

Kirch Flat Campground Recommendation Report

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Abstract

Providing opportunities for outdoor recreation experiences on public lands is essential for the quality of life of individuals as well as beneficial to land management efforts by encouraging and developing stronger stewardship of forests on public land. However, outdoor recreation managers must balance the recreation and rejuvenation people seek from outdoor environments with the need to protect the resource. Using Kirch Flat Campground (50 miles southwest of Fresno, California, in the High Sierra Ranger District, Sierra National Forest) as a case study, the impacts of visitor use and current management practices on public lands were examined to reveal concerns and opportunities to improve and protect these resources. Information was obtained by personal site visits, discussions with recreation professionals and visitor interviews, previously-conducted visitor use surveys, Forest Service recreation site data from the INFRA database, the Sierra National Forest Land and Resource and Kings River Special Management Area management plans, peer-reviewed literature, and government agency publications which were used to develop recommendations. Long-term and short-term management solutions are suggested to promote the improvement of Kirch Flat Campground conditions, longevity of sustainable operations, protect natural resources, and provide visitors with an enjoyable experience that leaves the recreation site un-impaired for future generations, eliminating the possibility of a permanent site closure.

Introduction

National forests and grasslands offer the single largest source of outdoor recreation opportunities in the United States. People are visiting them in record numbers to hike, camp, fish, canoe, ski, and much more. Outdoor recreation occurs in many settings, from wilderness to suburban and urban areas, at developed and undeveloped sites, in a wide variety of forms (USDA, 2012b). Outdoor recreation is usually considered any type of enjoyment during leisure time while outdoors, often in natural or semi-natural settings out of town (Zinser, 1995). Most outdoor recreation takes place on public lands and most of the management responsibility falls on public agencies such as the U.S. Forest Service. Providing authorizations and guidelines for recreation management, the National Forest Management Act of 1976 (NFMA) directs recreation on Forest Service public land (Zinser, 1995b, pp.244):

“The purpose of recreation management is to provide and protect natural resources and facilities that accommodate the public’s need for outdoor recreation, emphasizing opportunities to know and experience nature.”

NFMA also gives direction to maintain, repair, and restore existing facilities necessary to meet the demands for public outdoor recreation in natural settings, as well as to utilize challenge cost-share projects and other partnerships when appropriate (Zinser, 1995b). The task of land managers is to determine whether all people have access to recreation sites, facilities and experiences. This is particularly important when either resources or people are vulnerable; for

example, where designated wilderness areas, water resources, or underserved populations are involved (California State Parks, 2005).

Outdoor recreation has positive impacts on our society and is important to the quality of life for many people (California State Parks, 2005). An outdoor recreation experience may allow participants to change their self-image and gain personal satisfaction. Quality of life benefits from recreational experiences include: enhanced self-esteem through improved feelings of self-worth, reliance, and confidence; personal growth; enhanced expression of and reflection on personal spiritual ideals; and feelings of satisfaction from one's personal, neighborhood and community life (Payne, 2010). Federal land management agencies, such as the Forest Service, provide for these marketable products by offering opportunities for recreation visits in which visitors can seek these benefits (Zinser, 1995).

Providing opportunities for outdoor recreation experiences on public lands are essential not only the quality of life of individuals, but are also an ideal medium for encouraging and developing stronger stewardship of the land. People who enjoy outdoor recreation become more familiar with natural resources and the environment. This increased knowledge helps them understand how their personal actions can affect the environment (CPS, 2005; USDA, 2012b). According to McDonald & Schreyer (1991), optimal outdoor recreation experiences can result in a state of connectedness with the earth and its creatures, which in turn, can result in a greater sense of appreciation for the environment and the community of life. In another study, 95% of Americans agreed that outdoor recreation is a good way to increase peoples' appreciation for nature and the environment (ARC, 2000).

Public land managers must meet the needs of American citizens and the natural environment by providing opportunities to improve the quality of life and promoting stewardship of public lands efficiently and effectively. Outdoor recreation managers must balance the recreation and rejuvenation people seek from outdoor environments, with the need to protect the resource. Well-informed decisions can maintain that balance (USDA, 2012b). However, mismanagement, or managing public lands ineffectively, may result in unacceptable visitor impact on sensitive natural environments (Hammit & Cole, 1998). According to Farrel & Marion (2002), visitor impact problems require management attention for the following reasons:

- (1) Impacts may compromise protected area resource protection mandates;
- (2) Many impacts occur rapidly at initial or low levels of use;
- (3) Some impacts are cumulative, increasingly degrading resources over time; and
- (4) Impacts may lead to other undesirable consequences such as diminished visitation, economic benefits or resource protection incentives.

Visitor impact management programs can minimize negative effects before costly restoration and rehabilitation programs become necessary (Farrel & Marion, 2002). The purpose of this paper is to provide background and recommendations for the management of Kirch Flat Campground so decision-makers will be well-informed regarding how to balance opportunities for recreation use and protection of the natural environment.

Study Site

Kirch Flat Campground is located approximately 50 miles southwest of Fresno, California, in the southwestern portion of the High Sierra Ranger District (HSRD) of the Sierra National Forest (SNF). The campground is located approximately 15 miles east from the Pine Flat Reservoir, which is fed by the Kings River (Figures 1, 2). The site is located within the Kings River Zone of the Kings River Conservation Management Area (KRCMA) and includes a group site, day use area and river access (Appendix I; USDA, 1991b). Kirch Flat Campground is 2.4 acres, located approximately 75 yards adjacent to the King's River, and managed by the HSRD of the USDA Forest Service. Most visitors to the SNF generally reside in Fresno, Madera, Merced and Mariposa counties and drive less than 75 miles to their destination on the SNF (USDA, 2010b).

Background

Kirch Flat Campground lies within California oak woodland, a plant community found throughout the California chaparral and woodlands ecoregion of California (USDA, 1991a). According to California Department of Fish and Game's (CDFG) Wildlife Habitat Relationships (Ritter, 1988), the area adjacent to the perimeter of the Kirch Flat Campground area is classified as Valley Oak Woodland and Riparian. The CDFG (Ritter, 1988) identifies this habitat as woodlands with canopies dominated almost exclusively by valley oaks. This habitat varies from savanna-like to forest-like stands with partially closed canopies, comprised mostly of winter-deciduous, broad-leaved species. Other common tree species include sycamore (*Patanus occidentalis*), Hinds black walnut (*Juglans hindsii*), interior live oak (*Quercus wislizeni*), boxelder (*Acer negundo*), and blue oak (*Quercus douglasii*). The shrub understory consists of poison-oak (*Toxicoderndron diversilobum*), blue elder (*Sambucus cereluea*), California wild grape (*Vitis californica*), toyon (*Hertomeles arbutifolia*), California coffeeberry (*Rhamus californica*), and California blackberry (*Rubus ursinus*). Various sorts of wild oats such as brome (genus *Bromus*), barley (*Hordeum Vulgare*), ryegrass (genus *Lolium*), and needlegrass (*Achnatherum*) dominate the ground cover (Ritter, 1988). Dominant species in the canopy layer of Valley Foothill Riparian habitat are cottonwood (*Hibiscus tiliaceus*), California sycamore (*Plantus racemosa*) and valley oak (*Quercus lobata*). Subcanopy trees are white alder (*Alnus rhombilfolia*) and Oregon ash (*Fraxinus latifolia*) (Grenfell, 1988).

These woodlands provide food and cover for many species of wildlife. Oaks have long been considered important to some birds and mammals as a food resource (e.g., acorns and browse). 30 bird species known to use oak habitats in California include acorns in their diet. In decreasing order, the most common species were European starling (*Sturnus vulgaris*), California quail (*Callipela californica*), plain titmouse (*Baeolophus inornatus*), scrub jay (*Aphelocoma coerulescens*), rufous-sided towhee (*Pipilo erythrophthalmus*), Bewick's wren (*Thryomanes bewickii*), bushtit (*Psaltriparus minimus*), and acorn woodpecker (*Melanerpes formicivorus*). CDFG indicates that the ranges of about 80 species of mammals in California show substantial overlap with the distribution of valley oaks, and several, such as red fox (*Vulpes vulpes*) and western gray squirrels (*Sciurus griseus*) and mule deer (*Odocoileus hemionus*), have been documented using valley oaks for food and shelter (Ritter, 1988). The Kings River area provides suitable habitat for special status wildlife that occur in the area such as the bald eagle (*Haliaeetus leucocephalus*), western red bat (*Lasirurs blossevillii*), pallid bat (*Antrozous pallidus*), valley

elderberry longhorn beetle (*Desmocerus californicus dimorphus*), California spotted owl (*Strix occidentalis*), and the King's River salamander (*Batrachoseps regius*). The campground also lies within an established Home Range Core Area for the California spotted owl (USDA, 2013).

The primary watercourse at Kirch Flat Campground is the King's River. The King's River flows west from the Sierra Nevada Mountains, draining into Pine Flat Reservoir in the Sierra Nevada foothills. There are several tributaries located just outside the campground vicinity. The King's River flows approximately 75 yards from the campground at the closest point. The California Regional Water Board has determined that Lower King's River is an "impaired stream" as classified by the Environmental Protection Agency (CRWQB, 2010; EPA, 2010). The impaired section is located at the point which the North Fork Kings River joins the main King's River, approximately three miles east of the campground, to 76 miles west passing through Pine Flat Reservoir. The campground area is located within the "impaired" section of the King's River, as defined by the federal Clean Water Act and determined by the California State Water Quality Board. The impaired section is listed on the state's 303d water quality list for Chlorpyrifos and unknown toxicity pollutants; the potential source listed agriculture. All samples tested that exceeded Environmental Protection Agency standards, where west of Pine Flat Reservoir and the campground (CRWQCB, 2010).

