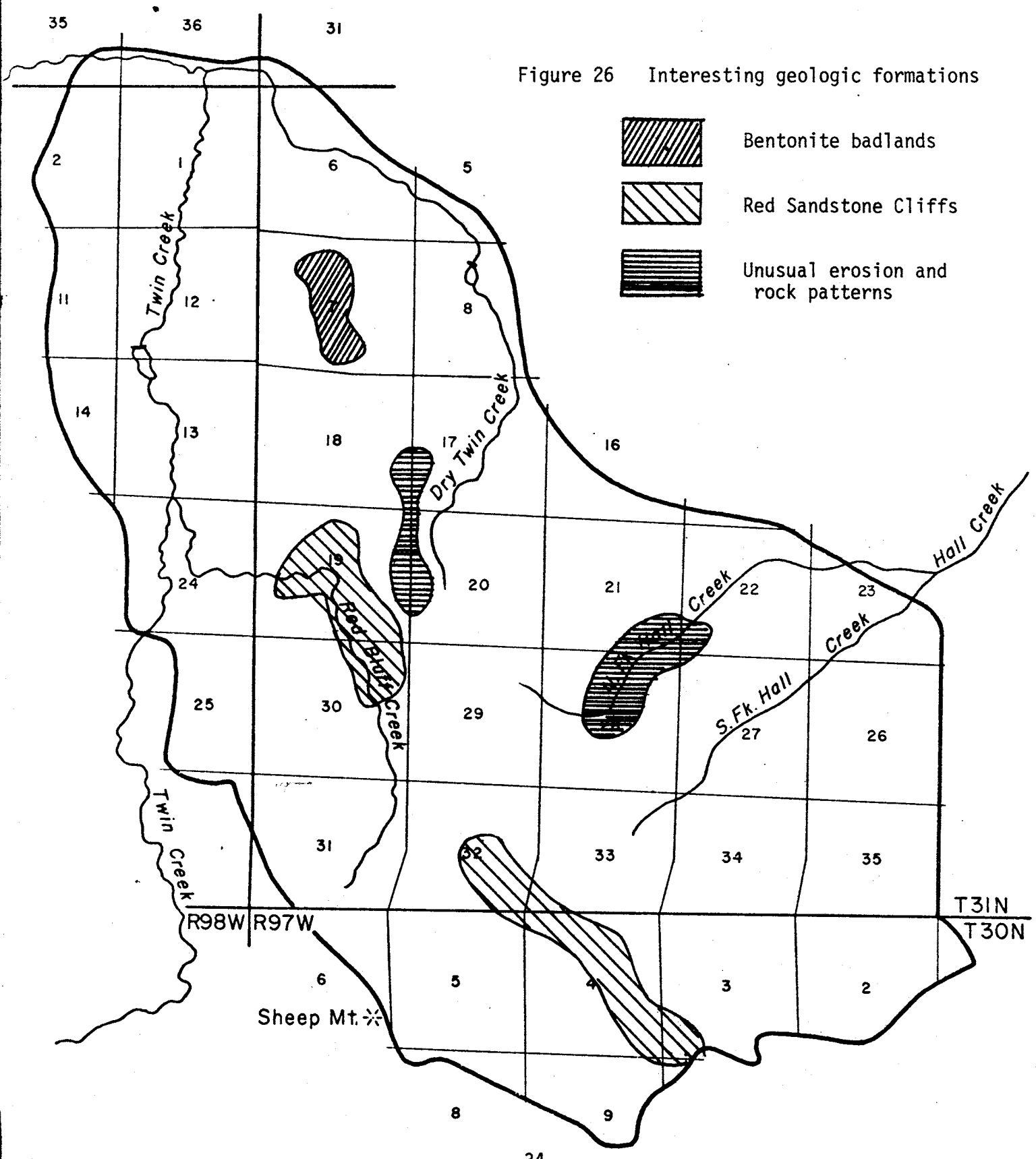


Figure 26 Interesting geologic formations

Figure 27 Aspen in fall, Sheep Mountain road, Hall Creek Area.

Figure 28 Spring runoff. South Fork Hall Creek, Hall Creek Area.

Wilderness

About 2400 acres of unspoiled wilderness still remain on the area. Access is only by foot (fig. 29).

Figure 29 An opening in the virgin pine-fir forest. Wild lilac is in bloom and the air is clean and fresh. Crest Ridge, Hall Creek Area.

Archeologic areas

The Shoshone Indians used the Hall Creek Area for a considerable period before the advent of white man. Evidence of their presence has been found in more than twenty locations to date (figs. 30, 31).

HALL CREEK MANAGEMENT AREA

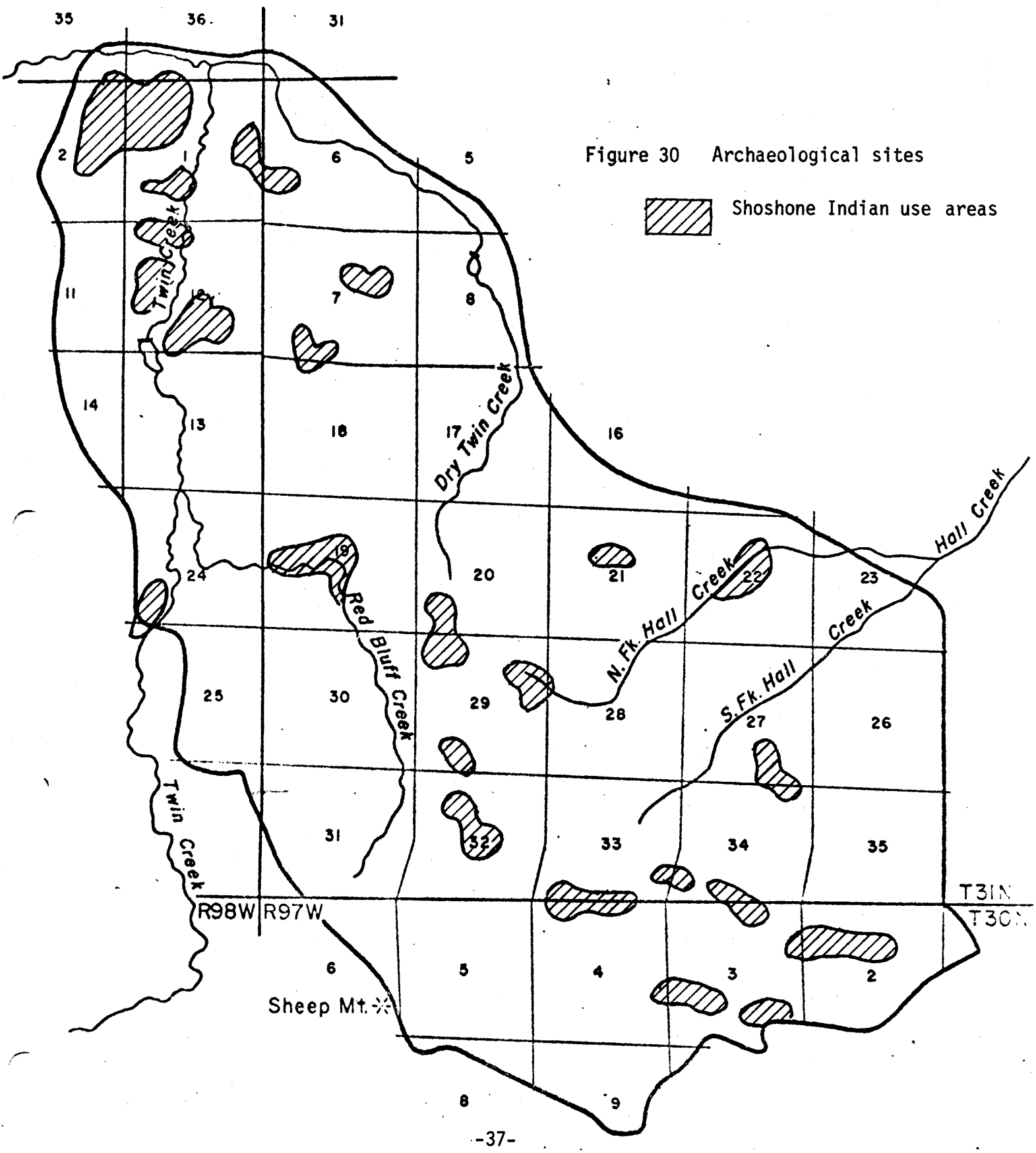


Figure 30 Archaeological sites

Shoshone Indian use areas

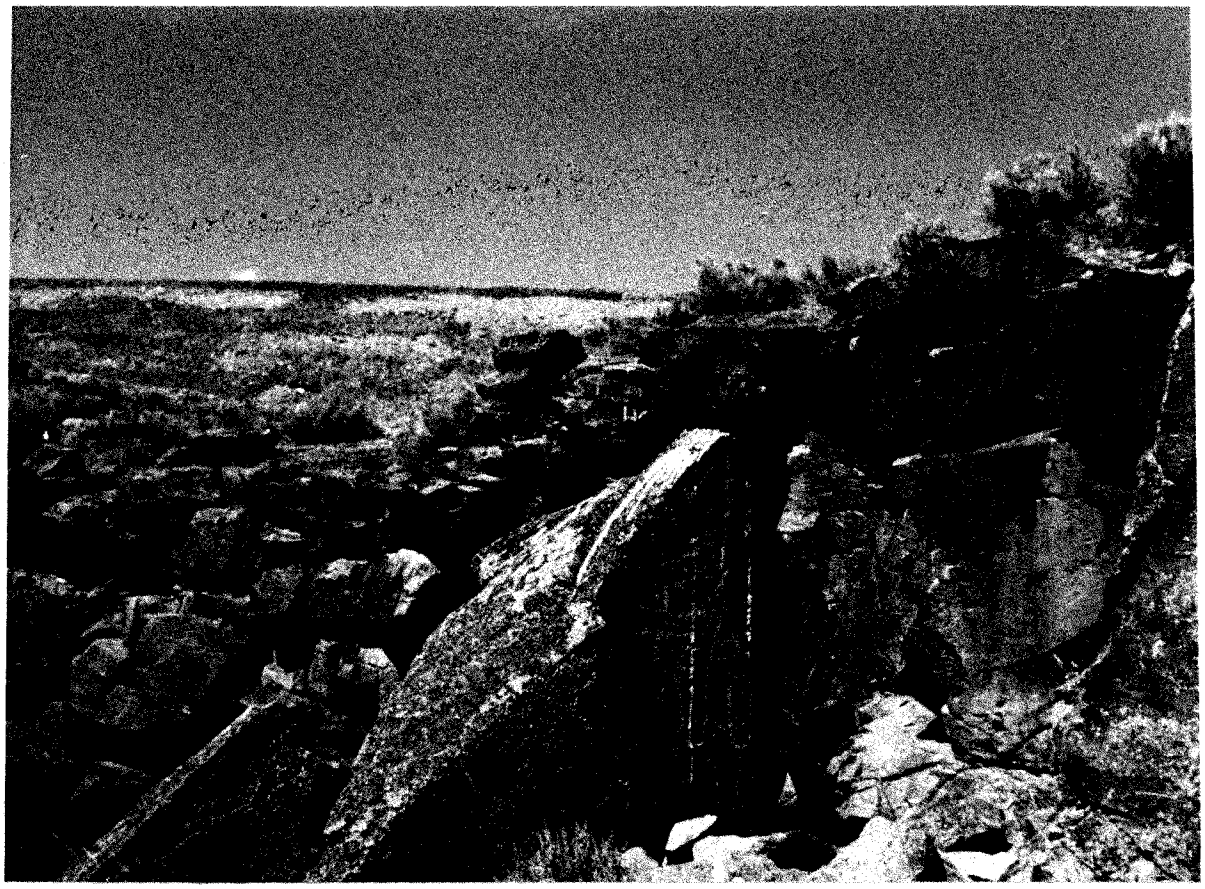
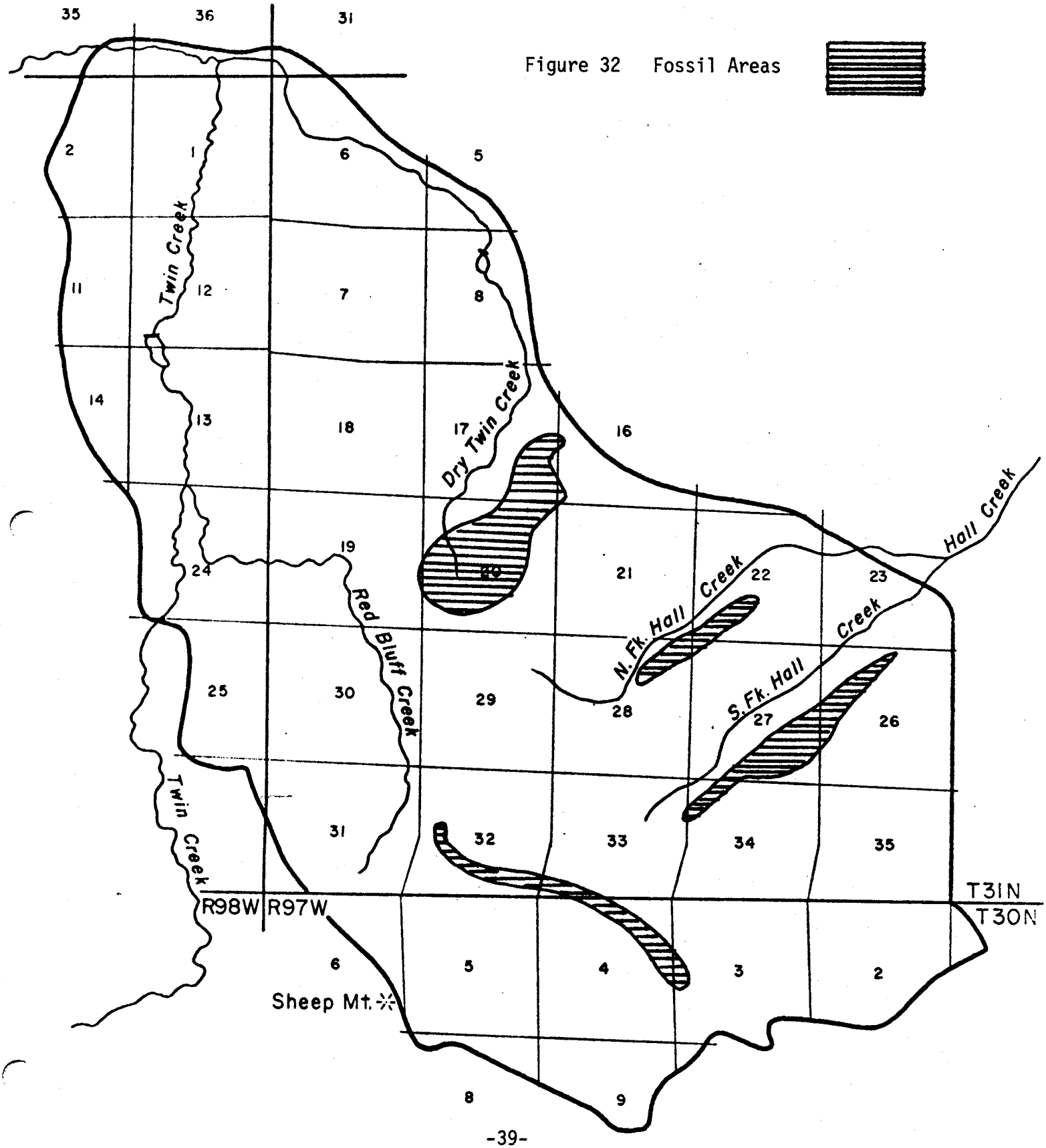


Figure 31 Inscriptions on lave rock by Shoshone Indians prior to white man. Coyote Draw, Hall Creek Area.

Fossil areas

Both plant and animal fossils dating back to the Cambrian period, some 550 million years ago, have been found on the area (fig. 32).

HALL CREEK MANAGEMENT AREA



Historic sites and structures

White man started to use the area rather intensively in the 1880's. Signs of his activities and way of life are still evident. Crumbling buildings and rusting mining equipment remain of Gold Load once a community of nearly 1000 people in the Dry Twin Creek drainage (figs. 33, 34).

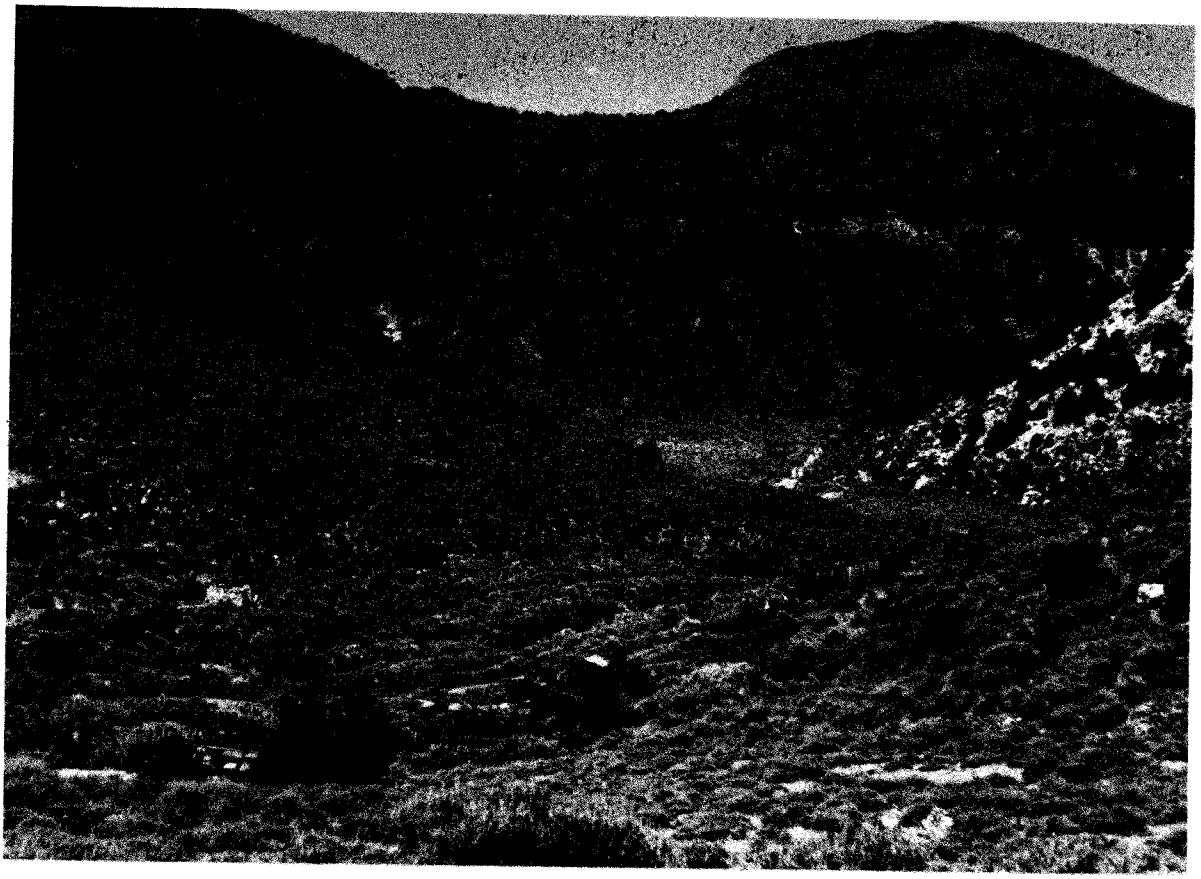
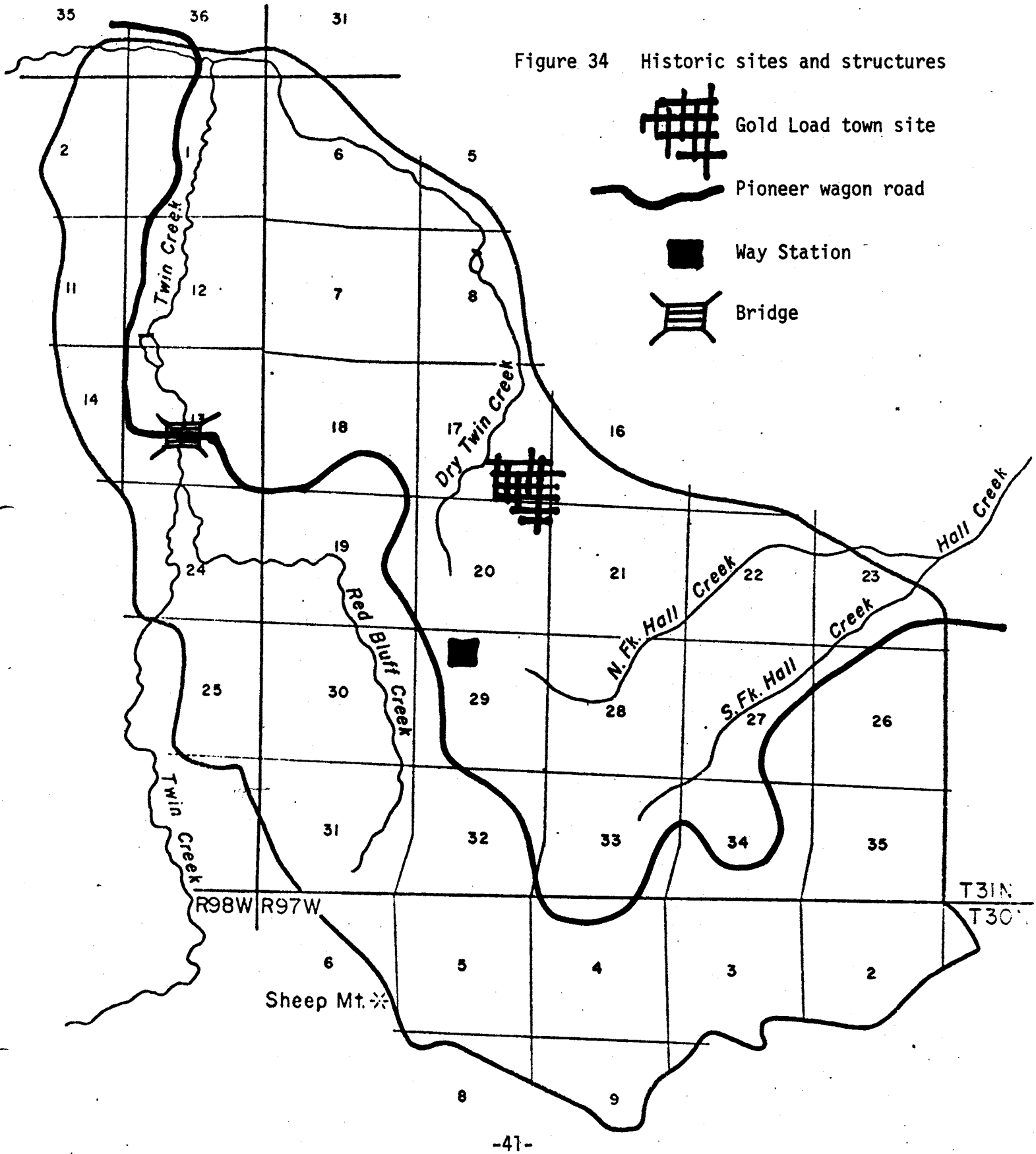


Figure 33 Gold Load was once a thriving gold mining community on the Hall Creek Area. The town "died" when the supply of gold--a non-renewable resource--was exhausted.

HALL CREEK MANAGEMENT AREA



The miners led a hard but not altogether lonely life (fig. 35).

Figure 35 One of the bordellos near Gold Load in the hey-day of mining. Hall Creek Area.

A pioneer wagon road, still well defined in many places, passes northwestward through the area (fig. 34). An old way station on the east side of Red Bluff Canyon and a wooden bridge across Twin Creek are along the route.

Research and educational areas

In 1939, the Bureau of Land Management in cooperation with the University of Wyoming, the Wyoming Department of Fish and Game and the Soil Conservation Service established a research area in the North Fork drainage of Hall Creek to study land management problems associated with the ecological complex on the Hall Creek Area. Management information that may be developed on the area has wide application in Wyoming and neighboring states.

Impact of man activities

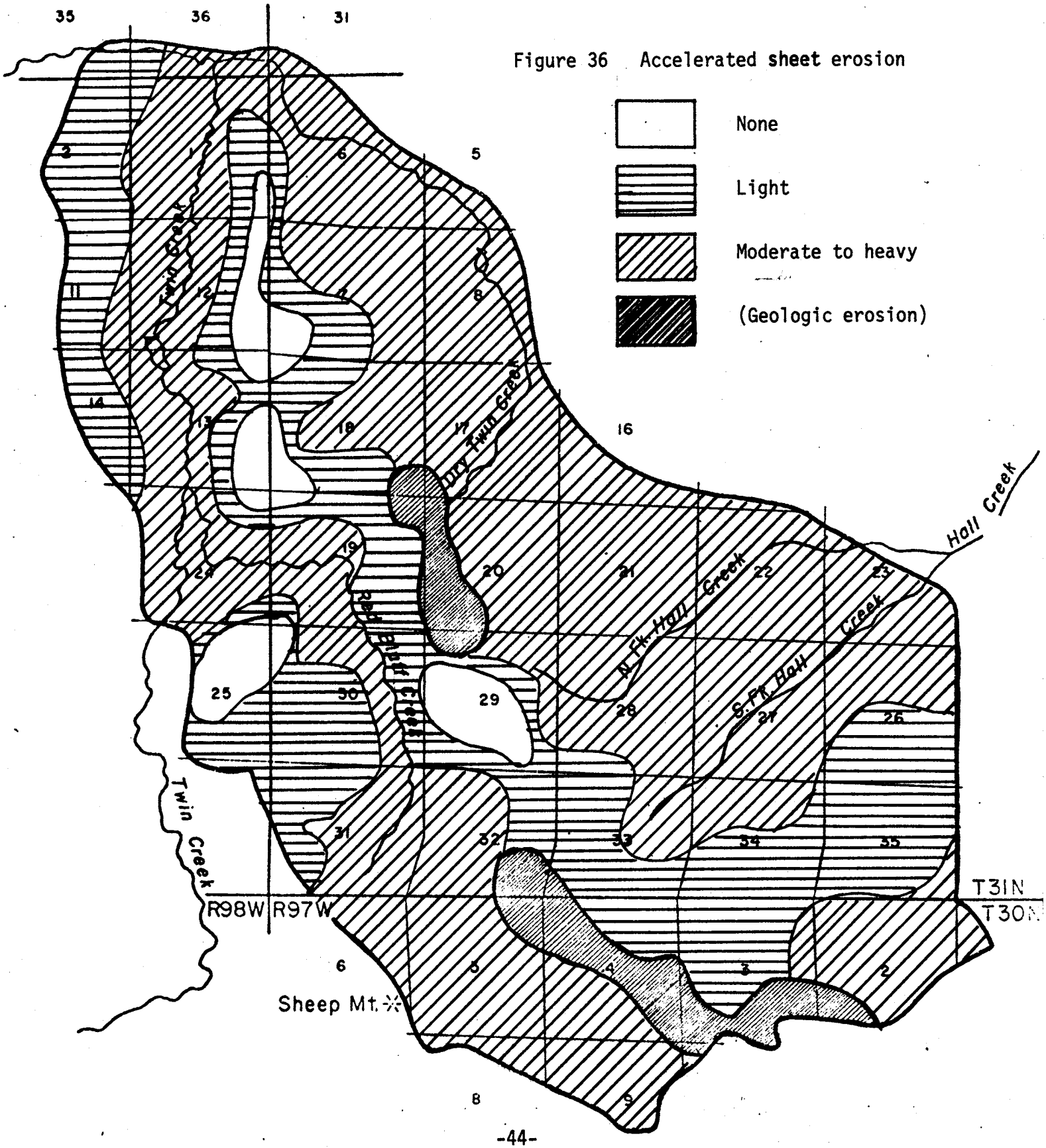
Vegetation and soil both have been heavily deteriorated on the Hall Creek Area by man's activities in the last 100 years. Most serious, soil has been lost through erosion, reducing soil fertility and the basic capacity of the land to produce renewable resources. Practically the entire area used by man has been eroded (fig. 36).

The principal man activities responsible for this land degradation and the approximate acreage effected by each are listed in table 12.

Table 12 Approximate acreage effected by man activities on the Hall Creek Area (1878-1976)

Activity	Acres	Percent of Hall Creek area
Livestock grazing	17,300	94
Cultural practices	1,550	9
Construction (roads, dams, reservoirs, etc.)	800	4
Mining	650	3
Forestry	300	2
Recreation	190	1
Other	115	1
	18,500	

HALL CREEK MANAGEMENT AREA



Livestock grazing

Livestock have been grazed on practically the entire Hall Creek Area more or less continuously and heavily since about 1878 (fig. 37) table 16 (Appendix B). Livestock grazing is responsible for most of the damage to vegetation and soil that has occurred on the area (figs. 38-45). The damage, basically, was caused not by overstocking as commonly thought but by failure to give plants relief from grazing use.

HALL CREEK MANAGEMENT AREA

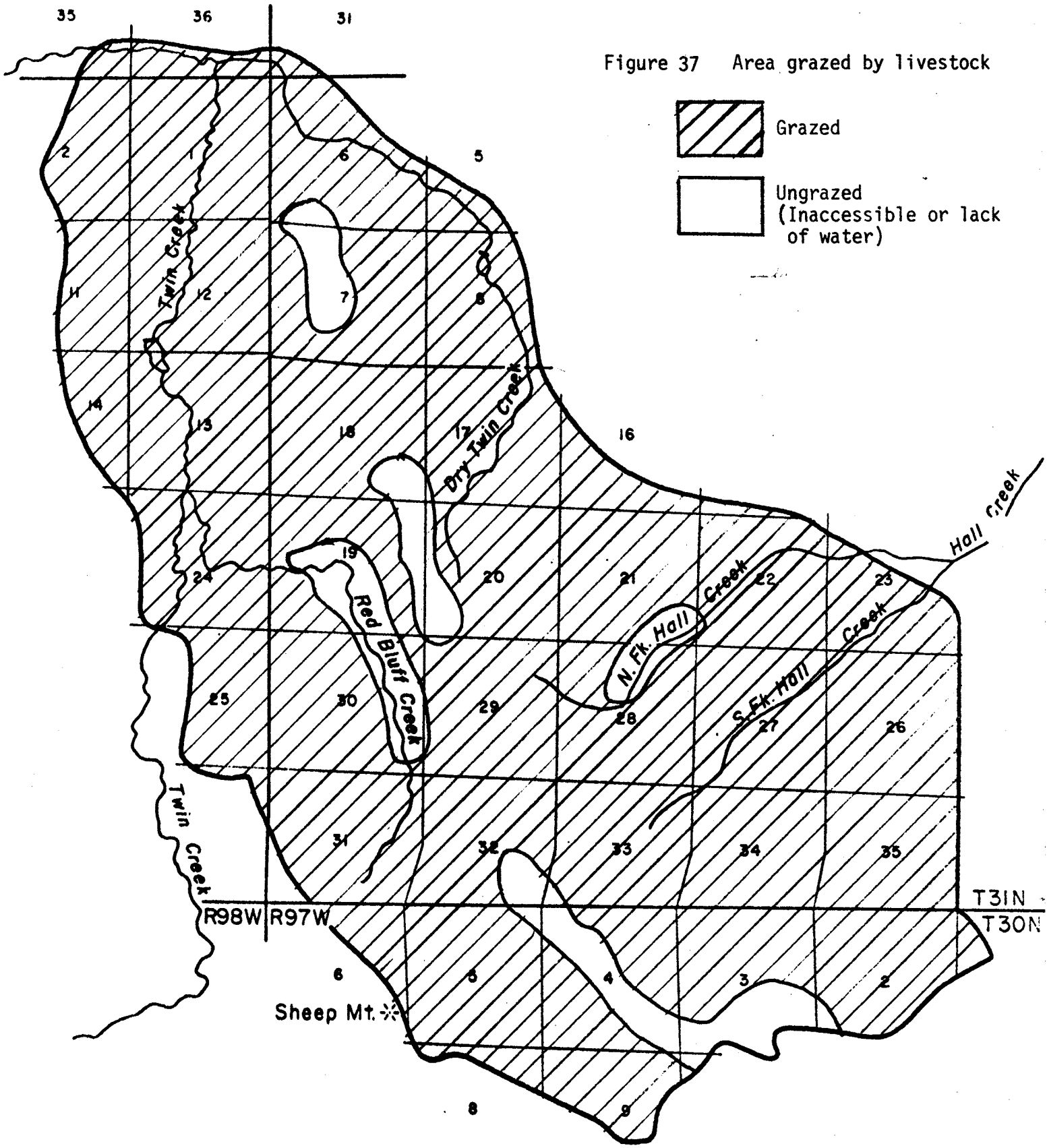


Figure 37 Area grazed by livestock

Figure 38 Upper Twin Creek. The vegetation cover has been deteriorated by continuous grazing and soil erosion is occurring. Hall Creek Area.

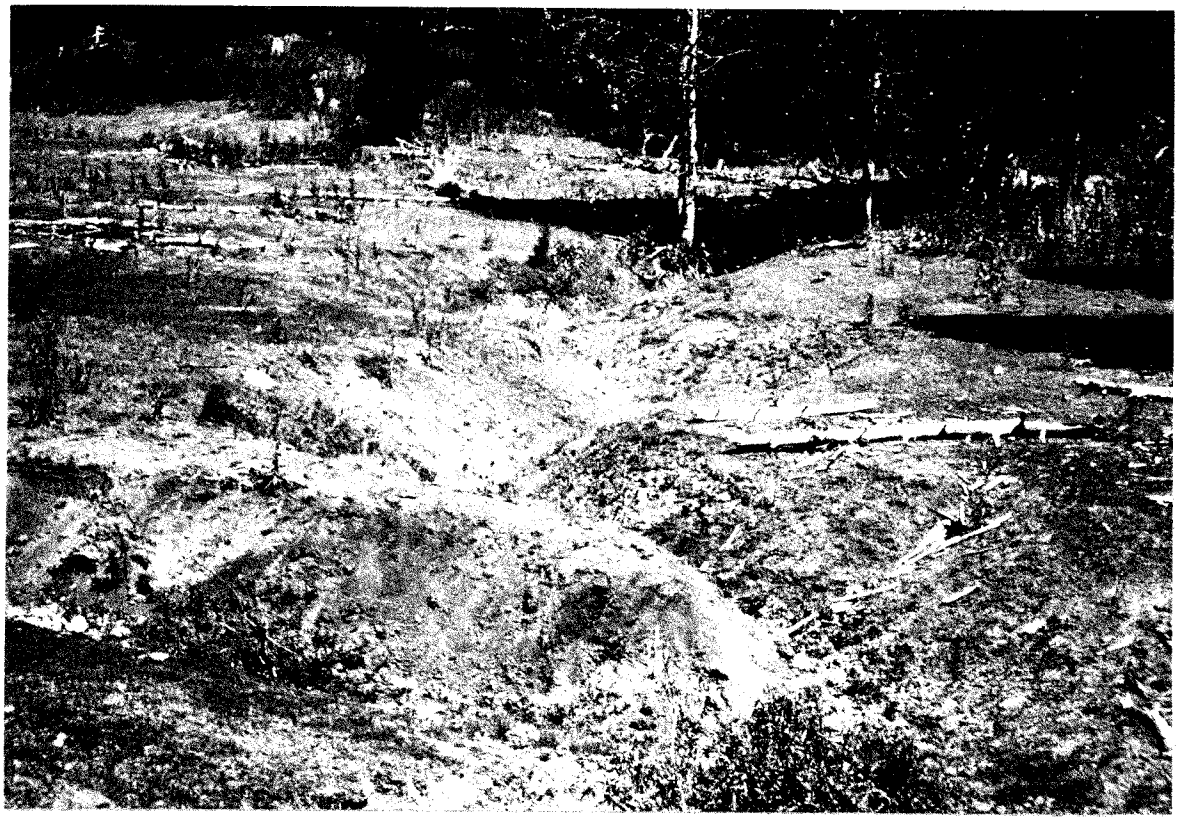


Figure 39 Lark Meadow. The plant cover has been all but destroyed by concentrated continuous grazing. The water table has dropped and soil has eroded as a result. Hall Creek Area.

