

Off the Road: The Issues Surrounding Mountain Bicycling

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Introduction

During the early part of this decade, people began discovering the all-terrain bicycle (A.T.B.) or mountain bike. Exercise enthusiasts, "explorers", and thrill-seekers had found a new release for their energy. On a mountain bike, they could venture into the back country, face the challenges of the rugged terrain, and search out lands that were too far to reach by hiking. The A.T.B. allowed nature enthusiasts to explore new areas away from crowds and paved roads. Since that time, the popularity of mountain biking has continued to grow and has caused the trails and paths within public parks to become increasingly crowded. Recently, mountain bike use on public lands has become the focus of much public attention. Cyclists, equestrians, park employees, hikers, and other park visitors each have their own ideas about the malignant and the benign qualities of mountain biking.

In this paper I look at the issues brought up by various park users and attempt to determine the relevant facts. I hope this analysis, with its broad view of the conflicts, impacts, and management strategies that are associated with this growing sport, will enable all parties to gain a better understanding of the actual impacts of mountain bicycling and how to manage them.

Past Studies

Four past studies proved valuable in my research. Goldstein (1987), Hain (1986), and Santa Barbara Ranger District (1987) analyzed the conflicts and impacts of mountain bicycling in a specific state or national park. The fourth study (Jones, 1988) was a compilation of mountain bicycling articles, statistics, and comments from both the public and East Bay Regional Park supervisors.

Methodology

Initially, I gained a fundamental understanding of the mountain bicycling issues by speaking with the various trail users I met on the trails of Charles Tilden Regional Park. These

casual conversations enabled me to focus in on the specific topics to be researched: the environmental impacts, the conflicts and complaints between users, and the roles park management and various organizations play.

I determined the environmental impacts of mountain bicycling by researching books, periodicals, and documents. In addition to utilizing the few past studies I had found, I reviewed several publications on the environmental impacts of other things such as horses, hikers, and motorized off-road vehicles. By studying their effects, and then making personal observations on various trails throughout the East Bay Regional Park District, I gained a general idea of the actual impacts of mountain cycling.

Understanding the types of conflicts and complaints that surround the sport required informal interviews, attending various trail-users meetings, and attending the hearings held by the California Recreational Trails Committee. In the interviews I asked trail users how they felt about mountain bicycles on trails and whether they or someone they knew had encountered an unfavorable experience with a mountain cyclist.

In examining the role that park management and organizations play, I reviewed the current mountain-bicycling policies at the local, state, and federal levels of park management. By attending several East Bay Bicycle Trails Committee meetings and speaking with several other cycling organizations, I was able to determine the active part that groups play and how they are helping management to adapt to mountain bicycling.

Data

Environmental Impacts of Mountain Bicycling: Several factors, including traffic density (Edington, 1986), local environment, and the manner in which cycling is performed, determine the environmental impacts of mountain bicycling on each individual trail (Byrnes, 1988, pers. comm. Figure 1 gives a basic depiction of the direct and indirect effects of off-road cycling. Bicycles compact the soil, increase erosion, and lead to other indirect impacts on trails, aquatics, and plant life. Bicycles also affect plant life and wildlife through physical contact, and by altering the ecology of the area.

Mountain bikes have broad impacts on vegetation that vary for each ecosystem. In forests and areas covered with shrubs, the impact of a cyclist can be slight, for example, redistributing the ground cover; or substantial, such as crushing or uprooting saplings. In grassland regions, cyclists who venture off the trails cut distinct paths through vegetation.

