San Geronimo Creek Watershed
Sediment Source Sites Assessment and Evaluation

For the San Geronimo Creek
Watershed Planning Program

Prepared by
Stetson Engineers Inc.

Prepared for
Marin Municipal Water District

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Matt Smeltzer supervised this study for Stetson Engineers. Jason Alexander and John Lane reviewed site inventory data sheets and field checked potential priority sites. Lauren Shahroody entered data and sieved sediment samples. Dean Curtis and Christi Nelson managed GIS database and graphics production. Jason Alexander and Gustavo Trinidad prepared schematic site repair drawings. John Gowan prepared other graphics.

The San Geronimo Sediment Survey is an ambitious undertaking. The following volunteers graciously donated their time and energy to walk steep and rugged terrain and endure ticks and poison oak to assist in identifying sediment sources impacting downstream fish habitat. Each and every one maintained not only a jovial and pleasant attitude, but also displayed a genuine interest in the overall goals of the project. Without such community interest and participation, this program would fall short of adequately meeting its objectives. They are greatly appreciated and can be proud to know of their contribution to making San Geronimo Creek a healthier habitat for future fish populations.

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Executive Summary

Stetson Engineers coordinated with MMWD and MCOSD personnel and private citizen volunteers to identify 298 sediment source sites in the San Geronimo Creek watershed during the summer and fall of 2001. The field data were input into a digital database and the 298 sites were ranked according to two measures: problem-sized sediment production rate (tons/year); and volunteer-designated field priority (1-4).

Stetson Engineers assessed field data sheets and site photographs for the 75 top sediment producing and field priority sites and selected the 27 highest sediment producing sites that appeared to have suitable repair feasibility and repair access. These 27 sites were further evaluated in the field. Stetson Engineers adjusted the estimated sediment production rates for each of these 27 potential repair priority and further evaluated access and repair feasibility. Stetson Engineers selected the top ten sediment producing sites listed below from the adjusted sediment production and potential erosion reduction values and total access considerations.

Stetson Priority Site Number	Site Description	Landowner Contact	Problem-Sized Sediment Production (tons/year)
ST-1	Tributary channel along Spirit Rock entrance road	Spirit Rock	44
ST-2	Tributary channel in Spirit Rock leased cattle grazing area	Spirit Rock	30
ST-3	Mainstem bank erosion at MMWD water treatment plant	MMWD	26
ST-4	Dickson Ranch runoff and channel bank management	Dickson Ranch	20
ST-5	North Ridge Fire Road Repair	Spirit Rock	14
ST-6	Mainstem bank erosion below box bridge culvert	Creekside Equestrian Center	9
ST-7	Mainstem bank erosion at culvert pipe outlet	Dickson Ranch	9
ST-8	Mainstem bank erosion below MMWD Treatment Plant	MMWD	9
ST-9	Old fire road/trail repair at Spirit Rock	Spirit Rock	8
ST-10	Mainstem bank erosion at golf course	San Geronimo Golf Course	7

This report documents the site inventory and priority repair site selection process. Schematic erosion repair drawings are included for each of the top ten sites, along with repair cost estimates for the recommended repairs.

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1. Study Purpose

In accordance with the 1995 California State Water Resources Control Board (SWRCB) Decision 95-17, the Marin Municipal Water District (MMWD) developed the *Lagunitas Creek Sediment and Riparian Management Plan: Final*. A primary objective of the Plan is to produce an appreciable, long-term improvement to Lagunitas Creek streambed conditions below Peters Dam to enhance fish habitat for threatened coho salmon (*Oncorhynchus kisutch)* and threatened steelhead trout (*Oncorhynchus mykiss)*. Recent population estimates indicate that the Lagunitas Creek system supports as much as ten percent of the native coho salmon population in Northern California. Surveys indicate that a significant portion of the coho and steelhead populations use the San Geronimo Creek tributary for spawning and rearing (Andrew and Cronin 1998a; Andrew and Cronin 1998b). San Geronimo Creek flows into Lagunitas Creek one-half mile below Peters Dam.

Studies have identified significant habitat impairment on Lagunitas Creek caused by excessive coarse sand and fine gravel (1-8 mm) deposition on the channel bed in the reach below Peters Dam and below the outlet of San Geronimo Creek (Hecht 1992:15). The San Geronimo Creek watershed is the source of this excess sediment. Previous studies also identified excess sediment yield from the San Geronimo Creek watershed as the most significant factor limiting anadromous fish production in the Lagunitas Creek system. Erosion control work was completed in the 1990s at several previously identified high priority sites in the San Geronimo Creek watershed.

The purpose of this study is to update the sediment source site inventory for the San Geronimo Creek watershed, rank all the identified sites by sediment production rate (in tons/year), select the top ten highest priority sites according to sediment production rate and erosion reduction potential and feasibility, and prepare site specific erosion control plans and estimated repair costs for the top ten sites.