Figure 40 An early stage in deterioration of the grassland type to a shrub type. Sagebrush, rabbitbrush, snake weed and lupine are encroaching upon the site as more desirable plants, grasses and other herbaceous species, are killed out by grazing. Upper Dry Twin Creek drainage, Hall Creek Area.

Figure 41 An advanced stage in the transformation of the grassland type to a shrub type by grazing. Sagebrush and other shrubs are now dominant on the area. Lower Dry Twin Creek drainage, Hall Creek Area.

Wild free-roaming horses

Large numbers of tame and "wild" horses ran on the area in the past, table 16 (Appendix B). They caused considerable damage to the area. At present some 60 head of so-called wild horses, unlicensed horses, are causing serious damage to vegetation and soil on some 500 acres on Sheep Mountain where they tend to concentrate in spring and summer when the vegetation is most susceptible to injury (figs. 46, 47).

Figure 46 Heavy deterioration of vegetation and soil caused by unrestricted continuous use of the area by only about 60 head of "wild" horses. Sheep Mountain, Hall Creek Area.

HALL CREEK MANAGEMENT AREA

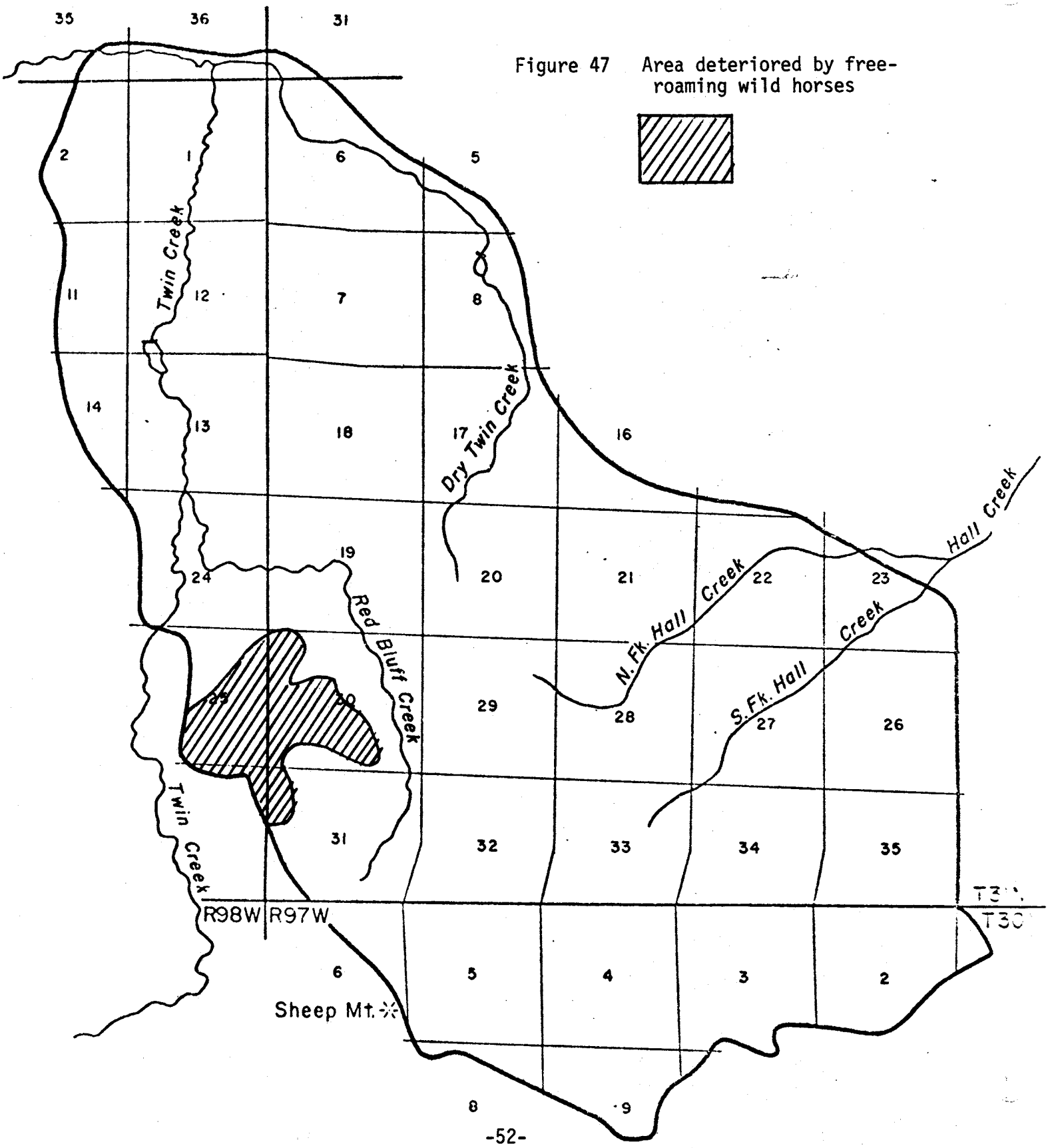


Figure 47 Area deteriored by free-roaming wild horses

Cultural practices

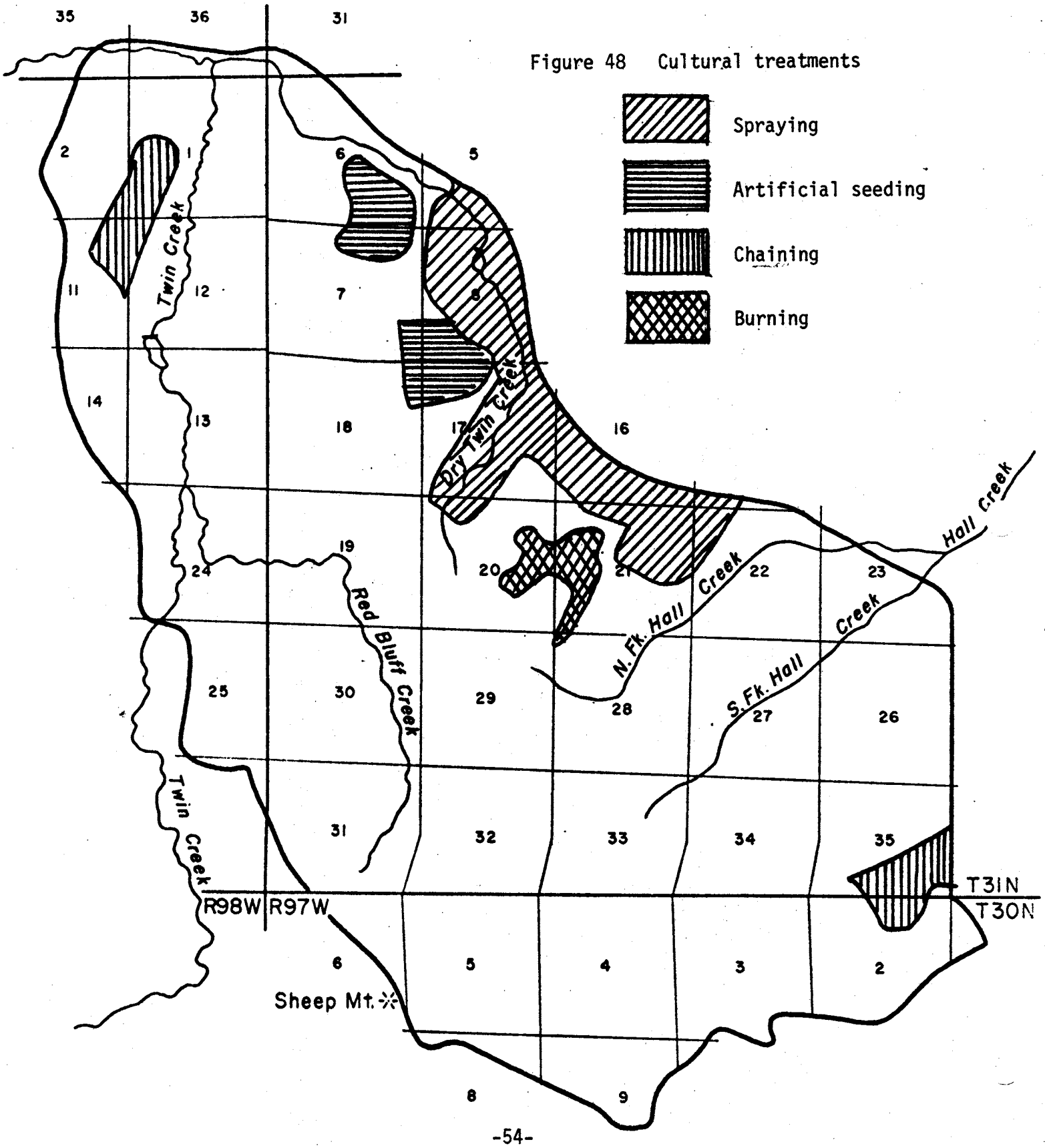
About 1550 acres on the Hall Creek Area have been treated culturally with the objective of improving wildlife habitat, the watershed and grazing conditions for livestock (table 13) (fig. 48).

Table 13 Cultural treatments, Hall Creek Area

Treatment	Acres
Spraying	900
Artifical seeding	360
Chaining	200
Burning	90
	1550

Results in many cases were not up to expectations and did more harm than good (figs. 49-52).

HALL CREEK MANAGEMENT AREA



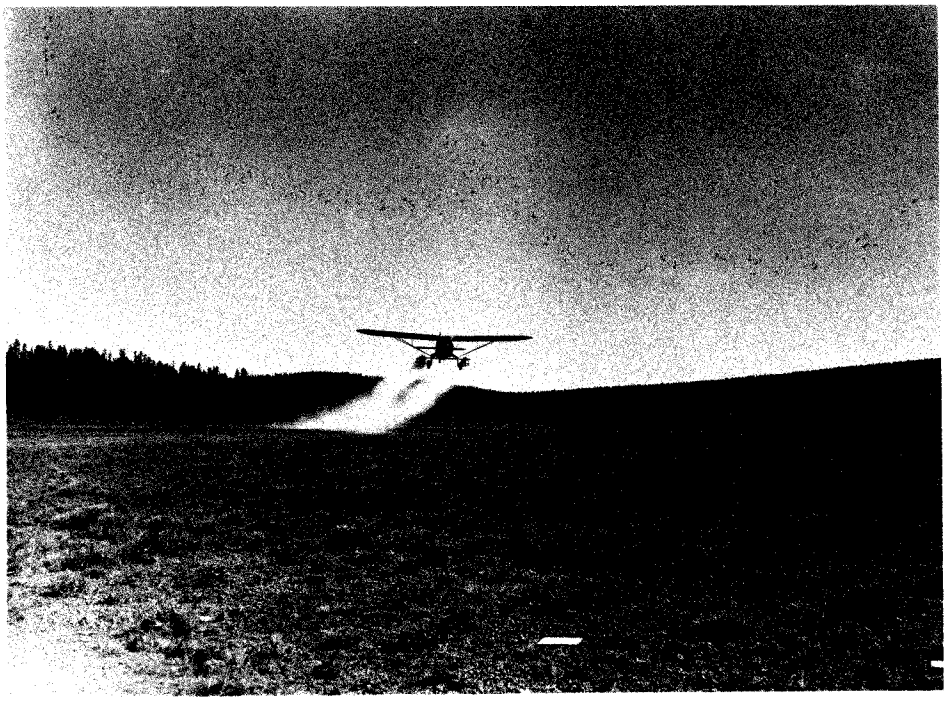


Figure 49 Sagebrush was effectively controlled by spraying but only temporarily in most cases. Here it reestablished in less than ten years. Desirable species were also reduced by spraying but these did not reestablish satisfactorily. Dry Twin Creek, Hall Creek Area.

Figure 50 The area was disced and seeded. A stand failed to establish. Serious erosion resulted. Lower Dry Twin Creek, Hall Creek Area.

Figure 51 Juniper was chained, piled, and burned on this area. Esthetics of the site and wildlife habitat were not given adequate consideration in this work. Red Bluff Ridge, Hall Creek Area.

Figure 52 This area was burned repeatedly to reduce sagebrush and increase grass. Rabbitbrush (yellow flowers), a shrub less desirable than sagebrush increased instead. Snake Gulch, Hall Creek Area.

Construction

Construction work in connection with the installation of management facilities has adversely effected soil, vegetation, esthetic and other environmental values on local areas. The facilities that have been installed on the area are shown in table 14. Road construction has effected the largest land area and has had the greatest adverse impact (figs. 53, 54). Most construction work reduced esthetic values. On Sheep Mountain construction of a ski slope not only marred the landscape but caused serious soil erosion (fig. 55).

Table 14 Management facilities, Hall Creek Area

Facility	Amount
Highway	9.0 miles
Improved roads (gravelled)	4.2 miles
Unimproved roads	30.4 miles
Trails (foot and horse)	5.1 miles
Transmission line (power)	4.4 miles
Pipe line (gas)	3.6 miles
Fences	21.2 miles
Cattle guards	2 units
Corrals	1 unit
Campgrounds	3 units (10 acres)
Springs	6 units
Reservoirs, dams	5 units (18 acres)
Ski slope	1 unit (26 acres)

Figure 53 Failure to provide adequate drainage from the road caused this gully.

Figure 54 These roads and prospect trails on Sheep Mountain were made in connection with mining. Were they all necessary? Hall Creek Area.

Figure 55 Gully erosion on a prospective ski slope caused by bulldozing off the vegetation cover. Sheep Mountain, Hall Creek Area.

Mining

Mining activities, directly, have caused undesirable land disturbances open pits and holes, and pollution in several locations (fig. 56).

Figure 56 Silt and salts from this unsightly mining waste pile are polluting Clear Creek in the ravine below. Hall Creek Area.

Logging

Cutting and logging methods used to date have caused considerable soil deterioration on the area (figs. 57, 58).

Figure 57 Heavy cutting and poorly planned skidding resulted in excessive soil disturbance and soil erosion. Crest Ridge, Hall Creek Area

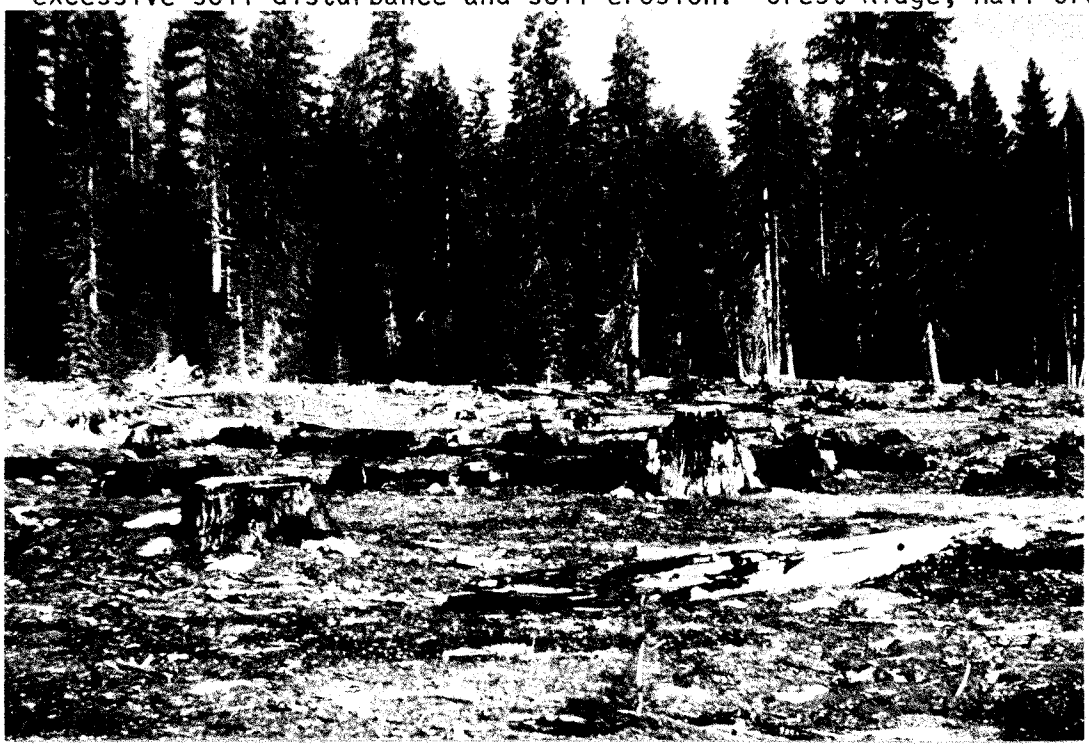


Figure 58 Clear cutting on this dominantly fir site resulted in reduction of timber site quality and in watershed, esthetic, and other environmental values. Crest Ridge, Hall Creek Area.

Recreation

Recreational activities have caused appreciable damage to land resources in certain locations (table 15). Off-road vehicle use has had the greatest impact (fig. 59). Damage in campgrounds and vandalism are problems of concern (figs. 60, 61).

Table 15 Recreational activities on Hall Creek Area causing damage to land resources

Activity	Amount effected
Off-road vehicle travel	230 acres
Campground use	15 acres (3 units)
Trail use (hiking)	4 miles
Vandalism	3 acres (9 cases)

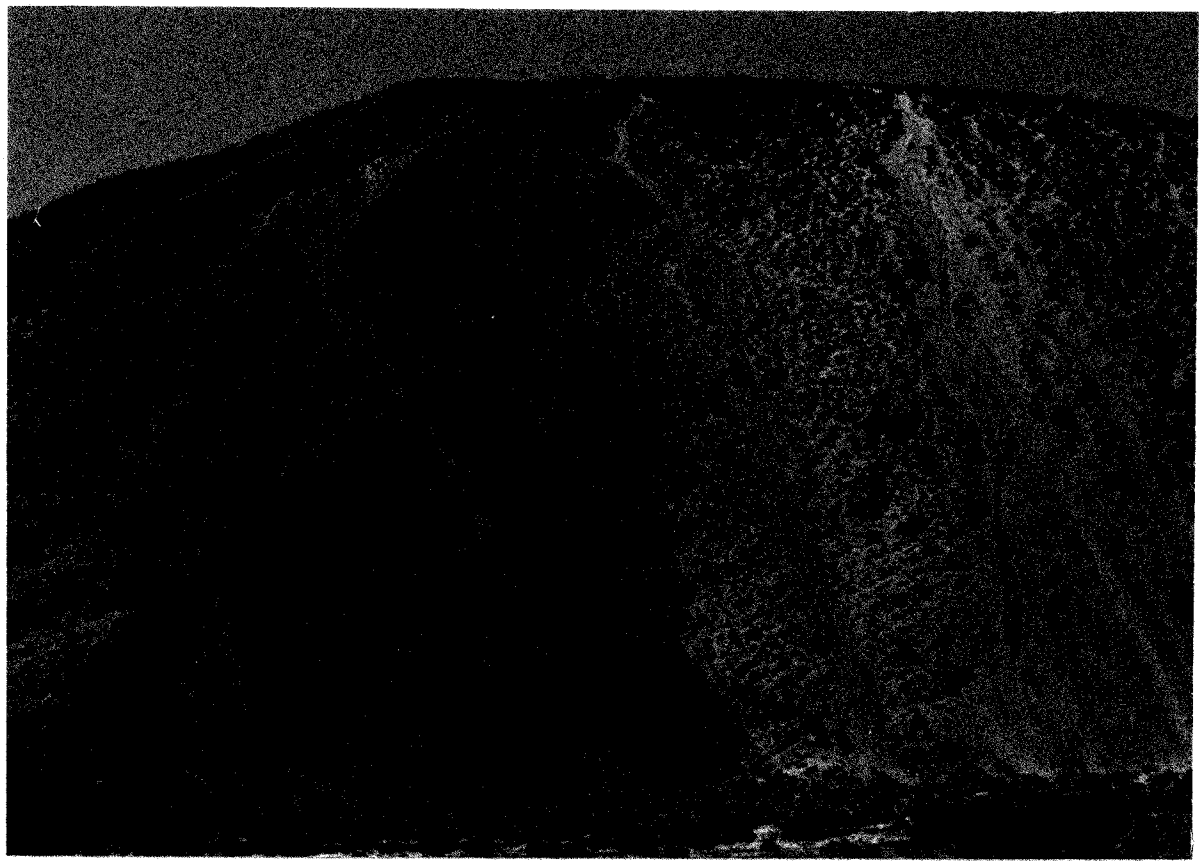


Figure 59 Motorbike trails on Challenge Hill caused erosion and degradation of esthetic values on the area. Hall Creek Area.

Figure 60 Heavy trafficing by people reduced the plant cover, compacted the soil and caused erosion on this campground site. Sunset Campground, Hall Creek area.

Figure 61 The wild character of this area was destroyed by this thoughtless act of vandalism. Near Lodgepole Campground. Hall Creek Area.

Impact of natural forces

Approximately 3700 acres or 20 percent of the Hall Creek area has been adversely effected by natural forces for shorter or longer periods (table 15).

Table 15 Approximate acreage effected adversely by natural forces, Hall Creek Area

Force	Acres	Percent of Hall Creek Area
Wildfire	1,790[1]	10
Big game	900	5
Insects	770	4
Rodents and similar anamals	120	1
Diseases	50	T
Weather	40	T
	3,670	

[1]Includes accidental man-caused fire acreage.

Wildfires

Nearly 1800 acres were burned over by wildfires (fig. 62). Most of the burned acreage was caused by lightning (table 16)(figs. 63, 64).

Table 16 Areas burned by wildfires, Hall Creek Area

Area (No.)	Area (Name)	Burn (Date)	Burn (Vegetation type)	Burn (Acres)		Cause
(1)	Deer Ridge	1956	Juniper	225		
			Sagebrush	100		
					325	Lightning
(2)	Sheep Mountain	1934	Grassland	380		
			Aspen	20		
					400	Lightning
(3)	Gold Load	1957	Sagebrush	390		
					390	Man
(4)	Crest Ridge	1969	Pine-fir	475		
			Juniper	150		
			Sagebrush	50		
					675	Lightning
			Total		1790	

HALL CREEK MANAGEMENT AREA

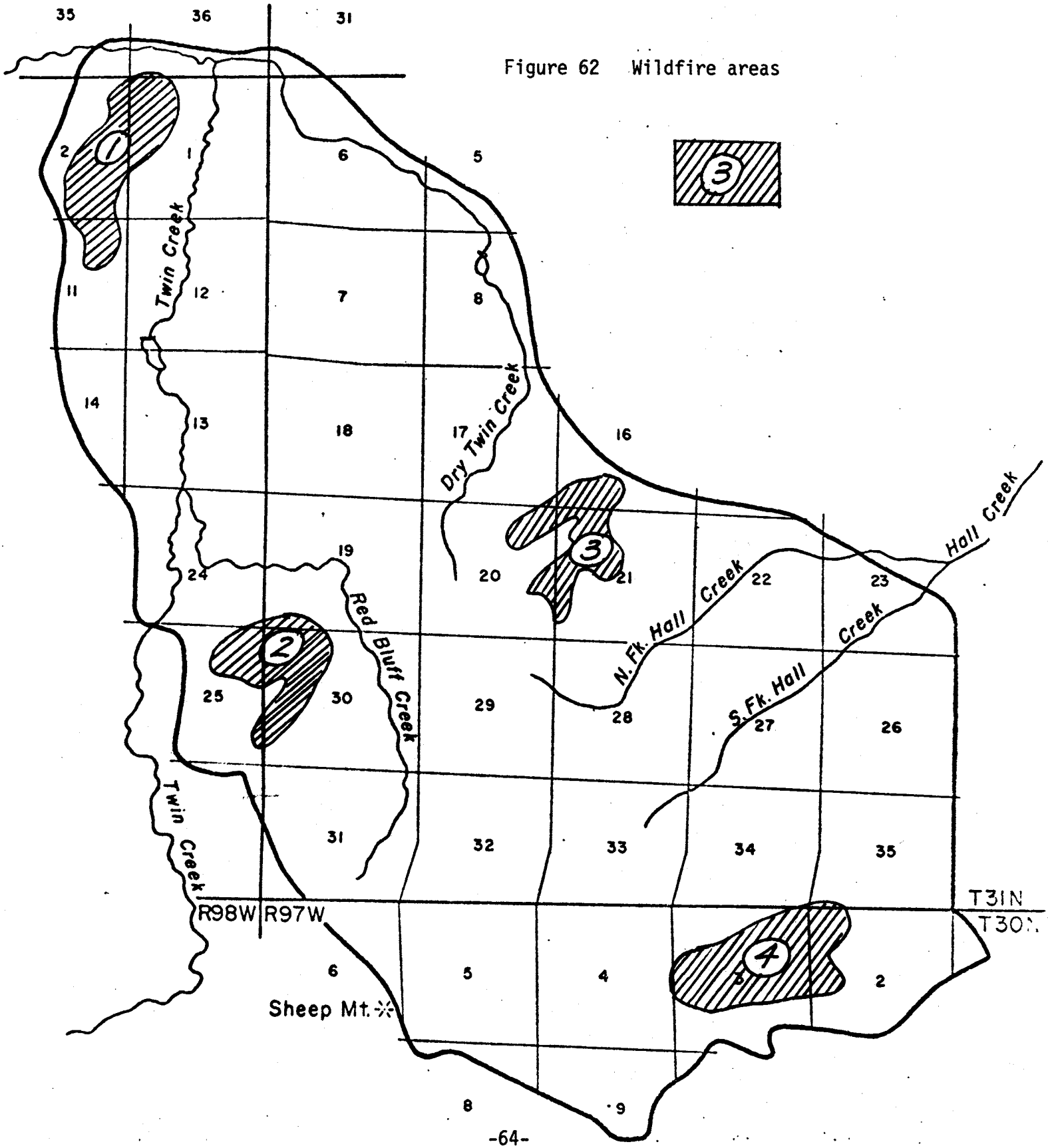


Figure 62 Wildfire areas

Figure 63 Crest Ridge Burn caused by lightning in 1969. Hall Creek Area, 1975.

Figure 64 Off-road fire caused by a lighted cigarette in 1957. Near Gold Load town site. Hall Creek Area, 1975.

Big game

Elk and deer have deteriorated vegetation and soil on some 900 acres on Hall Creek (table 17) (fig. 65). Elk, in particular, have caused striking changes in vegetation (fig. 66).

Table 17 Acreage deteriorated by big game, Hall Creek Area

Area	Vegetation	Acreage	Kind of game	Kind of range
1. Sheep Mountain	Grassland	300	Elk	Winter
2. Hall Creek	Sagebrush	200	Elk	Winter
3. Crest Ridge	Juniper	210	Deer	Winter Summer
4. Boles Basin	Juniper	190	Deer	Winter
	Total	900		

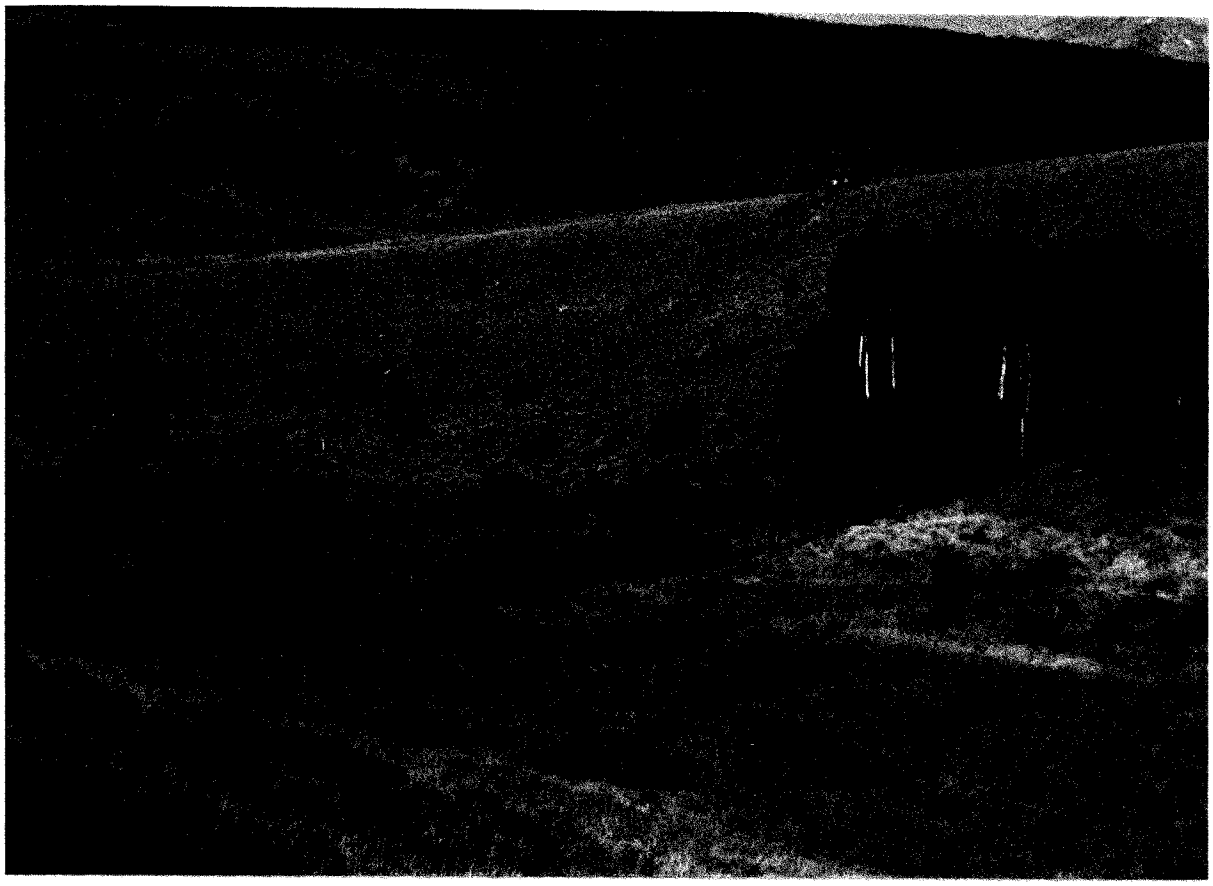
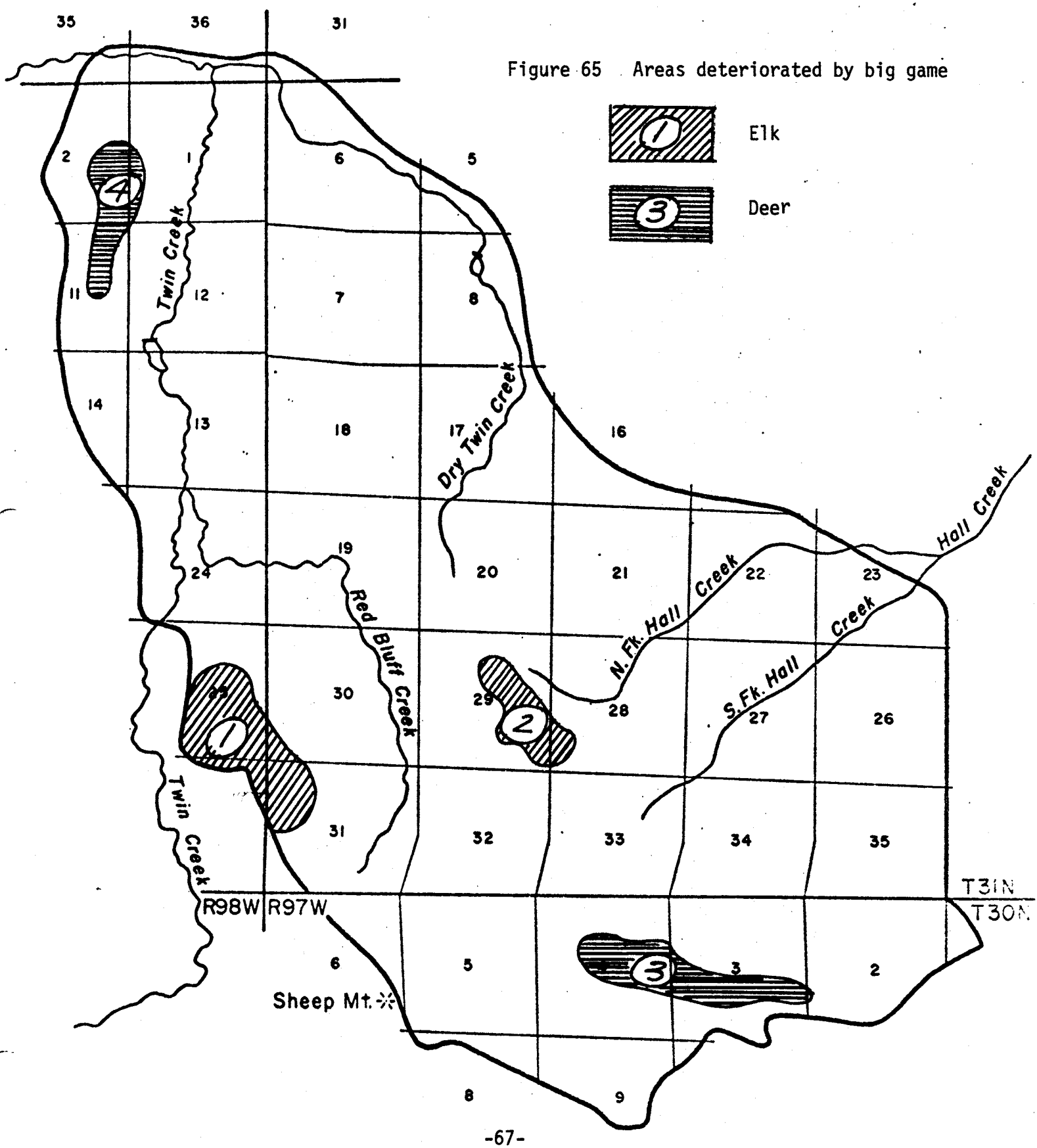


Figure 66 This is an elk exclosure on an elk wintering area on Sheep Mountain. Notice how elk reduced shrubs and trees, their favored forage plants, outside the exclosure. Hall Creek Area

HALL CREEK MANAGEMENT AREA



Insects

The insect Aroga websteri has killed sagebrush on approximately 400 acres on the area (fig. 67). The results appear more beneficial than harmful (fig. 68). The herbaceous ground cover thickened as the sagebrush was killed providing a better soil cover and more desirable plants than sagebrush. Other insects have effected certain species of plants adversely but have not caused significant damage. The more important of these are the Great Basin Tent Caterpillar that defoliates and sometimes kills bitterbrush, the Western pine beatle that effects ponderosa pine and the Fir engraver beatle that effects white-fir.