Recreation Use

Within the riparian chaparral habitat, the Kings River flows at an elevation of 1,300 feet. Due to its low elevation, the King's River area provides year-round recreational opportunities which include camping, picnicking, fishing, and non-motorized boating activities. The campground is popular with San Joaquin Valley residents, fisherman, day users, and whitewater enthusiasts who come to enjoy many challenging rapids and beautiful canyon scenery of the King's River (Alaniz, 2013). During the spring months when the river flows are high and safe enough to support the activity, three whitewater rafting companies offer guided whitewater rafting trips near the campground (USDA, 199b).

The King's River serves as a boundary line throughout the Kings River Zone, separating the Sierra and Sequoia National Forests. Kirch Flat Campground is the only recreation site along the Kings River that provides a facility for developed camping. Other camping opportunities include two dispersed camping sites on the Sierra National Forest side of the river. On the opposite side of the river, three dispersed camping sites are also available on the Sequoia National Forest. These dispersed camping sites are considered to have almost no site modification or Level 1 on the Forest Service Recreation Site Development Modification table (Appendix III; USDA, 1991a). In addition to recreation sites, the nearest services are located in Sanger, a moderate-sized town about 45 miles (1 hour 20 min.) away, with all essential services (i.e. gas, propane, post office, supplies, groceries, restaurants, medical, etc. (Alaniz, 2013).



Figure 1: Region Map

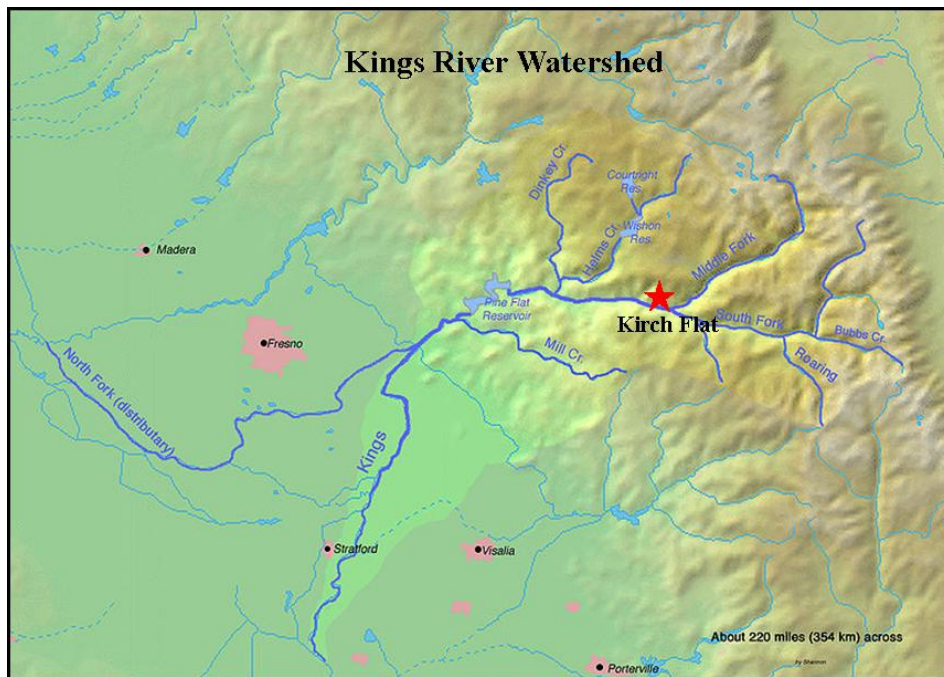


Figure 2: Watershed Map

The peak recreational use begins mid- to late-March, ending June to mid-July. The duration of the peak season is heavily dependent on the length of time the water level of the King's River is high enough to navigate boats safely. Visitors that come to boat the river primarily use the campground during this time. The campground is open all year; however, the established operating season is from the beginning of April thru the end of September, and this is the only time the Forest Service maintains the campground (Alaniz, 2013). According to the 1991 Sierra National Forest Land and Resource Management Plan (LMRP), Kirch Flat Campground is considered to have "Moderate Site Modification," or a Level 3 developed campground (Appendix III). It is comprised of two paved loops, each with two vault toilets, and a total of 17 first-come, first-serve campsites (Appendix II). A group site with a 50 person capacity is available by reservation only, and has two vault toilets. Each campsite offers picnic tables, fire rings, tent pads and a paved parking spur. The campground road is paved asphalt with wooden barriers are placed along roadside. Drinking water, sewer, electricity hookups, and trash service are not provided at the campground. This campground is on the "Pack it In, Pack it Out" program; garbage cans are not provided. Campers are asked to bring their own garbage bags and take their garbage with them when leaving the campsite. Currently, fees for overnight camping and day use are not charged at either campground or group site.

Recreation Management

Since it was established in 1930, the Sierra National Forest has managed Kirch Flat Campground operations (USDA, 2013a). There have not been any major improvements to the campground since before 1991, when two Sierra National Forest districts combined to make the High Sierra Ranger District. Over the last 15 years, provided amenities have not been managed up to Forest Service standards, have continued to deteriorate, and have not provided an experience up to visitor expectations (Ekman, 2013). Prior to 1990, trash service was available and a fee was charged for the campground and group site, supplementing funding for operation and maintenance costs. Since then, trash service was discontinued, fees were not charged, and the operation and maintenance costs have relied solely on appropriated fees for funding (Ekman, 2013). After an examination of the campground's change in condition and visitation and discussion with the HSRD's Recreation Officer, increased recreation use at the site and the lack of management resources to maintain this use are the two explanations for its current condition; however, since many of the issues are thought to be solved with additional funding, the root of the problem appears to be the lack of management resources.

Currently, one Forest Service employee is responsible for the operation and maintenance of Kirch Flat Campground. This employee has many other job duties and is only able to attend to the campground part time. In addition, access to the campground is a 75 minute drive from the High Sierra Ranger District, making it costly and time consuming for Forest Service personnel to travel out to the location to conduct maintenance tasks. Site maintenance is conducted one to two times a week during the high-use season, and once a month in the low-use season. In the past, one temporary seasonal river ranger and a pair of campground host volunteers were primarily responsible for campground operations and maintenance on a full time basis. Although campground host volunteers have been used to supplement funding, retaining volunteers has

been a struggle due to the lack of amenities available at the campground to support long-term camping required for the volunteer’s lodging. The lack of electricity and drinking water also make it difficult to recruit volunteers (Alaniz, 2013).

In 2002, after it was discovered that the implementation of visitor use fee collection in Kirch Flat Campground was illegal because it did not use the public scoping process mandated by the

Table 1: Annual operating, maintenance, and deferred maintenance costs	
Kirch Flat Campground Annual Costs	
Operation	\$19,490
Maintenance	\$1,505
Deferred Maintenance	-\$12,545
Total O&M Costs	\$20,995
Total DM Costs	\$73,750
Actual Funding Allocated for Annual O & M	< \$ 10,000
<small>(est.~\$6,000 for personnel, \$450 for supplies, \$2,000 for toilet pumping)</small>	

Federal Lands Recreation Fee Enhancement Act legislation, a decision was made by the Forest Supervisor of the Sierra National Forest to discontinue fee collection at the site. After the decision to stop charging fees, the campground host and temporary seasonal river ranger were cut from the campground’s operation and maintenance budget once supplemental funding was eliminated and budget reduced. Currently, operation and maintenance is solely financed by appropriated agency funding and has been further reduced this year due to 2013 federal sequester budget cuts (Ekman,

2013). Since 1999, operation and maintenance costs have maintained an average of \$20,995 a year; however, the amount of deferred maintenance has continued to increase. With approximately \$8,450 of appropriated funds currently allocated for operation and maintenance, the campground is left with a deficit of \$4,095, adding to the repeatedly increasing deferred maintenance costs. Deferred maintenance was estimated to be approximately \$10,000 in 1999. At a grand total of \$73,750, deferred maintenance has steadily increased each year by 11%. Currently, and in the foreseeable future, appropriated funds for recreation at this site are not enough to meet recreation maintenance and service needs (Alaniz, 2013). The amount of accrued deferred maintenance over time demonstrates this. The amount of funding allocated is inadequate in addressing operating, maintenance, and deferred maintenance costs, as identified by the changes in site conditions (Table 1). Without adequate funding, current operations cannot afford the proper resources to maintain the campground to Forest Service health and safety standards, nor address issues related to the protection of natural resources.

Management Direction

Kirch Flat Campground and adjacent lands administered by the Sierra National Forest are managed in accordance with the Sierra National Forest Land and Resource Management Plan (LRMP), as amended. The purpose of the LRMP and its amendments is to guide the integrated protection and use of Forest resources. Kirch Flat Campground falls within the LRMP Pine Flat Analysis Area 65 that is designated as a Developed Recreation Management Area (USDA, 1991a). Although outside the Kings River Special Management Area boundary, management direction for Kirch Flat campground is also included within

the Kings River Zone of the Kings River Special Management Area Implementation Plan (USDA, 1991b).