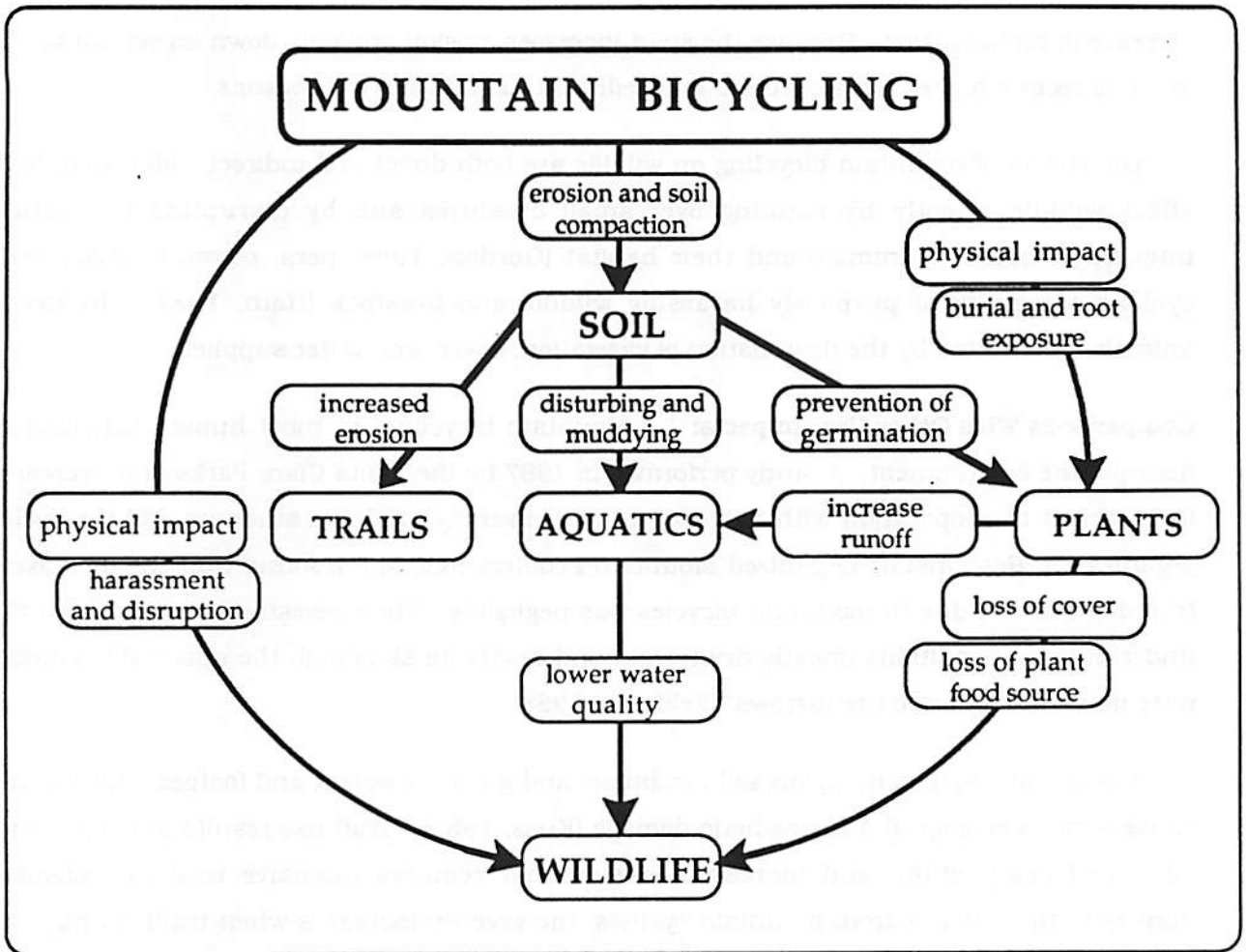


Figure 1. The Direct and Indirect Impacts of Mountain Bicycling

One important issue is the concern that mountain bikes might be accelerating the rate of erosion. Erosion directly leads to trail and soil degradation (Jubenville and O'Sullivan, 1987). When the soil is soft, or wet from recent rains, the tires of a bicycle can cut grooves into the terrain (Feldman, 1988). Over time, as cyclists continue to ride over the same area, these grooves increase in size, uncover tree roots, and eventually alter the ecology of the area. Grooves made in trails and in erosion-control devices such as waterbars, can change the runoff patterns and thus increase trail degradation (Knize and Chase, 1987). The degree of soil erosion is dependent on several variables: vegetation cover, soil type (sand, silt, clay), slope gradient, rainfall (season), and drainage.

Aquatic areas are also impacted by mountain bicycles. Cyclists who ride in or through stream beds disturb the sediment and make the water murky. Also, soft muddy stream banks often collapse from the pounding they receive from riders, leading to muddy waters and an

increase in bank erosion. Because the sport increases erosion and cuts down on vegetation, the streams receive higher rates of runoff and sedimentation during wet seasons.