Figure 68 Big sagebrush killed by Aroga websteri. Lower Dry Twin Creek drainage, Hall Creek Area.

HALL CREEK MANAGEMENT AREA

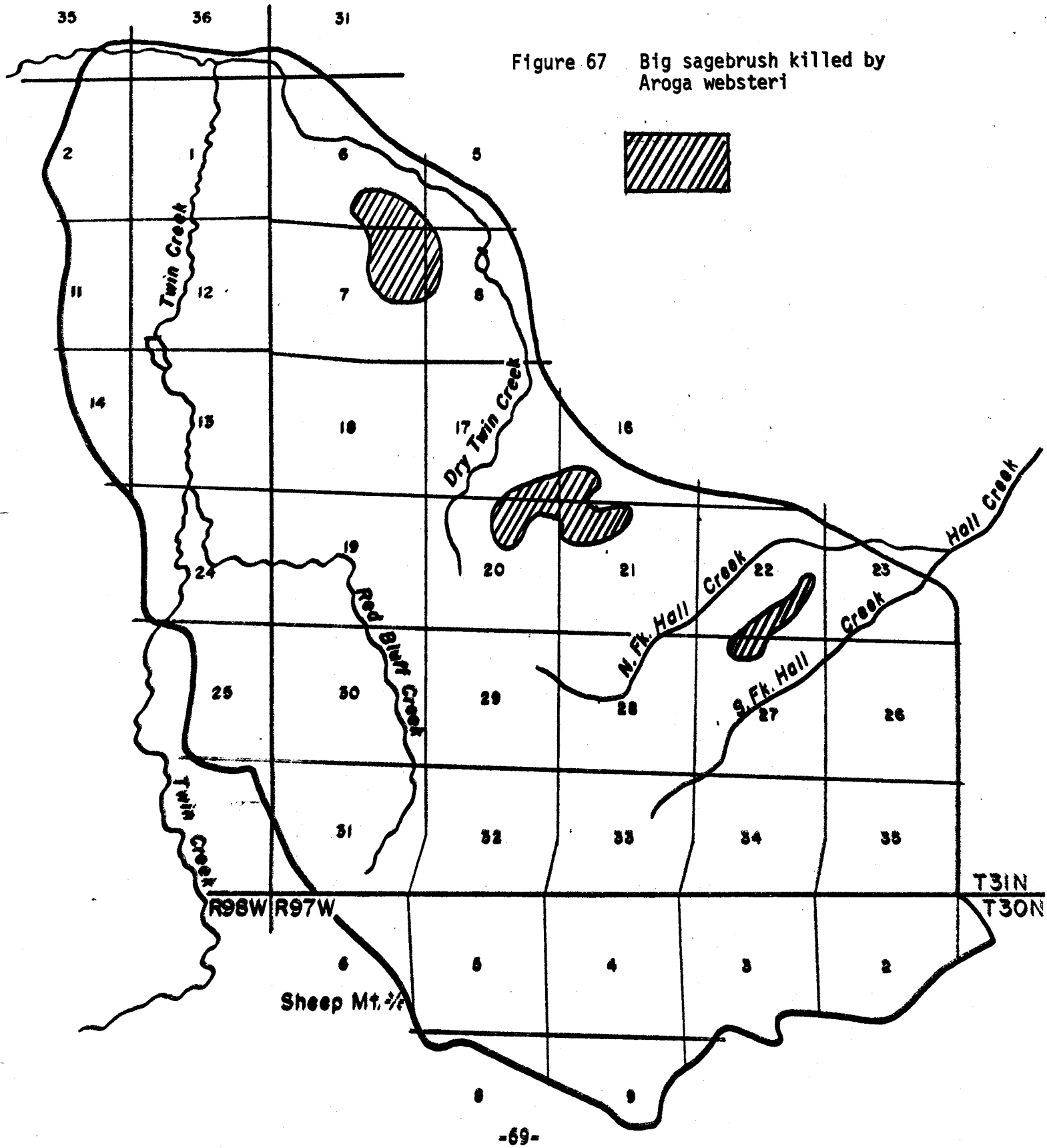


Figure 67 Big sagebrush killed by Aroga websteri

Rodents and other gnawing animals

Prairie dogs and pocket gophers have produced changes in vegetation on a small acreage. Impact on soil has been negligible.

Beaver produced striking vegetation changes and reduced esthetic values temporarily in a few locations but has had little effect on soil fertility and the production capacity of the land (fig. 69).

Figure 69 By felling the aspen tress on this slope beaver are destroying their own habitat. The area will be unsightly for several years but soil fertility has not been adversely effected. North Fork Hall Creek, Hall Creek Area.

Diseases

Dwarf mistletoe occurs in small amounts on pine in some locations. A blight killed small areas of aspen from time to time but the trees resprouted. Neither disease is of concern at the present time.

Weather

In May 1963, a strong wind blew down most of the larger trees on a 100 acre area in Chimney Canyon. Most of the trees were salvaged. The area still has a devastated appearance.

Management objectives

Main

Manage renewable resources on a multiple-use, high-level, sustained yield production basis and non-renewable resources on a conservation basis while maintaining the production capacity of the land and the highest quality natural environment.

Specific

Renewable resources

To realize main objectives:

1. Establish a full vegetation cover on the land.
2. Restore soil fertility to site capacity.
3. Control soil erosion.
4. Improve and maintain wildlife habitat.
5. Protect rare and endangered plant and animal species.
6. Improve and maintain the watershed.
7. Maintain esthetic and natural recreational values.
8. Improve and maintain forest land sites.
9. Improve and maintain game habitat.
10. Maintain as much land as possible in wilderness.
11. Improve and maintain the land for livestock production.
12. Produce livestock, game, timber, and other resource values in equitable balance in the public interest.

Non-renewable resources

Extractive--utilize conservatively with minimum adverse impact on the environment.
Non-extractive--protect and maintain.

Management principles

The principle of periodic resting from use will be applied to the management of renewable resources and judicious conservative use to management of non-renewable extractive resources. See Appendix A for an explanation of these principles.

Management of man uses

- Livestock grazing
- Wild horses
- Cultural practices
- Logging
- Recreation
- Construction
- Mining

Management of effects of natural forces

- Big game
- Wildfires
- Insects
- Rodents and other gnawing animals
- Diseases
- Weather

January 28, 1976

Note! Material on the above subjects is not ready yet. Should be ready about mid-February 1976. Will send it to you then.

Forestry

None of the commercial aspen timber type, but about half of the pine-fir type has been cutover to date (table). Posts and fire wood have been obtained from the juniper-pinyon type periodically.

Table Use of commercial timber and other tree types on Hall Creek to date

Type	Area In type (acres)	Used (acres)	(%)
Pine-fir type	500	235	47
Aspen	50	0	0
Juniper	350[1]	70	20

[1]Area considered suitable for post and wood cutting.

The silvicultural and logging methods used to date have caused considerable damage to the land and environment (figs. ,).

Figure 63 Cattle under rest-rotation management.

Figure 64 Sheep under rest-rotation management.

All to ~~8x10~~ 5x7" glossy black and white contrast for reproduction (One print each)

1 (4x5" B&W negatives)

ALH No

1	324	Logging
2	3073	Gully erosion (rock)
3	2077	Pn reprod. (moss)
4	2048	" " (closeup)
5	5676	Pine plantation (burn)
6	878	Polls Camp (meadow)
7	3041	Trampling (Pn HV#1)

Total 7 4x5 B&W

Grand total 7+27 = 34

Hormay
U.S.F.S

Apr. 8/75

2 (35mm Kodachromes Make black and white negatives and enlarge to 8x10" B&W glossy)

ALH No

1	3013 x 13,740
2	4613 x 14,717
3	5303 x 15,470
4	5760 x 16,087
5	6689 x 16730
6	7679 x 1746
7	7100D x 13,090
8	8540
9	8782
10	10172
11	10640
12	11368
13	11778
14	17,627
15	17,713
16	13,046
17	13,078
18	13,755
19	13,504
20	13,857

Total 27

Wyoming "Lander"

HALL CREEK REST ROTATION MULTIPLE USE LAND MANAGEMENT DEMONSTRATION AREA

✓ Name of Area: Hall Creek Allotment

✓ Size: 18,500 acres

✓ Land Status:

	Acres	%
Federal (NRL)	15,000	81
State	1,400	7.6
Private	2,100	11.3

✓ Location: 17 miles SE of Lander, Twin Creek Planning Unit, Lander Resource Area, Rawlins District, Wyoming

✓ Elevation: 7442' - 5725'

Access: Borders old U.S. Highway 287

License: L&H Ranch, Inc. (Robert Laeger and Ray Hewitt)

Mountain Canyon	248 cattle 5/1-5/15
Hall Creek	432 cattle 5/16-10/15
Mountain Canyon	300 cattle 10/16-11/22

✓ Vegetation Types:

	Acres	
Juniper		
+ Sagebrush	236	
+ Wheatgrass	887	
+ Limber pine	212	
		1,335
Big Sagebrush		
+ Wheatgrass	4,070	
+ Bluegrass	4,302	
+ Sedge	3,011	
		11,356
Black sagebrush		3,138
3-Tip sagebrush		1,333
Wheatgrass/bluegrass		550
Roads, ditches, hayfields, etc.		761
		18,500

Also see Table II and Map II

$\frac{18500 - 761}{17739}$ $\frac{1335}{17739} = 7.5\%$ = Juniper, J. pine

92.5% Sagebrush grass

(2) Hall Creek Divide Rain Guage
1966-1971 Averages

Winter (10/15-4/15)	3.82 inches
Spring (4/15-7/1)	5.83 "
Summer (7/1-9/1)	1.01 "
Fall (9/1-10/15)	1.54 "
Total	12.21 "
11 year avg. total	11.55 "

Geology:

The allotment is situated on a relatively steep (25-45°), faulted, northwest trending arch (Sheep Mountain anticline), modified by erosion and smaller northeast trending arches. The sediments range in age from Mississippian (ca. 350 million years old) to recent and include: sandstones, shales, claystones, limestones, volcanic ash and alluvium. There are deposits of bentonite (altered volcanic ash), phosphate and gypsum. There is also a probability of uranium and minor gold occurrences.

Mining:

A gold claim was located on Sheep Mountain in 1939 and some mining took place on the claim. The duration and intensity of the mining activity, as well as the amount of gold removed, are unknown.

Eleven uranium claims were filed prior to the enactment of Public Law 167 (7/23/55). All are in Sections 11 and 12 of T. 31 N., R. 98 W. The Bureau is now in the process of determining the status of these claims and obtaining surface management rights to the claim areas.

Seven oil wells have been drilled on the Hall Creek allotment. None struck oil, but the possibility of using the abandoned shafts for water wells is now being investigated. In addition, 73 oil placer claims were filed during the period 1891-1908. The status of these claims is also currently under investigation.

More than 200 other mining claims have been located within the allotment. However, these claims were filed after enactment of PL 167. This gives the Bureau surface management rights to the claims. Given present technology and marketing practices, mining of these claims will remain economically unfeasible in the foreseeable future.

Forestry:

(1) Limber Pine (Pinus flexilis) occurs both in isolated pockets in Juniper type woods and in relatively pure stands. All age classes are present, but seedling establishment appears to be at a rate only replacing

decadent and diseased trees. The growth forms found on the allotment vary from multi-stemmed decumbent trees to single-stemmed erect ones averaging twenty feet in height. Dwarf mistletoe infection is causing moderate to severe mortality in some stands, as are procupines.

Some illegal cutting of firewood, posts and possibly shoring timber has occurred, but to a very limited extent. The only recent cuttings found were of dead wood and obviously to supply firewood for hunter's camps. This dead wood removal has no detrimental impact on the stand and may have a beneficial one by reducing wildfire potential. The limber pine on the Hall Creek allotment has no economic potential for removal.

(2) All three species of juniper native to Wyoming occur on the allotment: Rocky Mountain juniper (Juniperus scopulorum), Utah juniper (J. osteosperma) and common juniper (J. communis). The first two are shrubby to arborescent, the third usually a decumbent shrub. Rocky Mountain juniper is found mainly in the Wood Canyon-Gyp Spring area at the southern extremity of the allotment. Utah juniper form the remaining stands, with common juniper occurring as very localized ground cover under the Utah juniper canopy.

All age classes of juniper occur, with active pioneering and seedling establishment into adjacent sagebrush types. The mature forms are mostly multiple-stemmed and vary in height from three feet on marginal sites to over twelve feet on deeper soiled, better watered sites. No diseases were found in the juniper stands. The evidence seems to indicate that range fires, natural and man-caused, have historically kept the juniper stands from achieving stabilized, climax stands; alternately pioneering out from steep, rocky core areas into sagebrush-grass types and being fire killed back into those core areas.

The potential exists for limited juniper harvesting to supply the local demand for posts. However, topography, wildlife and erosion considerations will keep this potential from being realized except in very limited instances. Before any harvesting could be authorized a detailed analysis of all ramifications resulting from the cutting would have to be made.

(3) Localized stands of quaking aspen (Populus tremuloides), narrowleaf cottonwood (P. angustifolia) and peachleaf willow (Salix amagdaloides) occur along water courses throughout the allotment. Negligible seedling establishment is occurring and those few established are severely browsed. Trampling by cattle is also severely limiting establishment, especially in the cottonwood stands and to a lesser extent in the aspens.

These stands have no present economic potential for harvesting. They do have, however, great importance to wildlife and in controlling erosion. Some consideration should be given to increasing these stands because of their aesthetic and wildlife values, even though this could entail some loss in stream flow volumes.

(4) A reforestation project could be programmed for those limber pine stands heavily infected with dwarf mistletoe. Consideration should also be given to using a tree planting program as an adjunct to other activities--for example, as part of a reservoir construction-fishing-recreation site project. Manipulation of existing forest types has a place in enhancing other resource values and should be given full consideration as the management objectives for the allotment are defined.

Wildlife:

(1) Birds

Seventeen species of game birds are found on the allotment and ten of these have been documented as breeding in the diverse habitat types present. Sixteen species of raptors make extensive to migratory use of the allotment, but field data is lacking or inconclusive on species breeding in the area. An additional sixty-three species of birds make varying use of the allotment, for a total of 99 species in 33 avian families. For a complete listing see Table I.

No census data is available on any of the birds found on the allotment. However, very rough late summer numbers were noted for some species during preliminary reconnaisance of the allotment. Some of the unsystematic field reports follow to give an indication of numbers and diversity:

(1) 2 pintail and 3 teal broods on Rock Draw Reservoir - August.

(2) 1 mallard, 4 teal and 2 coot brood on Carr Reservoir - August.

(3) 3 sage grouse flocks (9, 17 and 15) in Red Bluff Canyon, 1 flock (12) on Sheep Mountain and 2 flocks (16 10) on upper Hall Creek - September.

(4) Pinyon jay flocks at Gyp Spring (37) and west of Twin Creek (21) - September.

(5) Twenty-five chukars near upper Dry Twin Creek - September.

(6) Newly fledged juvenile shovelers (6) on Red Bluff Creek - September.

(7) 5 raptor nesting sites in Red Bluff Canyon, juvenile prairie falcon and two juvenile red-trailed hawks hunting in same area - October.

Obviously, much more field work is needed just to document the species breeding on the allotment. A census of each species occurring is a

practical impossibility and not advocated. However, the impact that any project, objective or management scheme may have on both game and nongame species must be evaluated from a broad, multiple use viewpoint.

(2) Mammals

A total of 57 species of wild mammals in 17 families occur or are suspected to occur on the Hall Creek allotment. Of these, 23 species can be listed as game and/or furbearers of varying sporting, economic and aesthetic importance. See Table I for a complete species list.

Mule deer and pronghorn antelope are the principle game species on the allotment. Pronghorn use is late spring into fall or winter, depending on the weather. Total numbers on the allotment are not available and so variable that a meaningful estimate could not be derived. There is a resident mule deer herd numbering 75-125 animals distributed principally in the juniper-pine vegetation types and foraging out into wet meadows and hayfields for green feed. A migratory herd moves onto the allotment as winter storms force them from higher elevations in the Wind River Mountains. The total count for the wintering herd is so weather dependent as to make an estimate meaningless.

The allotment is also highly critical winter range for elk coming out of the Wind River Mountains as the snows cover the forage. The elk utilize the windblown ridge top system of the Hall Creek drainage for feeding and bedding. Any management scheme affecting these ridges must give careful and complete attention to their critical nature.

No information is available on small game or nongame mammal populations. Field studies are lacking that would document occurrence and numbers. The species list was compiled from those animals known to occur, those that should occur and those that might occur on the allotment. As further studies are conducted for the management plan, the population dynamics will become more fully documented and understood.

Fisheries:

Twin Creek is the only perennial stream on the allotment with a fisheries program at present, although some potential does exist in Red Bluff Creek, Hall Creek and some of the reservoirs. Roughly fifteen miles of meanders and ox-bows of Twin Creek occur within the allotment, all on deeded or state lease land. Carr Reservoir, a 10 acre artificial impoundment, is part of the Twin Creek fishery.

Twin Creek has a rapid current with an average flow volume of between 0.33 and 2 CFS, and annual fluctuation of from two to four feet. The bottom is sand, gravel, silt and rubble with steeply cut, well vegetated to sterile sandstone banks. A heavy silt load is carried by the stream at all times and a considerable bed load of rock and gravel is moved during the run-off period.

The stream has a stocking history beginning in 1939 and extending irregularly to the present with brook trout. Rainbow and brown trout are also found in Twin Creek. Productivity is high and fish growth rapid, but as the stream is difficult to fish and located on deeded ground the fishing pressure is relatively light.

The waters behind the thirty foot dam of Carr Reservoir are also highly favorable for rapid fish growth. The reservoir has a maximum depth of 23 feet, with a six foot annual fluctuation and mud bottom. It was first stocked in 1958 with brown trout, brook trout the following year and rainbow trout since then. It is becoming heavily silted at the upper end and may need dredging to achieve full potential as either a fishery or a water basin.

See also Table I.

Land Use:

An archeological survey of the Hall Creek Allotment has shown the area to be inhabited at least by the Early Prehistoric (10,000 yrs. B.P.). From then until the advent of Europeans the area seems to have supported a basic pattern of small nomadic groups of primitive hunters and gatherers, probably dependent on bison, elk, deer and antelope. At some undetermined time prior to the nineteenth century the Shoshones became constant inhabitants of this general area but moved about freely.

From the early nineteenth century, when the first Europeans visited the area, it has been traversed by a constant stream of explorers, soldiers, pioneers and miners. The name of the main drainage in the area, Beaver Creek, would indicate the possibility of trappers and mountain men also having been in the area.

A major search of historical literature was not undertaken for this preliminary meeting. Any historical or archeological site of importance encountered during implementation of this management plan will be researched, documented and protected if necessary.

Data is lacking as to the start of the livestock industry on this specific allotment, but the 1870's or '80's would be a close approximation. consistent with ranching practices through the entire northern Rockies at the time, large numbers of cattle, sheep and horses with moderate to severe overgrazing can be assumed.

By the early 1930's sheep had replaced cattle in the area and 4,000 to 6,000 were maintained on Hall Creek. The season of use was sporadic and dependent upon weather conditions, but generally late spring/early summer and again in late fall/early winter.

Cattle were replacing sheep on the allotment by the mid-1950's. In 1954 the allotment was licensed at 2600 sheep for two months spring and winter, and 460 cattle April to October. Seven operators were involved and the unfenced allotment was considerably larger than now, so that the stocking rate is not as high as it would seem.

At present the allotment is licensed as follows:

248 cattle	5/1 - 5/15	Mountain Canyon Pasture
432 cattle	5/16 - 10/15	Hall Creek
300 cattle	10/16 - 11/22	Mountain Canyon Pasture

The deeded land along Red Bluff and Twin Creeks has and is now being farmed for alfalfa and grass hay. There is evidence of reversion of 40 - 60 tilled acres along Red Bluff Creek to sagebrush. These lands have a high potential for intensive farming practices--two cutting alfalfa yields average 400 tons per acre in fresh plantings. The operator has 300acres under cultivation presently and is aiming for a 600 tons per acre yield. The hay produced is fed during the winter to produce a balanced, year-round operation.

Recreation:

The Hall Creek Allotment, because of its scenic nature, has a recreation potential. This scenic appeal is not, however, unique to the allotment; being more a factor of its natural, unaltered appearance than any specific site or natural formation. Until such time as a specific demand on the recreation potential of the allotment is evidenced, a major objective of any management scheme should be to preserve and protect this natural aspect.

Project work should be blended into the natural landscape as much and wherever possible. Existing projects intruding into this aesthetic appeal should be removed or relocated. By keeping alterations in harmony with the natural aspect we would be retaining all options for development if the demand at some later date would warrant this.

Red Bluff Canyon should be given special consideration towards retaining its natural scenic value. This area has more scenic value than any of comparable size on the allotment and would be most susceptible to man-made intrusions.

Appendix

TABLE I

HALL CREEK ALLOTMENT ANIMAL LIST

A. Mammals

1. Game and Furbearers

Common Name	Scientific Name	Major Food Items
Black bear	Ursus americanus	rodents, insects, carrion, berries
Short-tail weasel	Mustela erminea	rodents, lagomorphs, small birds
Longtail weasel	M. frenata	rodents, lagomorphs, small birds
Mink*	M. vison	" " " "
River otter**	Lutra canadensis	fish, frogs, snakes
Badger	Taxidea taxus	ground squirrels
Spotted skunk	Spilogale putorius	insects, rodents, reptiles
Striped skunk	Mephitis mephitis	" " "
Coyote	Canis latrans	rabbits, rodents, insects
Red fox	Vulpes fulva	" " "
Swift fox	V. velox	" " "
Cougar*	Felis concolor	deer, squirrels, rabbits
Bobcat	Lynx rufus	rabbits, squirrels, mice
Whitetail jackrabbit	Lepus townsendii	snakeweed, rabbitbrush, sage
Mountain cottontail	Sylvilagus nuttalli	(bitterbrush, sagebrush, sunflower,
Desert cottontail	S. auduboni	(mahonia, snakeweed, shokecherry
Elk	Cervus canadensis	grasses, bitterbrush, sagebrush
Mule deer	Odocoileus hemionus	bitterbrush, grasses, sagebrush
White tail deer	Odocoileus virginianus	" " "
Pronghorn	Antilocapra americana	sagebrush, rabbitbrush, grasses
Bighorn sheep*	Ovis canadensis	fescue, sagebrush, ribes
Beaver	Castor canadensis	aspen, willow
Muskrat	Ondatra zibethica	cattail, pondweed

2. Nongame

Masked shrew	Sorex cinereus	insects, other inverts
Merriam shrew	S. merriami	" " "
Vagrant shrew	S. vagrans	" " "
Dusky shrew	S. obscurus	" " "
Dwarf shrew	S. nanus	" " "
Little brown myotis	Myotis lucifugus	insects
Fringed myotis	M. thysandes	"
Long-eared myotis	M. evotis	"
Small-footed myotis	M. subulatus	"
Silver-haired bat	Lasionycteris noctivagans	"
Big brown bat	Eptesicus fuscus	"
Hoary bat	Lasiurus cinereus	"
Spotted bat	Euderma maculata	"
Western big-eared bat	Plecotus townsendi	"

Common Name	Scientific Name	Major Food Items
Yellowbelly marmot	Marmota flaviventris	grasses, astragalus
Whitetail prairie dog	Cynomys gunnisoni	saltbush, salsola, grass
Richardson's ground squirrel	Spermophilus richardsoni	goosefoot, pos, cinquefoil, grass
Golden-mantled ground squirrel	S. lateralis	knotweed, bitterbrush, grass
Thirteen-lined ground squirrel	S. tridecemlineatus	ragweed, knotweed
Least chipmunk	Eutamias minimus	bitterbrush, grasses
Red squirrel	Tamiasciurus hudsonicus	pine, juniper, ribes
Northern pocket gopher	Thomomys talpoides	sagebrush, grasses
Wyoming pocket mouse	Perognathus fasciatus	grass and forb seeds
Ord kangaroo rat	Dipodomys ordi	" " " "
Western harvest mouse	Reithrodontomys megalotis	
Deer mouse	Peromyscus maniculatus	pine, salsola, sunflower
Northern grasshopper mouse	Onychamys leucogaster	wheatgrass, salsola
Bushytail woodrat	Neotoma cinerea	plant material-green
Meadow vole	Microtus pennsylvanicus	" " "
Prairie vole	M. ochrogaster	" " "
Longtail vole	M. longicaudus	" " "
Sagebrush vole	Lagurus curtatus	" " "
Porcupine	Erethizon dorsatum	pine, aspen, knotweed
Western jumping mouse	Zapus princeps	

B. Birds

1. Game

Great Basin Canada goose*	Branta canadensis moffitti	(saltgrass, pondweed, (bulrush,
Richardson's Canada goose*	B. c. hutchinsii	(wingeongrass, (grain
Taverner's Canada goose*	B. c. taverneri	((
Tule goose*	Anseralbifrons gambelli	(grasses, sedge
White-fronted goose*	A. albifrons	(bulrush
Mallard	Anas platyrhynchos	pondweed, bulrush
Northern pintail	A. acuta acuta	" "
Gadwall	A. strepera	spikerush, pondweed
American widgeon	A. americana	" "
Northern shoveler	Spatala clypeata	" "
Blue-winged teal	Anas jiscors	bulrush, wigeongrass
Cinnamon teal	A. cyanoptera	bulrush, saltgrass
Green-wing teal	A. carolinensis	pondweed, bulrush
Ruddy duck	Oxyura jamaicensis	" "
Sage grouse	Centrocercus urophasianus	sagebrush, clover

Common Name	Scientific Name	Major Food Items
Chukar	Alectoris graeca	cheatgrass
Hungarian partridge*	Perdix perdix	grass and forb seeds
Mourning dove	Zenaidura macroura	" " " "
Rock dove	Columba livia	" " " "
American coot	Fulica americana	pondweed, mosses, grass

2. Raptorial

Turkey vulture	Cathartes aura	carrion
Sharp-shinned hawk	Accipiter velox	small birds
Cooper's hawk	A. cooperii	birds
Marsh hawk	Circus cyaneur	rodents, rabbits
Red-tailed hawk	Buteo borealis	" "
Swainson's hawk	B. swainsoni	" "
American rough-legged hawk	B. lagopus	" "
Ferruginous rough-legged hawk	B. regalis	" "
Prairie falcon	Falco mexicanus	birds, rodents, insects
Merlin	F. columbianus	" " "
American kestrel	F. sparverius	" " "
Golden eagle	Aquila chrysaetos	rodents, rabbits
Long-eared owl	Asio otus	rodents, small mammals
Short-eared owl	A. flammeus	" " "
Burrowing owl	Speotyto cunicularia	" " "
Barn owl	Tyto alba	" " "

3. Nongame

Western grebe	Aechmophorus occidentalis	(fish, aquatic insects,
Horned grebe	Podiceps auritus	(mollusks, crustoceans,
Eared grebe	P. caspicus	(amphibians,
Pied-billed grebe	Podilymbus podiceps	(water snakes
Great Blue heron	Ardea herodias	fish, mice, crustaceans
American bittern	Botaurus lentiginosus	" " "
Sandhill crane	Grus canadensis	grain, grass seeds
American avocet	Recurvirostra americana	insects, mollusks, crustaceans
Mountain plover	Eupoda montana	insects
Killdeer	Charadrius vociferus	"
Lesser yellowlegs	Totanus flavipes	insects, fish, crustaceans
Common snipe	Capella gallinago	" " "
Herring gull	Larus argentatus	fish, carrion
Ring-billed gull	Larus delawarensis	" "
Yellow-billed cuckoo	Coccyzus americanus	insects
Common nighthawk	Chordeiles minor	"
White-throated swift	Aeronautes saxatalis	"
Belted kingfisher	megaceryle alcyon	fish, amphibians
Common flicker	Colaptes cafer	insects

Common Name	Scientific Name	Major Food Items
Eastern kingbird	Tyrannus tyrannus	insects
Western kingbird	T. verticalis	"
Say's phoebe	Sayornis saya	"
Gray flycatcher	Empidonax wrightii	"
Barn swallow	Hirundo rustica	"
Cliff swallow	Petrochelidon pyrrhonota	"
Bank swallow	Riparia riparia	"
Rough-winged swallow	Stelgidopteryx ruficollis	"
Violet-green swallow	Tachycineta thalassina	"
Pinyon jay	Gymnorhinus cyanocephalus	pine, insects
Clark's nutcracker	Nucifraga columbiana	" "
Black-billed magpie	Pica pica	(insects, carrion, ribes
Common crow	Corvus brachyrhynchos	(bird eggs, sunflower
House wren	Troglogytes aedon	insects, spiders
Rock wren	Salpinctes obsoletus	" "
Canyon wren	Catherpes mexicanus	" "
Mockingbird	Mimus polyglottos	
Sage thrasher	Oreoscoptes montanus	insects, berries
Robin	Turdus migratorius	" "
Western bluebird	Sialia mexicana	" "
Mountain bluebird	S. currucoides	" "
Cedar waxwing	Bombycilla cedrorum	
Loggerhead shrike	Lanius ludovicianus	insects, mice
Starling	Sturnus vulgaris	grass and forb seeds
House sparrow	Passer domesticus	" " " "
Western meadowlark	Sturnella neglecta	insects, seeds
Yellow-headed blackbird	Xanthocephalus xanthocephalus	" "
Tricolored blackbird	Agelaium tricolor	" "
Brewer's blackbird	Euphagus cyanocephalus	" "
Brown-headed cowbird	Molothrus ater	" "
House finch	Carpodacus mexicanus	pigweed, goosefoot, smartweed
Common redpoll	Acanthis flammea	" " "
American goldfinch	Spinus tristis	thistle, ragweed, sunflower
Savannah sparrow	Passerculus sandwichensis	grass and weed seeds
Lark bunting	Calamospiza melanocorys	grasshoppers
Lark sparrow	Chondestes grammacus	ragweed, grass, pigweed
Brewers sparrow	Spizella breweri	insects, grasses, pigweed
White-crowned sparrow	Zonotrichia leucophrys	pigweed, knotweed, sunflower
Oregon junco	Junco oreganus	insects, grass, seeds
McCowen's longspur	Rhynchophanes mccownii	" " "
Vesper sparrow	Pooecetes gramineus	grass and forb seeds
Horned lark	Eremophila alpestris	" " " "
Red crossbill	Loxia curvirostra	pine
Green-tailed towhee	Chlorura chlorura	insects

*Occurrence not documented but suspected at least in a migratory status.
**Occurrence possible, probability unknown.

C. Fishes

1. Game Fish

Common Name	Scientific Name	Major Food Items
Rainbow trout	Salmo gairdneri	insects, small fish, algae
Brown trout	S. trutta	" " " "
Brook trout	Salvelinus frontinalis	" " " "

2. Nongame Fish

Creek chub	Semotilus atromaculatus	insects, crustaceans, small fish
Lake chub	Couesius plumbeus	" " " "
Flathead chub	Hybopsis gracilis	aquatic and terrestrial insects
Longnose dace	Rhinichthys cataractae	" " " "
Northern redhorse	Moxostoma macrolepidotum	algae, invertebrates
White sucker	Catostomus commersoni	" "
Longnose sucker	C. catostomus	" "
Mountain sucker	C. platyrhynchus	" "

Grass-like

flowering

Seed ripe

MAR APR MAY JUN JUL AUG SEP OCT

1. ARCO
2. CAEL
3. CAFI
4. CAGE
5. CANE
6. Eleoc
7. ERAN
8. JUBA
9. JUBU
10. JUME
11. JUSA
12. SCAC
13. SCPA
14. SCVA
15. TYLA

TREES

Start of growth

flowering

Seed ripe

MAR APR MAY JUN JUL AUG SEP OCT

Conifers

1. JUCO
2. JUOS
3. JUSC
4. PIFL

Deciduous

1. BEOC
2. POAN
3. POBA
4. POTR
5. SAAM

Wyoming

Appendix

TABLE II

& phenology

Plant SPECIES COMPOSITION FOR [redacted] ALLOTMENT

Code	Common Name	Scientific Name
(Trees)		
(A. Conifers)		
JUCO	Common Juniper	Juniperus communis
JUOS	Utah Juniper	J. osteosperma
JUSC	Rocky Mountain Juniper	J. scopulorum
PIFL	Limber Pine	Pinus flexilis
(B. Deciduous)		
BEOC	Water Birch	Betula occidentalis
POAN	Narrowleaf Cottonwood	Populus angustifolia
POBA	Balsam poplar	P. balsamifera
POTR	Quaking Aspen	P. tremuloides
SAAM	Peachleaf Willow	Salix amagdaloides
(Shrubs)		
AMAL	Serviceberry	Amelanchier alnifolia
ARCA-1	Silver Sagebrush	Artemisia cana
ARFR	[redacted]	A. frigida
ARNO	[redacted]	A. nova
ARTR-1	[redacted]	A. tridentata
ARTR-2	Threetip Sagebrush	A. tripartita
ATCO	[redacted]	Atriplex confertifolia
ATNU	[redacted]	A. nuttallii
CHNA	[redacted]	Chrysothamnus nausseosus
CHVI	Douglas Rabbitbrush	C. viscidifloris
EULA	[redacted]	Eurotia lanata
GUSA	[redacted]	Gutierrezia sarothrae
LEPU	Prickly-phlox	Leptodactylon pungens
OPPO	[redacted]	Opuntia polyacantha
POFR-1	Shrubby Cinquefoil	Potentilla fruticosa
PRVI	Chokecherry	Prunus virginiana
PUTR	[redacted]	Purshia tridentata
RHTR	Skunkbush Sumac	Rhus trilobata
Ribes	Gooseberry	Ribes spp.
ROWO	Rose	Rosa woodsii
SAVE	Black Greasewood	Sarcobatus vermiculatus
Sheph	Buffaloberry	Shepherdia spp.
Symph	Snowberry	Sumphoricarpos spp.
TECA	Horsebrush	Tetradymia canescens

Code	Common Name	Scientific Name
(Grasses)		
(Annual)		
BRTE	Cheatgrass	Bromus tectorum
VUOC	Sixweek Fescue	Vulpia octoflora
(Perennial)		
AGCR	Crested wheatgrass	Agropyron cristatum
AGDA	Thickspike wheatgrass	A. [redacted]
AGRE	Streambank Quackgrass	A. riparium
AGSM	Bluestem	[redacted]
AGSP	Bluebunch wheatgrass	[redacted]
AGSU	Bearded wheatgrass	A. subsecundum
ARFE	Fendler Three-Awn	Aristida fendleriana
BOGR	Blue Grama	[redacted]
ELCA	Canada Wildrye	Elymus canadensis
ELCI	Basin Wildrye	E. cinereus
HOJU	Foxtail Barley	Hordeum jubatum
KOCR	Junegrass	Koeleria cristata
ORHY	Indian Ricegrass	[redacted]
PHCO	Common Reed	Phragmites communis
POCA	Canby Bluegrass	Poa canbyi
POFE	Muttongrass	P. fendleriana
POSE	Sandberg Bluegrass	P. secunda
SIHY	Bottlebrush Squirreltail	Sitanion hystrix
SPAI	Alkali Sacaton	Sporobolus airoides
SPCR	Sand Dropseed	S. cryptandrus
SPGR	Alkali Cordgrass	Spartina gracilis
STCO	Needle-and-Thread Grass	Stipa comata
STLE	Letterman needlegrass	S. lettermanii
(Grass-like)		
ARCO	Ballhead Sandwort	Arenaria conjesta
CAEL	Needleleaf sedge	Carex eleocharis
CAFI	Threadleaf Sedge	C. filifolia
CAGE	Elk sedge	C. geyeri
CANE	Nebraska Sedge	C. nebraskensis
Eleoc	Spikerush	Eleocharis spp.
ERAN	Cottonsedge	Eriophorum angustifolium
(Forbs)		
(A. Annual)		
CAMI	Littlepod Falseflax	Camelina microcarpa
CHAL	Lambsquarter	Chenopodium album
Cheno	Goosefoot	Chenopodium spp.