Sierra National Forest Land and Resource Management Plan (USDA, 1991a)

Applicable to Kirch Flat Campground, the overall forest-wide goals and objectives provided by the LRMP state:

- | |
|--|
| <ol style="list-style-type: none">1. Provide a broad spectrum of dispersed and developed recreational opportunities in accord with identified needs and demands and meet Recreation Opportunity Spectrum (ROS) class objectives shown on ROS element maps.29. Encourage use of the Forest by disadvantaged, handicapped and minority persons. |
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Standards and guidelines which specifically describe how Sierra National Forest goals and objectives will be achieved and set minimum conditions that must be maintained while achieving the goals and objectives while adhering to policies. Those that apply to Kirch Flat Campground are as follows:

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|--|
| <ol style="list-style-type: none">1. Provide moderate increases in intensively used recreational developments.3. Encourage use of Forest by disadvantaged, disabled, and minority persons. Provide for their needs when designing facilities.6. Increase capacity of developed sites about 7% by 2000. |
|--|

For planning purposes, the Forest was divided into geographical subdivisions called management areas. Each management area is subject to additional more site-specific direction, referred to as management prescriptions. Kirch Flat Campground lies within the Pine Flat Recreation Management Area of the LRMP, which identifies future conditions for which forest recreation in that area will strive to meet. Rural and road-accessible natural recreational opportunities are stressed. Kirch Flat Campground is classified as Roded Natural Opportunity class, defined as rustic facilities providing some comfort for the user and providing site protection. The LMRP also addresses visual resources which give standards and guidelines directing facilities to be designed and installed to be compatible with and subordinate to the landscape's natural characteristics.

The Pine Flat Recreation Management Area is given further direction for the removal of diseased and hazardous trees from developed recreation sites, rehabilitation of existing sites, and allowing for a moderate increase in the number of developed sites to accommodate increased use. It also directs Forest's recreational sites to be maintained to have "Moderate Site Modification" or Development Level 3 of the Recreation Site Modification table (Appendix III).

Kings River Special Management Area Implementation Plan (USDA, 1991b)

Common to all zones listed in the KRSMA Implementation Plan, objectives include providing for the long-term protection and preservation of the areas' natural and scenic resources, managing the area for the use and enjoyment of visitors in a manner that will leave the area un-impaired for future use and enjoyment, providing facilities and programs that will reflect the public need for recreation opportunities in appropriate environments, and providing co-operative funding such as seeking volunteers to augment appropriated dollars. More specifically, the King's River Zone provides direction to maintain a diversity of river- and land-based recreation activity opportunities emphasizing the combined activities of camping, fishing and floating; including managing access sites for floater use and allowing further improvement of recreation sites only for protection of natural resources.

When the KRSMA Implementation Plan was developed in 1991, assumptions were made for all zones. It predicted that existing facilities would need rehabilitation to meet health and safety needs, custodial management standards, and continued maintenance. Changes in technology, social attitudes, and agency direction may require updating or improving current facilities. It also projected that demands for recreational opportunities within the KRSMA would continue to grow in the future and unmanaged recreation use of the KRSMA would result in increased resource deterioration. Management opportunities were also identified in the plan for people with disabilities and suggest that a river access facility should be developed to be in full compliance with the adopted accessibility codes and standards. In addition, it suggests offering additional amenities as recreation demand of the site increases.

As directed by the plan, in areas where recreation activities will be permitted and areas where the natural environment will be maintained, it states that site plans will be developed for areas where development or use is or has been conceptually located or suggested in the Plan. These areas include rafting put-ins, developed campgrounds, and picnic areas. Kirch Flat Campground has been identified as one of these areas. Defined by Zinser (1995a), a site management plan is a framework designed to develop objectives for management which identify the desired condition of the site and the management actions needed to achieve those objectives.

ADA Compliance

Currently, Kirch Flat Campground does not meet accessibility guidelines for persons with disabilities, as required by the American with Disabilities Act. In 1990, the Americans with Disabilities Act (ADA) was established to recognize and protect the civil rights of people with disabilities. It prohibits discrimination and ensures equal opportunity for persons with disabilities in employment, state and local government services, public accommodations, commercial facilities, and transportation (USDJ, 2010). To ensure compliance with ADA, the Forest Service developed a universal design policy which requires new or altered facilities and associated constructed features in recreation areas to be accessible, rather than only a certain percentage of those facilities, with few exceptions. The goal of universal design is to ensure integration of all people, without separate or segregated access for people with disabilities. Forest Service Outdoor Recreation Accessibility Guidelines (FSORAG) has been established to ensure

compliance and are required at recreation sites with a FS Recreation Site Development Scale of “Moderate Site Modification” (Appendix III) or higher. Regardless of the FS Recreation Site Development Scale, under the Forest Service’s universal design policy, with few exceptions, all new or altered facilities and associated constructed features at recreation sites must comply with the technical provisions of the Forest Service ORAGs (US Access Board, 2004).

Opportunities to Improve & Protect Resources in Kirch Flat Campground

The following assessment of site condition, visitation, and the site’s lack of alignment with management direction of Kirch Flat Campground, have presented several potential opportunities for the improvement of visitor experiences and protection of the natural environment within the site’s boundaries. To determine the current “condition” of Kirch Flat Campground, the state of facility amenities, natural resources, and occupancy rates were examined and then compared to baseline data to show the amount of change in visitation and site resource conditions over time. To illustrate the change in site resource conditions over time, current site resource condition survey data is compared to 1999 baseline data retrieved from the Forest Service Recreation Site INFRA database. The earliest data recorded in the INFRA database for Kirch Flat Campground is from 1999. Changes in visitation and site condition are demonstrated accordingly, presenting resource issues that are degrading Kirch Flat Campground’s natural and recreation resources and negatively impacting visitor experiences. As an option to provide additional funding to address these issues, implementing fee collection at the site is evaluated for qualification into the Federal Land Recreation Enhancement Act Fee Program.

Changes in Visitation

In 2010, the Sierra National Forest determined that there was a 22% reduction in developed camping as a primary forest visitor activity throughout the 60 developed campgrounds on the forest (USDA, 2010b); however, according to the 2012 NVUM data, in the last 13 years recreational use at Kirch Flat Campground has increased by 26% (SNF, 2013). In 1999, it was estimated that approximately 1,373 forest visitors camped at Kirch Flat Campground (USDA, 2013a). From October 1, 2011 to September 30 2012, National Visitor Use Monitoring (NVUM) data was collected, with results showing 1,732 people visited Kirch Flat Campground during that time (SNF, 2013). Results also indicate the number of peak and moderate use days have increased within the campground (Appendix IV). Kirch Flat Campground occupancies and percent capacities of campground occupancies were the greatest from mid-April to the end of 4th of July holiday weekend (USDA, 2013b).

NVUM surveys in 2012 and observations from Forest Service recreation specialists' further support the trend in increased use generated by past data and visitor use surveys. Conversations with leaders of several groups who use the campground reveal that they also have observed increased use in the area over the years (Alaniz, 2013; USDA, 2013b). Based on Sierra National Forest recreation use statistics and assumptions (USDA, 2010b), as well as the increase in recreational use from 1999 to 2013 at Kirch Flat Campground (SNF, 2013), it is projected that recreation visitation will continue to increase in the future. Figure 3 shows typical high use during months March thru June, as it is popular with boaters who come to raft or kayak the high spring flows caused by winter snowmelt.



Figure 3: Saturday, March 16, 2013. Sites are full and over the two car limit per campsite.

Resource Concerns

In March of 2013, a routine condition survey was performed in Kirch Flat Campground (USDA, 2013a). The condition of campground amenities and natural resources within the campground were examined to determine the existing condition of the campground (Appendices V & VI). Amenities such as bathrooms, picnic tables, fire rings, road and campsite barriers, signs, and road conditions were inventoried, revealing a great deal of repairs needed in the campground. Resource conditions were recorded by examining tree damage, ground cover loss, soil erosion, damage proximity to water, trash level, human waste, and user-created features. Condition survey results indicated that the majority of the campground features such as picnic tables and parking barriers needed to be repaired or replaced, many trees contained some level of damage, the majority of bathrooms needed repairs, all sites had some level of vegetation loss, and human waste occurred around the outside perimeter of one bathroom (Appendix V). Sites visits also continued to record the condition of the campground throughout the peak season. Twenty-one site visits were also made between mid-March thru the end of July of 2013. Trash left behind by campers was observed in the majority of the campsites and bathrooms, human waste was observed on the outside perimeter of the bathrooms, and restroom conditions were found to be less than acceptable 71% of the time (Appendix V).

It is estimated that the condition of the campground falls below Forest Service facility operation standards approximately 64% of the days during the operating season. To understand the change in the site resource condition over time, 2013 condition survey data is compared to 1999 baseline (USDA, 2013a). Table 2 illustrates the differences in site resource condition from 1999 to 2013:

Table 2: Comparison of Kirch Flat Campground Site Condition Survey Data over time.

Category	1999	2013
Tree Damage	<20%	35%
Ground Cover Loss	20%	40%
Soil Erosion	Minimal	Moderate
Trash Level	Minimal	Extensive
Human Waste	None	Yes
User Created Features	None	3 fire rings
Picnic Tables Needing Replace/Repair	16%	82%
Barriers Needing Replace/Repair	13%	41%
Bathrooms Needing Repair	0	4
Bulletin boards/ Signs Needing Repair	25%	100%

Of the 10 categories presented, all 10 show a negative change in the condition of campground amenities or natural resources within campground boundaries. According to the table, tree damage, ground cover loss, trash level, human waste and user created features have increased since 1999, including the amount of repairs or replacement of campground amenities that is needed.