2. Study Location

The San Geronimo Creek watershed is located in west-central Marin County, California. The area is accessible by following west-bound Sir Francis Drake Boulevard approximately 8 miles from Interstate Highway 101 in the town of Larkspur. Sir Francis Drake Boulevard enters the east end of the east-west trending watershed and parallels San Geronimo Creek along the valley floor westward for about 5.6 miles before the creek enters Lagunitas Creek about one-half mile downstream from Peters Dam (Figure 2). The major tributaries to San Geronimo Creek include: Woodacre Creek, Bates Canyon, Creamery Gulch, Larson Creek, Arroyo Creek (which is actually an unnamed tributary along Arroyo Road).

3. Biological Significance of Lagunitas Creek and San Geronimo Creek

Recent estimates indicate that that the Lagunitas Creek system supports as much as ten percent of the native coho salmon (*O. kisutch*) population in Northern California. Genetic studies indicate that this population of coho salmon may be the most important remnant wild stock remaining in the Central California Evolutionarily Significant Unit (ESU). Studies also indicate genetic variation between fish that spawn in San Geronimo Creek and fish that spawn in the mainstem Lagunitas Creek.

Juvenile salmonid surveys and coho spawner surveys conducted over the past three years indicate that a significant portion of the coho (*O. kisutch*) and steelhead (*O. mykiss*) populations (both listed as "threatened" species) in the Lagunitas Creek system use San Geronimo Creek for spawning and rearing (Andrew and Cronin 1998a; Andrew and Cronin 1998b). These surveys estimated that between 1,286 and 12,560 juvenile coho in San Geronimo Creek and between 9,913 and 20,737 juvenile steelhead. Surveys conducted during the 1997-1998 winter found that 48% of all redds (122 of 254) and 56% of all live adult coho (240 of 430) documented in the Lagunitas Creek system were observed in San Geronimo Creek and its tributaries.

The California freshwater shrimp (*Syncaris pacifica*) is listed as "endangered" under the Endangered Species Act. Recent surveys indicate that freshwater shrimp populations have increased and the species is recovering in the watershed (Prunuske Chatham 1997).

4. Streambed Sedimentation on Lagunitas Creek below Peters Dam

Streambed sedimentation caused by excessive deposition of coarse sand and fine gravel has been identified as a primary limiting factor for coho salmon and steelhead that use Lagunitas Creek, San Geronimo Creek, and tributary streams for spawning and rearing. The SWRCB Order 95-17 describes this problem as follows:

> "Erosion and sedimentation have resulted in large quantities of sand and fine gravel filling pools and glide habitat areas, and filling the spaces around cobbles, boulders, and undercut banks. The result is to reduce habitat available for juvenile fish." (SWRCB, 1995).

Although the San Geronimo Creek watershed comprises only ten percent of the total Lagunitas Creek watershed area, sediment delivered to Lagunitas Creek from San Geronimo Creek significantly affects Lagunitas Creek streambed conditions. MMWD enlarged Kent Reservoir in 1979 by increasing the spillway elevation of Peters Dam. Operation of the enlarged Peters Dam/Kent Reservoir resulted in reduced spills during winter storms. These smaller, less

frequent spills reduced the mainstem Lagunitas Creek's capacity to flush sediment entering the channel from the San Geronimo Creek watershed about one-half mile below the dam.

Lagunitas Creek's median bed material size is 8-22 mm and San Geronimo Creek's median bed material size is 5-9 mm. The median size of excess sediment deposits on the Lagunitas Creek streambed below Peters Dam and San Geronimo Creek (i.e., "problem-sized sediment") is 1-8 mm (Hecht 1992:15).

5. Summary of Previous Sediment Source Identification, Repair, and Management Projects

The 1977 San Geronimo Valley Plan linked the problem of excessive Lagunitas Creek channel bed sedimentation with excessive sediment delivery from the San Geronimo Creek watershed. Increased environmental review led to some sediment source repair projects at the Skye Ranch development. Several minor bank erosion repairs were also completed by community groups and the Marin County Resource Conservation District (MCRCD) in the early 1980s, principally along the upper or eastern portion of the San Geronimo Creek mainstem and its tributaries on the Flanders and High School District properties (Hecht 1992:19).

Bedload and suspended sediment transport data were collected at several sites along mainstem San Geronimo Creek in 1980-1982. The data were used in conjunction with long-term sediment transport modeling to estimate the average annual bedload sediment production from the San Geronimo Creek watershed (Hecht and Woyshner 1983). The model results suggested that detrimental bed sedimentation would not occur on Lagunitas Creek below Peters Dam if the bedload delivered from the San Geronimo Creek watershed were reduced approximately 600 tons/year (Hecht 1992:13).

MMWD developed the San Geronimo Program in 1987 to identify and repair sediment sources in the San Geronimo Creek watershed. Surveys conducted in 1987 identified hundreds of sediment source sites and recommended several sites for repair (Prunuske-Chatham 1987). However, repair of numerous bank erosion sites was deemed uneconomical, in comparison to directly removing bedload sediment from the stream channel network through maintenance of potential existing sedimentation basins.