Code	Common Name	Scientific Name
CIFO	Elk Thistle	Cirsium foliosum
CIVU	Bull Thistle	C. vulgare
CLSE	Rocky Mountain Bee Plant	Cleome serrulata
CORA	Branched Birdbeak	Cordylanthus ramosus
DEPI	Pinnate Tansymustard	Descurainia pinnata
GIAG	Scarlet Gilia	Gilia aggregata
GILE	Gilia	G. leptomeria
HEAN	Annual Sunflower	Helianthus annuus
Lapul	Stickseed	Lapula spp.
LARE	"	L. redowskii
LATE	"	L. texana
Lepid	Pepperweed	Lepidium spp.
MATA	Aster	Machaeranthera tanacetifolia
MEDE	Ten-petaled Blazingstar	Mentzelia decapetala
MELA	Blazingstar	M. laevicaulis
MIGR	Pink microsteris	Microsteris gracilis
PLPU	Woolly Indianwheat	Plantago purshii
PLSP	Spiny Indianwheat	P. spinescens
POAV	Prostrate Knotweed	Polygonum aviculare
TRDU	Salsify	Tragopogon jubius
TRPR	Meadow Salsify	Tragopogon pratensis
Sisym	Tumblemustard	Sisymbrium spp.
SAKA	Russian Thistle	[redacted]
YAST	Cocklebur	Xanthium strumarium

(B. Perennial)

ACLA	Yarrow	Archillea lanulosa
AGGL	Pale Agoseris	Agoseris glauca
Alliu	Wild Onion	Allium spp.
ALTE	Textile Onion	Allium textile
ANRO	Rose Possytoes	Antennaria rosea
Aplop	Goldenweed	Aplopappus spp.
ARHO-1	Hooker Sandwort	Arenaria hookeri
ARHO-2	Holboell Rockcress	Arabis holboellii
ARLU	Cupweed sagebrush	Artemisia ludoviciana
AROB	Sandwort	Arenaria obtusiloba
ASDR	Drummond Milkvetch	Astragalus drummondii
ASMI	Missouri "	A. missouriensis
ASPU	Pursh Loco	A. purshii
ASSP	Showy Milkweed	Asclepias speciosa
ASST	Astragalus	Astragalus stenophyllus
Balsa	Balsamroot	Balsamorhiza spp.
BRDO	Wild Hyacinth	Brodiaea douglasii
Caloc	Mariposa	Calochortus spp.
Casti	Indian Paintbrush	Castilleja spp.
Chrys	Goldaster	Chrysopsis spp.
CIAR	Canada Thistle	Cirsium arvense

Code	Common Name	Scientific Name
CLCO	Clematis	Clematis columbiana
CRAC	Hawksbeard	Crepis acuminata
Delph	Larkspur	Delphinium spp.
DENE	Low Larkspur	Delphinium nelsoni
DIUN	Steershead	Dicentra uniflora
ERHE	Umbrella Plant	Erigonum heracleoides
Erigo	Erigonum	Erigonum spp.
ERPU	Fleabane	Erigeron pumilus
FRPU	Yellow Fritillary	Fritillaria pudisa
GRSQ	Curlycup Gumweed	Grindelia squarrosa
GUCO	Scarlet Guara	Guara coccinea
HAAC	Stemless Goldenweed	Haplopappus acaulis
IRMI	Rocky Mountain Iris	Iris missouriensis
LERE	Bitterroot	Lewisia rediviva
LOAM	Biscuitroot	Lomatium ambiguum
Lupin	Lupine	Lupinus spp.
Mahon	Holly-grape	Mahonia spp.
OEHE	Primrose	Oenothera heterantha
Phlox	Phlox	Phlox spp.
Penst	Penstemon	Penstemon spp.
Psora	Scurfpea	Psoralea spp.
RAGL	Sagebrush Buttercup	Ranunculus glaberrimus
RHRA	Poison Ivy	Rhus radicans
RUAC	Sheep Sorrel	Rumex acetosella
RUPA	Dock	Rumex paucifolius
Sedum	Sedum	Sedum spp.
Senec	Groundsel	Senecio spp.
SPCO	Scarlet Glademallow	Sphaeralcea coccinea
Trifo	Clover	Trifolium spp.
VIAM	Vetch	Vicia americana
WYAM	Mulesears	Wyethia amplexicaulis
Zygad	Death Camas	Zygadenus spp.

Common Name	Scientific Name
(Aquatic and Semi-Aquatic)	
(Algae)	
Green and Red Algae	Batrachospermum spp.
	Cladophora spp.
	Spirogyra spp.
Muskgrass	Chara vulgaris
	Nitella flexilis
(Mosses and Liverworts)	
Watermoss	Frontinalis spp.
Leafy Liverwort	Scapania spp.
Slender Riccia	Riccia fluitans
(Horsetails)	
Common Horsetail	Equisetum arvense
Scouring Rush	E. hyemale
Smooth Scouring Rush	E. laevigatum
Variegated Horsetail	E. variegatum
(Misc.)	
Water Plantain	Alisma plantago-aquatico
Waterweed	Eleodea canadensis
Rush or wiregrass	Juncus balticus
" "	J. bufonius
" "	J. mertensianus
" "	J. saximontanus
Duckweed	Lemna minor
Threadleaf pondweed	Potamogeton filiformis
Sago Pondweed	Potamogeton pectinatus
Pondweed	Potamogeton spp.
Ditchgrass	Ruppia maritima
Arrowhead	Sagittaria cuneata
Hardstem Bulrush	Scirpus acutus
American 3-2Square Bulrush	S. americanus
Small-Seeded Bulrush	S. microcarpus
Soft-Stemmed Bulrush	S. validus
Bur-Reed	Sparganium spp.
Arrowgrass	Triglochin maritima
Common Cattail	Typha latifolia

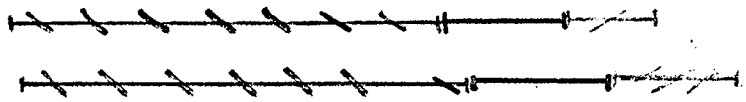
Grasses

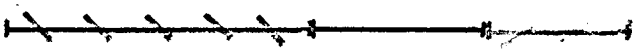
start of growth
flowering
seed ripe

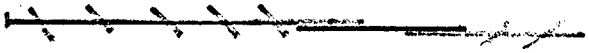
MAR APR MAY JUN JUL AUG SEP OCT

Annual
1. BRTE
2. VUOC

Perennial
1. AGCR
2. AGDA
3. AGRE
4. AGSm
5. AGSP
6. AGSU
7. ARFE
8. BOGR
9. ELCI
10. HOJU
11. KOCR
12. ORHY
13. POCA
14. POFE
15. POSE
16. SIHY
17. SPAI
18. SPCR







Appendix I

GRASSES

start of growth

flowering

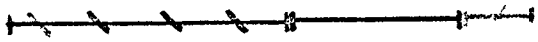
seed ripe

MAR APR MAY JUN JUL AUG SEP OCT

19. SPGR

20. STCO

21. STLE



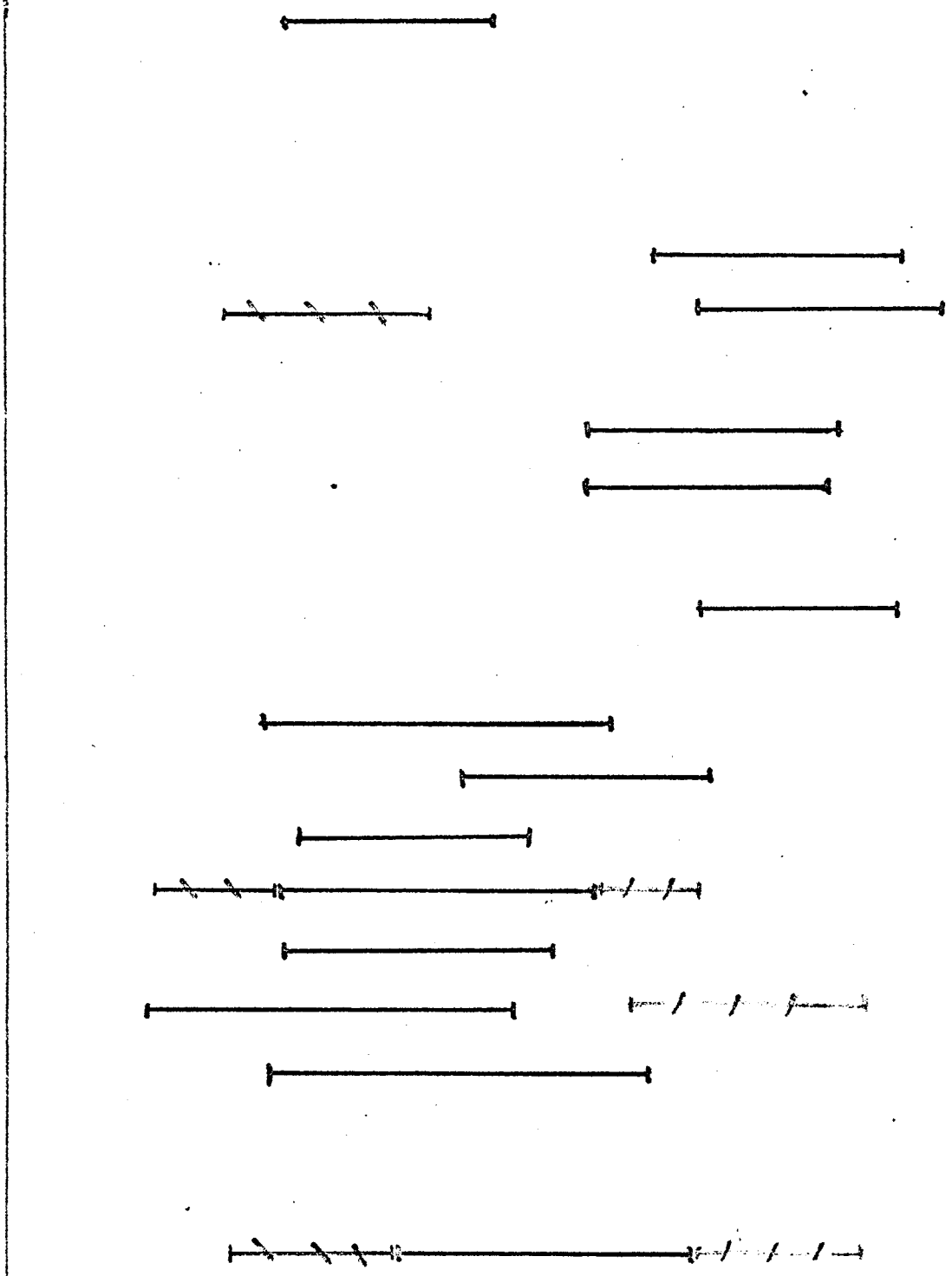
shrubs

flowering

seed ripe

MAR APR MAY JUN JUL AUG SEP OCT

1. AMAL
2. ARCA-1
3. ARFR
4. ARNO
5. ARTR-1
6. ARTR-2
7. ATNU
8. CHNA
9. CHVI
10. EULA
11. GUSA
12. HEPU
13. OPPO
14. POFR
15. PRVI
16. PUTR
17. RHTR
18. Ribes
19. ROWO
20. SAVE
21. Symph.
22. TECA



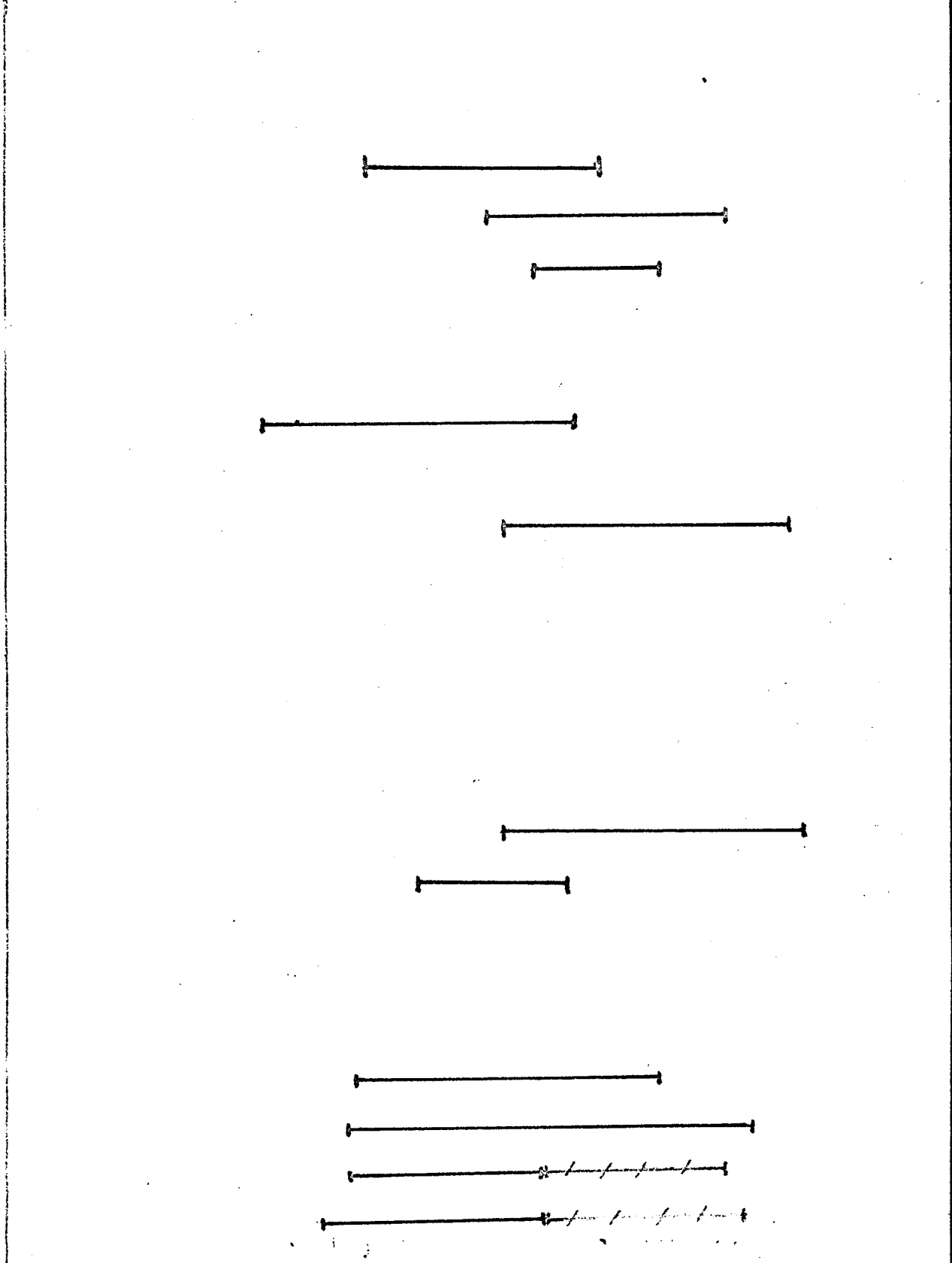
Forbs, Annual

— flowering

+++ seed ripe

MAR APR MAY JUN JUL AUG SEP OCT

1. CAMI
2. CHAL
3. Cheno
4. CIFO
5. CIVU
6. CLSE
7. CORA
8. DEPI
9. GIAG
10. GILE
11. HEAN
12. Lapul
13. LARE
14. LATE
15. Lepid
16. MATA
17. MEDE
18. MELA
19. MIGR
20. PLPU
21. PLSP
22. POAV
23. PONA
24. TRDU
25. TRPR



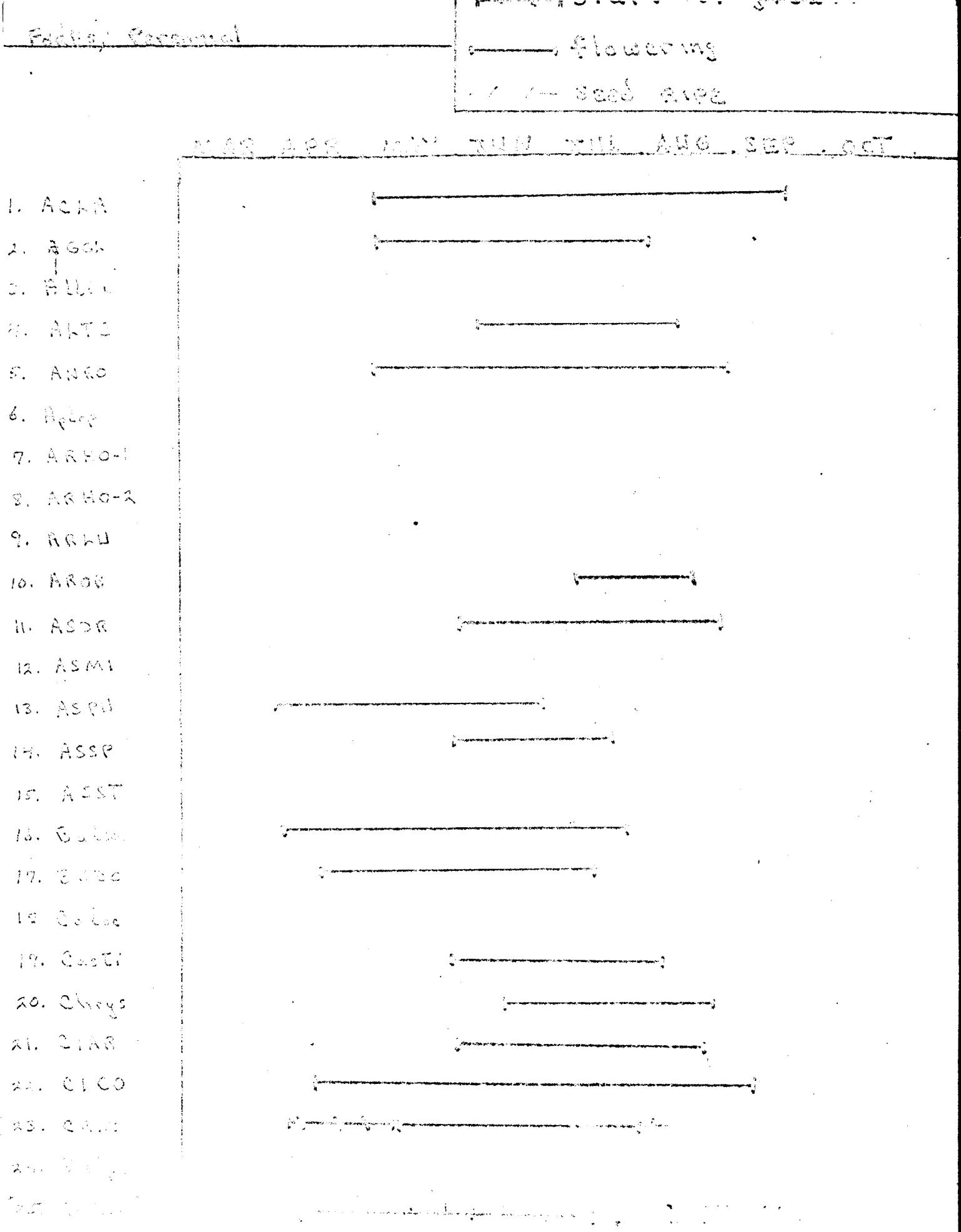
Forbs, Annual

start of growth
flowering
seed ripe

MAR . APR . MAY . JUN . JUL . AUG . SEP . OCT .

26. SAKA
27. Sisym
28. IXAST

Faddis, Personnel

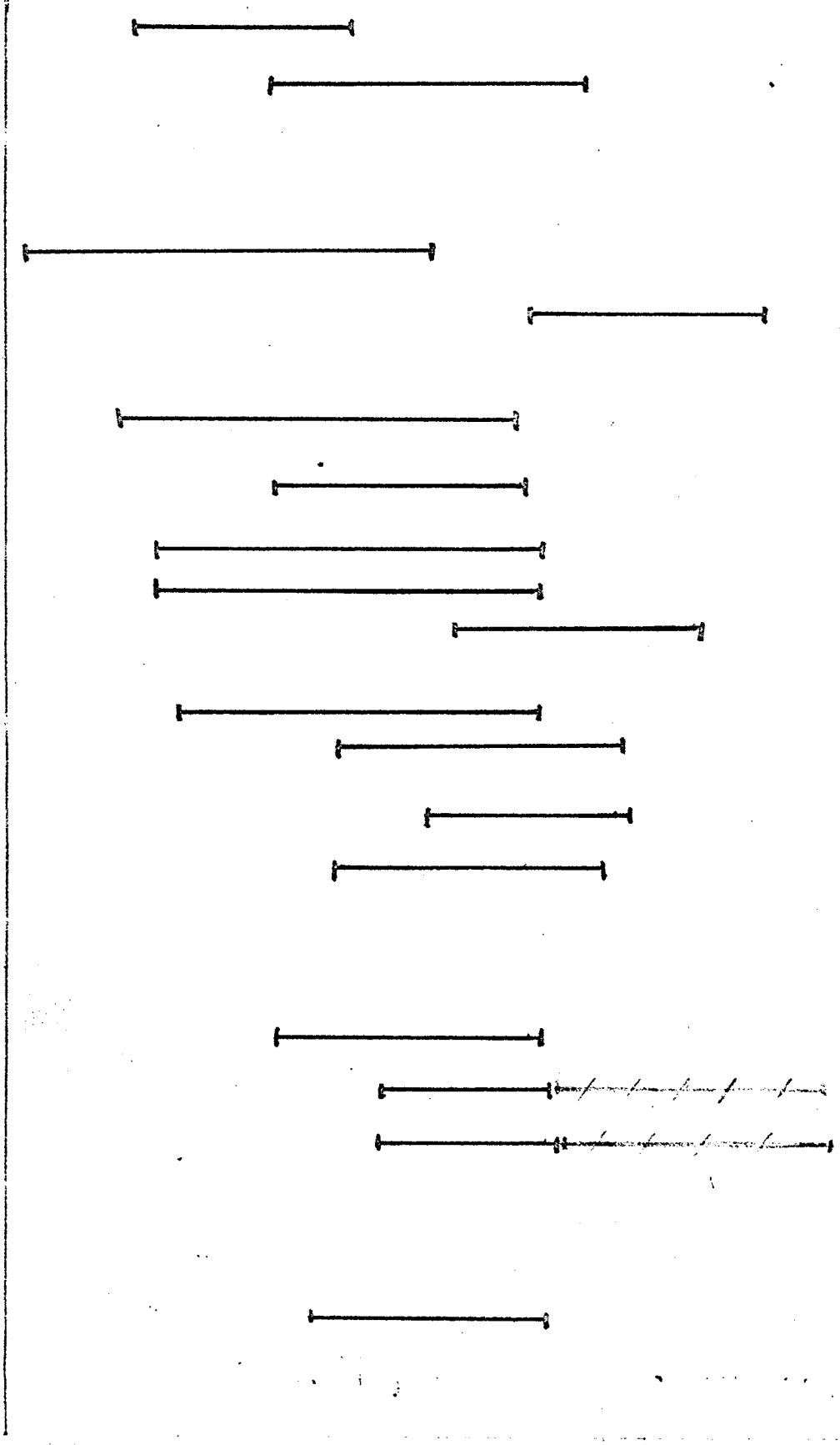


Forbs, Perennial

flowering

Seed ripe

MAR APR MAY JUN JUL AUG SEP OCT



Forbs, Perennial

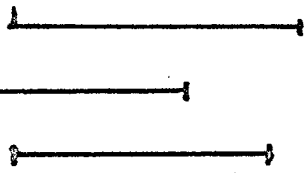
start of growth
flowering
seed ripe

MAR . APR . MAY . JUN . JUL . AUG . SEP . OCT .

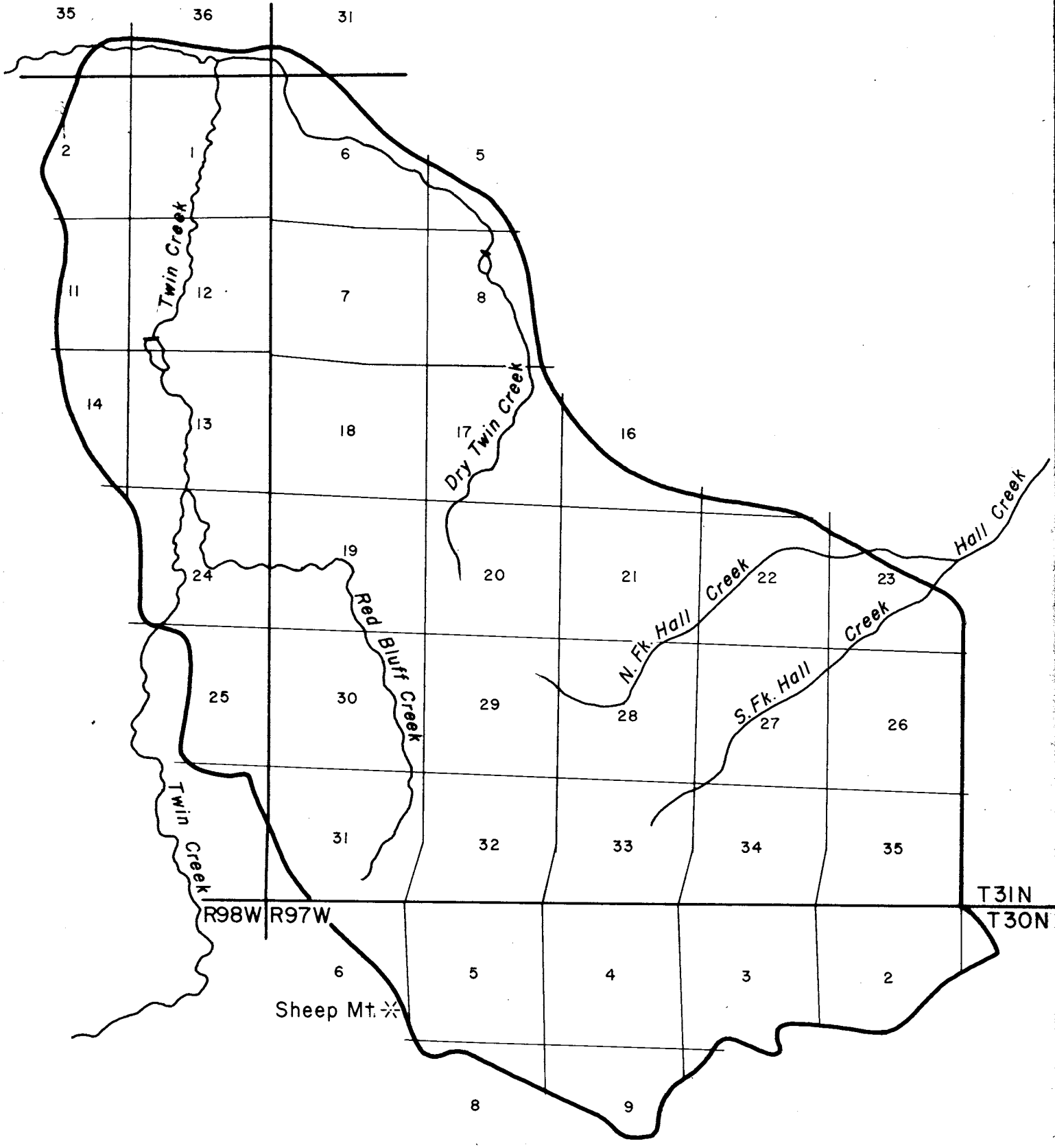
51. VIAM

52. WYAM

53. Zygad



HALL CREEK MANAGEMENT AREA

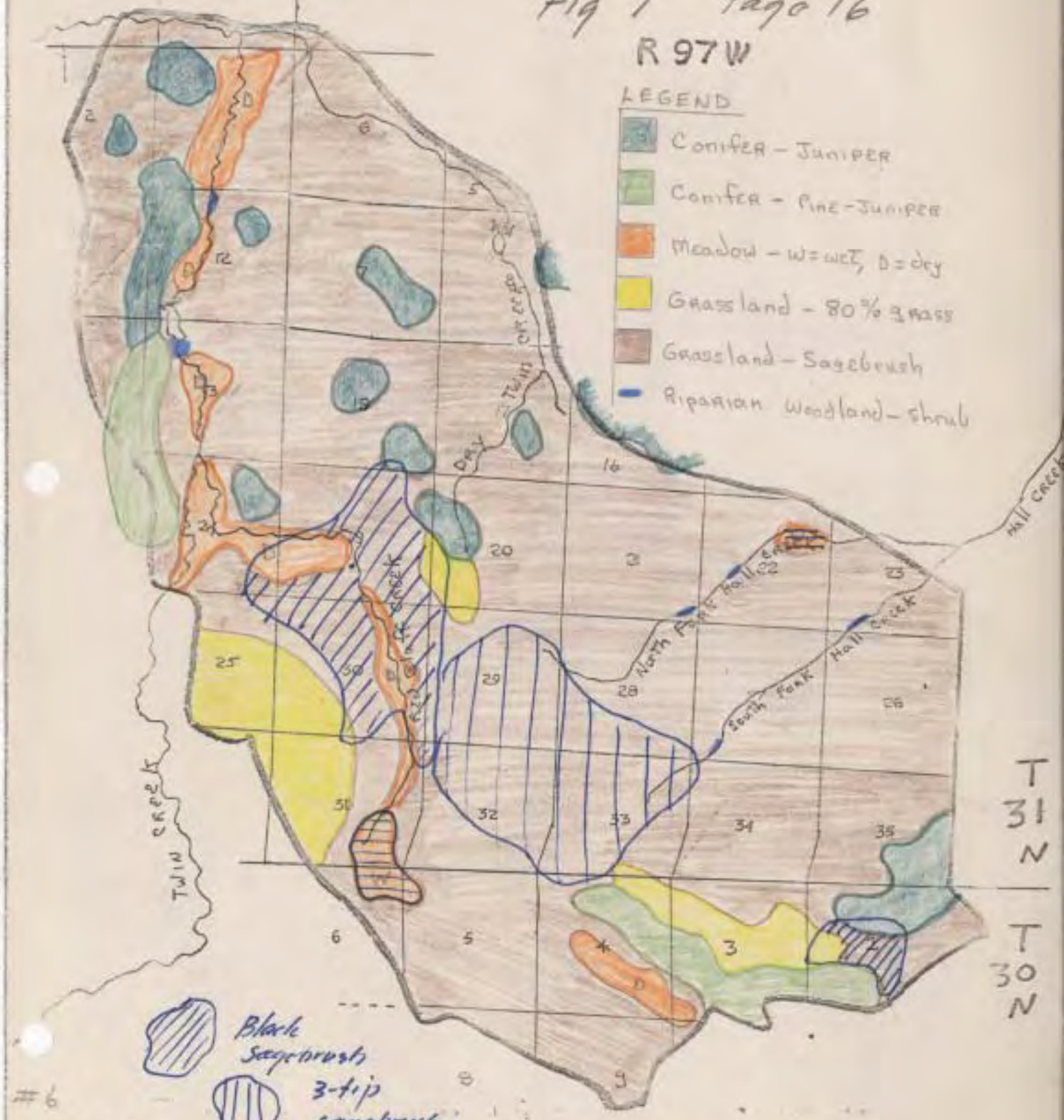


(Map 6)

