

GRAND MESA, WESTERN COLORADO ^{1/}

By

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The time is here when people who administer, develop and use our lands and natural resources must be concerned with what environmental changes are occurring and assume some responsibility. In fact, the National Environmental Policy Act requires us to be concerned.

I feel there could be some changes occurring on the lands of the Grand Mesa that are related to man's on-the-snow activities.

First, as background, I am going to discuss briefly characteristics of the Grand Mesa and its surroundings, mention some history and how the Mesa fits into the lives of the people. Then I will mention man's winter time activities on the Grand Mesa and some concerns the Forest Service has about the effects of the winter activities.

The Grand Mesa is the largest flat-topped mountain in the world. It is about 10 miles wide and 40 miles long. With an elevation of over 11,000 feet it dominates the valleys a mile below. Grand Mesa is a remnant of ancient times--a mountain that would have eroded into the Colorado River had it not been for the protective basalt cap over the soft shale and sandstone. Grand Mesa stands alone, the areas that used to surround it were washed away years ago.

Northwest of Grand Mesa, where the Gunnison and Colorado Rivers meet, is Grand Junction, the largest town on the western slope of Colorado. From the western edge of the Mesa, you can see the stately San Juan Mountains to the south and the gently rising Uncompahgre Plateau to the west.

Although located just east of the Colorado-Utah border and surrounded on three sides by arid land, the Grand Mesa receives up to 45 inches of precipitation annually. The lowlands and valleys receive as little as eight inches a year.

The last Indians in the area, the Utes, spent much of their time on the slopes of Grand Mesa, up above the dry valleys. They didn't do much hunting on top of the Mesa; they considered it to be sacred--a place of departed spirits.

The first white settlers who came to the area in the late 1900's realized that they needed irrigation water to grow crops in the dry valleys. Rather than tap the Gunnison River on the south or Plateau Creek on the north, most of them turned to Grand Mesa. The relatively flat top and glaciated terrain provided many suitable reservoir locations. They stored snow melt water practically in the same spot it fell. Today there are about 300 lakes and reservoirs. The early reservoirs were built by hand and horses--some reservoirs were named Neversweat, Skinned Horse and Goodenough.

Because of the importance of Grand Mesa, in 1892 President Benjamin Harrison established the Battlement Mesa Forest Reserve. Later, President Coolidge changed the name to Grand Mesa.

During the early years, about the only people on the Mesa had cattle or a reservoir to tend. Access was poor in the summer and nearly impossible in the winter. The only way up in the summer was by foot and horse. Wagon roads were constructed to some spots. Early Forest Service snow surveyors went up to read snow boards the first of each month in

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the winter. In a letter referring to his snow survey from 1914 to 1922, John Spencer, an early Forest Service employee, reported that they used bear paw snowshoes for climbing and skis for going back down. They used a stout stick for a ski pole and brake. John said, "When we needed to set the air we straddled the pole like a hobby horse and bore down hard." From what information I could find, the cooperative snow surveys, on the Grand Mesa, started about 1937.

In 1925 a usable auto road was built onto the top of the Mesa. Better roads followed, and about seven years ago the highway department began plowing snow off the road in the winter. Finally everyone could visit the top of the Mesa in the winter. But, until that time, most people living below the Mesa just patiently waited as the snow piled up in the winter and melted in the spring. Then in the summer, they used the stored water like it was going out of style.

The Mesa plays a big role in the lives of people in the area. Over 35,000 people depend on the Grand Mesa for domestic water. Nearly 150,000 acres of agricultural land are irrigated by the stored melt water. Snow accumulation is so important to irrigation that some water users on the south part of the Mesa have financed a cloud seeding program since the late 1950's. Their network of silver iodide generators includes one fifty miles from the Mesa. Some water is used by a hydroelectric plant on the side of the Mesa. In the summer tourists and valley residents alike go up to cool off, fish or just relax.

Recently, man hasn't been content to wait for summer to utilize nature's gift of water and the Mesa's recreational opportunities. For the past few years he has gone onto the Mesa in the winter to enjoy the snow and winter environment. Now he goes sledding, snowshoeing, ski touring, ice fishing, downhill skiing and snowmobiling.