As identified by an examination of site condition and visitor use surveys, visitor experiences and resource damage have presented significant issues in the campground. Among deteriorating amenities, unacceptable sanitation practices and the lack of adequate management control devices to concentrate recreation use (i.e. parking barriers and well-defined, level tent pads) have been identified as the main conditions that are degrading the campground's natural resources and visitor experiences; including litter, human waste, and trampled vegetation.

Litter

The lack of trash disposal is negatively affecting the campground condition as trash bags full of garbage left behind by campers are ripped open by non-human animals and scattered all over the area; including the nearby "impaired" King's River (Alaniz, 2013). Litter is any product or material that should be recycled or placed in the garbage, but is rather found in places such as recreation areas, bodies of water, and roads. In addition to being unsightly, litter can serve as a breeding ground for pests and harmful bacteria and litter such as cigarette butts, pop can tabs or plastic wrap and bags may cause illness or injure to wild and companion animals. Litter can also injure people; a visitor may step on a piece of glass or metal hidden in the grass. Some people litter when they do not feel a sense of ownership in public places, others believe someone else will clean it up, or they see litter already accumulating in an area and feel it is acceptable to behave similarly (Brown, Ham & Hughes, 2010).

Littering in campgrounds and other natural environment areas frequented by the public is commonly defined as inappropriate behavior, yet the accumulation of litter in such areas is a persistent and expensive problem (Clark, Burgess & Hendee, 1972). Litter is a common problem in outdoor recreation settings and is one of the more important factors detracting from the experience of visitors (Cole, 1989). Clearly, the cause of litter problems is improper disposal of

items such as used toilet paper, leftover food scraps, etc., all of which are unpleasant to pack out. Other items are easily misplaced and left behind. Many times food is left behind in campsites and becomes a wildlife attractant that is subsequently scattered around the area (Cole, 1989). Solid waste tends to accumulate at the bottom of streams and rivers (Hammit & Cole, 1987). The litter problem in Kirch Flat Campground will continue to pollute natural and visual resources and degrade water quality if disposal issues are not addressed (Alaniz, 2013; Ekman, 2013).

In a study conducted by Cole & Hall (2009), visitors were asked about the degree to which encountering varying levels of different setting attributes would add to or detract from their experience. They concluded that the most influential attributes were the presence of litter and even a few pieces of litter had an adverse effect on the recreation experience. Irritating and frustrating demands or situations that occur during recreation experiences represent specific attributes of the outdoor recreation experience that may negatively affect the experience, and when taken collectively, could have a significant disruptive impact. Another study conducted by Shuster & Hammit (2001) conclude the main source of negative experiences at the Shining Rock Wilderness Area was litter from hikers who drop items and campers who do not clean sites thoroughly, or visible toilet paper from inadequate burial of human waste. Seeing litter in a recreation setting might be frustrating, or stressful, to some visitors. Stressful situations and the stress process have the potential to negatively affect a recreation experience.

Sanitation

Restroom conditions continue to degrade due to the shortage of available Forest Service personnel to clean and maintain them (Appendix VI). The unhygienic conditions have resulted in human feces and toilet paper occurring on the ground outside the bathroom, as visitors would rather go outside than use a dirty bathroom. In addition, there is potential for septic tank leakage due to the age of the vault toilet facilities. At the river access area, the lack of restroom facilities has presented human waste close to the river's edge as visitors do not want to walk 100 yards to the nearest campground bathroom.

According to David Cole (2002), recreational users are one of three prominent sources of water contamination. Untidy humans, pack animals, companion animals and wildlife all have the potential to contaminate recreation area water sources by coliform bacteria. An overriding concern with human waste disposal in outdoor recreation settings is the potential for contamination of water systems and the resultant potential for disease transmission (Cilimburg et al., 2000). Over 100 bacteria, protozoans, and viruses are potentially present in human feces and capable of causing illness (Rockwell, 2002). In addition, when fecal material is applied on the soil surface, the quantity of eroded material decreases but runoff can increase by up to 30%. This practice implies an important source of pollution for surface waters. If rainfall takes place within a short period after application, fecal coliforms in runoff waters reach high concentrations, especially during the first phases of the rainfall event. This may cause an increase in the concentration of fecal coliforms in surface water (Ramos, Quinton & Tyrrel, 2006).

According to the Klum Landing EA (USDI, 2008), not replacing old septic tanks create the potential for possible ground water contamination from the old vault toilets in the upper campground. Dust from the bare ground or smell from seeping vaults could impede the

recreational experience of some people. Additionally, foul odors and lack of restroom cleanliness are also determined to be the cause of sanitation issues regarding human waste. If no action is taken, human waste is expected to keep occurring around the outside perimeter of the restroom facilities and other dispersed areas around within the campground. Over time, this may lead to adverse water quality effects to the Kings River (Alaniz, 2013; Ekman, 2013).

Trampled Vegetation

Impact associated with trampled vegetation occurs wherever people park their cars, pitch their tents, and walk between sleeping areas, eating areas, water sources, toilets, and garbage cans (Hammit & Cole, 1998). In Kirch Flat Campground, over time many of the tent pads within the campsites have become unlevelled and, therefore, undesirable. As tent pads are found to be undesirable, multiple tent pads are created where the ground is more flat, resulting in an increase of trampled vegetation. In addition, old wooden parking barriers have become rotten and many are missing, providing areas for vehicles park. The additional, illegal parking areas have created opportunities for vehicles to trample vegetation (Alaniz, 2013).

Vehicles cause soil compaction, which drastically changing the ability of water to move into and through soil, reducing infiltration and percolation, increasing surface runoff, and encouraging erosion (Lull, 1959). Impacts such as severe soil erosion and exposed roots are visually offensive and can degrade the aesthetics and functional value of recreational settings which may occur in recreation areas. All footwear, regardless of type, will cause substantial impact to vegetation and soils (Hammit & Cole, 1998). Survey research has shown that resource impacts are noticed by visitors, and that they can degrade the quality of recreation experiences (Marion, 2001).

Three environmental analyses (EAs) for campground rehabilitation projects on federal land concluded that vegetation loss and soil compaction associated with visitor use, poor campsite definition, and uncontrolled vehicle parking, would continue to degrade vegetation in campsites and restricted undefined parking areas. Increased vegetation loss and soil compaction would continue, further reducing ground cover. Soil compaction near campsites would remain, resulting in increased runoff during storm events, contributing to soil erosion. Continued erosion and soil loss would reduce soil productivity, which would impact existing vegetation and any re-vegetation efforts (USDA, 2012a; USDI 2008, 2012).

Visitor Experiences

The inefficient operations and safety concerns in the campground may deter visitors from using the facility, which would potentially strain other areas of the park. Black Rock EA determined that continued use of Black Rock Campground in its current condition would have long-term moderate adverse effects on the quality of visual resources and the visitor experience. Degradation of the campground would lead to unacceptable visual impacts on natural resources and campground infrastructure which may result in less visitor use and place greater strain on other park campgrounds (USDA, 2012a). According to SNF Recreation Specialist Elaine Alaniz, if visitors were deterred to other camping areas, more strain would most likely be placed upon dispersed camping areas along the Kings River. These areas were not designed to provide

the same recreation opportunities or sustain increased use, which may cause potential resource damage at these sites (Alaniz, 2013).

Ninety-six percent of all Californians believe maintaining the quality of the natural setting is an important factor in their enjoyment of outdoor recreation areas (CPS, 2005). According to the 2013 visitor surveys, many visitors perceive the campground to be in disrepair as wooden road and parking spur barriers installed over twenty years ago are now rotting or missing, the paved road through the campground contains large cracks and potholes, and bulletin boards and signs are deteriorating, vandalized and need replacing (Appendix VI). Many of the tent pads are not level and are undesirable, creating multiple pads and trampled vegetation. Public safety is a concern as broken amenities; including picnic tables, benches, and broken fencing around culverts, create hazards that have the potential to harm visitors (Appendices V and VI). Additionally, six hazard trees were identified. A tree is considered hazardous if it has defects that may cause all or part of the tree to fall (USDI, 2008). The lack of maintenance also allows for tall, dry grass to grow close to fire rings, creating dangerous conditions for escaped campfires (Alaniz, 2013).

Survey results from a study conducted by Cole and others (1997) revealed that vegetation loss at campsites was noticed by about two-third of visitors, while litter and noise from other groups were noticed by about one-half of visitors. The same survey also indicated that noticing visitor impacts bothered many people, and about two-thirds reported that it detracted from their enjoyment. In some places, more than 30% of the visitors who noticed certain impacts reported that those impacts detracted “a lot” from their enjoyment (Cole et al., 1997). In addition, visitor use surveys conclude that the deterioration of Kirch Flat Campground’s condition is negatively impacting the quality of the recreation experience visitors seek when using the site. The 2012 NVUM and 2013 visitor use surveys found complaints about the condition of Kirch Flat’s campground amenities were common (Alaniz, 2013; USDA, 2013b). The 2013 visitor use survey revealed the following: 59% of 135 survey respondents thought parts of the facility were unsafe, 82% thought the condition of the facility could be improved upon, and 77% said their recreation experience would be improved if the facility was cleaner and amenities were updated (USDA, 2013b).