Hall Creek Management Area

Fig 7 Page 16

R 97 W

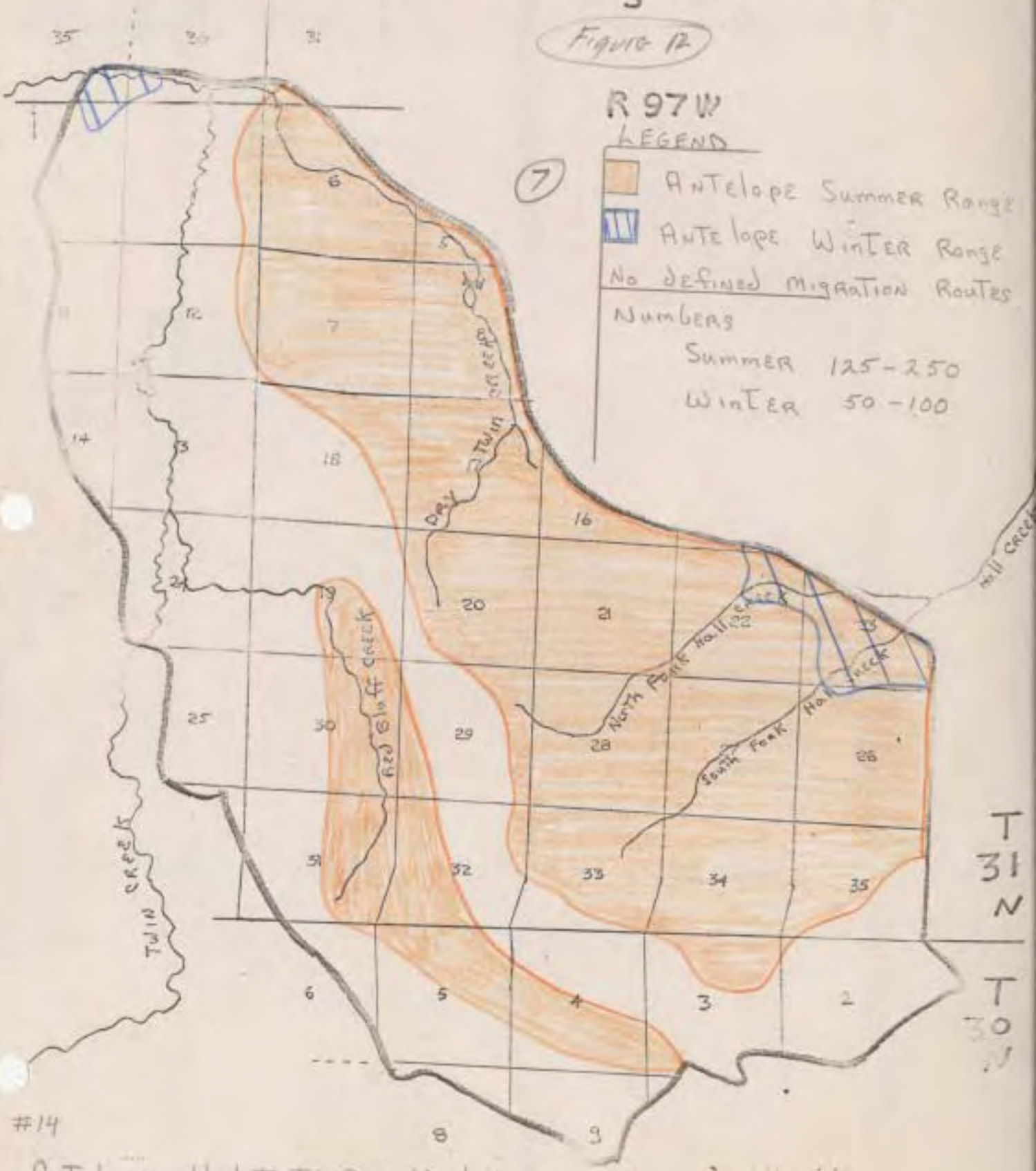


#6 Vegetation Types

Map 12

Hall Creek Management Area

Figure 12



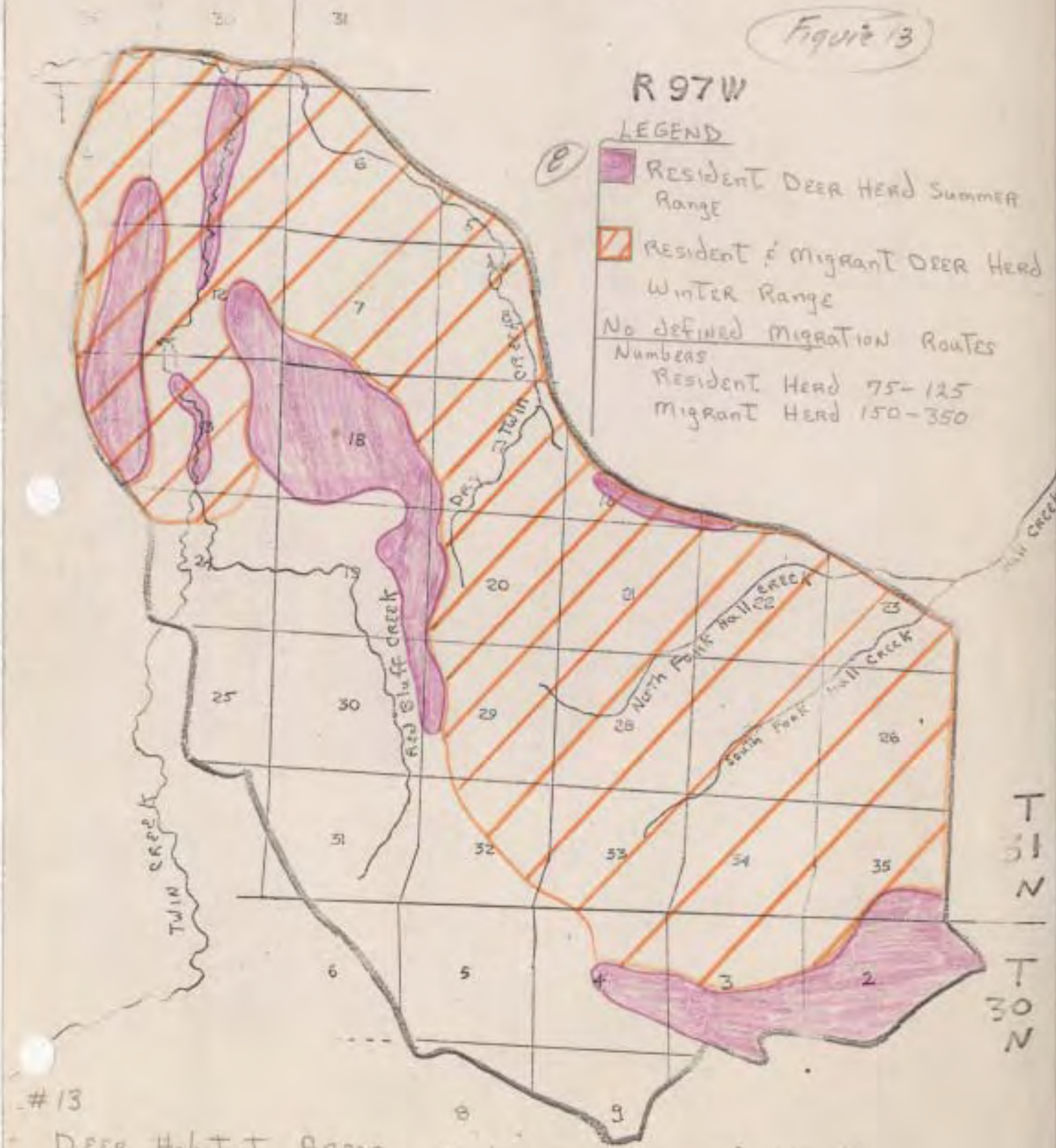
#14

Antelope Habitat Areas

Map 7

Hall Creek Management Area

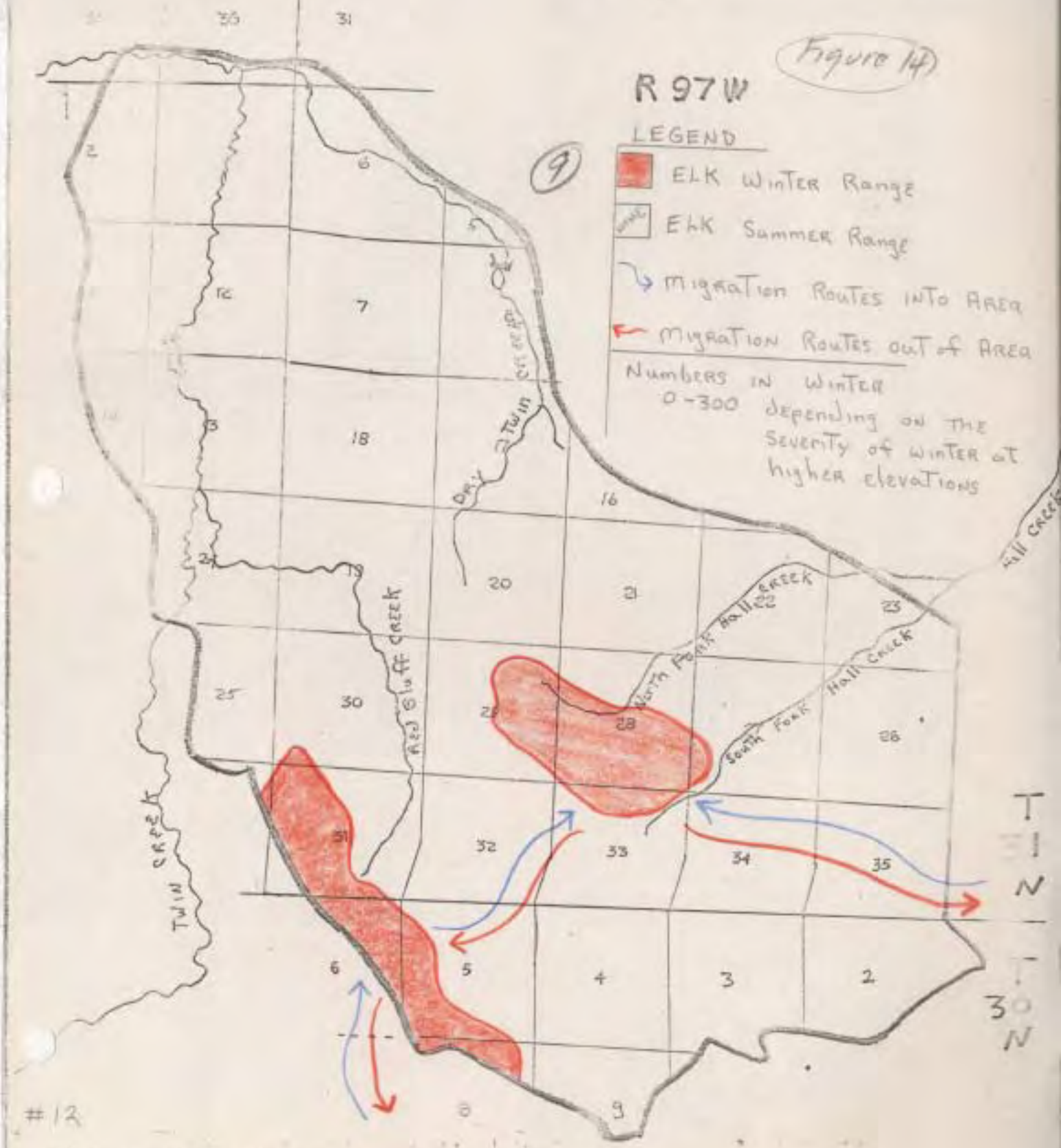
Figure 13



#13

Deer Habitat Areas

Hall Creek Management Area

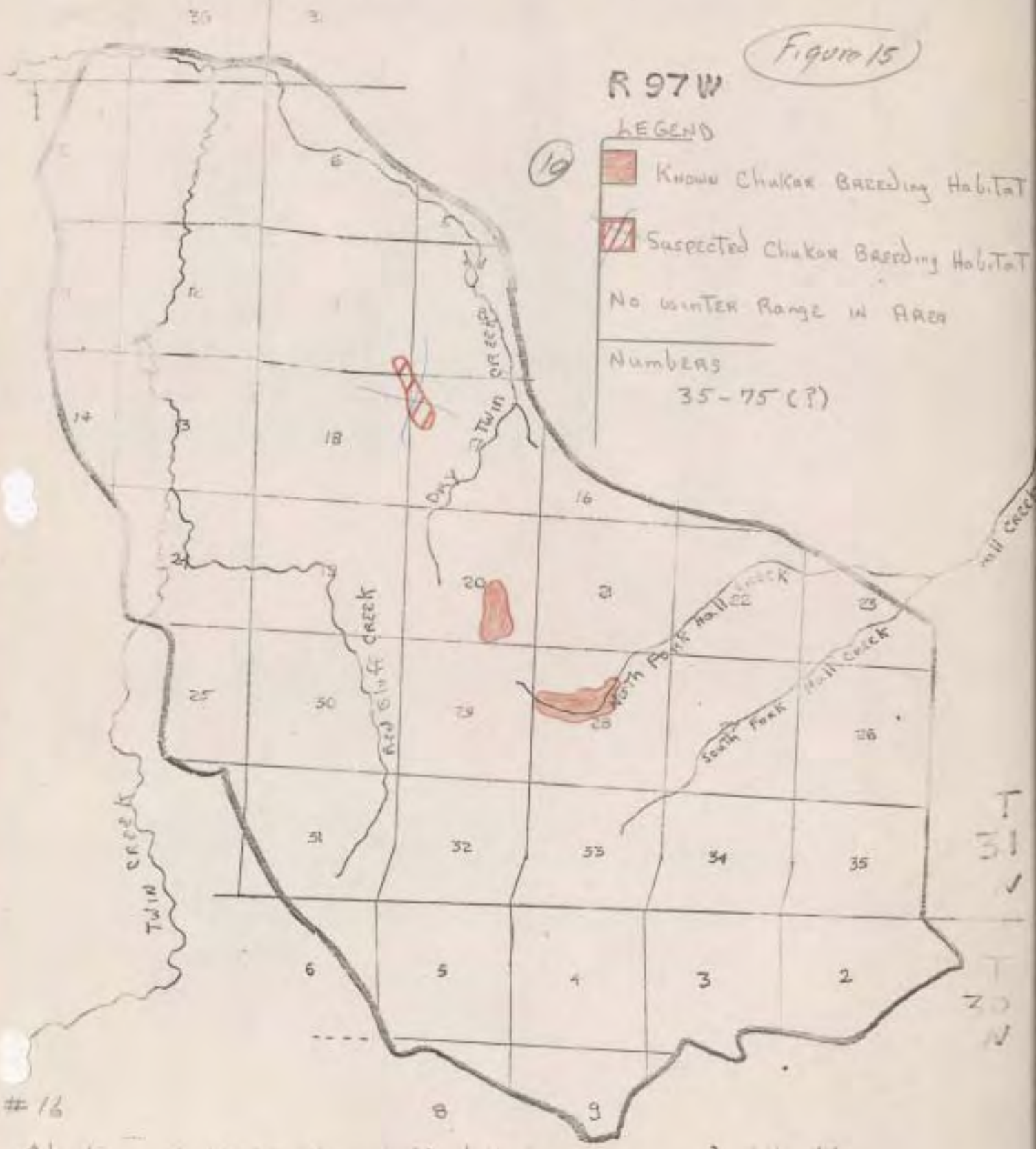


#12
ELK Habitat Areas

Map 12

Hall Creek Management Area

Figure 15



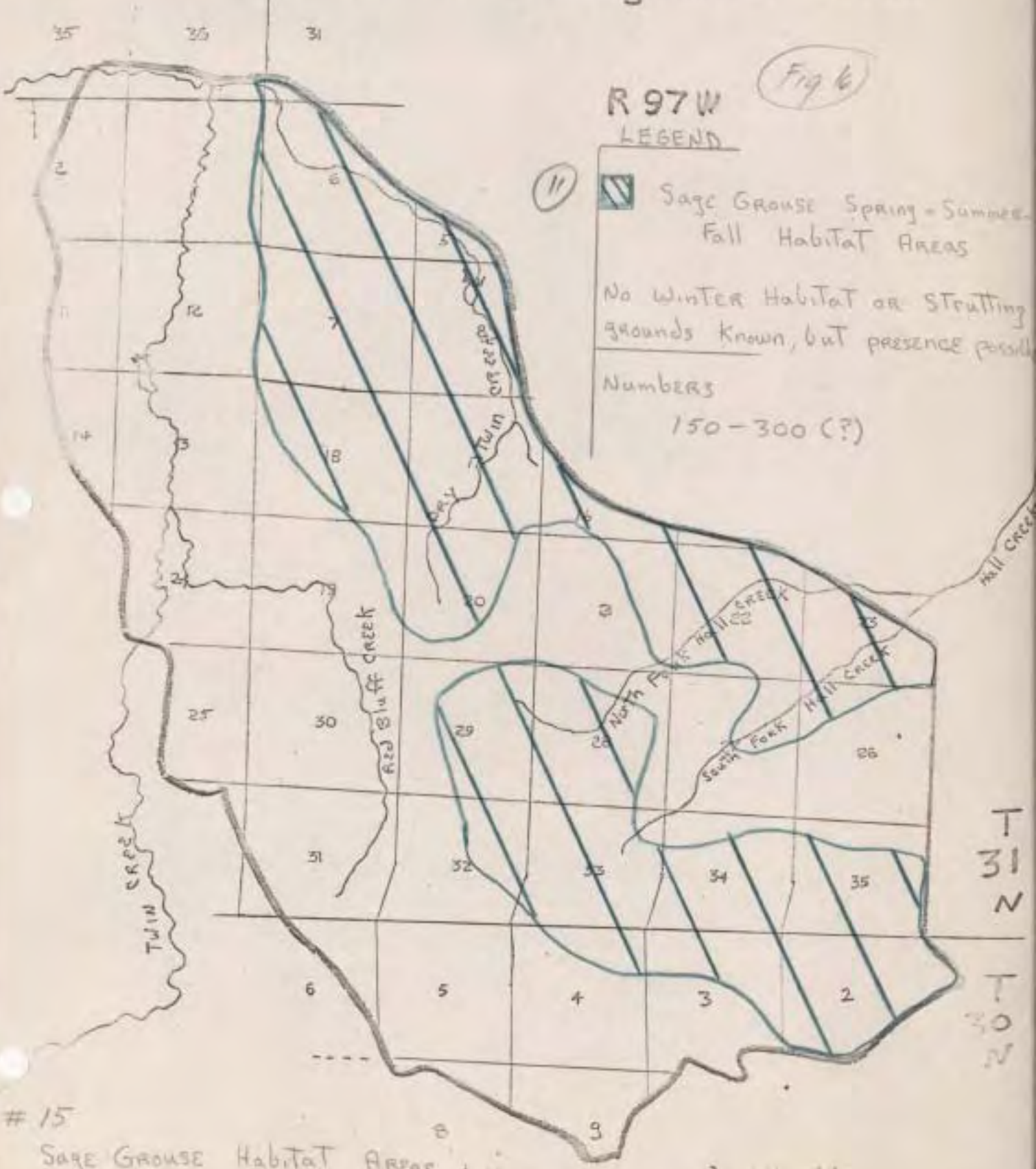
#16

Chukar Habitat Areas

HALL CREEK MANAGEMENT AREA

Map 11

Hall Creek Management Area



#15
Sage Grouse Habitat Areas

Map 13

Hall Creek Management Area

#17 A

Waterfowl Habitat Areas

Waterfowl Populations – estimated from one year's partial observation & census

I. Breeding in Management Area

Species	# Breeding Pairs	Estimated # Young fledged
Mallard	5	20-25
Pintail	6	26-30
Teal	9	20-30
Gadwall	2	6-9
American Coot	4	12-20