The number of people using the Grand Mesa in the winter is increasing rapidly. Powderhorn Ski Area on the north side of Grand Mesa has a capacity of over 2,000 skiers per hour. In a year or two the area is to be enlarged to twice the present size. In 1966 there were an estimated 1,800 snowmobile visits compared to about 12,000 snowmobile visits last year or 4,000 visitor days. In other words the number of times snowmobiles have been used on the snow of Grand Mesa has increased at the rate of about 50% per year. Although we have no figures, the number of people participating in other on-the-snow activities is also increasing. As a land management agency responsible for the care of natural resources, the Forest Service is concerned about the effects of any activities on the environment. We have a pretty good idea of the results of our management on water yields, sedimentation, plant composition, animal life, and the magnitude of any changes. We understand fairly well the behavior of the snow pack under natural conditions. But, what do we know about the consequences of man's on-the-snow activities? In this area, I feel there is much yet to be learned. We need answers soon, before the use gets out of hand and undesirable effects, if any, occur.

The immediate and most obvious results of man's activities on the snow are the altering of snow redistribution patterns and the changing of snow density. Since the increase of snowmobile activity along a section of State Highway #65 on Grand Mesa, the snow plow crews have reported less of a drifting problem--snow along the edge is packed down. Other areas that were previously devoid of snow because of wind scour now have snow cover. Activities other than snowmobiling could cause the same effects.

Of all activities, I feel that snowmobiling has the most drastic or significant impact on the Grand Mesa. The snowmobile is capable of traveling long distances in a short period of time. Because of the terrain on Grand Mesa, there are only a few places a snowmobile can't reach. At ski areas, activity is normally isolated to prepared runs. Snowmobiles on the other hand tend to concentrate their use near the unloading and parking areas. Use then radiates out from that point with frequency of travel and amount of area compacted decreasing with distance away from the jumping off point.

We are starting to feel the impact of winter recreation and in response we have provided sanitary facilities and marked trails. In the approval of ski area developments, we analyze ski trail locations and stipulate land treatments.

Effects

What do we know about on-the-snow activities and their effects? I have come up with only a meager amount of information and most of it is related to snowmobiles.

Newsweek magazine recently reported that a researcher in Minnesota, Wallace J. Wanek, found that soil temperatures can be colder where snowmobiles have traveled, and some plant systems can be harmed. In New York, preliminary experiments indicate that where snowmobiles travel, there is increased infiltration of water into the soil. Also they found that snow melt was delayed. Others have said small animals are affected and erosion may occur. I have seen places on ski areas where a layer of ice persists well into the spring. Under the correct conditions such a situation could contribute to erosion and localized flooding. On Grand Mesa in the spring, some roads that were used by snowmobiles during the winter are covered by a thick layer of ice. Snow plow crews have a difficult job-- public access is delayed.

Most winter time users of National Forests in our area wait anxiously for the first snow. They begin snowmobiling, skiing or whatever just as soon as conditions permit. If there are early snows their interest drops off in early spring. With a late fall, their activities may continue far into the spring. The duration or length of the season of on-the-snow activities might be significant in the analysis of effects.

Questions

We, in Forest Service administration, would like to know more about the winter activities and their effects. It is difficult for us to determine the answers, we have to leave that to universities and research. But, it is easy for me to come up with some questions. I have listed a few that have come to mind.

What are the effects of each form of on-the-snow recreation on forest and range ecosystems? Perhaps a change in plant composition occurs; it could cause certain species to decrease in number. Lower soil temperatures, if they occur, might reduce the number of rodents, such as gophers.

What, if any, combinations of snow depth, snow density, air temperature, solar radiation, and other factors tend to maximize or minimize the effects?

Should use in some areas be restricted during a part of the winter?

How sudden are any impacts on the ecosystems? In a manner similar to grazing, we may have to rotate or alternate winter use between two or more areas to let one area recover.

Could we use artificial methods of changing the albedo to counteract the effects of on-the-snow recreation?

Would widespread on-the-snow recreation alter the timing and peak flow of spring runoff? Minimizing the possibility of flooding during a high snow year is a need, just as is increasing snowfall in a slim year.

Does the introduction of petroleum substances into a winter environment cause unusual pollution problems?

With the information I've given you on the Grand Mesa, Grand Mesa's importance, and man's use of the snow, I'm sure you have some questions or concerns I haven't thought of. Hopefully, in the near future there will be some answers.

We might see the time when in addition to regulating a cattleman's grazing in the summer, according to range condition, the Forest Service would also limit his winter snowmobiling to certain areas to help maintain or improve the condition of that same range.

References

- Cushing, J., "Small minority of snowmobiles creating antagonism to sport," Grand Junction Daily Sentinel, February 24, 1972.
- Havnik, P., "The Abominable Snowmobile," Moneysworth, Volume 2, No. 10, February 21, 1972.
- Hogan, A. W., "Snowmelt Delay by Oversnow Travel," Water Resources Research, Volume 8, No. 1, February 1972, pp. 174-175.
- "Boon or Bane?", Newsweek, January 24, 1972.