Alignment with Management Direction

As mentioned previously, the Sierra National Forest LRMP directs forest recreational sites to be maintained to meet Moderate Site Modification 3 of the Recreation Site Modification table; however, the campground has a development density closer to 6 family units per acre, facility design with incorporation of synthetic materials, obvious vehicular traffic control, primary access over paved roads, and extensive use of artificial surfacing of roads. This would characterize the campground as a facility as development level 3 which would be categorized as Heavy Site Modification (Appendix III).

As determined by site condition surveys, the campground currently does not meet the following LRMP objectives: (1) hazardous trees exist in the facility with no plans for their removal; (2) the facility needs rehabilitation but this has not been accomplished; (3) it is not aligned with the LRMP direction to be

maintained as a Development Level 3 facility, and (4) the site does not provide amenities for disabled persons; therefore, it does not encourage the use by disabled persons as directed by the LRMP standards and guidelines. In addition to the recreation analysis area direction, the current restrooms are not found to be compatible with the forest visual resource guidelines as the exterior design and color does not complement the landscape's natural characteristics.

Determined by the KRSMA plan, Kirch Flat Campground should have a site management plan but no such plan has been developed for the recreation site. Since the KRSMA plan was written, there have not been any major improvements or rehabilitation applied to the campground; therefore, management of the site has failed to address resource impacts created by increased recreation use, rehabilitation needed to meet health, safety and maintenance standards, offering additional recreation opportunities and amenities, or seek solutions to provide co-operative funding. In result, the site is not aligned with the KRSMA plan's direction to manage the area for the use and enjoyment of visitors in a manner that will leave the area unimpaired for future use and enjoyment, providing facilities and programs that will reflect the public need for recreation opportunities in appropriate environments, or provide co-operative funding.

Fee Implementation

When the possibility of implementing a fee at Kirch Flat Campground was considered to supplement appropriated funding, the recreation site was evaluated against Federal Land Recreation Enhancement Act (FLREA) requirements and Forest Service FLREA Implementation Guidelines. The site was found to meet the applicable criteria, thus qualifying for fee collection. It has also been evaluated against the 2007 Sierra National Forest Recreation Facility Analysis (USDA, 2007) which supports charging a fee at this site.

Kirch Flat Campground and Group Site lies within Fee Category 3 under the Forest Service FLREA Implementation Guidelines as a Developed Campground. This category has an emphasis on recreation fees and is determined to contain services for which user fees should offset all or most of the costs (provides a high level of individual benefits). According to the Forest Service Guidelines, Fee Category 3 "includes facilities and services that provide direct benefits primarily to individuals or groups. It is thus appropriate for the individual or group that is provided a direct service or uses a specialized facility to bear a greater share of these costs." As a Category 3, Kirch Flat Campground is considered an Expanded Amenity Recreation Site. The Forest Service Guidelines have concluded that fees may be assessed for the facility (Forest Service, 2005).

To charge fees at developed campgrounds, FLREA requires that the facility must provide at least five out of nine amenities in a configuration that can be used in an integrated manner by the visitor. Campsites designed for tents, picnic tables, easy access, reasonable visitor protection, toilet facilities, and campfire devices are six amenities provided by Kirch Flat Campground that meet qualified criteria. The campground exceeds the minimum of five amenities, thus meeting the criteria for charging fees. The campground was also evaluated using a pricing tool to

estimate the fee that should be charged. It provided a recommendation of \$12-15 a night for the individual sites and \$50-70 a night for the group site (Forest Service, 2013). Based on current visitor occupancy rates (Appendix IV), charging a fee has the potential to generate between \$26,759 and \$34,348 in revenue a year.

Summary of Recreation Management Opportunities

After comparing current 2013 visitor use and site resource condition data to 1999 baseline data, the following conclusions can be made:

1. Visitor use at Kirch Flat Campground has increased 26%.
2. The number of peak use days has increased by 12 days; moderate use has increased by 30 days.
3. Site amenities have deteriorated.
4. The natural environment within the site is being degraded.
5. The current condition of the site is negatively impacting the visitor experience.
6. Appropriated funding is not adequate to cover operation and maintenance, resulting in increased deferred maintenance and continuance of facility deterioration.

According to College Campground EA (USDA, 2012a), the campground would remain in need of heavy maintenance and, without management action, the necessary heavy maintenance would be deferred; thus, the campground would fail to meet FS standards and the current demands of the visiting public. Black Rock EA (USDI, 2012) concluded that not taking action would result in long-term, moderate adverse effect on public health, safety, and operations by not addressing heavy maintenance such as poor campsites and road conditions, and other deteriorating infrastructure. In addition, College EA concludes that it is Forest Service (FS) Policy to upgrade facilities to meet FS standards at time of refurbishment; therefore, the campground would continue to not meet American with Disabilities Act (ADA) requirements (USDA, 2012a). In addition, safety concerns such as hazard trees within the campground area may result in property damage, personal injury, or death if not removed. If health and safety conditions become severe, closure of the site will result (Alaniz, 2013).

There are several opportunities to improve visitor experiences and protect natural resources in Kirch Flat Campground. The impact of visitor experiences appears to associate a relationship with the condition of resources in the campground; thus, an improvement of resource conditions will improve visitor experiences (Cole et.al 1997; USDA, 2013b; Alaniz, 2013). As revealed by the analysis of its alignment to Sierra National Forest Management plans, taking actions to align Kirch Flat with management direction may provide possibilities for the improvement of resource conditions and, overall, improvement of visitor experiences. Further supporting the need for management action, the American with Disabilities Act (1990), and implementation of fee collection may also offer additional opportunities that may provide a solid foundation from which these opportunities may be reinforced.

Recommendation

As determined by College, Klum Landing, and Black Rock Campground Environmental Analyses, it is assumed that without action Kirch Flat Campground would continue to be operated and maintained under current conditions (USDA, 2012a; USDI, 2008, 2012), which may subsequently result in closure of the site. It is highly recommended that the permanent closure of Kirch Flat Campground be avoided for several reasons. Closing the campground violates the forest management direction stated in the LRMP and KRSMA plans that promote recreation for the purposes of improving the quality of life and stewardship of public lands and the natural environment. The campground is very popular with recreationists and offers secondary recreation experiences (e.g., rafting, fishing) and provides the only opportunity for developed recreation within a 50-mile radius (USDA, 1991a; 1991b; 2010b). Eliminating these opportunities would adversely affect a large population of forest visitors. A site closure would also place a significant strain on the resources of nearby dispersed camping areas that were not designed for such heavy use, possibly resulting in the proliferation of and further degradation of natural resources (Alaniz, 2013). Opportunities for funding to sustain operations and lessen reliance on appropriated funding exist and should be attempted before permanent site closure is considered. Due to the importance of outdoor recreation to the quality of life for many people and its positive impacts on our society (California State Parks, 2005), public land managers should promote recreation opportunities and should only consider recreation site closures when all options have been exhausted.

In order to address the need for management action, a list of recommendations has been developed for Kirch Flat Campground. Long-term and short-term solutions are presented to promote the improvement of campground conditions, longevity of sustainable operations, provide management for the protection of natural resources and use and enjoyment of visitors in a manner that will leave the recreation site un-impaired for future generations, and eliminate the possibility of a permanent site closure. These include the development of a site management plan and techniques for site rehabilitation and improvement of visitor experiences.

Site Management Plan

To align site conditions with the LMRP and KRMSA plans, the first and most important step is the development of a site management plan to address all elements listed as in need of management action. Such a plan would establish short- and long-term operations and ensure the site is aligned with the forest management directives. As a framework designed to develop objectives for management which identify the desired condition of the site and the management actions needed to achieve those objectives, a site plan should include: (1) a site map indicating the location and types of facilities for the site; (2) a general development schedule that identifies the time framework for each of the management phases; and (3) any constructions plans that identify construction details (Zinser, 1995a). When developing site management plans, it is important to strive to maintain a natural appearance (Hammit & Cole, 1998).

As identified previously, the development of a site management plan will also serve to align Kirch Flat Campground recreation facility with the following LRMP and KRSMA plan objectives and standards:

1. Develop a site management plan for each area where recreation activities will be permitted in developed campgrounds and areas where the natural environment will be maintained.
2. Allow further improvement of recreation sites for protection of natural resources and rehabilitate existing campgrounds' conditions to ensure facility is managed to Forest Service standards.
3. Review and evaluate the appropriate development level for the facility.
4. Remove public health and safety hazards.
5. To provide recreation opportunities for disabled persons.
6. To provide co-operative funding

A site management plan will also require the review and determination of the appropriate development level of the facility. Since the facility has been managed as Heavy Site Modification rather than as Moderate Site Modification, as directed by the LRMP (USDA, 1991a), it is recommended that the development level be changed to level 4, Heavy Site Modification development class. Since the 1991 LRMP was published, the site has evolved to exhibit level 4 qualities to accommodate increased recreation use. Increasing site capacity for increased recreation use is supported by the KSRMA and, currently, there is a need to retain the campground's existing capacity to sustain current recreation use levels. In addition, managing for development level 3 would be much more costly as campsites would require to be removed permanently and rehabilitation efforts more intense; thus, further resource damage would be predicted as site capacities would be much too small to accommodate current recreation use levels.