The effects of mountain bicycling on wildlife are both direct and indirect. Mountain bikes affect wildlife directly by running over small creatures and by disrupting the natural interaction between animals and their habitat (Gordon, 1988, pers. comm.). Also, many cyclists are guilty of purposely harassing wildlife and livestock (Hain, 1987). Indirectly, animals are affected by the degradation of vegetation, cover, and water supplies.

Comparisons With Other User Impacts: Mountain bicycling, as most human activities do, disrupts the environment. A study performed in 1987 by the Santa Clara Parks and Recreation Department in cooperation with San Jose State University graduate students and the cycling organization Responsible Organized Mountain Pedalers (R.O.M.P.), found that the increase in trail degradation due to mountain bicycles was negligible. Their investigation concluded that under optimal conditions (mostly dry terrain and moderate skidding), the observable changes were none to "moderate tire furrows" (Feldman, 1988).

In many areas, depending on soil conditions and a hiker's weight and footgear, hikers often cause serious ecological and aesthetic damage (Kuss, 1983). Trail use results in deep vertical cuts, soil compaction, and increased erosion that requires intensive trail management. Similar to the impacts from mountain cyclists, the severity increases when traffic is high, the hiker does not remain on the trail, or when the soil is wet. Comparing the impacts, it is apparent that both the mountain cyclist and the hiker have similar impacts except that the cyclist can travel much further than the hiker and will thus have an impact on a greater area of land. In the Santa Clara Park Department's study, the researchers concluded that mountain bikers have little more impact on trails than hikers wearing lug-soled hiking boots (Bloom, 1988).

Horses have a substantial impact on the environment (Summer, 1986). Horses graze on trailside foliage and lead to a higher rate of devegetation. In addition, the horse and rider have a much greater weight to contact-area ratio; this leads to increases in the compaction of soils, erosion, and trail degradation. When considering the differences between horses and bicycles, one might argue that a bicycle leaves a continuous rut while a horse leaves hoof-prints that are less likely to degrade trails. The counter argument to this is that the lighter weight of a bicycle causes less overall damage. In fact, one study has shown that, "[The impacts of] trail scooters used at moderate speeds on reasonable grades normally cause less impact on trails than horses" (Deinema, quoted in Lodico, 1973).

The differences between the impacts from motorized vehicles and bicycles are considerable. Motorized off-road vehicles are heavier, obtain higher speeds, and travel over larger areas than a bicycle and thus have a greater impact on the environment (Sheridan, 1979). Also, noise and air pollution, which are not created by cycling, affect the ecology and other users' enjoyment of a park.

User Conflicts and Complaints: The most common concern among trail users is the issue of safety; are the mountain bicyclists creating an unsafe situation on the trails? One of the major complaints surrounds the speeds of cyclists. Riders often reach speeds which do not allow them ample time to adjust to traffic. A large number of the complaints which arose at the Trails Committee hearings stemmed from joggers, hikers, equestrians, and nature observers who had experienced a near miss or an actual accident.

Only 4 of the 24 cycling accidents reported at the East Bay Regional Park District during the period of July 1987 to June 1988 involved a cyclist and another party: twice cyclists collided, once a cyclist fell when avoiding a cow, and once a cyclist fell while avoiding a hiker (Jones, 1988). The accidents occurred due to the cyclists' lack of attention or control. But these statistics and others compiled by other park services do not accurately record the number of near accidents and other unreported incidents which have occurred.

Factors such as trail width, gradient, visibility, and surface condition play a role in the safety of both the cyclist, and others who use the trails. Narrow trails (also known as single-track trails) that do not allow sufficient room for trail users to pass and trails where visibility is impaired by foliage or short-radius curves increase the possibility of a collision. Steep trails encourage cyclists to ride at speeds that restrict the maneuverability of a bicycle and create a situation dangerous to other trail users. Additionally, if the surface of a trail is rough and uneven, a cyclist can easily lose control and fall.

A conflict which developed soon after bicycles began sharing the trails with horses is that many horses scare very easily. When a cyclist overtakes an equestrian, the horse often will become spooked and may dangerously throw its rider. To prevent this it has been suggested either to consider the two uses incompatible and not allow them both on the same trails, or to have cyclists use warning bells or horns. The problem with the first suggestion is that some trails are used to gain access to remote areas and closing them denies this access. The second proposal is considered unsatisfactory by many because some horses are startled or are taught to run at the sound of bells or horns.