II. Fall migrants – principally on Twin Creek & Carr Reservoir

Species	Number
American Merganser	25-30
American Goldeneye	4-8
Ruddy Duck	5-10

III. Winter Residents – so long as open water remains in Carr Reservoir

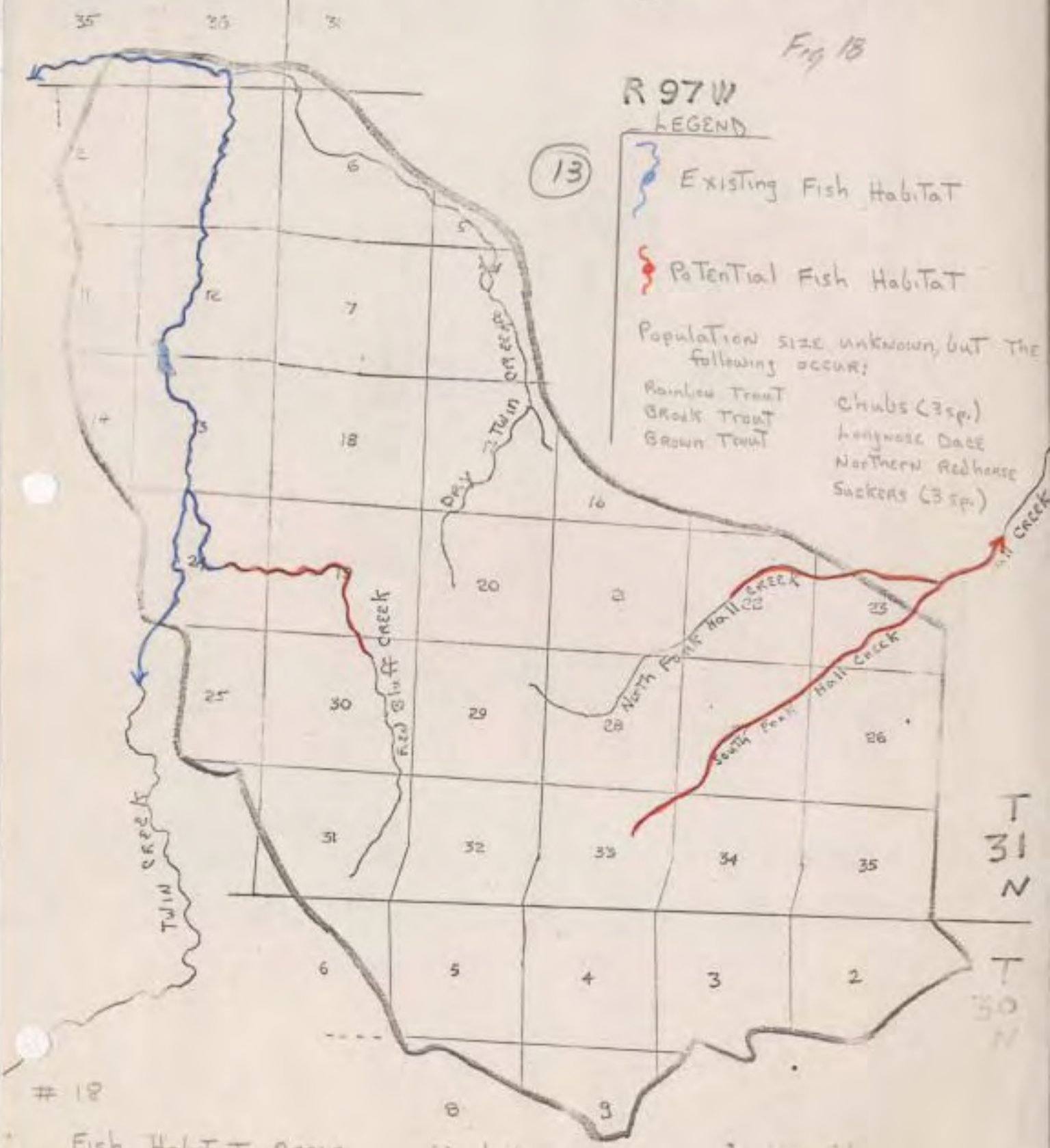
Species	Number
Mallard	10-15

#17 B
Waterfowl Populations

Map 14

Hall Creek Management Area

Fig 13

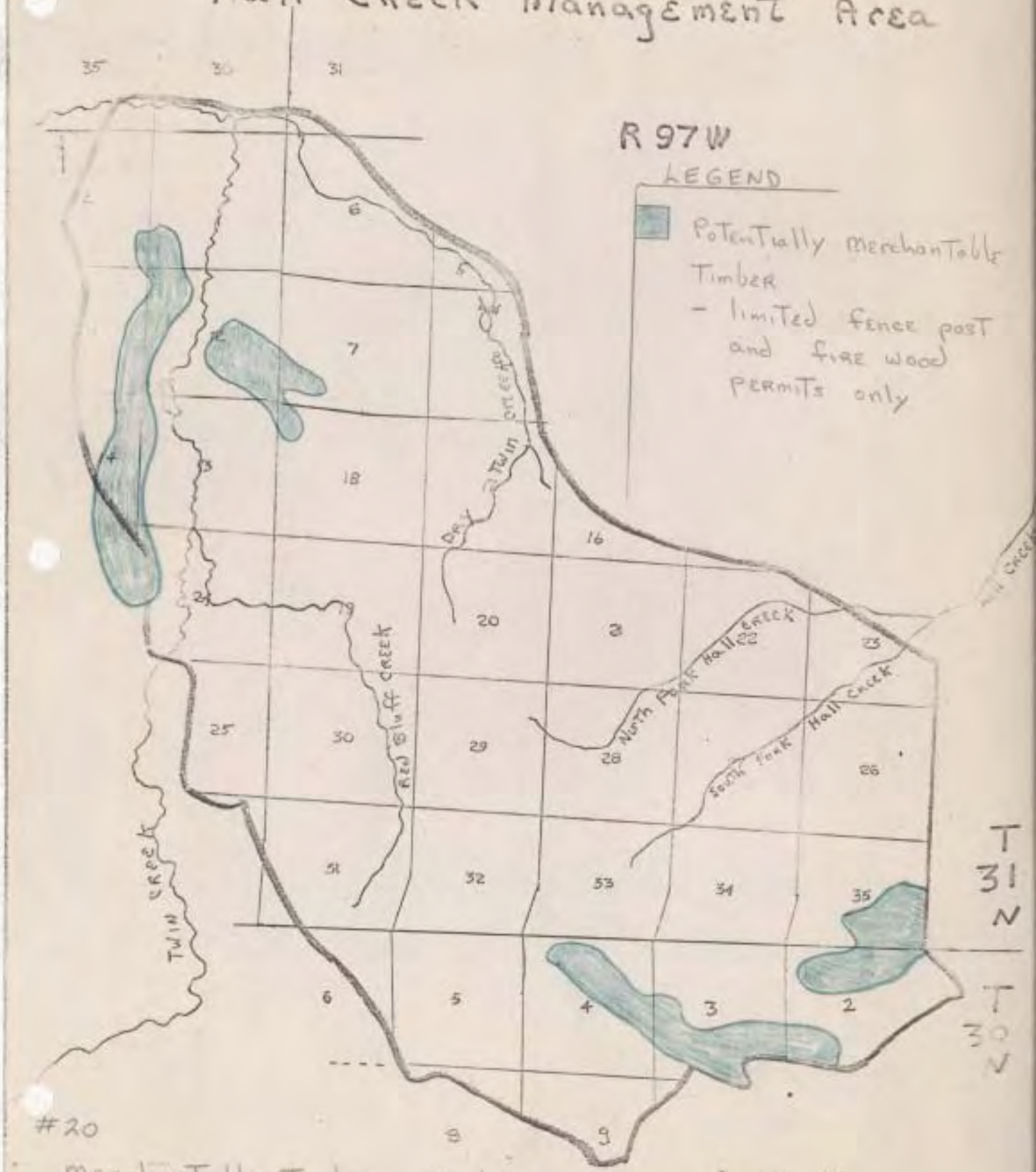


18

Fish Habitat Areas

Map 7

Hall Creek Management Area



#20

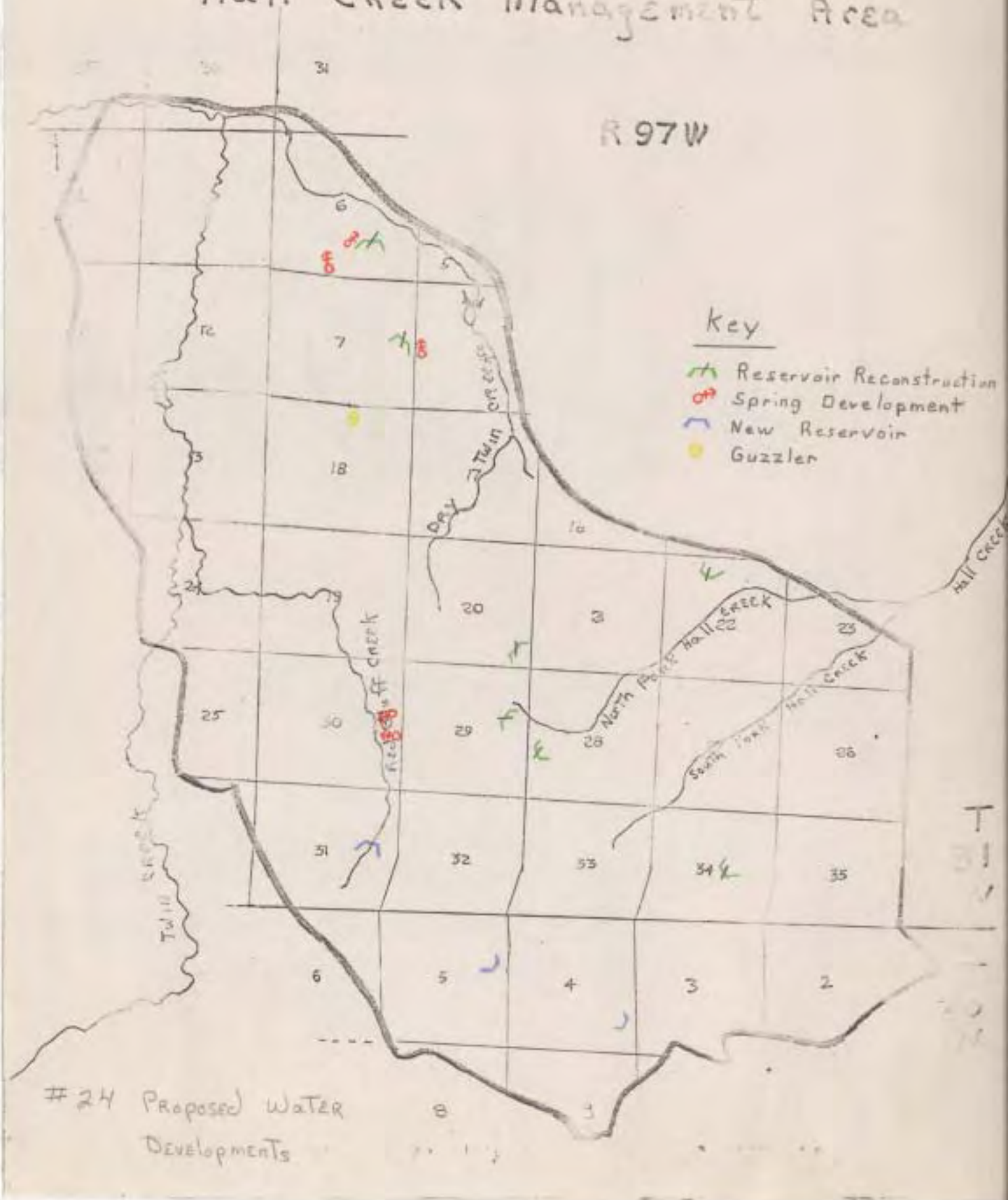
Merchantable Timber

Map 20

Hall Creek Management Area

#23

Hall Creek Management Area



#24 Proposed Water Developments

HALL CREEK MANAGEMENT AREA

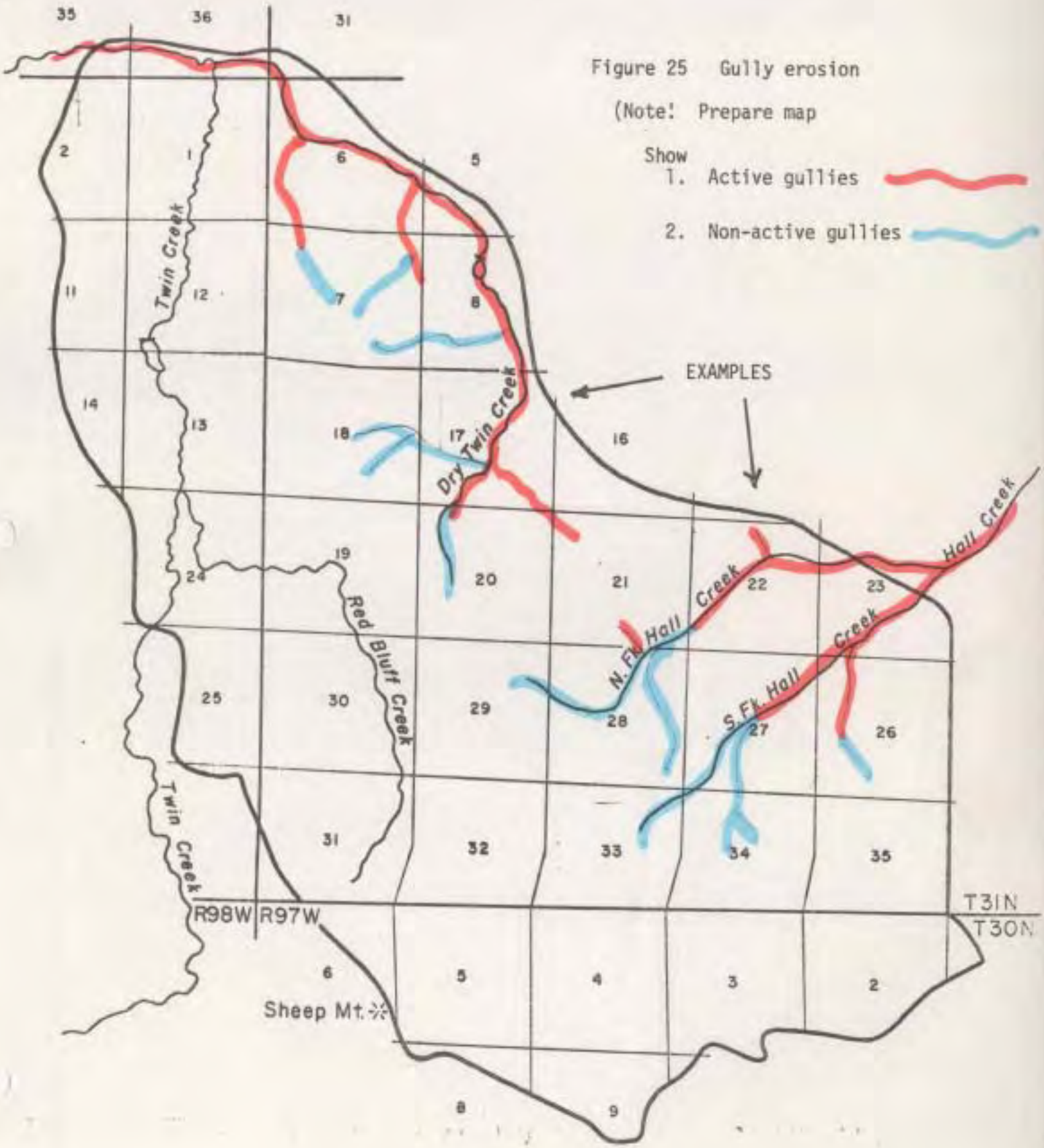


Figure 25 Gully erosion

(Note! Prepare map

Show

1. Active gullies

2. Non-active gullies

Map 21

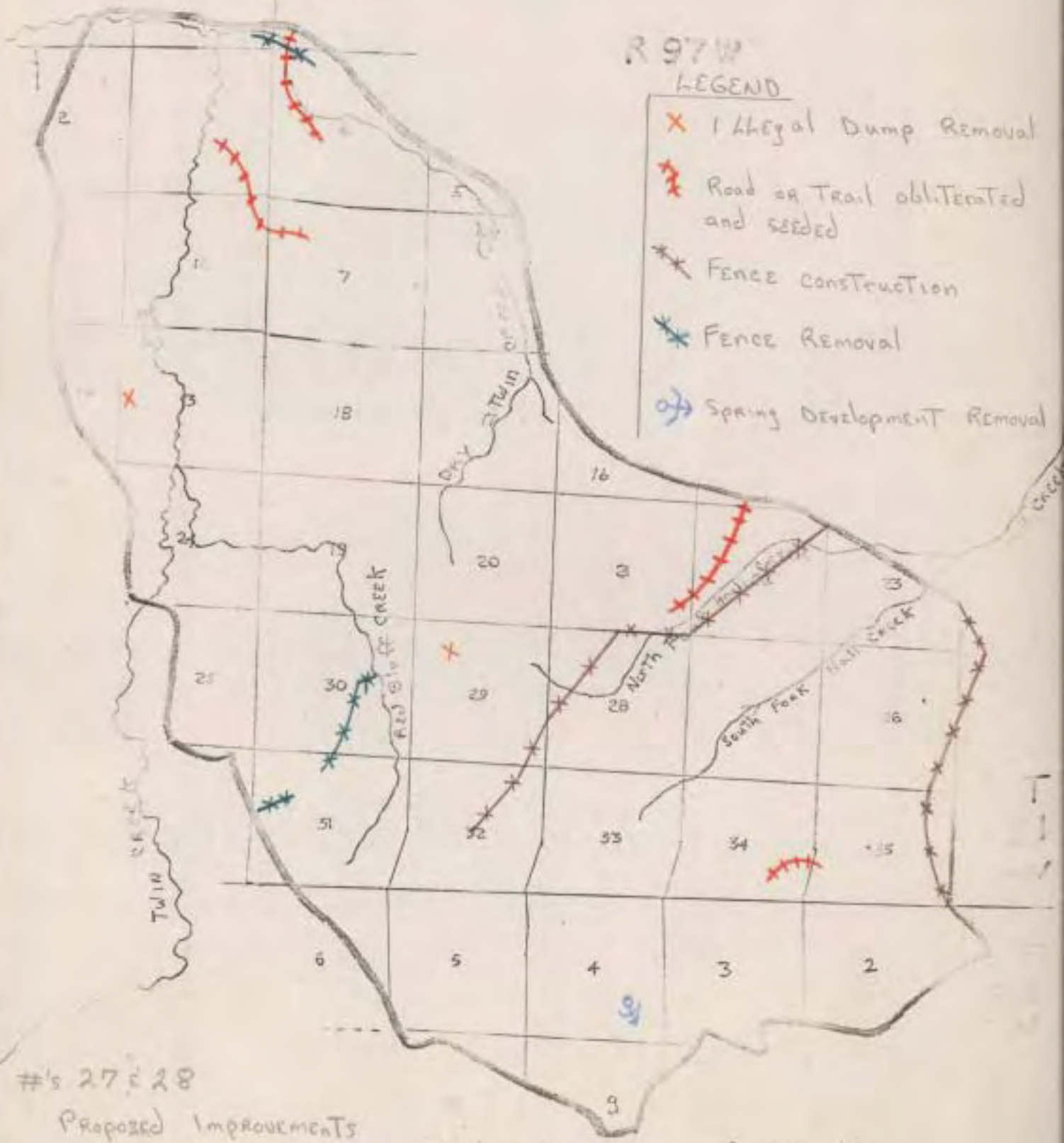
Roads Bldgs

Hall Creek Management Area

#26

Existing Improvements

Hall Creek Management Area



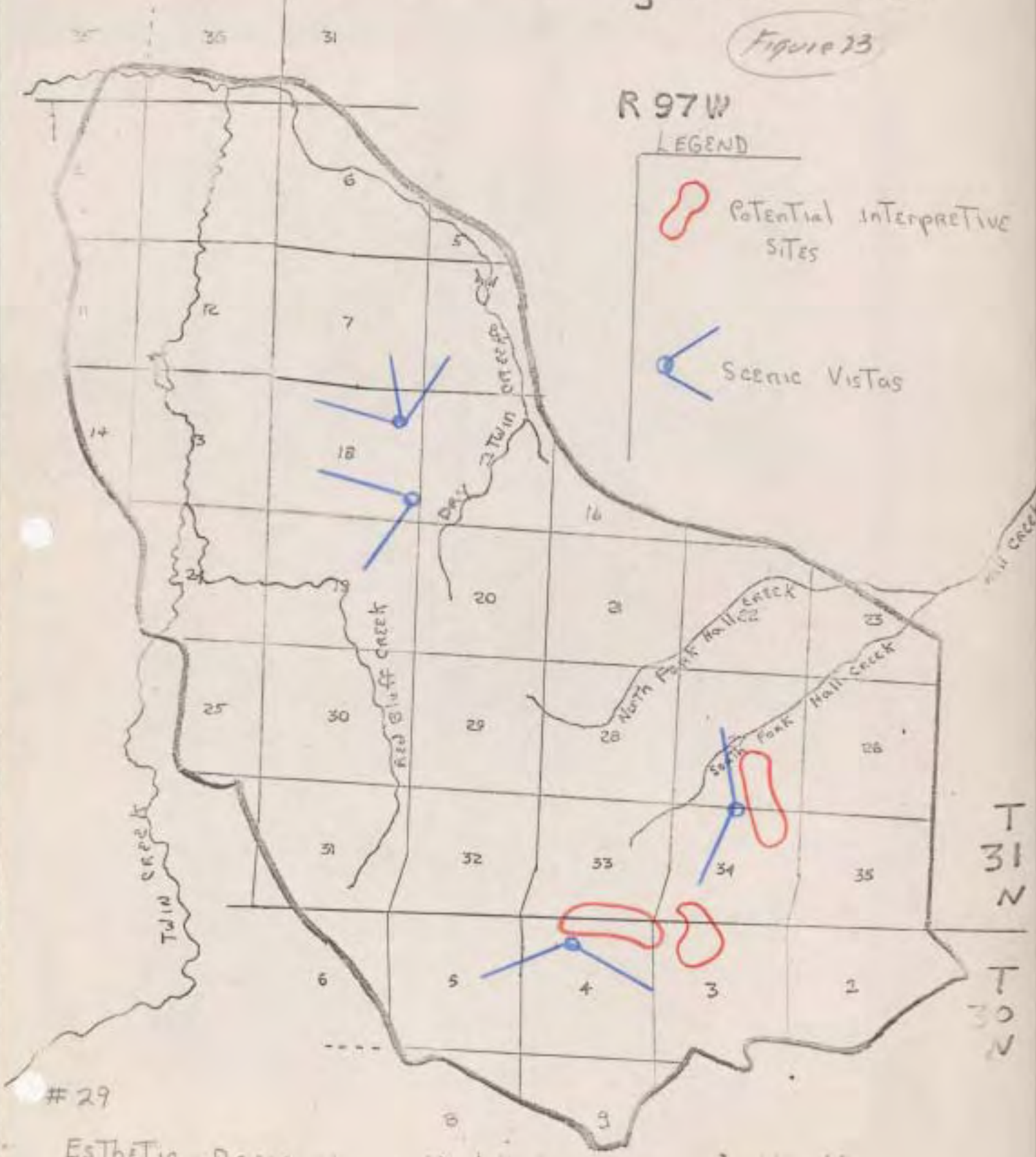
#'s 27 & 28

Proposed Improvements

Refuse dump sites

Hall Creek Management Area

Figure 23

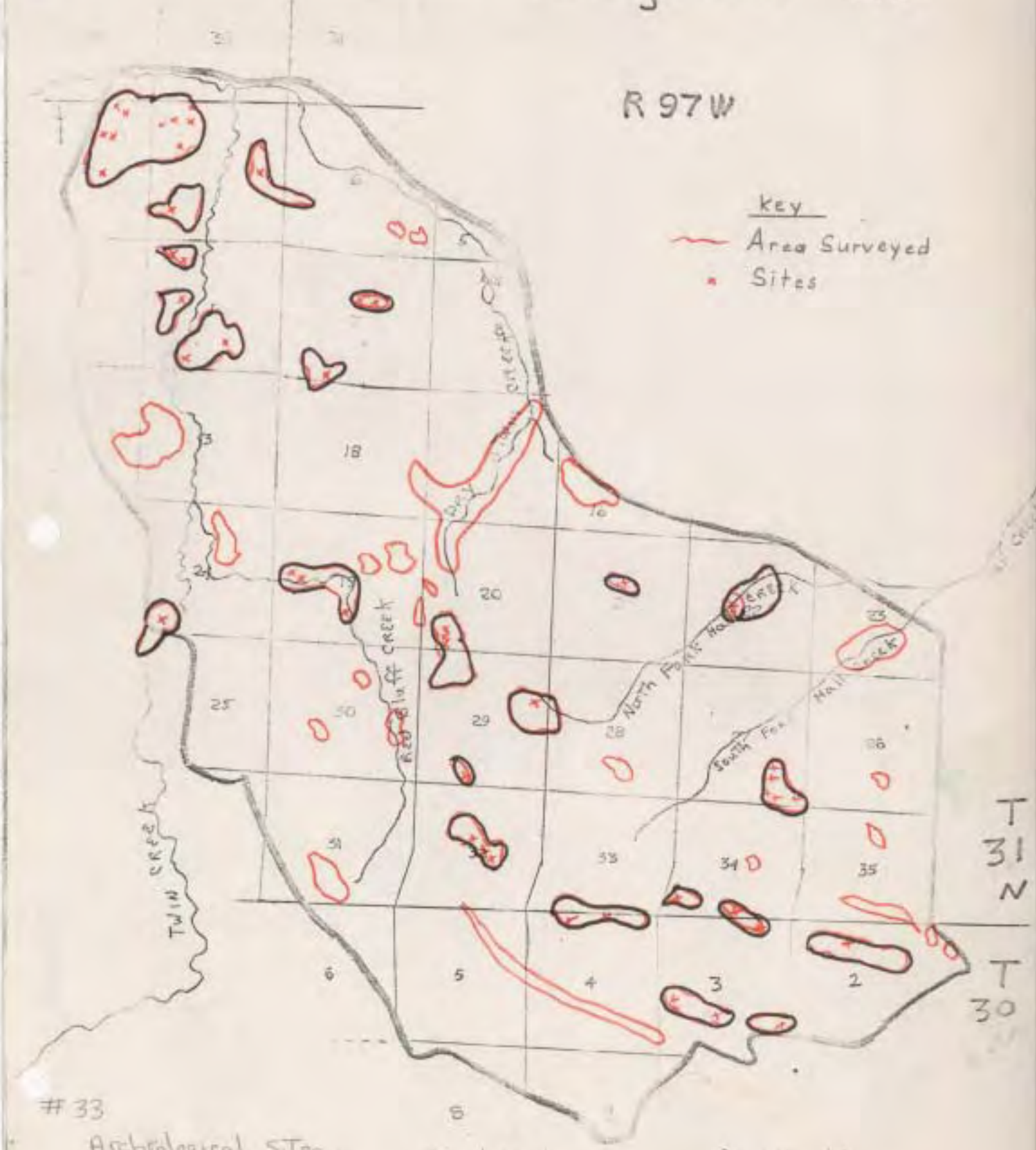


#29

Esthetic Areas

Map 1E

Hall Creek Management Area



#33

Archeological Sites

Hall Creek Management Area

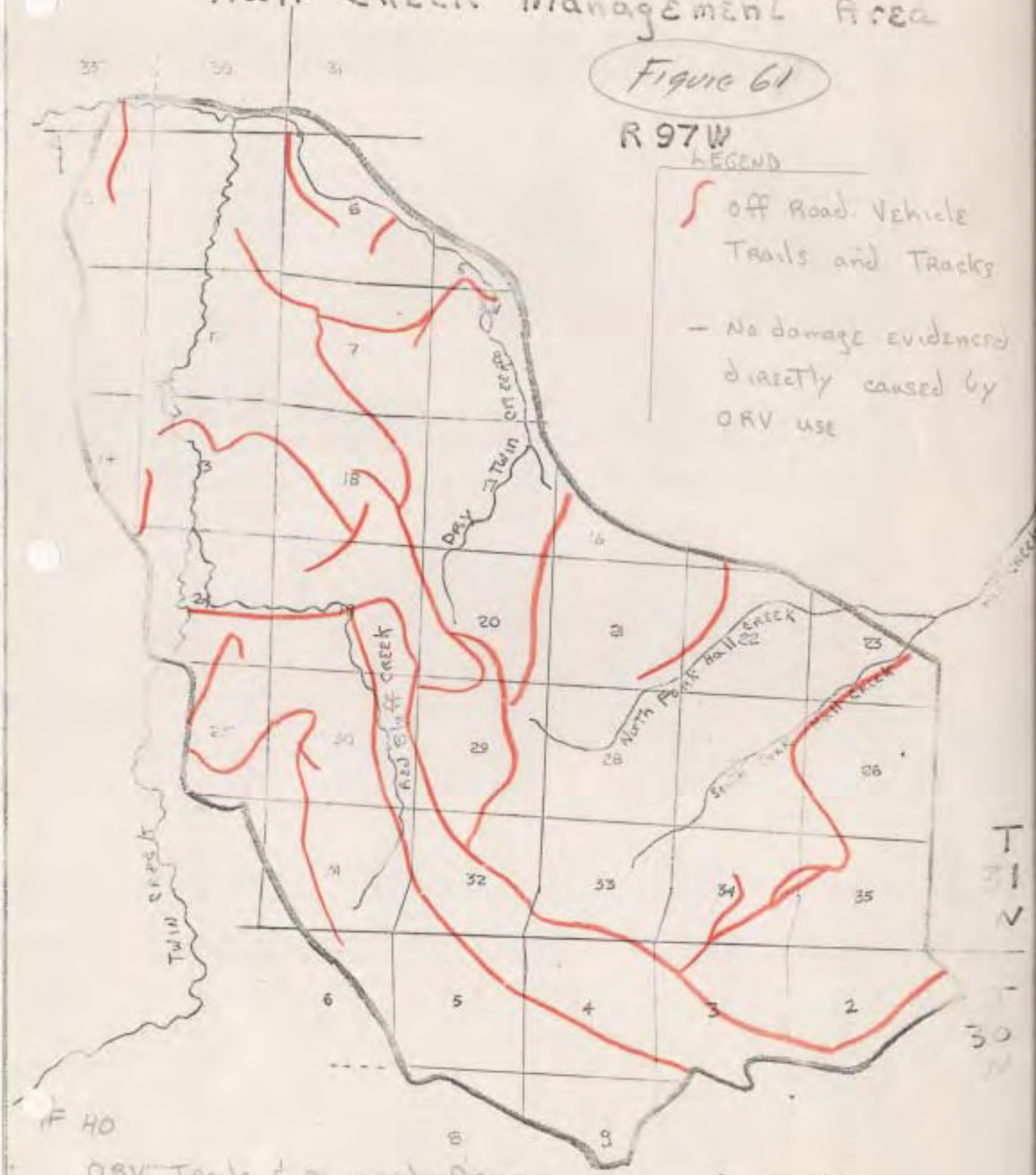
37

Plant Diseases

Map 22

Hall Creek Management Area

Figure 61



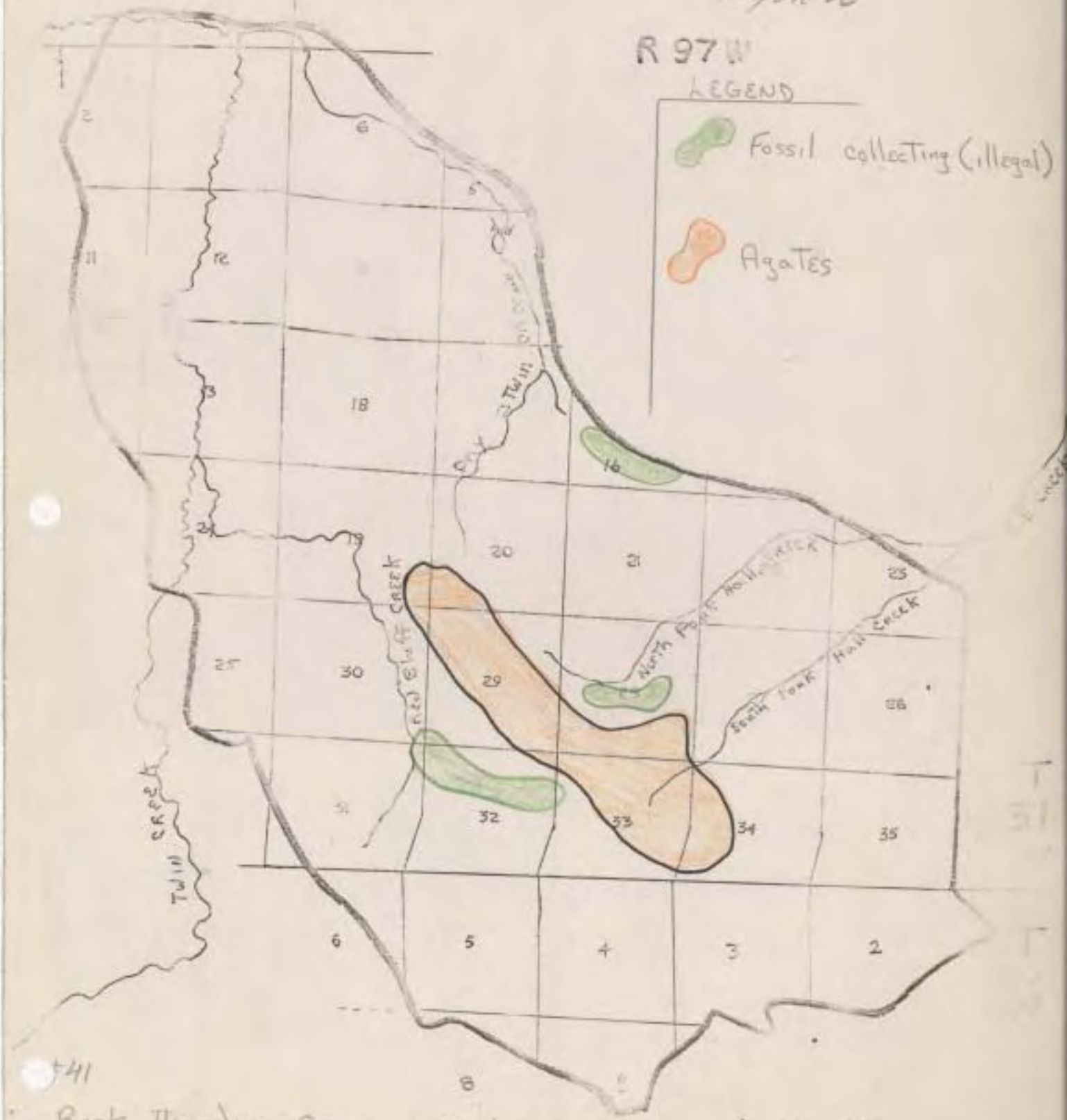
F 40

ORV Trails & Damaged Areas

Map 17

Hall Creek Management Area

Figure 25



#41

Rock Hounding Areas

Map 12

Hall Creek Management Area

Figure 63

R 97 W

Unlicensed refuse dump sites

Hall Creek Management Area

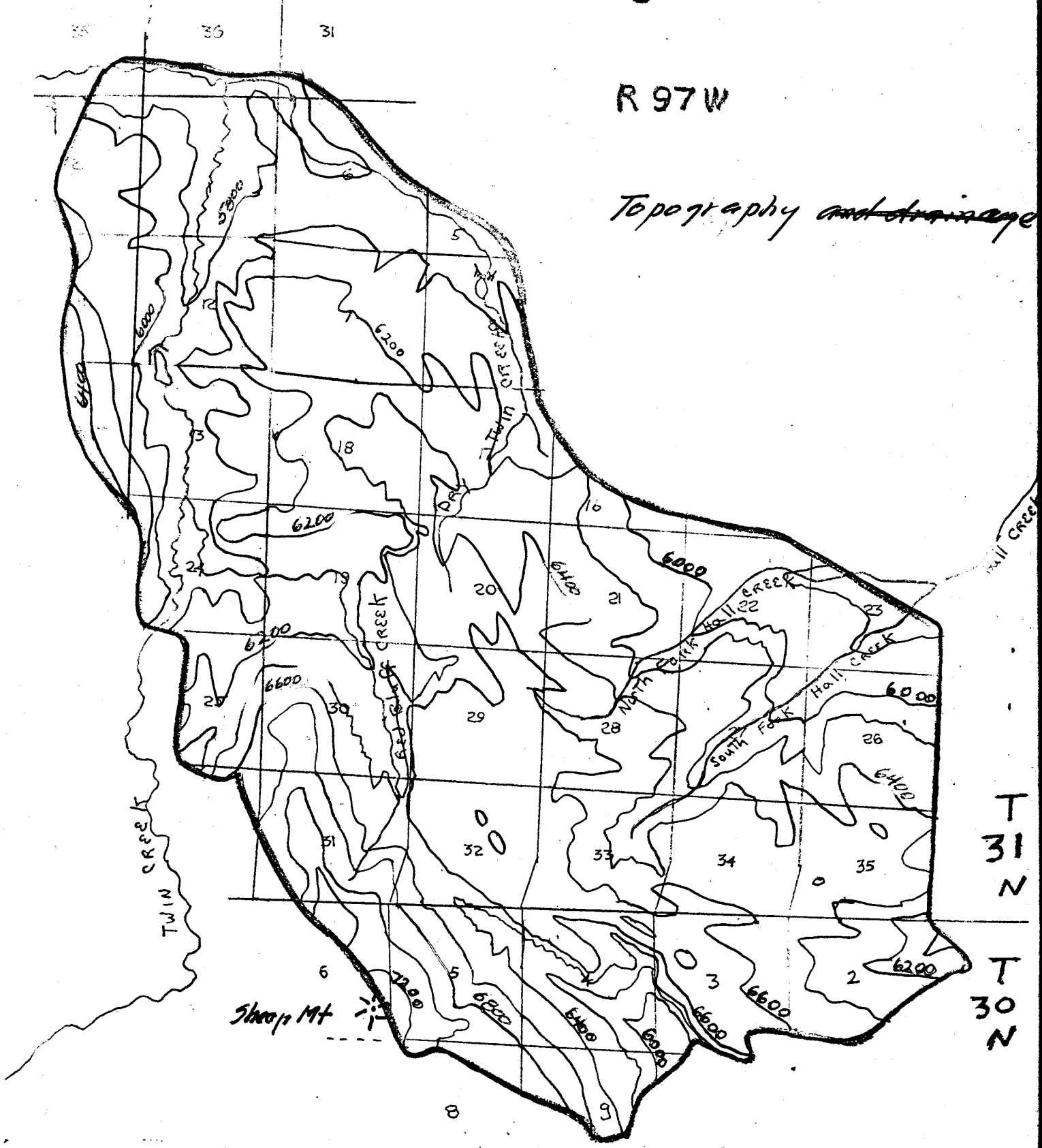
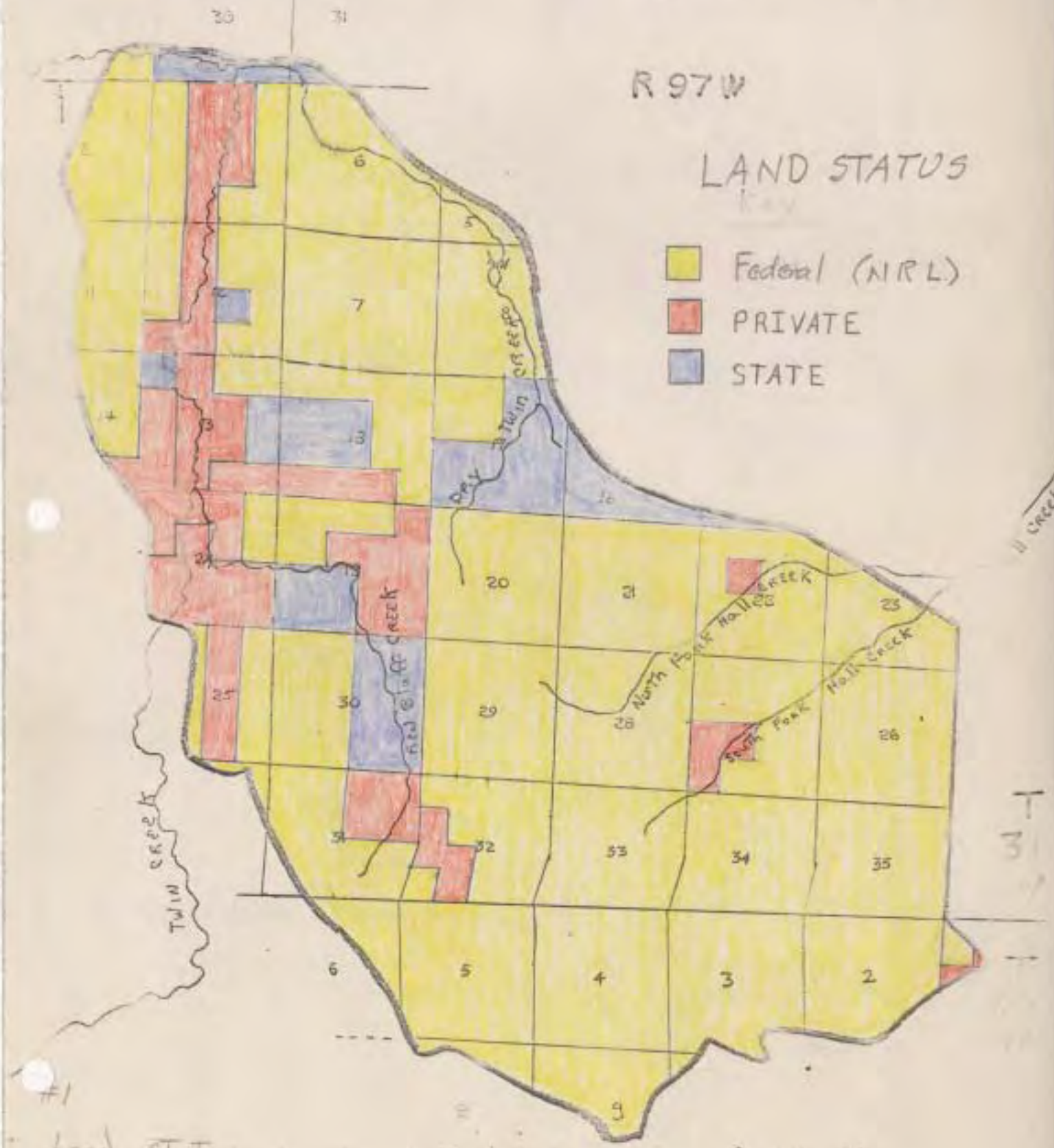