Farrel and Marion (2002) suggest that an ideal framework for a site management plan would: (1) be easy, quick, inexpensive and cost-effective to implement; (2) be able to successfully assess and/or minimize visitor impacts; (3) consider multiple underlying causes of impacts; (4) facilitate selection of a variety of management actions; (5) produce defensible decisions; (6) encourage public involvement, shared learning, and consensus building; and (8) incorporate local resource uses and resource management issues. In addition to aligning Kirch Flat Campground with the Sierra National Forest management direction, the site plan will include facility rehabilitation, strategy for co-operative funding, and improving visitor recreation experiences.

Rehabilitation

As revealed by forest management plans and site condition surveys, rehabilitation of the site is needed and will include implementation of a site management plan for the purpose of improving facility design and function and restoring conditions to improve visitor experiences and protection of natural resources. Rehabilitation should restore the condition of the facility to meet Forest Service facility standards, recover damaged resources, and prevent further degradation of

resources (USDA, 2012a; USDI, 2012; Hammitt & Cole, 1998). Recommended techniques for rehabilitation of Kirch Flat Campground include:

1. Temporary site closure to allow campground rehabilitation
2. Concentrate use by defining and improving campsite layout
3. Use techniques for site-hardening, re-leveling tent pads and common areas
4. Replace old amenities and provide additional facilities

Temporary Site Closure

A campsite management strategy that is most frequently employed in developed recreation areas is to temporarily close highly impacted sites, allowing them to recover before they are opened to use again (Marion & Cole, 1996). To rehabilitate and protect natural resources within Kirch Flat Campground from further degradation, a temporary site closure of extreme problem areas is recommended. This method has been used and recommended by other national forests (USDA, 2003; USDA, 2012a). Recovery rates vary greatly in response to such factors as length of growing season and moisture regime. Relatively, rapid recovery rates on closed campsites with similar vegetation to Kirch Flat Campground suggest this strategy might be an effective means of controlling impacts and could take 2-4 years in this type of chaparral environment that the campground is located (Marion & Cole, 1996).

Concentrate Use

According to Hammitt and Cole (1998), managers can also strive to control impact through management where use occurs and through manipulation of the site itself, in addition to a temporary site closure. In many situations, impact increases more as a result of new places being disturbed than from the deterioration of places that have been disturbed for a long time (Cole, 2002). The results of a study by Marion and Cole (1996) offer insights into the likely effectiveness of strategies for limiting campsite impact is concentrating use in campsites and also suggest that management actions that concentrate the disturbing agent are likely to be most effective in minimizing impact levels (Marion & Cole, 1996). Therefore, impacts will be reduced if use occurs on relatively durable sites. Design and treatment of sites can also do much to keep impacts within acceptable limits (Hammit & Cole, 1998.)

Improve Site Durability

Implementing subtle site hardening techniques to concentrate use and make sites durable to direct use and control impacts are recommended. Defining, re-leveling and hardening campsites will direct concentrated use and prevent further degradation. With the use of material such as gravel, site hardening increases the resource durability of camp areas that receive concentrated use (Hammit & Cole, 1998). Methods employed may include strategic placement of natural-appearing barriers and deliberate site design to define access parking and use patterns are recommended as physical alterations would control impacts to resources (USDA, 2003). Particularly relevant to the design of developed campgrounds such as Kirch Flat, designing traffic flow on and between sites in a way that as little area as possible is frequently trampled is an effective technique (Hammitt & Cole, 1998).

Provide Additional Amenities

To reduce resource damage, providing facilities can aid in concentrating use and shield the resource from impact. For example, picnic tables, fire rings, and tent pads concentrate the impact associated with sleeping, eating, and cooking food (Hammitt & Cole, 1998); therefore, replacing old, broken picnic tables and fire rings and installing in appropriate locations to concentrate use and reduce trampling impacts is recommended. Restrooms can also be used to concentrate human waste, and garbage cans concentrate litter. (Hammitt & Cole, 1998; Brown et al. 2007). To further minimize or eliminate sanitation issues, providing dumpsters and trash service and constructing a restroom at the river access area is also recommended.

In addition to improving facility design and function and restoring conditions to improve visitor experiences and protect natural resources, rehabilitation will eliminate deferred maintenance (USDI, 2012; USDA, 2012a). Eliminating deferred maintenance will make more funding available for sustainable operation and maintenance of the facility and may offer opportunities for future improvement projects (Alaniz, 2013).

Improving Visitor Experiences

According to the College and Black Rock Campground EAs (USDA, 2012a; USDI, 2012), rehabilitating the campground will improve the visitor experience. It will provide the opportunity to update old amenities, improve visitor safety, and offer additional recreation opportunities. Campground restoration activities will give the campground a new look, eliminating “eyesores” throughout the campground and eliminate safety hazards. To enhance public safety in Kirch Flat Campground, hazard trees should also be removed during construction. The removal of hazard trees and broken amenities is recommended for public safety reasons. Hazards will be removed to protect public safety and prevent property damage, personal injury, or death (USDI, 2008). Improving campsite layout would provide better definition of parking areas and camp pads and improve privacy between campsites, and other amenities would substantially improve the quality of visitor use and experience (USDI, 2012).

In regards to managing sanitation, one strategy to reduce littering is to provide convenience and, as planned for rehabilitation, providing trash receptacles and service would provide more convenience. Campground visitors would be more willing to dispose their trash in receptacles rather than leave it behind (Christensen & Clark, 1983) because the “pack it in, pack it out” system is considered inconvenient. Overall, providing trash service would eliminate visual impacts caused by the presence of litter. Installing new restrooms and septic tanks will also eliminate foul odors that can negatively impact the visitor experience (USDI, 2008). In addition to improving the recreation experience, installing a restroom and providing picnic tables at the river access will provide additional recreation opportunities and add to the convenience for those using the river access area by providing an area for day users to picnic.

Improving campsite layout could also provide additional recreation opportunities and experiences. Currently, Kirch Flat Campground does not meet ADA accessibility guidelines and, as required by law, will need to provide upgrades needed to comply with accessibility standards if management action were taken. Providing additional amenities to accommodate disabled persons

will also improve accessibility, thus improving the recreation experience for such visitors. To align with the LRMP and KRMSA plans direction to provide recreation opportunities and amenities to persons with disabilities, and comply with the Americans with Disability Act of 1990, all newly constructed features Kirch Flat Campground will comply with the technical provisions of the Forest Service Outdoor Recreation Accessibility Guidelines (USDA, 2006). The FSORAG doesn't require a specific number or type of camp units or constructed features, but all camp units and constructed features must meet FSORAG requirements (USDA, 2006). The following is recommended to be implemented during rehabilitation activities:

1. 3 campsites to be constructed (20% as required by the FSORAGs) to meet the specified accessibility requirements. This will include vehicle parking areas that are 20 feet wide.
2. All fire rings installed in the campground will be a minimum of 9 inches above the floor or ground surface.
3. All trash containers will meet specified requirements.

In addition to enhancing the visitor recreation experience and providing additional opportunities, implementing a reservation-only system for all camping and overnight use is recommended. Reservation systems have been used as an effective tool to control use numbers and off-site impacts (USDA, 2003). Placing the campground on the National Recreation Reservation System would allow visitors to easily reserve campsites, thus increasing customer service and improving the experience. Management strategies to improve the visitor recreation experience of the Hells Canyon National Recreation Area Management Plan also recommend locating volunteers to serve as host in campgrounds, as a direct source of information concerning use, regulation, and area condition (USDA, 2003). Campgrounds hosts can aid in the reservation process by ensuring that reservation system operations are implemented in the field smoothly the use of campground host volunteers will ensure that the condition of the campground is maintained and visitor information services are provided for visitor satisfaction.

Campground host volunteers can also providing daily and annual maintenance, facility security, and visitor information. Volunteers will ensure that campground facilities are always clean, maintain acceptable health and safety standards and maintenance issues will be dealt with promptly, eliminating sanitation issues concerning bathrooms. Utilizing campground hosts will also increase surveillance of all recreation and use activities to assure compliance with regulation and protection of resource (USDA, 2003). To be included with the proposal for the utilization of volunteer support, it is recommended that providing additional amenities for the exclusive use of volunteers will help retain quality candidates for volunteer support (USDA, 2012a). Offering electrical hookups for long-term volunteer lodging and a phone connection for communications is essential. This will require installing electrical and telecommunication connections with local service providers.

Strategy for Co-operative Funding

To ensure that the facility has adequate funding and support for operation and maintenance, implementing a fee and utilizing volunteer support is proposed. Generating fees will supplement appropriated funding and are projected to provide enough funding to cover operation and maintenance costs. Since rehabilitation activities will assume the elimination of deferred

maintenance, funding will be needed to address deferred maintenance costs. Operation and maintenance costs associated with additional amenities are predicted to increase, but are determined to not be significant since funding will still be allowed to be set aside for future improvement needs (Figure 4).