Another grievance is that many of the more passive park users such as nature observers and picnickers find that bicycles in the back country take away from the "nature experience." Many people feel that items such as bicycles which give a person an advantage over the terrain do not belong in the back country. In fact, organizations such as the Sierra Club feel that a mechanical device rumbling down the trails spoils their ability to enjoy natural surroundings (Feldman, 1988). Because cyclists travel at rapid speeds and create disturbances, wildlife observers in particular find that mountain bicyclists disrupt their activities.

The question of overcrowded trails is another rising issue. As more people discover the beauty and peacefulness of wilderness trails, the amount of trail use increases. Statistics show that five million mountain bicycles are on the country's roads and trails (Foote, 1987). Although it has been estimated that 90 percent of all mountain bikes sold are never used off paved roads, the introduction of that ten percent has created some uneasy feelings (Carey, 1987). Many nature enthusiasts believe that the wilderness trails are already overcrowded and resent the introduction of any new technology that will increase the number of people on the trails.

A common complaint shared by all trail users (including mountain bicyclists) is the issue of renegade cyclists. These "bad-apples" ride recklessly and carelessly on and off the trails and it is basically their highly visible actions which result in many of the previous conflicts. The actions of these few cyclists drive the media to associate a "kamikaze" image with all mountain bicyclers (Bloom, 1988). In fact, many printed advertisements sensationalize the rugged, muddy, and reckless riders. Renegades consist of a wide range of people, from "speed demons" who are trying to get a rigorous workout or are training for road cycling, to thrill-seekers and those who love the mud and the challenge. These cyclists know that their chances of being caught are low so they continue to ignore regulations and signs. Their impacts vary from cutting through the off trail vegetation, to startling or colliding with unsuspecting hikers and equestrians.

Government Policy and User Organizations: On lands under federal jurisdiction the regulations are often vague and inconsistent. Unpaved trails in National Parks are considered off limits to bicycles except where determined safe and acceptable. Except in federal Wilderness and areas that are found inappropriate, mountain bicycles are permitted on lands that fall under the jurisdiction of the Forest Service (FS) or the Bureau of Land Management (BLM) (36 CFR 261.16). The current penalties for cycling on restricted Federal areas is a \$25 fine.

The state park's current policy allows bicycles only on fire roads and on trails approved by the District Superintendent. The California Recreational Trails Committee (a committee formed by the California Department of Parks and Recreation to oversee trail use in the state's parks) has held several hearings to receive comments and recommendations for policy revisions.

Locally, the East Bay Municipal Utility District (E.B.M.U.D.) does not allow mountain bicycles on land under its jurisdiction. However, the East Bay Regional Park District's (E.B.R.P.D.) current policy (Section 409 of Ordinance 38) permits bicycles on fire roads and approved trails and prohibits them on all single-track trails and in sensitive areas that are posted off-limits. In addition, the E.B.R.P.D. closes all trails after it rains to prevent trail degradation. This policy has been rather successful in preventing conflicts although not every interest group is satisfied. Some equestrians, naturalists, and hikers would like more regulations while cyclists would like access to additional trails and lands.

Federal, state, and regional parks are currently experiencing very similar difficulties with implementing their regulations. Budget cuts which reduce staff size, along with the very fact that parks span vast regions and encompass many miles of trails, make it difficult to enforce policies. A renegade cyclist riding in the back country has a very low chance of being caught. At the present time, the fines and penalties for illegally operating a bicycle are insignificant and are an ineffective deterrent against renegades. Also, due to bureaucratic delays, many prohibited trails and zones are inadequately marked with signs. Among trail users, trails where no signs are posted are assumed to be unrestricted. Park staff have reported cyclists, hikers, and equestrians using prohibited trails accidentally.

Because of park managements' initial inability to adapt to the activity, local organizations have stepped forward and offered assistance to rangers at several of the high traffic parks. Organizations such as the Bicycle Trails Council of the East Bay (BTC EB) have set up trail maintenance programs such as "Trail Days"--an event in which members repair and restore trails. The BTC EB also patrols back country trails and the entrances to prohibited regions so that they can assist all trail users and inform unlawful cyclists of the trail regulations and why certain areas have been closed to riders. At the highly utilized Mt. Tamalpais State Park, the Bicycle Trails Council of Marin (BTC M) has set up "road blocks" which are trail use information centers. The various mountain cycling organizations also volunteer to assist park staff with trail maintenance and help develop and distribute pamphlets on proper trail etiquette. These procedures along with cooperation between the various trail organizations have helped lessen the friction between opposing interest groups.