Fig. 2

Hall Creek Management Area



#1 Land Status

HALL CREEK MANAGEMENT AREA

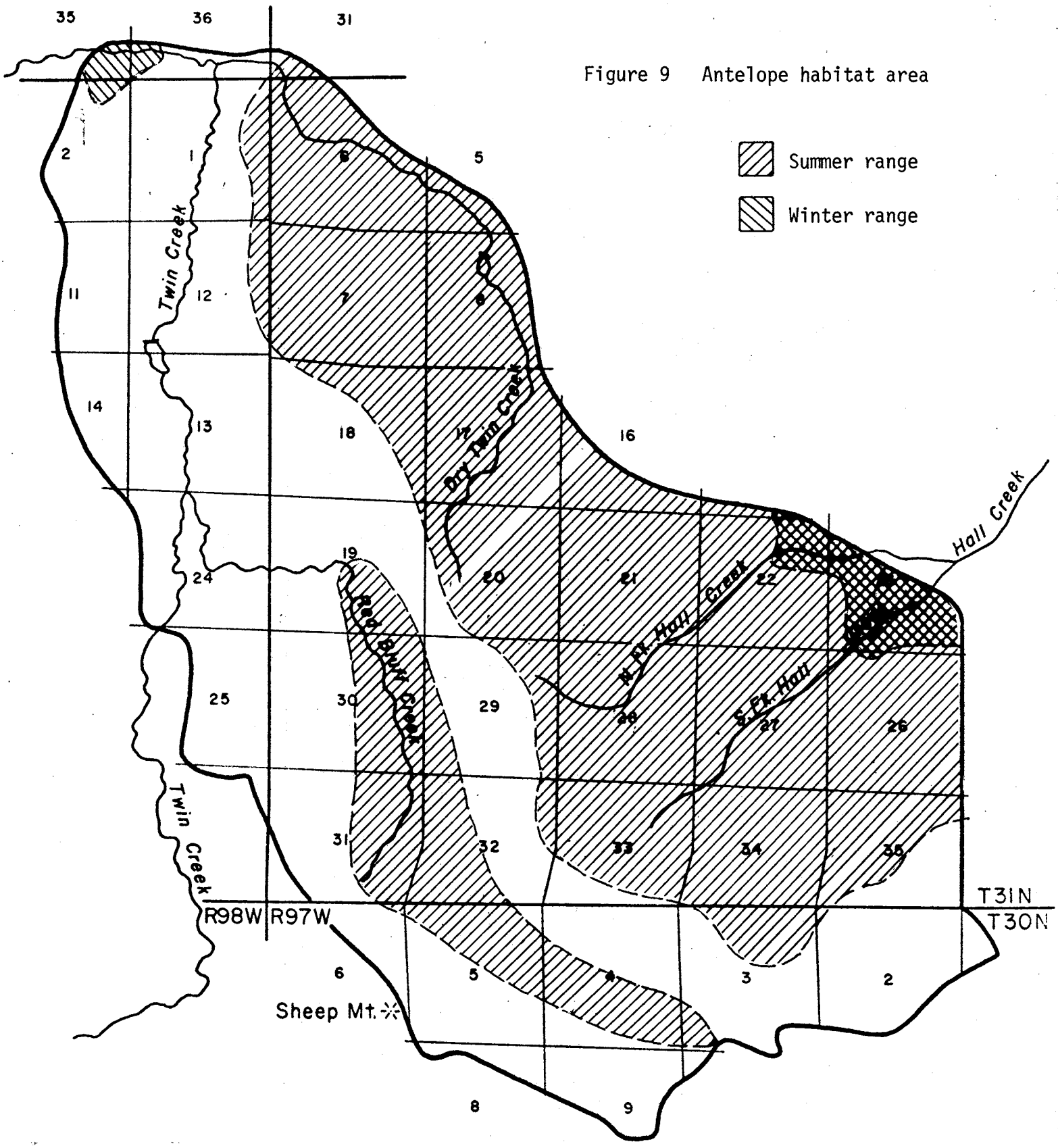


Figure 9 Antelope habitat area

HALL CREEK MANAGEMENT AREA

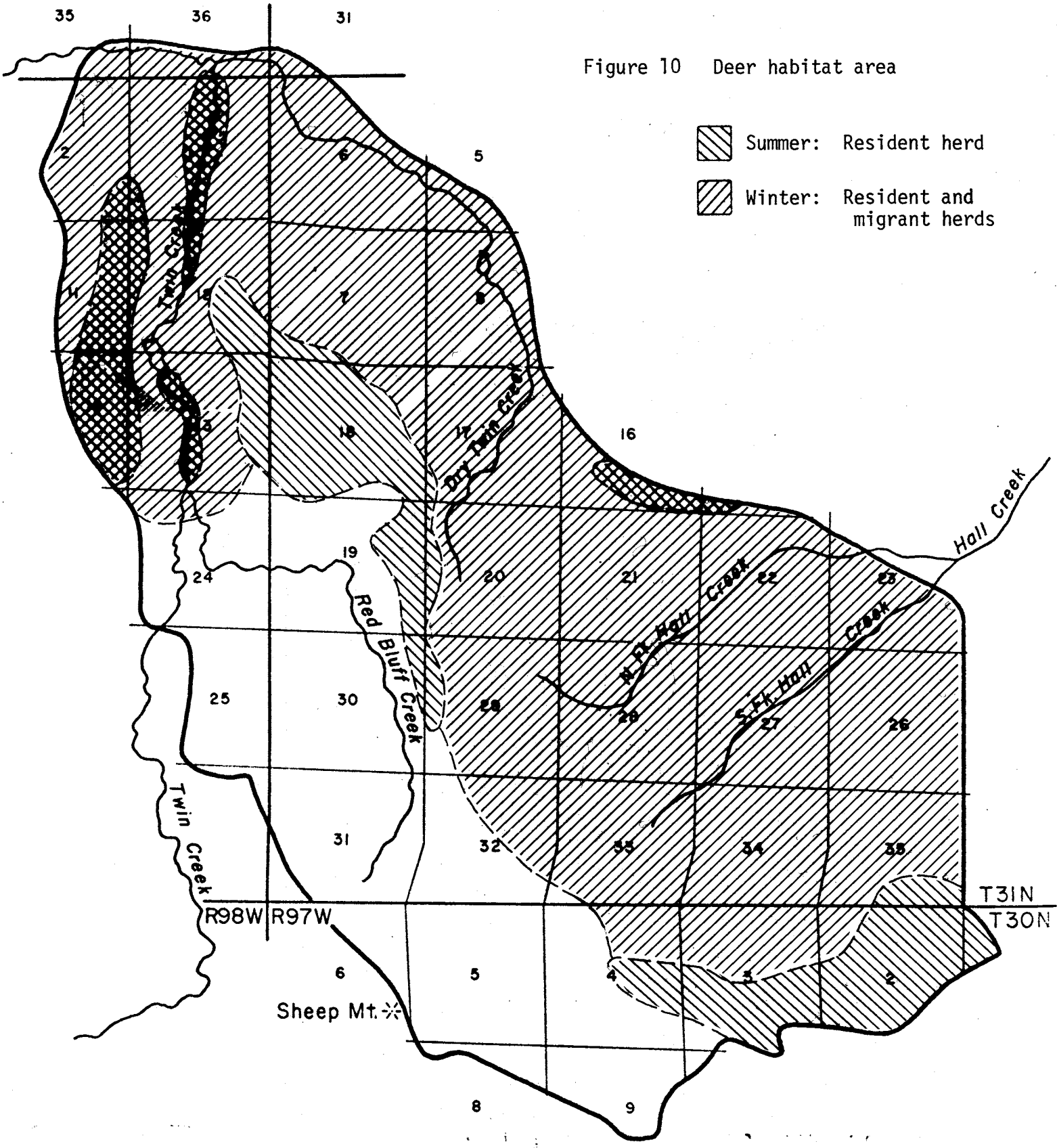


Figure 10 Deer habitat area

Summer: Resident herd

Winter: Resident and migrant herds

HALL CREEK MANAGEMENT AREA

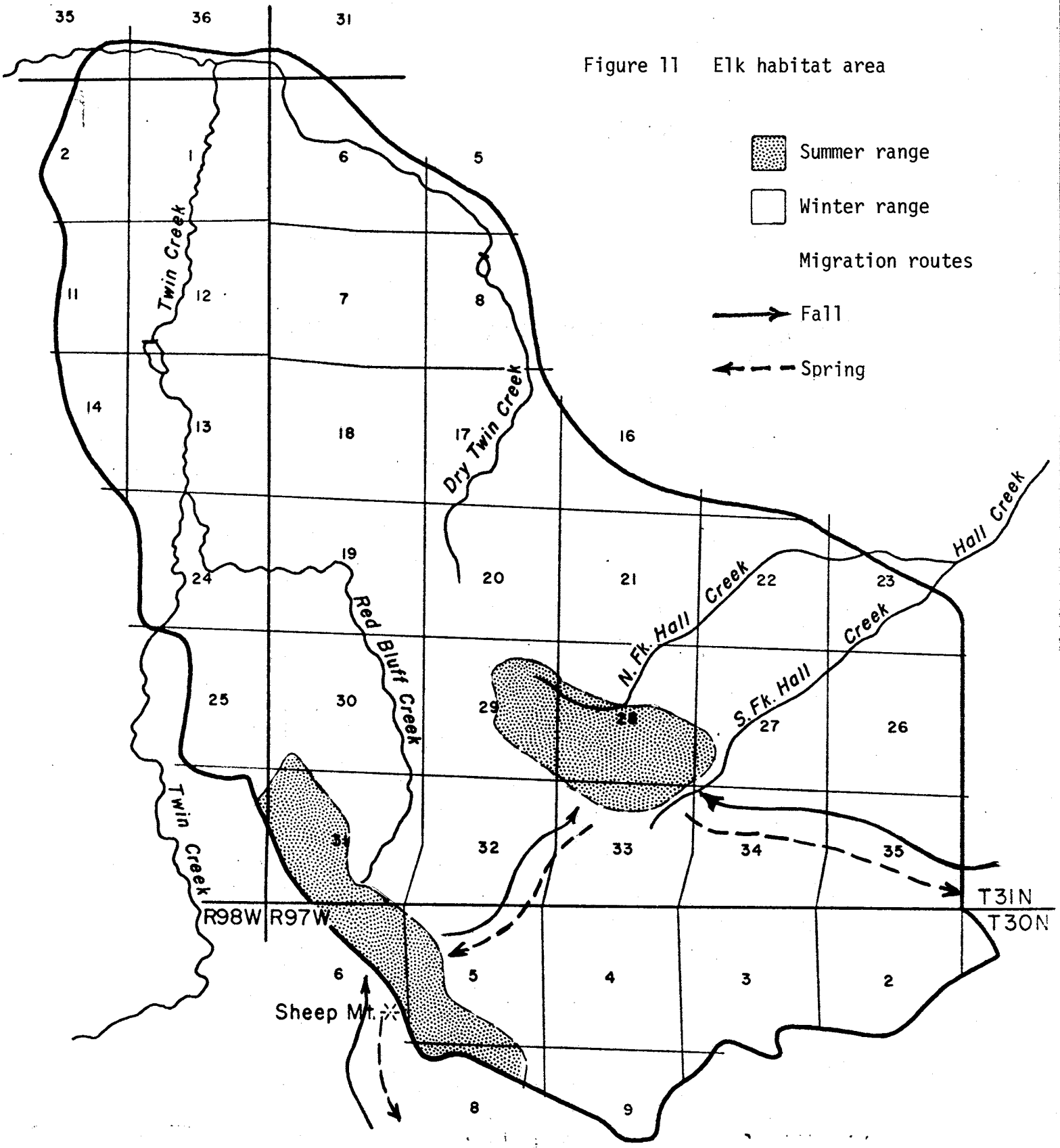


Figure 11 Elk habitat area

HALL CREEK MANAGEMENT AREA

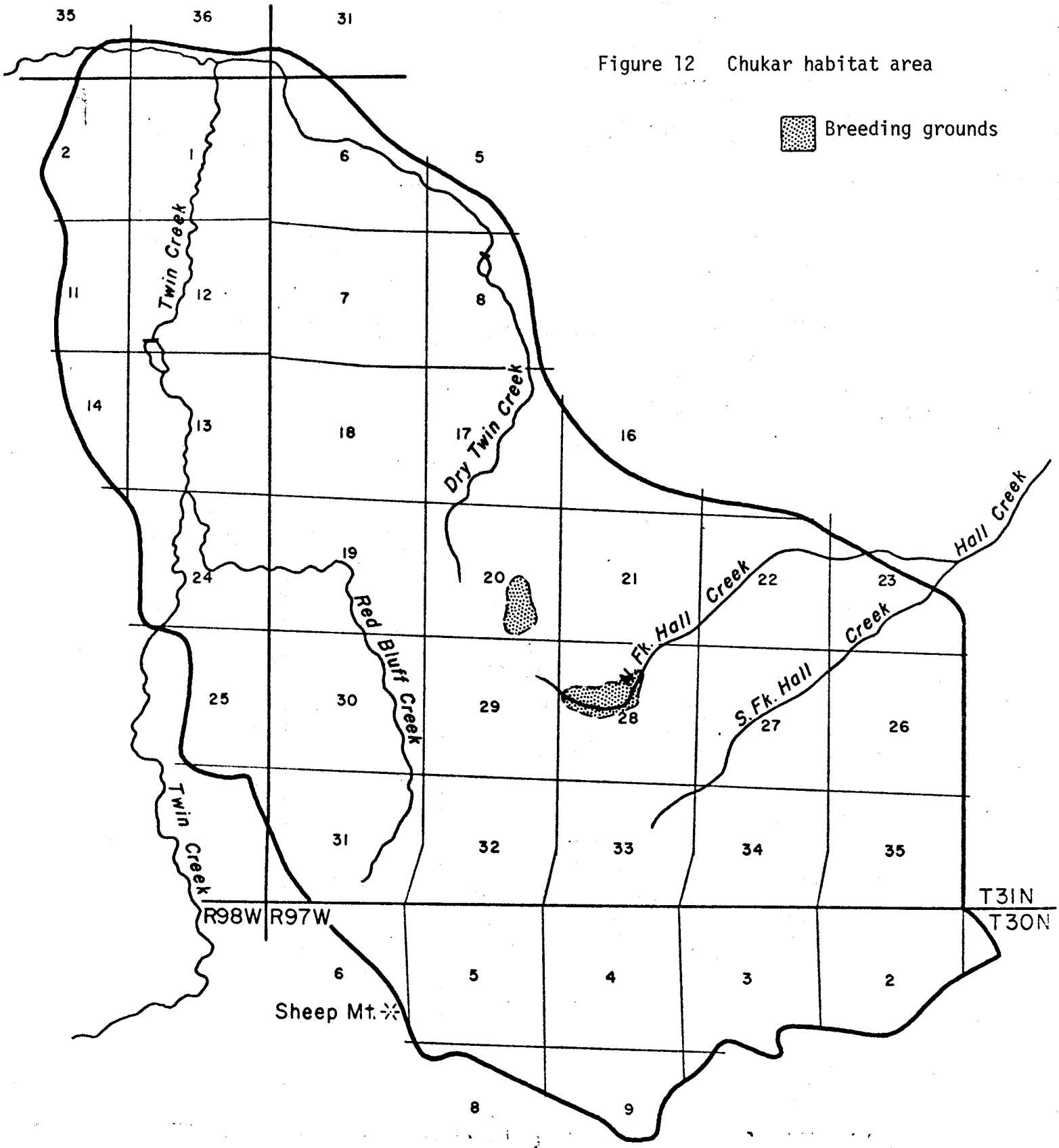


Figure 12 Chukar habitat area

Breeding grounds

HALL CREEK MANAGEMENT AREA

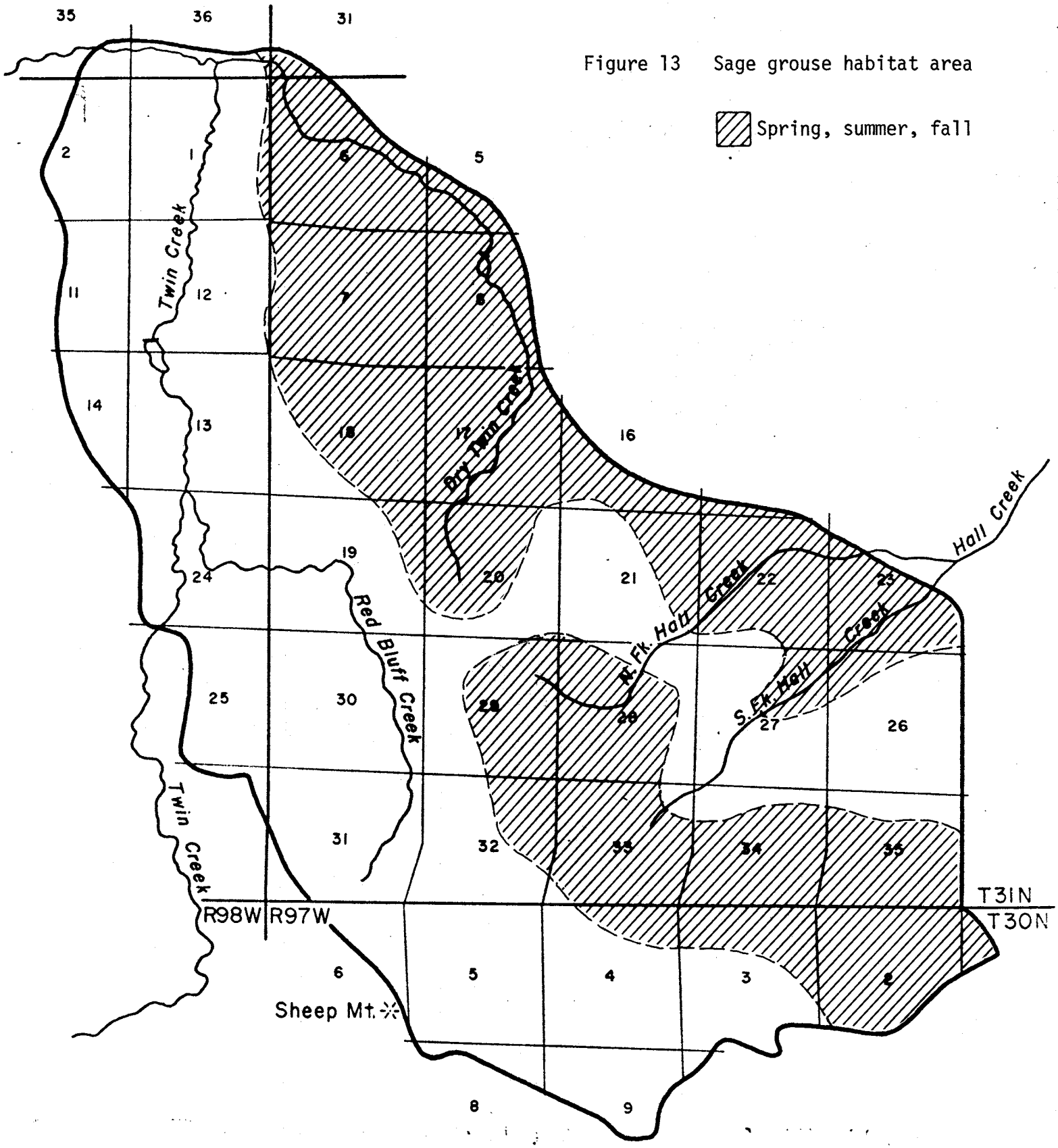


Figure 13 Sage grouse habitat area

Spring, summer, fall

HALL CREEK MANAGEMENT AREA

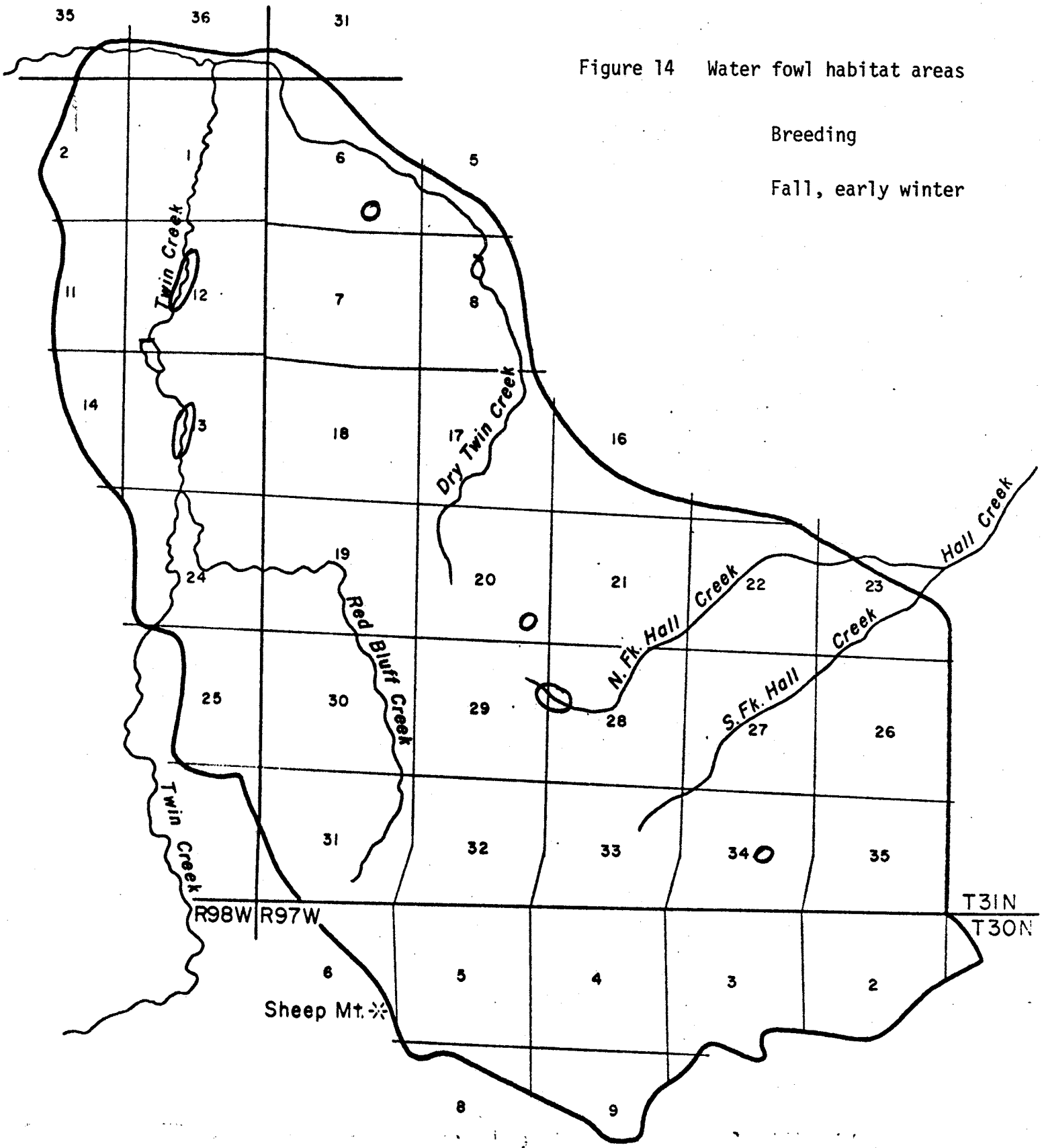


Figure 14 Water fowl habitat areas

Breeding

Fall, early winter

HALL CREEK MANAGEMENT AREA

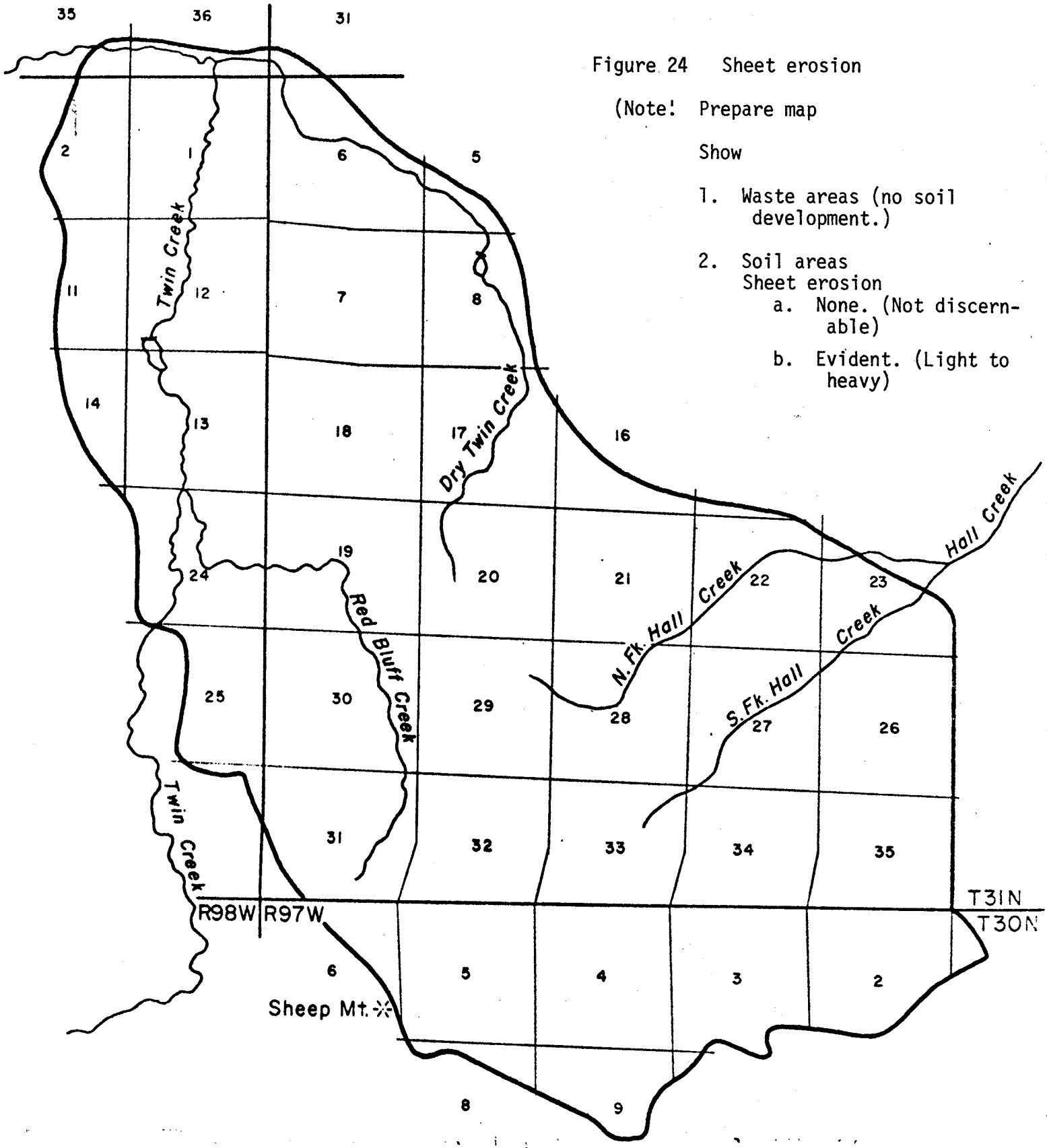


Figure 24 Sheet erosion

(Note! Prepare map

Show

1. Waste areas (no soil development.)

2. Soil areas
   Sheet erosion
   a. None. (Not discernable)
   b. Evident. (Light to heavy)

HALL CREEK MANAGEMENT AREA

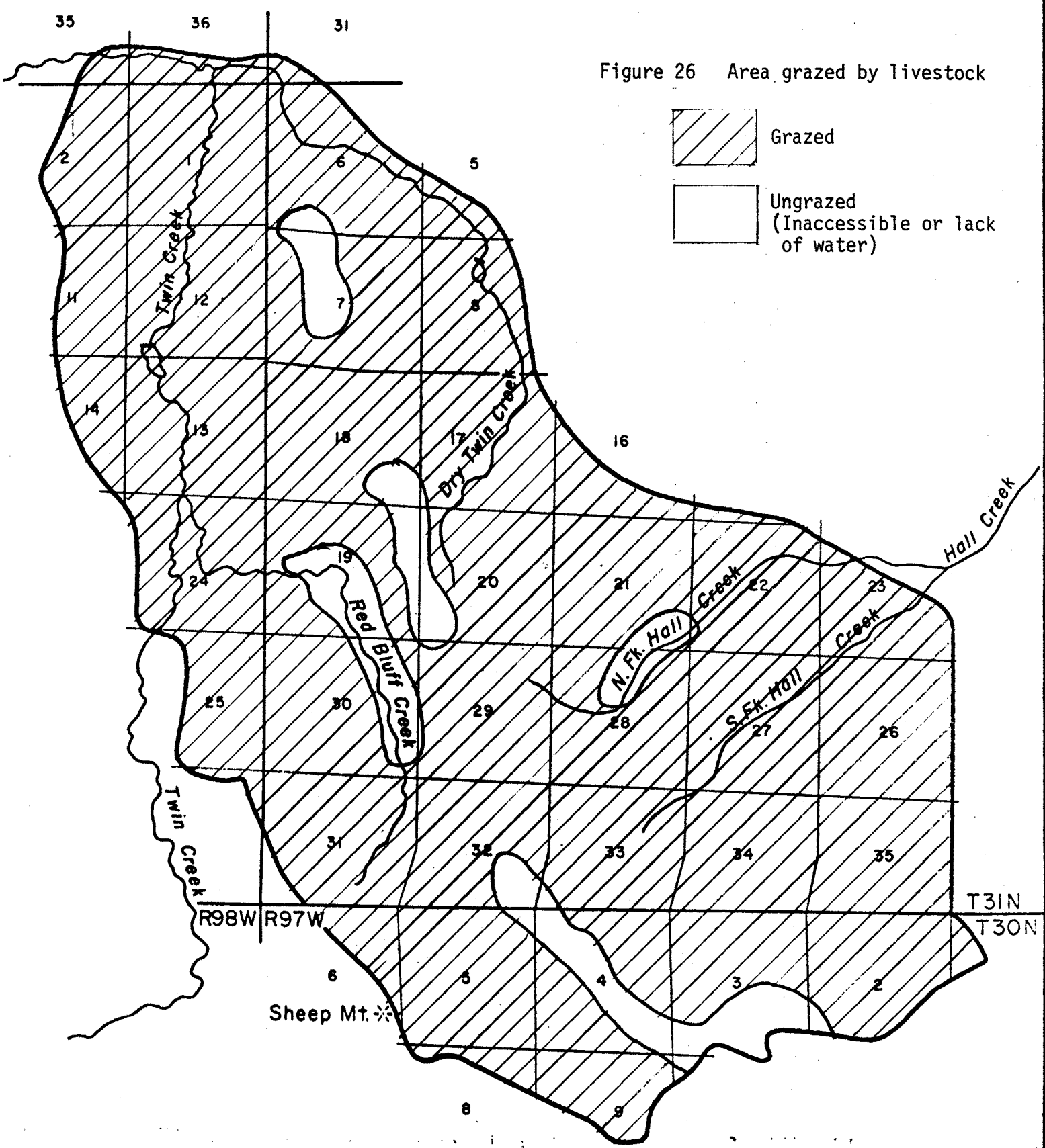


Figure 26 Area grazed by livestock

HALL CREEK MANAGEMENT AREA

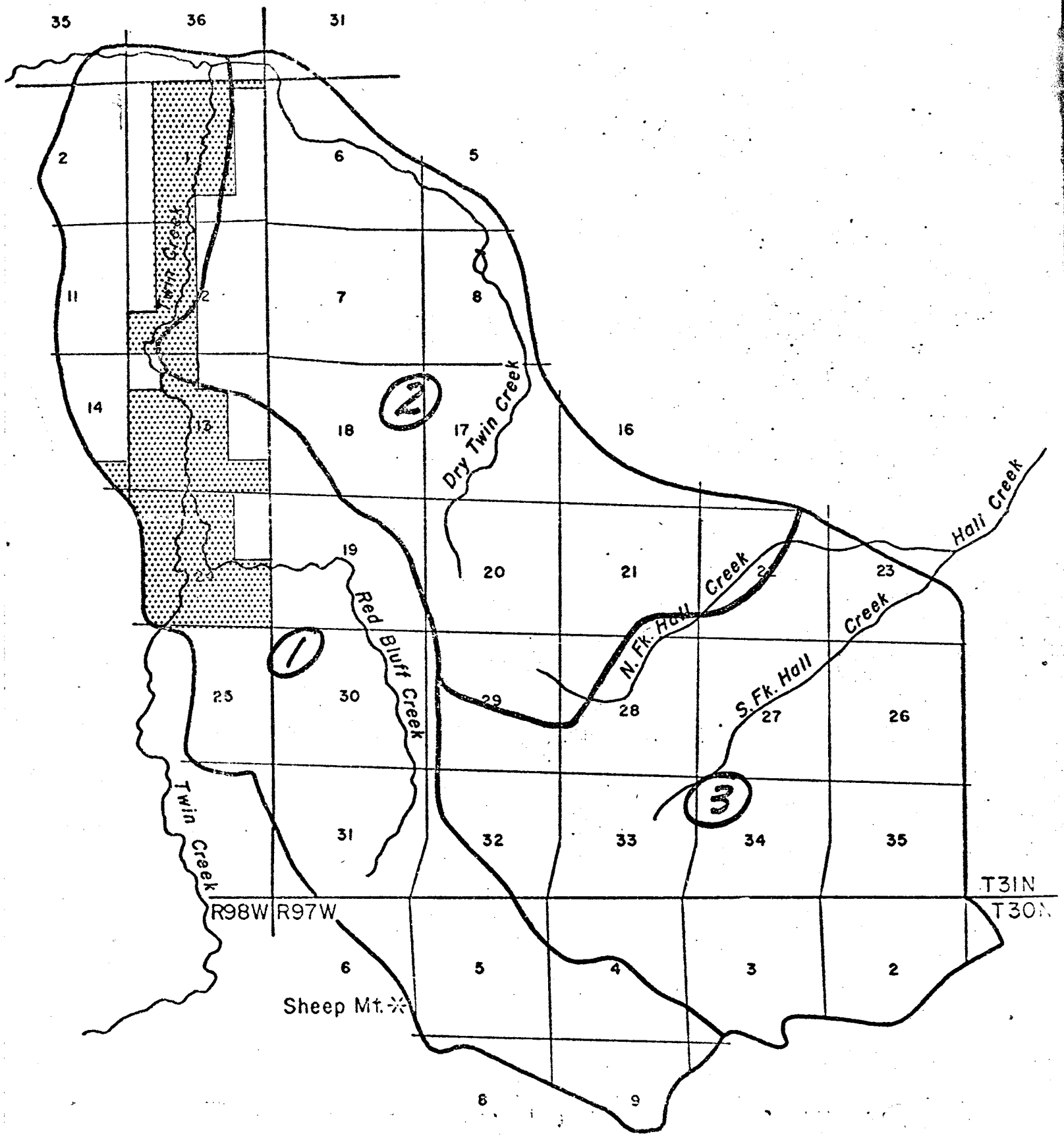
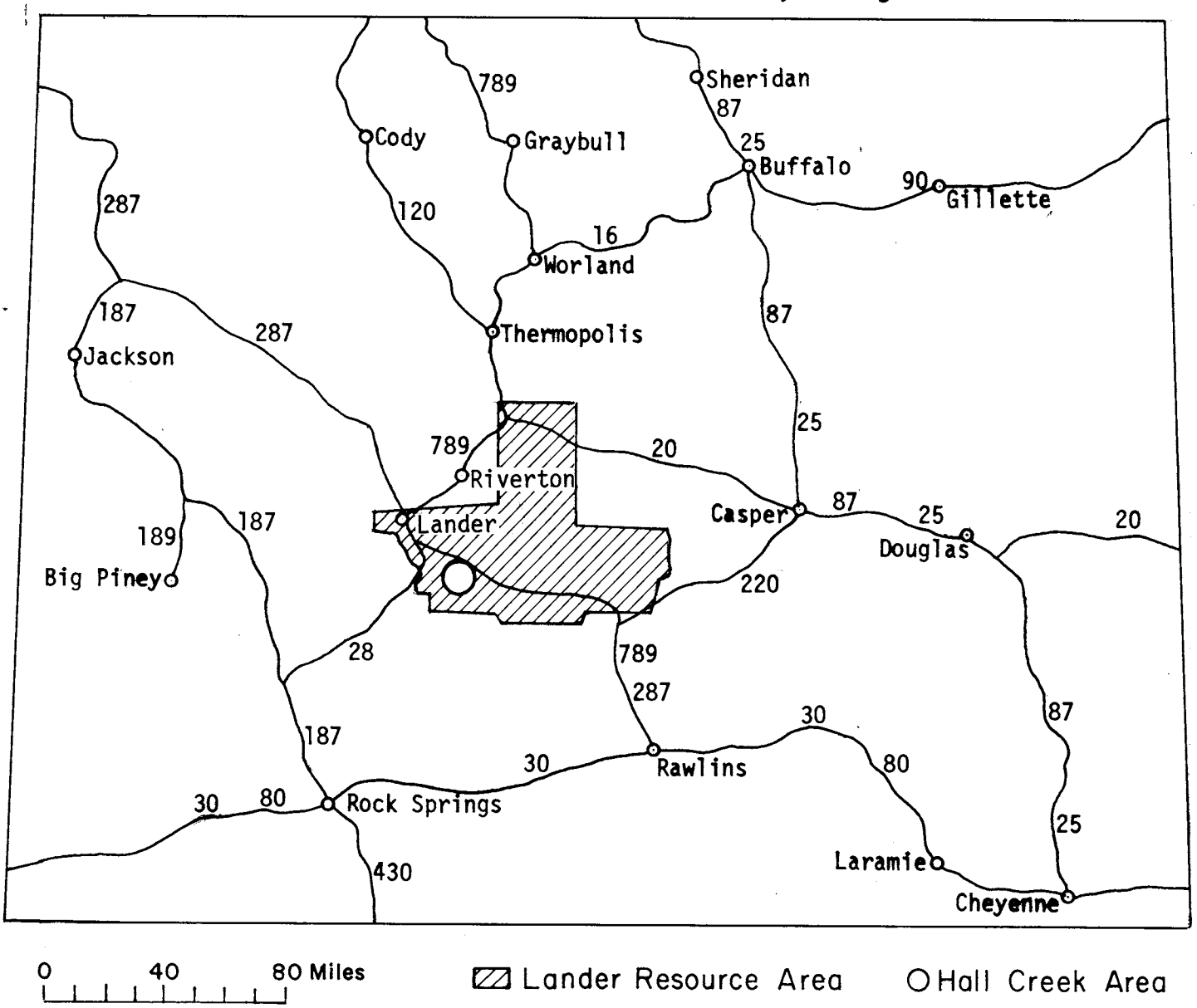


Figure 1 Location Hall Creek Area-Wyoming



Management Plan

Mining (See Map No ___)

A gold claim was located on Sheep Mountain in 1939 ~~and~~ some mining took place ~~on the claim~~. The duration ~~and intensity~~ of ~~the~~ mining ~~activity~~, ~~as well as~~ any the amount of gold removed, are unknown.

Eleven uranium claims were filed prior to the enactment of Public Law 167 (7/23/55). ~~All are in Sections 11 and 12 of T. 31 N., R. 98 W.~~ The Bureau is now in the process of determining the status of these claims and obtaining surface management rights to the claim areas.

Seven oil wells have been drilled on the ~~Hall Creek allotment~~ area. None struck oil, ~~but~~ the possibility of using the abandoned shafts for water wells is now being ~~investigated~~ studied. In addition, 73 oil placer claims were filed during the period 1891-1908. The status of these claims is ~~also currently~~ under investigation.

More than 200 other mining claims have been located ~~within~~ on the ~~allotment~~ area. ~~However, these claims were filed after enactment of PL 167~~. ~~This gives~~ the Bureau has surface management rights to the claims. Given present technology and marketing practices, mining of these claims will remain economically unfeasible in the foreseeable future.

Areas that have been denuded of vegetation or on which the vegetation cover has been thinned resulting in soil erosion by past mining activities will be reseeded immediately (See plans for cultural practices)

~~Measures~~

Every effort will be made to see that the soil and vegetation are disturbed as little as possible in mining operations. and that disturbed areas are reclaimed reshaped and revegetated immediately. Mining sites will be carefully chosen so as not to detract from esthetic values. Prospecting and mining within sight of main travelled road will be discouraged.

Deposits of bentonite, phosphate, and gypsum occur on the area. Uranium and gold may also occur (fig. 7). Oil has been prospected without success. Agates of interest to rock collectors have been found on a fairly large area (fig. 8). More than 200 mining claims have been filed on the area indicating possible potential for mineral production.

Forestry:

(1) Limber Pine (Pinus flexilis) occurs both in isolated pockets in Juniper type woods and in relatively pure stands. All age classes are present, but seedling establishment appears to be at a rate only replacing decadent and diseased trees. The growth forms found on the allotment vary from multi-stemmed decumbent trees to single-stemmed erect ones averaging twenty feet in height. Dwarf mistletoe infection is causing moderate to severe mortality in some stands, as are procupines.

Some illegal cutting of firewood, posts and possibly shoring timber has occurred, but to a very limited extent. The only recent cuttings found were of dead wood and obviously to supply firewood for hunter's camps. This dead wood removal has no detrimental impact on the stand and may have a beneficial one by reducing wildfire potential. The limber pine on the Hall Creek allotment has no economic potential for removal.

(2) All three species of juniper native to Wyoming occur on the allotment: Rocky Mountain juniper (Juniperus scopulorum), Utah juniper (J. osteosperma) and common juniper (J. communis). The first two are shrubby to arborescent, the third usually a decumbent shrub. Rocky Mountain juniper is found mainly in the Wood Canyon-Gyp Spring area at the southern extremity of the allotment. Utah juniper form the remaining stands, with common juniper occurring as very localized ground cover under the Utah juniper canopy.

All age classes of juniper occur, with active pioneering and seedling establishment into adjacent sagebrush types. The mature forms are mostly multiple-stemmed and vary in height from three feet on marginal sites to over twelve feet on deeper soiled, better watered sites. No diseases were found in the juniper stands. The evidence seems to indicate that range fires, natural and man-caused, have historically kept the juniper stands from achieving stabilized, climax stands; alternately pioneering out from steep, rocky core areas into sagebrush-grass types and being fire killed back into those core areas.