Figure 4: Funding supplemented with fee implementation	
Potential Revenue	\$26,759-\$34,348
Annual Appropriated Funding...	_____ + ~\$9,000
Total Funding.....	~\$35,759-\$43,348
Operation & Maintenance.....	(-) \$20,995
Total Funding for	+ ~\$14,764-\$22,353
Future Improvements	

In a study conducted by Schroder (1999) to predict the impact of user fees at recreation sites, results indicated people are probably more willing to accept a substantial fee for a site that they have traveled a considerable distance to reach and where they intend to spend a longer period of time. The study also drew the conclusion that people accept fees as an appropriate management policy for the recreation sites used in the study (Shroder, 1999). On-site visitor interviews in 2013 also revealed many long time returning visitors have noticed the deterioration of the campground’s condition over the years and would support management actions that would improve the site, including paying a fee to use the facility (USDA, 2013b). National Visitor Monitoring Use surveys in 2012 discovered that establishing a fee in Kirch Flat Campground supported was by the majority of survey takers, as long as the fee went toward campground improvements. Many complaints about the conditions of the campground’s amenities were made during this time. Many of those that complained were aware that fees would help improve the condition of the campground. (USDA, 2012a; Alaniz, 2013). Conversations with 10 group leaders who have or have had reservations for the group site further support the establishment of fees, as long as fees are used for improvements. All leaders believed that their group members would also support paying a fee for use of the facility (USDA, 2013b). Since the campground stopped charging a fee for the group site and the majority of those groups that used the site then still use the site now, visitors to the group site are already accustomed to paying a fee and understand having to pay as long as the fees are reasonable (Alaniz, 2013).

In addition to fee implementation, utilizing volunteer support is highly recommended. The benefits of utilizing volunteers include: the capability to do more with available resources, cost-savings to government, improved community relations, the capability to provide services that otherwise could not be provided, an expansion of staff in emergency and peak load periods, increased public support for our programs, improved quality of services or programs, increases in level of services or programs, greater public awareness of pressures and constraints on the government, and the expansion of the kinds of services or programs that can be offered (Brudney & Kellough, 2000). To plan and prepare for any future appropriated funding budget cuts, volunteers are also low cost solution to ensuring that campground operations are maintained according to agency management direction, health and safety standards, and visitor satisfaction.

Conclusion

Kirch Flat Campground is in dire need of improvement. The need for management action is presented by numerous issues associated with site condition, visitation, and the lack of alignment with management direction. These issues are negatively affecting visitor experiences and impairing natural resources in Kirch Flat Campground. Without management action, site conditions will continue to deteriorate-degrading visitor experiences and natural resources for future recreation use- and increase the possibility of campground closure. Based on the findings of this examination, opportunities to improve visitor experiences, protect resources, and sustain funding to implement improvement activities are revealed and used to determine appropriate recommendations for management action. It is the responsibility of public land managers to promote stewardship of our public lands through outdoor recreation and offer opportunities that will contribute to improving the quality of life within our society; therefore, these recommendations serve as a tool for short- and long-term management of Kirch Flat Campground by providing solutions that will sustain recreation use, rehabilitate site conditions and provide for future use and enjoyment for generations to come.

Literature Cited

- Alaniz, E. 2013. "Recreational use and visitation estimates for Kirch Flat Campground." Personal Communication. Developed Recreation Manager. USDA Forest Service, High Sierra Ranger District.
- American Recreation Coalition (ARC). 1999. *Outdoor recreation in America 1999: The family and the environment*. Washington, D.C.: Roper Starch. Retrieved from: <http://www.funoutdoors.com/Rec99/>.
- Brown, Terry; Ham, Sam; Hughes, Michael. 2010. "Picking up litter: an application of theory-based communication to influence tourist behaviour in protected areas." *Journal of Sustainable Tourism*. Vol.18, Issue 7, pp.879-900
- Brudney, Jeffrey & Kellough, J.Edward. 2000. "Volunteers in State Government: Involvement, Management, and Benefits." *Nonprofit and Voluntary Sector Quarterly* 29: University of Georgia.
- California State Parks. 2005. "*The Health and Social Benefits of Recreation: An Element of the California Outdoor Recreation Planning Program*". Retrieved from: <http://www.parks.ca.gov/pages/795/files/benefits%20final%20online%20v6-1-05.pdf>
- California State Regional Water Quality Board (CRWQB). 2010. "Impaired Water Quality." Retrieved from: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml?wbid=CAR5518000020090112105219
- Christensen, Harriet & Clark, Roger. 1983. "Increasing public involvement to reduce depreciative behavior in recreation settings." *Leisure Sciences: An Interdisciplinary Journal*. Vol.5, Issue 4, pp.359-379
- Cilimburg, Amy; Monz, Christopher; & Kehoe, Sharon. 2000. *Wildland Recreation and Human Waste: A Review of Problems, Practices, and Concerns*. *Environmental Management* Vol. 25, No. 6, pp. 587-598
- Clark, Roger N.; Burgess, Robert L.; & Hendee, John C. 1972. The Development of Anti-Litter Behavior in a Forest Campground. *Journal of Applied Behavior Analysis*, Vol.5, No.1
- Cole, David; Watson, Alan; Hall, Troy; & Spildie, David. 1997. High-use Destinations in Wilderness: Social and Biophysical Impacts, Visitor Responses, and Management Options. USDA Forest Service Research Paper, INT-RP-496.
- Cole, David N. 1989. *Low-Impact Recreational Practices for Wilderness and Backcountry*. United States Department of Agriculture Forest Service Intermountain Research Station General Technical Report INT-265 August 1989

- Cole, David N. 2002. *Ecological Impacts of Wilderness Recreation and Their Management*. Wilderness management: stewardship and protection of resources and values. J. Hendee and C. Dawson. Fulcrum Publishing, Golden, CO: pp.413-459.
- Cole, David N. & Hall, Troy E. 2009. Perceived Effects of Setting Attributes on Visitor Experiences in Wilderness: Variation with Situational Context and Visitor
- Ekman, R. 2013. "History of Kirch Flat Campground." Personal Communication. Recreation Officer. USDA Forest Service, High Sierra Ranger District.
- Environmental Protection Agency (EPA). 2010. Total Maximum Daily Loads, List of Impaired Waters in California. Retrieved from: http://ofmpub.epa.gov/waters10/attains_impaired_waters.impaired_waters_list?p_state=C&p_cycle=201
- Farrel, Tracy & Jeffrey Marion. 2002. The Protected Area Visitor Impact Management Framework: A Simplified Process for Making Management Decisions. *Journal of Sustainable Tourism*. Vol.10, No.1, pp.31-51
- Forest Service. 2005. *Federal Lands Recreation Enhancement Act Interim Implementation Guidelines*. Retrieved from: <http://fswweb.wo.fs.fed.us/rhwr/recfee/rea-direction.shtml>
- Forest Service. 2013. *Fee Proposal Tool*. Microsoft Access Database. Retrieved: June 30, 2013
- Godbey, Geoffrey. 2009. "Outdoor Recreation, Health, and Wellness: Understanding and Enhancing the Relationship." Discussion Paper prepared for the Outdoor Resources Review Group.
- Grenfell Jr., William E. 1988. "Valley Foothill Riparian." California Wildlife Habitat Relationships System California Department of Fish and Game California Interagency Wildlife Task Group
- Hammit, William E. & Cole, David N. 1998. *Wildland Recreation: Ecology and Management* (2nd Ed.). New York: John Wiley and Sons. 361p.
- Marion, Jeffrey & Cole, David. 1996. "Spatial and Temporal Variation on Soil and Vegetation Impacts on Campsites. *Ecological Applications*. Vol.6, No.2, pp.520-530.
- McDonald, B.L., & Schreyer, R. 1991. "Spiritual benefits of leisure participation and leisure settings." *Benefits of Leisure* (pp.179-194). State College, PA: Venture Publishing, Inc.
- Payne, Laura. 2010. "Healthy Outdoor Recreation: An Integrated Approach to Linking Physical Activity with Wellness Goals." *Leisure, Health, and Wellness: Making the Connections*. Venture Publishing, Inc.
- Ramos, M.C; Quinton J.N; & Tyrrel, S.F. 2006. *Effects of cattle manure on erosion rates and runoff water pollution by fecal coliforms*. *Journal of Environmental Management*, Jan. 2006, Vol.78, No.1, pp. 97-101

- Rockwell, Robert L. 2002. *Giardia Lamblia and Giardiasis With Particular Attention to the Sierra Nevada*. Yosemite Association News Letter #4, March 18, 2002. Retrieved from: <http://www.yosemite.org/naturenotes/Giardia.htm>.
- Ritter, Lyman V. 1988. Valley Oak Woodland.” California Wildlife Habitat Relationships System California Department of Fish and Game California Interagency Wildlife Task Group
- Schuster, Rudy & Hammit, William E. 2001 Visitor Experiences of Stress and Reported Hassles in the Shining Rock Wilderness Area. *The Journal of Wilderness*, Vol.7, No.2
- Schroder, Herbert. 1999. “Stated Choice Models for Predicting the Impact of User Fees at Public Recreation Sites.” *Journal of Leisure Research*. Vol.31, No.3, pp.300-324
- Sierra National Forest. 2013. *National Visitor Use Monitoring Data Results*. Natural Resource Manager Database.
- US Access Board. 2004. American Disability Act Guidelines. Retrieved from: <http://www.access-board.gov/ada/>
- USDA Forest Service. 1991a. “Land and Resource Management Plan.” Sierra National Forest.
- USDA Forest Service. 1991b. “King’s River Special Management Area Implementation Plan.” Sierra & Sequoia National Forests.
- USDA, Forest Service. 2003. “Visitor Management Strategies for Hells Canyon Nonwilderness.” Hells Canyon National Recreation Area Comprehensive Management Plan FEIS. Appendix C, Page204-205. Retrieved from: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5362321.pdf
- USDA Forest Service. 2006. Forest Service Outdoor Recreation Accessibility Guidelines.
- USDA Forest Service. 2008. “Sierra National Forest Recreation Facility Analysis.” Sierra National Forest.
- USDA Forest Service, 2010a. *Biological Evaluation (BE) and Biological Assessment (BA) for Threatened, Endangered and Sensitive Plant Species for Travel Management*. Sierra National Forest.
- USDA Forest Service, 2010b. *Final Environmental Impact Statement: Motorized Travel Management*. Sierra National Forest. R5-MB-211
- USDA Forest Service. 2012a. “College Campground Rehabilitation Project Environmental Assessment.” Sierra National Forest.
- USDA Forest Service. 2012b. “Future of America’s Forests and Rangelands: Forest Service