Discussion

The Actual Impacts of Mountain Bicycling: The current policy in many parks allows mountain bicycles only on fire roads. Where this is the case, the question of environmental degradation becomes irrelevant because automobiles also travel these roads. But in areas where bicycles are permitted on trails, the environmental effects of cyclists become significant. The data I have collected show that under similar conditions, the environmental impacts caused by mountain bicycles are on a level comparable to other trail uses. The impacts of mountain bicycling only become a factor when cyclists operate their bicycles in a careless manner.

But what is considered a careless manner? An important fact that most investigations have neglected is that mountain bikes are used in conditions that other trail users are likely to avoid. Although many cyclists are conscientious and bypass sensitive tracts, many other cyclists enjoy riding on boot-leg trails and through the mud and water. Not just the so-called renegade cyclists, but many thrill-seekers, nature observers, and everyday mountain bikers prefer single-track trails. These trails are utilized because they are challenging, they allow further access into remote areas, and they connect fire roads so cyclists can ride a loop (rather than riding there and back on the same trail). Therefore, further studies may prove that bicycles cause a greater proportion of trail degradation than initial research has shown.

Soil compaction, erosion, devegetation, wildlife harassment, and aquatic degradation have undoubtedly increased since the introduction of the mountain bicycle to the trails. In popular areas where the bicycle traffic is high, the impacts are more apparent and require increased maintenance. The degree to which they have increased is unknown because no long term studies have been concluded.

What is Safe ?: Every time an incident occurs in which a cyclist is involved the issue of safety resurfaces. Those who utilize the trails question the compatibility of bicycles, pedestrians and horses all on the same trails. Trail safety, which is a major concern of trail users, requires the basic knowledge of exactly what creates an unsafe situation. The major causes of accidents and near accidents are: excessive speed, poor visibility, narrow trails, and lack of rider attention and education. Each of these factors must be accounted for when determining and developing a solution.

Solutions: Finding solutions to the mountain bicycling conflicts will demand innovative thinking and difficult choices. A policy that does not restrict the use of mountain bicycles will

most likely increase user conflicts and environmental degradation. Conversely, a policy that excludes bicycles contradicts managements' objective to provide nature experiences. However, in areas that are physically or aesthetically sensitive, exclusion is the only appropriate solution.

A wide range of educational efforts can be utilized to lessen the impacts of mountain bicycling. Education is important because many people do not understand the environmental impacts they create when riding in prohibited areas. Also, some cyclists do not foresee the possible safety conflicts that arise when riding recklessly; very few realize how easily horses spook. The public could be educated through the media or through programs that develop and distribute informational pamphlets. These brochures could explain proper trail etiquette, where to ride, and when trails are open. Local bicycle shops, cycling clubs, and park staff could distribute the information and pamphlet holders could be set up at trail heads.

In addition to the educational efforts, management could make regulations more strict. Increasing the enforcement effort and raising fines might deter cyclists from riding negligently. Also, if bicycles are determined to be incompatible with other park activities, it may be necessary to confine the cyclists to certain regions and thus not allow the conflicting activities to coincide.

The number of user conflicts can also be reduced by improving several of the existing trails within each park. The creation of uni-directional loop trails, widening or enlarging some trails, cutting back brush to increase visibility, and the installation of trail signs would decrease the number of accidents. This solution is applicable in some situations because it enables all trail users to coexist on the same trails; however, it is important to note that not all trails are suitable for improvements.

Conclusion

There are no easy answers to the mountain bicycling conflicts. Many of the issues raised in this paper have no solution and many others will be resolved only after input is received from each user group.

I feel that a policy that satisfies all of the trail users will have to be developed on a state-wide level; that is, one consistent policy that allows bicycles on fire roads and non-single-track trails. Because some park trails are safe for multipurpose use, while other trails are unsafe or highly sensitive both environmentally and aesthetically, exceptions to this policy could be made on a trail-by-trail basis. Each park, wilderness, and natural area is unique;

therefore land managers should adapt mountain bicycling strategies that take into account the conditions and land-use objectives at each park.

Ultimately, an acceptable management strategy must consider the following criteria: the policy must meet users needs, have an acceptable level of safety, uphold the management objective for the area, be enforceable, and be accepted by park users.

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