The potential exists for limited juniper harvesting to supply the local demand for posts. However, topography, wildlife and erosion considerations will keep this potential from being realized except in very limited instances. Before any harvesting could be authorized a detailed analysis of all ramifications resulting from the cutting would have to be made.

(3) Localized stands of quaking aspen (Populus tremuloides), narrowleaf cottonwood (P. angustifolia) and peachleaf willow (Salix amagdaloides) occur along water courses throughout the allotment. Negligible seedling establishment is occurring and those few established are severely browsed. Trampling by cattle is also severely limiting establishment, especially in the cottonwood stands and to a lesser extent in the aspens.

These stands have no present economic potential for harvesting. They do have, however, great importance to wildlife and in controlling erosion. Some consideration should be given to increasing these stands because of their aesthetic and wildlife values, even though this could entail some loss in stream flow volumes.

(4) A reforestation project could be programmed for those limber pine stands heavily infected with dwarf mistletoe. Consideration should also be given to using a tree planting program as an adjunct to other activities--for example, as part of a reservoir construction-fishing-recreation site project. Manipulation of existing forest types has a place in enhancing other resource values and should be given full consideration as the management objectives for the allotment are defined.

Management Plan

Forest Resources

The acreage of ~~potentially marketable~~ timber types is small only about 420 acres. The types are:

	(Acres)
Utah Juniper	265
Limber pine	135
Quaking aspen	20
	420

See map No ___ for location of types

There has been very limited use of trees in these types in the past. The trees were used to supply posts and firewood mainly.

These forest types have high esthetic, recreation, wildlife and wilderness value. Any timber cutting in these types will be directed mainly at enhancing and maintaining these values. Any commercial cutting will be carried out within these limitations.

Forestry:

(1) Limber Pine (Pinus flexilis) occurs both in isolated pockets in Juniper type woods and in relatively pure stands. All age classes are present, but seedling establishment appears to be at a rate only replacing decadent and diseased trees. The growth forms found on the allotment vary from multi-stemmed decumbent trees to single-stemmed erect ones averaging twenty feet in height. Dwarf mistletoe infection is causing moderate to severe mortality in some stands, as are procupines.

Some illegal cutting of firewood, posts and possibly shoring timber has occurred, but to a very limited extent. The only recent cuttings found were of dead wood and obviously to supply firewood for hunter's camps. This dead wood removal has no detrimental impact on the stand and may have a beneficial one by reducing wildfire potential. The limber pine on the Hall Creek allotment has no economic potential for removal.

(2) All three species of juniper native to Wyoming occur on the allotment: Rocky Mountain juniper (Juniperus scopulorum), Utah juniper (J. osteosperma) and common juniper (J. communis). The first two are shrubby to arborescent, the third usually a decumbent shrub. Rocky Mountain juniper is found mainly in the Wood Canyon-Gyp Spring area at the southern extremity of the allotment. Utah juniper form the remaining stands, with common juniper occurring as very localized ground cover under the Utah juniper canopy.

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These stands have no present economic potential for harvesting. They do have, however, great importance to wildlife and in controlling erosion. Some consideration should be given to increasing these stands because of their aesthetic and wildlife values, even though this could entail some loss in stream flow volumes.

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Mining:

A gold claim was located on Sheep Mountain in 1939 and some mining took place on the claim. The duration and intensity of the mining activity, as well as the amount of gold removed, are unknown.

Eleven uranium claims were filed prior to the enactment of Public Law 167 (7/23/55). All are in Sections 11 and 12 of T. 31 N., R. 98 W. The Bureau is now in the process of determining the status of these claims and obtaining surface management rights to the claim areas.

Seven oil wells have been drilled on the Hall Creek allotment. None struck oil, but the possibility of using the abandoned shafts for water wells is now being investigated. In addition, 73 oil placer claims were filed during the period 1891-1908. The status of these claims is also currently under investigation.

More than 200 other mining claims have been located within the allotment. However, these claims were filed after enactment of PL 167. This gives the Bureau surface management rights to the claims. Given present technology and marketing practices, mining of these claims will remain economically unfeasible in the foreseeable future.

Land Use:

An archeological survey of the Hall Creek Allotment has shown the area to be inhabited at least by the Early Prehistoric (10,000 yrs. B.P.). From then until the advent of Europeans the area seems to have supported a basic pattern of small nomadic groups of primitive hunters and gatherers, probably dependent on bison, elk, deer and antelope. At some undetermined time prior to the nineteenth century the Shoshones became constant inhabitants of this general area but moved about freely.

From the early nineteenth century, when the first Europeans visited the area, it has been traversed by a constant stream of explorers, soldiers, pioneers and miners. The name of the main drainage in the area, Beaver Creek, would indicate the possibility of trappers and mountain men also having been in the area.

A major search of historical literature was not undertaken for this preliminary meeting. Any historical or archeological site of importance encountered during implementation of this management plan will be researched, documented and protected if necessary.

Data is lacking as to the start of the livestock industry on this specific allotment, but the 1870's or '80's would be a close approximation. consistent with ranching practices through the entire northern Rockies at the time, large numbers of cattle, sheep and horses with moderate to severe overgrazing can be assumed.

By the early 1930's sheep had replaced cattle in the area and 4,000 to 6,000 were maintained on Hall Creek. The season of use was sporadic and dependent upon weather conditions, but generally late spring/early summer and again in late fall/early winter.

Cattle were replacing sheep on the allotment by the mid-1950's. In 1954 the allotment was licensed at 2600 sheep for two months spring and winter, and 460 cattle April to October. Seven operators were involved and the unfenced allotment was considerably larger than now, so that the stocking rate is not as high as it would seem.

At present the allotment is licensed as follows:

248 cattle	5/1 - 5/15	Mountain Canyon Pasture
432 cattle	5/16 - 10/15	Hall Creek
300 cattle	10/16 - 11/22	Mountain Canyon Pasture

The deeded land along Red Bluff and Twin Creeks has and is now being farmed for alfalfa and grass hay. There is evidence of reversion of 40 - 60 tilled acres along Red Bluff Creek to sagebrush. These lands have a high potential for intensive farming practices--two cutting alfalfa yields average 400 tons per acre in fresh plantings. The operator has 300acres under cultivation presently and is aiming for a 600 tons per acre yield. The hay produced is fed during the winter to produce a balanced, year-round operation.

Wildlife:

(1) Birds

Seventeen species of game birds are found on the allotment and ten of these have been documented as breeding in the diverse habitat types present. Sixteen species of raptors make extensive to migratory use of the allotment, but field data is lacking or inconclusive on species breeding in the area. An additional sixty-three species of birds make varying use of the allotment, for a total of 99 species in 33 avian families. For a complete listing see Table I.

No census data is available on any of the birds found on the allotment. However, very rough late summer numbers were noted for some species during preliminary reconnaisance of the allotment. Some of the unsystematic field reports follow to give an indication of numbers and diversity:

(1) 2 pintail and 3 teal broods on Rock Draw Reservoir - August.

(2) 1 mallard, 4 teal and 2 coot brood on Carr Reservoir - August.

(3) 3 sage grouse flocks (9, 17 and 15) in Red Bluff Canyon, 1 flock (12) on Sheep Mountain and 2 flocks (16 10) on upper Hall Creek - September.

(4) Pinyon jay flocks at Gyp Spring (37) and west of Twin Creek (21) - September.

(5) Twenty-five chukars near upper Dry Twin Creek - September.

(6) Newly fledged juvenile shovelers (6) on Red Bluff Creek - September.

(7) 5 raptor nesting sites in Red Bluff Canyon, juvenile prairie falcon and two juvenile red-trailed hawks hunting in same area - October.

Obviously, much more field work is needed just to document the species breeding on the allotment. A census of each species occurring is a

practical impossibility and not advocated. However, the impact that any project, objective or management scheme may have on both game and nongame species must be evaluated from a broad, multiple use viewpoint.

(2) Mammals

A total of 57 species of wild mammals in 17 families occur or are suspected to occur on the Hall Creek allotment. Of these, 23 species can be listed as game and/or furbearers of varying sporting, economic and aesthetic importance. See Table I for a complete species list.

Mule deer and pronghorn antelope are the principle game species on the allotment. Pronghorn use is late spring into fall or winter, depending on the weather. Total numbers on the allotment are not available and so variable that a meaningful estimate could not be derived. There is a resident mule deer herd numbering 75-125 animals distributed principally in the juniper-pine vegetation types and foraging out into wet meadows and hayfields for green feed. A migratory herd moves onto the allotment as winter storms force them from higher elevations in the Wind River Mountains. The total count for the wintering herd is so weather dependent as to make an estimate meaningless.

The allotment is also highly critical winter range for elk coming out of the Wind River Mountains as the snows cover the forage. The elk utilize the windblown ridge top system of the Hall Creek drainage for feeding and bedding. Any management scheme affecting these ridges must give careful and complete attention to their critical nature.

No information is available on small game or nongame mammal populations. Field studies are lacking that would document occurrence and numbers. The species list was compiled from those animals known to occur, those that should occur and those that might occur on the allotment. As further studies are conducted for the management plan, the population dynamics will become more fully documented and understood.

Fisheries:

Twin Creek is the only perennial stream on the allotment with a fisheries program at present, although some potential does exist in Red Bluff Creek, Hall Creek and some of the reservoirs. Roughly fifteen miles of meanders and ox-bows of Twin Creek occur within the allotment, all on deeded or state lease land. Carr Reservoir, a 10 acre artificial impoundment, is part of the Twin Creek fishery.

Twin Creek has a rapid current with an average flow volume of between 0.33 and 2 CFS, and annual fluctuation of from two to four feet. The bottom is sand, gravel, silt and rubble with steeply cut, well vegetated to sterile sandstone banks. A heavy silt load is carried by the stream at all times and a considerable bed load of rock and gravel is moved during the run-off period.

The stream has a stocking history beginning in 1939 and extending irregularly to the present with brook trout. Rainbow and brown trout are also found in Twin Creek. Productivity is high and fish growth rapid, but as the stream is difficult to fish and located on deeded ground the fishing pressure is relatively light.

The waters behind the thirty foot dam of Carr Reservoir are also highly favorable for rapid fish growth. The reservoir has a maximum depth of 23 feet, with a six foot annual fluctuation and mud bottom. It was first stocked in 1958 with brown trout, brook trout the following year and rainbow trout since then. It is becoming heavily silted at the upper end and may need dredging to achieve full potential as either a fishery or a water basin.

See also Table I.

Text LU, C & M - Wildlife

Game birds
Upland
Sage grouse
Chukar
Dove

Water fowl
Ducks
Coots
etc

Rare and endangered
Prairie falcon
Golden eagles

Distribution maps and population figures

Management Plan - Uses and resources

Birds

Game

Rare and endangered

Other

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Obviously, much more field work is needed just to document the species breeding on the allotment. A census of each species occurring is a practical impossibility and not advocated. However, the impact that any project, objective or management scheme may have on both game and nongame species must be evaluated from a broad, multiple use viewpoint.

Management Plan

Fish

Habitat. (Map No ___)

There is one live stream on the area - Twin Creek - that supports fish, rainbow brown and brook trout and some non-game species. Carr Reservoir 10 acres in size is located on the stream. All of the fishing waters are on private land.

Fish growth ~~and~~ is rapid and productivity of the stream and reservoir is high. A heavy load of silt is carried by the stream at all times. The upper end of the Carr Reservoir is becoming heavily silted. ~~restoring potential~~ Silt is reducing potential for ~~fish~~ production of fish and high quality water.

Two other streams Red Bluff Creek and Hall Creek and some livestock water reservoirs hold potential for fish production.

The results of livestock grazing management will be awaited before any move is made to improve habitat conditions for fish.

Support to Fish & Game others.

Population

~~The~~ on Twin Creek and Carr Reservoir Fishing will be managed on a rest-rotation basis. These fisheries will be rested from use periodically long enough for fish to develop from eggs to catchable size. On this basis the waters would be fished one year in 3 or 4

The program would be started with present bag ~~limit~~ and size restrictions. These would be changed if needed to get optimum production

Management Plans - Uses and resources

Fish

Habitat, population

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See also Table I.

Wildlife

- Big game
  - Objectives
  - General management plan
  - 1975 management plan
- Game birds
  - ~~Objectives~~
  - Upland species
    - Objectives
    - General plan
    - 1975 plan
  - Water fowl species
    - Objectives
    - General plan
    - 1975 plan
- Fish (species
  - Objectives
  - General plan
  - 1975 plan
- Rare and endangered species - each spp.
  - Objectives
  - General plan
  - 1975 plan
- Other forms of wildlife
  - Objectives
  - General plan
  - 1975 plan

Wildlife

A. Big game (Elk, deer, antelope)

Objectives

1. Produce ~~optimum~~ maximum amount in equitable balance with production of other renewable resources without degradation of the natural environment.
2. Maintain habitat in optimum productive condition
3. Prevent deterioration of habitat by big game

1975 Management plan

Continue management and harvesting as in the past. Await results of livestock grazing before changing management

Little basis for changing livestock grazing formula, or management and utilization techniques

For each species of animal ~~get~~ more information on habitat

1. Habitat areas--winter, summer
2. Populations--winter, summer
3. Food plants and percent of intake
4. Utilization of food plants--winter, summer

Determined conflicts ~~or benefits~~ with other uses

1. Livestock grazing
2. Forestry
3. Esthatics
4. Recreation

Wildlife

B. Game birds

Upland

Waterfowl

Objectives

1. Produce optimum amount of game birds in equitable balance with production of other renewable resources
2. Improve and maintain game bird habitat

1975 Management plans

Continue management and harvesting as in the past. Await results of livestock grazing before changing management

For each species get more information on

1.	Habitat areas	winter, summer
2.	Populations	winter, summer
3.	Food items	winter, summer
4.	Forage species utilization	winter, summer

Determine areas of conflict or benefit with

1. Livestock grazing
2. Forestry
3. Esthatics
4. Recreation
5. Cultural practices

Wildlife

C. Fish

Objectives

1. Produce optimum amount of gam fish in equitable balance with production of other renewable resources
2. Improve and maintain game fish habitat

1975 Management plans

Continue management and harvesting as in the past. Await results of livestock grazing before changing management

For each special get more information on

1.	Habitat areas	winter, summer
2.	Populations	winter, summer
3.	Food items; % food intake	winter, summer
4.	Forage species utilization	winter, summer

Define habitat areas and management problems

1. Livestock grazing
2. Forestry
3. Esthatics
4. Recreation
5. Cultural practices

Wildlife

D. Rare and endangered species

Objectives

Improve and maintain suitable habitat conditions promoting survival of rare and endangered species

1975 Management plan

Continue with management as in the past. Await results of livestock grazing management

For each species get more information on

1. Habitat areas
2. Population
3. Food items and percent of diet

Determine conflicts or benefits with

1. Livestock grazing
2. Forestry
3. Esthatics
4. Recreation

Wildlife

E. All other forms of wildlife

Objective

Maintain normal balance in the natural ecosystem

1975 Management plan

Await results of livestock grazing management

For each species get more information on

1. Habitat areas--winter, summer
2. Populations--winter, summer
3. Food plants, and percent of intake--winter, summer
4. Utilization of food plants--winter, summer

Determined conflicts or benefits with

1. Livestock grazing
2. Forestry
3. Esthatics
4. Recreation
5. Cultural practices

Text land uses, condition, management.
Wildlife ← All influenced by livestock grazing management.)
Big game
Elk, deer, antelope

Distribution of use
Summer, winter
Total area
Concentration areas } Migration or movement routes

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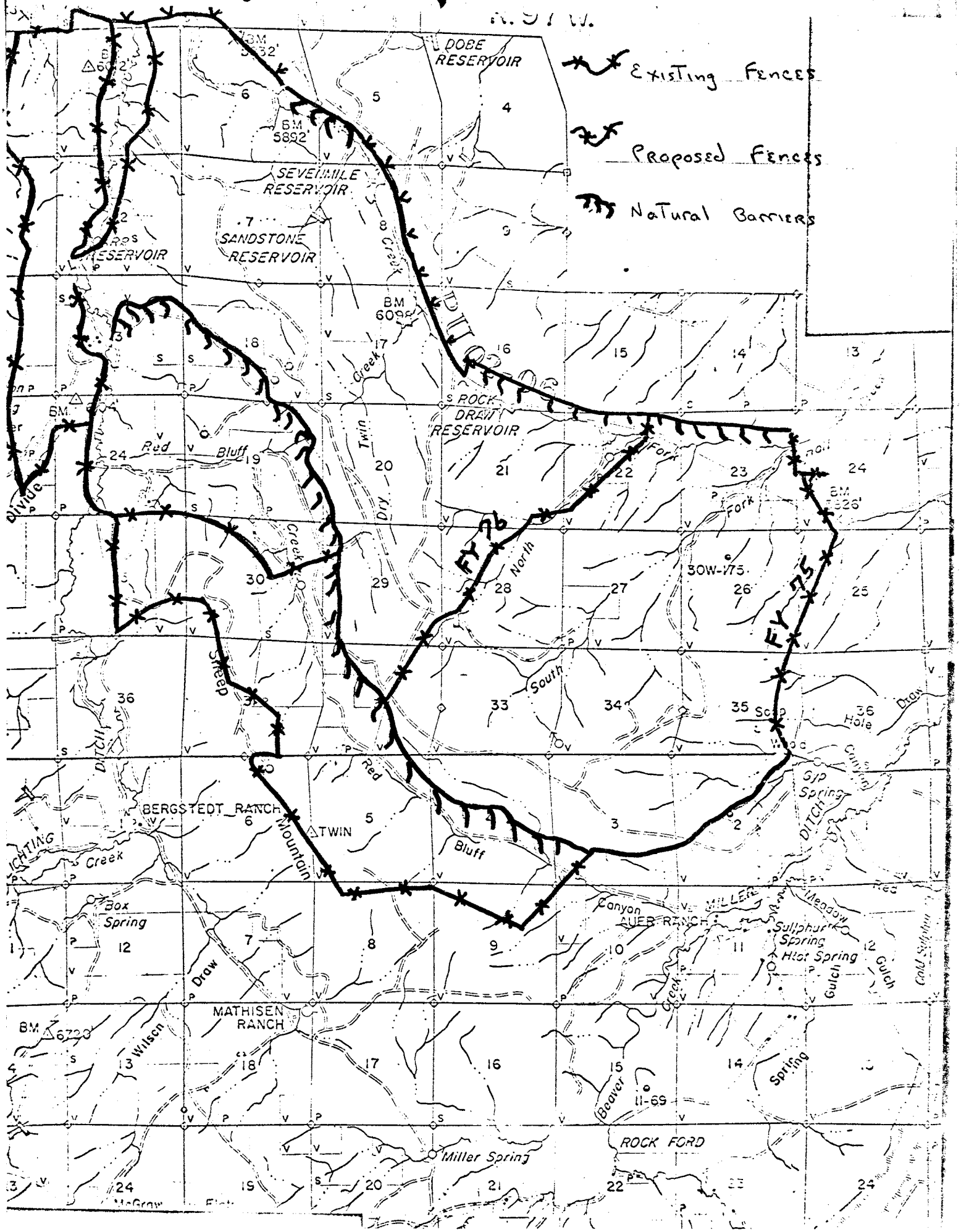
Management - Await livestock management results

KEY BROWSE AREAS

Location	Browse Acres	Browse by Species	Hedging Class	Utilized By
T.31N., R.97W., Sec. 21, 22, 27, 28 North Fork Hall Creek Drainage	420 total			
	Area 1	Artemesia tridentata	Slight	Antelope - Deer
		Purshia tridentata	Moderate	Antelope - Deer
T.31N., R.97W., Sec. 27, 28, 33, 34 South Fork Hall Creek Drainage	422 total	Purshia tridentata	Heavy	Antelope - Deer - Elk
		Juniperus scoparius	Heavy	Deer
		Artemesia nova	Moderate	Deer - Elk - Antelope
	Area 2	Artemesia tridentata	Slight	Deer - Elk - Antelope
T.30-31N., R.97W., Sec. 1, 2, 3, 4, 35, 36	956 total	Purshia tridentata	Heavy	Deer - Elk - Antelope
		Juniperus scoparius	Heavy	Deer
		Artemesia nova	Moderate	Deer - Elk - Antelope
	Area 3	Artemesia tridentata	Slight	Deer - Elk - Antelope
T.31N., R.97W., Sec. 31, 32	104 total	Purshia tridentata	Heavy	Deer - Elk
		Juniperus scoparius	Heavy	Deer
T.30N., R.97W., Sec. 4, 5, 6, 8, 9		Populus tremuloides	Moderate	Deer - Elk
	Area 4	Artemesia nova	Heavy	Deer - Elk



Existing Fences
Proposed Fences
Natural Barriers
DOBE RESERVOIR
SEVENMILE RESERVOIR
SANDSTONE RESERVOIR
ROCK DRAW RESERVOIR
FY 76
FY 75
BERGSTEDT RANCH
MATHISEN RANCH
AUER RANCH
ROCK FORD
Miller Spring
Box Spring
Gyp Spring
Sullphur Spring
Hot Spring
Red Bluff
Twin Creek
Dry Creek
North Fork
South Fork
Sheep Mountain
Wilson Draw
Beaver Creek
Canyon
Meadow Gulch
Cold Sulphur
Spring Gulch
Scop Hole Draw
Canyon
Red Bluff
Red Bluff
Gyp Spring
DITCH
Divide
30W-175
11-69

Management plan

Estbetic, wilderness values

A major
The main portion of these values stem from or are controlled by vegetation and are effected by the various land uses. They are largely maintained by maintaining a full cover of ~~native~~ vegetation on the ground.

Plans to enhance these values in any way, if needed and possible will be post poned until after the effects of planned livestock grazing management on the vegetation and soil are observed.

Careful consideration will be given to location, type and construction of land management facilities so as to prevent or minimize adverse effects on these values

The Hall Creek Allotment, because of its scenic nature, has a recreation potential. This scenic appeal is not, however, unique to the allotment; being more a factor of its natural, unaltered appearance than any specific site or natural formation. Until such time as a specific demand on the recreation potential of the allotment is evidenced, a major objective of any management scheme should be to preserve and protect this natural aspect.

Project work should be blended into the natural landscape as much and wherever possible. Existing projects intruding into this aesthetic appeal should be removed or relocated. By keeping alterations in harmony with the natural aspect we would be retaining all options for development if the demand at some later date would warrant this.

Red Bluff Canyon should be given special consideration towards retaining its natural scenic value. This area has more scenic value than any of comparable size on the allotment and would be most susceptible to man-made intrusions.

Recreation:

The Hall Creek Allotment, because of its scenic nature, has a recreation potential. This scenic appeal is not, however, unique to the allotment; being more a factor of its natural, unaltered appearance than any specific site or natural formation. Until such time as a specific demand on the recreation potential of the allotment is evidenced, a major objective of any management scheme should be to preserve and protect this natural aspect.

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HALL CREEK MANAGEMENT AREA

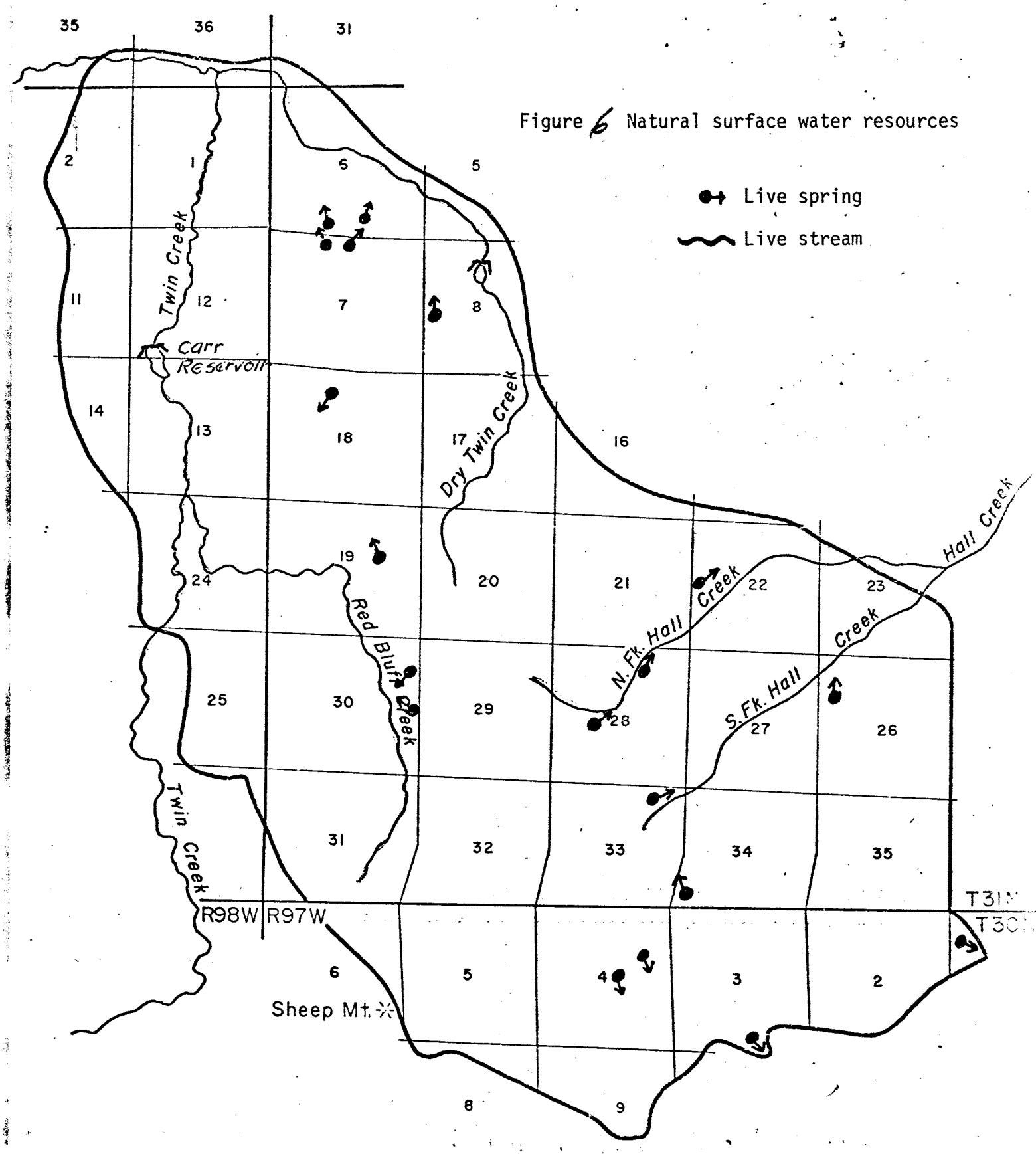


Figure 6 Natural surface water resources

Appendix
Weather, climate
Precipitation, temperature

(1) Lander Weather Station
Temperature Distribution (1941-1973)

Month	Normal Daily Max.	Normal Daily Min.	Extremes Record Highest	Year	Record Lowest	Year
Jan.	31.1	8.0	63	1971	-37	1963
Feb.	37.6	13.3	68	1951	-28	1949
Mar.	43.5	19.3	76	1966	-16	1960
Apr.	55.4	30.4	82	1962	-2	1973
May	65.9	39.7	91	1954	18	1954
Jun.	74.9	47.4	100	1954	25	1951
Jul.	86.0	55.1	101	1954	39	1968
Aug.	84.3	53.7	98	1961	35	1962
Sep.	73.0	43.7	93	1955	10	1965
Oct.	60.2	33.4	85	1963	0	1971
Nov.	43.3	19.7	68	1958	-15	1959
Dec.	34.3	11.6	61	1969	-26	1972

✓ Precipitation Distribution

Month	Normal Total	Maximum Monthly	Minimum Monthly	Maximum in 24 Hrs.
Jan	0.48	1.65	Trace	0.81
Feb	0.66	2.18	Trace	0.88
Mar	1.18	3.02	0.35	1.26
Apr	2.36	5.46	0.78	2.16
May	2.59	6.03	0.49	2.75
Jun	1.93	6.88	Trace	3.56
Jul	0.61	2.10	0.05	0.98
Aug	0.42	1.77	Trace	0.89
Sep	1.05	4.68	0.01	2.21
Oct	1.24	3.58	0.10	1.71
Nov	0.87	2.08	0.01	1.16
Dec	0.45	1.51	0.03	0.98

(2) Hall Creek Divide Rain Guage
1966-1971 Averages

Winter (10/15-4/15)	3.82 inches
Spring (4/15-7/1)	5.83 "
Summer (7/1-9/1)	1.01 "
Fall (9/1-10/15)	1.54 "
Total	12.21 "
11 year avg. total	11.55 "

Geology:

The allotment is situated on a relatively steep (25-45°), faulted, northwest trending arch (Sheep Mountain anticline), modified by erosion and smaller northeast trending arches. The sediments range in age from Mississippian (ca. 350 million years old) to recent and include: sandstones, shales, claystones, limestones, volcanic ash and alluvium. There are deposits of bentonite (altered volcanic ash), phosphate and gypsum. There is also a probability of uranium and minor gold occurrences.

(2) Hall Creek Divide Rain Guage
1966-1971 Averages

Winter (10/15-4/15)	3.82	inches
Spring (4/15-7/1)	5.83	"
Summer (7/1-9/1)	1.01	"
Fall (9/1-10/15)	1.54	"
Total	12.21	"
11 year avg. total	11.55	"

HALL CREEK REST ROTATION MULTIPLE USE
LAND MANAGEMENT DEMONSTRATION AREA

✓ Name of Area: Hall Creek Allotment

✓ Size: 18,500 acres

✓ Land Status:

	Acres	%
Federal (NRL)	15,000	81
State	1,400	7.6
Private	2,100	11.3

✓ Location: 17 miles SE of Lander, Twin Creek Planning Unit, Lander Resource Area, Rawlins District, Wyoming

✓ Elevation: 7442' - 5725'

Access: Borders old U.S. Highway 287

License: L&H Ranch, Inc. (Robert Laeger and Ray Hewitt)

Mountain Canyon	248 cattle 5/1-5/15
Hall Creek	432 cattle 5/16-10/15
Mountain Canyon	300 cattle 10/16-11/22

✓ Vegetation Types:

	Acres	
Juniper		
+ Sagebrush	236	
+ Wheatgrass	887	
+ Limber pine	212	
		1,335
Big Sagebrush		
+ Wheatgrass	4,070	
+ Bluegrass	4,302	
+ Sedge	3,011	
		11,356
Black sagebrush		3,138
3-Tip sagebrush		1,333
Wheatgrass/bluegrass		550
Roads, ditches, hayfields, etc.		761
		18,500

Also see Table II and Map II

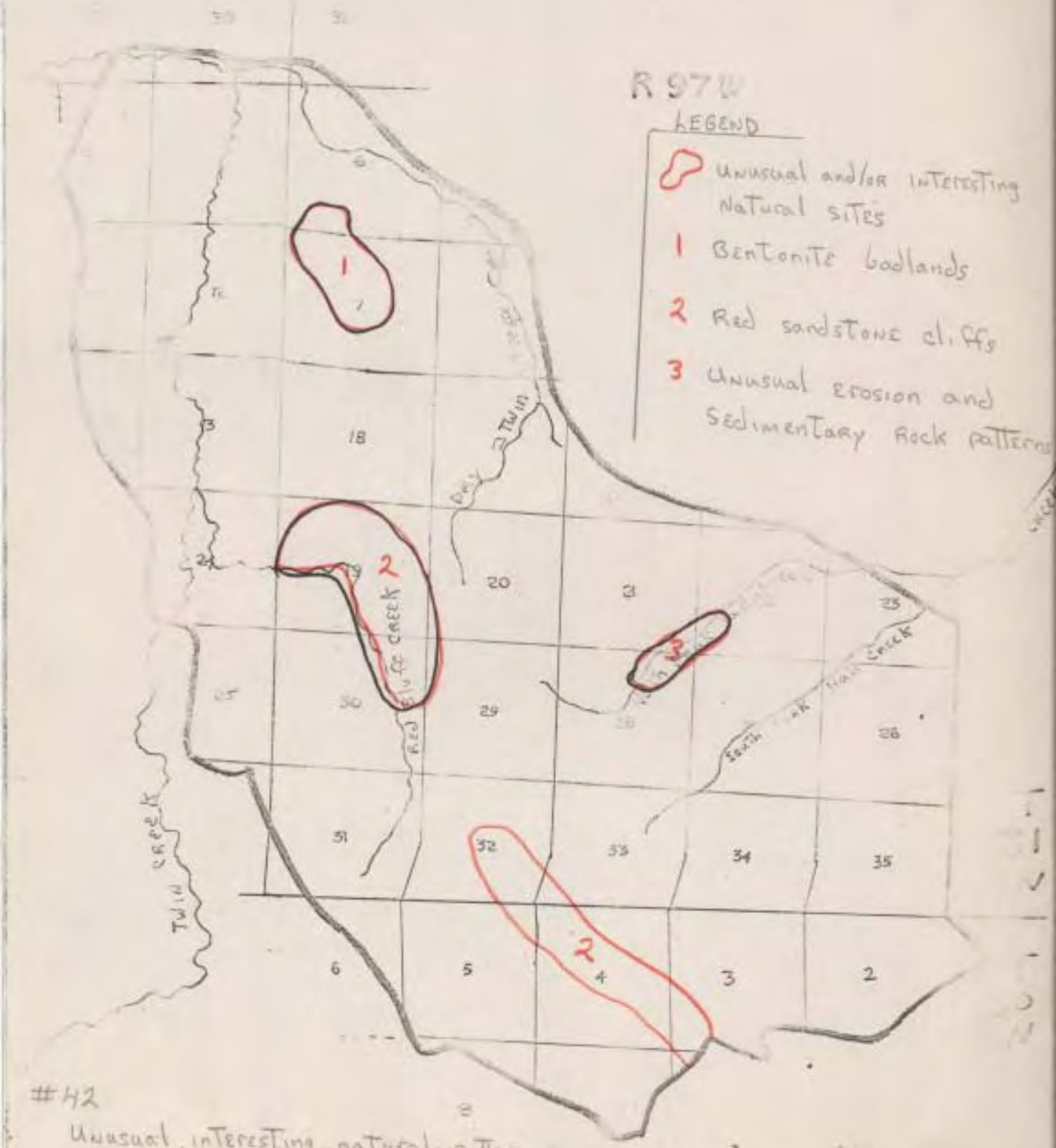
18500
− 761
17739

$\frac{1335}{17739}$ = 7.5% = Juniper, J, pine

92.5% Sagebrush grass

Map 17

Hall Creek Management Area



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Unusual, interesting natural sites and Recreation Areas

Map 16

Hall Creek Management Area

Figure 20

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Wild Areas

MAP II

Major Vegetation Types

Wyoming