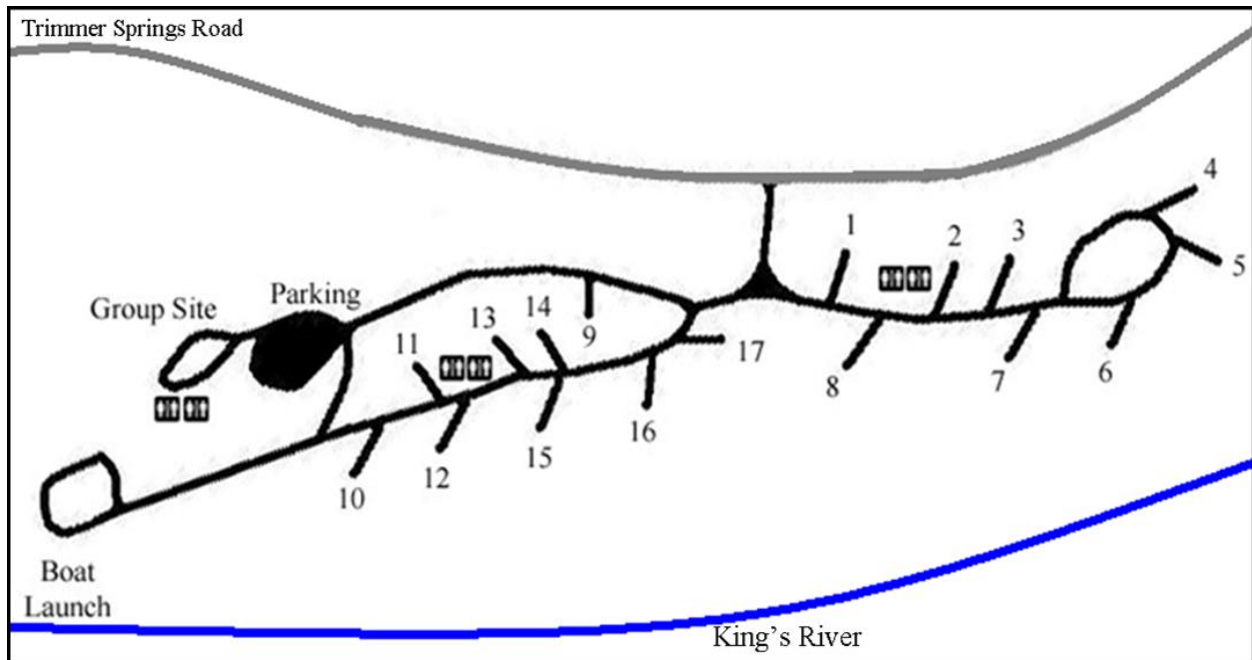
- 2010 Resources Planning Act Assessment.*” General Technical Report WO-87.
- USDA Forest Service. 2013a. “Kirch Flat Campground.” INFRA Recreation Site database. Accessed May 15, 2013.
- USDA Forest Service. 2013b. “Kirch Flat Campground Visitor Use Survey Results.” Prepared by Becky Shufelt.
- US Department of Interior. 2008. “*Final Klum Landing Campground Improvement Project Environmental Assessment.*” Bureau of Reclamation.
- US Department of Interior. 2012. “*Black Rock Campground Rehabilitation Environmental Assessment.*” Joshua Tree National Park.
- US Department of Justice. 2010. “*The Americans with Disabilities Act of 1990.*” ADA.gov website. Retrieved from: http://www.ada.gov/2010_regs.htm
- Wagstaff, Marc & Wilson, Beth. 1988. “The Evaluation of Litter Behavior Modification in a River Environment.” *The Journal of Environmental Education*. Vol.20, Issue 1, pp.39-44
- Zinser, Charles. 1995a. “Recreation Resources: Basic Concepts and Use .” *Outdoor Recreation*. John Wiley & Sons, Inc.
- Zinser, Charles. 1995b. “National Forest System: Recreation Facilities and Use .” *Outdoor Recreation*. John Wiley & Sons, Inc.

Appendix

I. Aerial View of Kirch Flat Campground



II. Kirch Flat Campground Map



III. Recreation Site Development Scale

Development Scale	Recreation Site Development Modification Definition (USDA, 2006)
0	<p>No site modification</p> <ul style="list-style-type: none"> o No constructed features evident at the site.
1	<p>Almost no site modification.</p> <ul style="list-style-type: none"> o Rustic or rudimentary improvements designed for protection of the site rather than comfort of the users. o Use of synthetic materials excluded. o Minimum controls are subtle. o No obvious regimentation. o Primary access usually over primitive roads o Spacing informal and extended to minimize contacts between users.
2	<p>Minimal site modification.</p> <ul style="list-style-type: none"> o Rustic or rudimentary improvements designed primarily for protection of the site rather than the comfort of the users. o Use of synthetic materials avoided. o Minimum controls are subtle. o Little obvious regimentation. o Spacing informal and extended to minimize contacts between users. o Primary access usually over primitive roads. o Interpretive services informal, almost subliminal.
3	<p>Moderate site modification.</p> <ul style="list-style-type: none"> o Facilities about equal for protection of natural site and comfort of users. o Contemporary/rustic design of improvements is usually based on use of native materials. <p>Inconspicuous vehicular traffic controls usually provided.</p> <ul style="list-style-type: none"> o Roads may be hard surfaced and trails formalized. o Development density about 3 family units per acre. o Primary access may be over high standard roads. o Interpretive services informal if offered, but generally direct.
4	<p>Heavy site modification.</p> <ul style="list-style-type: none"> o Some facilities designed strictly for comfort and convenience of users. o Luxury facilities not provided. o Facility design may incorporate synthetic materials. o Extensive use of artificial surfacing of roads and trails. o Vehicular traffic control usually obvious. o Primary access usually over paved roads. o Development density 3-5 family units per acre. o Plant materials usually native. o Interpretive services, if offered, often formal or structured.
5	<p>Extensive site modification.</p> <ul style="list-style-type: none"> o Facilities mostly designed for comfort and convenience of users and usually include flush toilets; may include showers, bathhouses, laundry facilities, and electrical hookups. o Synthetic materials commonly used. o Formal walks or surfaced trails. o Regimentation of users is obvious. o Access usually by high-speed highways. o Development density 5 or more family units per acre. o Plant materials may be non-native. o Formal interpretive services usually available. o Designs formalized and architecture may be contemporary. o Mowed lawns and clipped shrubs not unusual.

IV. Kirch Flat Campground Visitor Use Days

Category (% occupied of 17 sites)	1999	2013
High (76%)	26	26
Peak (95%)	52	64
Moderate (38%)	0	30
Low (4%)	287	245

V. Survey & Observation Results

March 2013 Kirch Flat Campground Condition Survey Results

- 19 out of 23 picnic tables needed repair or to be replaced, beyond what would be needed for minor maintenance.
- Six of the tables were in such a condition that leaving them in their existing condition would present a public safety hazard.
- 18 out of 54 trees within campsites contain some level of damage (carvings, nails, impaled objects) and six trees are determined to be hazards.
- Four out of the six existing bathrooms are found to need repairs. Broken windows, outdated septic tanks, deteriorating roof shingles, chipped paint were observed.
- Human waste occurred on the ground around the perimeter of one bathroom.
- Out of the 3,696 feet of wooden roadside and parking barriers, 1,548 feet need to be replaced.
- All 17 individual sites and group site were determined to have anywhere between 20 and 50% vegetation loss.
- Three user-created fire rings were also found.

Observation Results from 21 Kirch Flat Campground Site Visits

- Trash left behind from campers observed in the campground 18 out of 21 visits, many of them found left behind in multiple sites with trash strung across the campground.
- Trash was left in at least one bathroom all 18 visits.
- Human waste was also observed around at least one bathroom on 9 occasions and 4 times in locations within 100 feet of the river.
- Restroom conditions were found to be less than acceptable 15 out of 21 days, or 71% of the time.

VI. Pictures of Current Kirch Flat Campground Conditions



Road is cracking and needs repairs



Group site picnic tables are broken and missing parts. Remaining pieces are jagged, presenting visitor safety issues. Currently, there are no fire rings that meet ADA guidelines.



Picnic table with broken bench needs to be replaced.



Signs have been damaged by weather and vandalism.



Wood barriers are missing, rotting, and need to be replaced. Bathroom roof is deteriorating.



Overflow parking lot pavement is cracked and has several potholes.