Prunuske Chatham (1990) concluded that most of the problem-sized sediment yield from the San Geronimo Creek watershed is from natural, background erosion processes. The study recommended:

1. Annual removal of 122 tons of sediment from behind an existing weir on mainstem San Geronimo Creek;

2. Annual removal of 291 tons of sediment from behind an existing check-dam (also raised 2 feet) on a tributary channel just upstream from mainstem confluence (along the Flanders/High School District properties);
3. Annual removal of 474 tons of sediment from behind 4 new check-dam sedimentation basins:
   - Spirit Rock Middle tributary at toe of hillslope;
   - Spirit Rock East tributary just upstream of Sir Francis Drake Blvd;
   - Marin Open Space District Tributary (just north of the San Geronimo Water Treatment Plant) just upstream of Sir Francis Drake Blvd; and
   - Unnamed tributary upstream from the mainstem at Lagunitas Road; and
4. Repairing actively eroding sites (138 tons)

Prunuske Chatham (1990) and Hecht (1992:22) estimated that the total sediment removal capacity of the proposed program was about 1,025 tons/year, but that it would be likely and reasonable that the program would reduce sediment delivery to Lagunitas Creek by about 600-700 tons/year. (The difference is due to year-to-year variability in flows and bedload sediment production – i.e., the sedimentation basins may not fill to capacity every year.)

It is known that MMWD coordinated with the MCRCD to implement erosion control activities at several of these sites between 1993 and 1997. Prunuske Chatham (1997:56) indicates that "the Spirit Rock traps were constructed in 1994 and are maintained and operated by MCRCD as part of the San Geronimo Program. These structures capture an estimated 200 cubic yards per year. The Dickson Ranch Weir is an existing structure that functions as a sediment trap and can capture an estimated 200 cubic yards per year. It is operated by MCRCD as part of the San Geronimo Program. There is also a golf course pond constructed in-stream in subwatershed 7 that traps bedload from the east of Nicasio Hill Road.

6. Overview of San Geronimo Creek Watershed Geomorphic Processes and Sediment Sources

The San Geronimo Creek watershed encompasses 9.4 mi^2 of the Coast Range geomorphic province. Elevations range from 1,466 feet at Barnabe Mountain in the northwestern corner of the watershed to 160 feet at the outlet of San Geronimo Creek. The average annual precipitation ranges from 30 to 52 inches, with more intense rainfall in the southern and eastern uplands and less in the south-facing uplands on the northern side of the basin. Approximately 80 percent of the total annual precipitation occurs from November through March.

The San Geronimo Creek watershed has moderately steep hillslopes running along the north and south sides of the watershed that are variably underlain by moderately deformed Franciscan mélange bedrock and more resistant sandstone bedrock. The south-facing hillslopes

on the north side of the basin are variably covered with historically and currently grazed grasslands with oak-bay woodlands and redwood forests situated in drainages. The north-facing hillslopes on the south side of the basin are more continuously covered by redwood and oak-bay woodlands. San Geronimo Valley was logged from 1850 to 1960. Large fires raged through the watershed in 1904 and 1945.

The east-west trending valley floor is constructed of Quaternary channel and floodplain alluvium. The San Geronimo Creek watershed stores more Quaternary alluvium than any other subwatershed in the Lagunitas Creek system. The mainstem San Geronimo Creek runs along the extreme south edge of the valley fill. Therefore, all sediment generated by tributary streams and near-channel landsliding and continuous downslope soil creep on the north-facing hillslope is delivered directly into the mainstem channel. Sediment generated by isolated landsliding and downslope soil creep on the south-facing hillslopes is partly delivered to the Quaternary alluvium surface and partly delivered to tributary streams on the hillslopes that cross the Quaternary terrace to the mainstem channel on its south edge.

The mainstem San Geronimo Creek is significantly incised into the valley fill and nearly continuously cut into the toe of the north-facing hillslope from its outlet upstream to a grade control structure (weir) about 1,000 ft upstream from the Woodacre Creek confluence (Figure 2). It is commonly observed that San Geronimo Creek is one of the only streams in Marin County that contains the 100-year flood completely within its present channel banks. A number of bedrock and slowly-eroding clay outcrops in the mainstem channel bed and banks indicate that the maintstem channel has nearly completed downcutting in some reaches. Several documented cases of channel downcutting in Marin County streams show that a phase of rapid downcutting began in several Marin County streams around 1900, evidently in response to the introduction of intense logging and grazing practices and a series of wet water years in the late 1800s (Haible 1980, Montgomery 1999, Collins 1998, Stetson Engineers 2000). Numerous bank erosion sites along the mainstem channel indicate that the incised channel is undergoing relatively rapid channel widening. Geomorphic reasoning suggests that relatively rapid channel widening and bank erosion will continue for several decades or until the active channel width is great enough to accommodate the channel and the formation of an active floodplain surface several feet lower than the adjacent Quaternary alluvial terrace.

Lowering of tributary stream outlet elevations by mainstem San Geronimo Creek channel incision induced concurrent tributary channel incision. North-facing tributary stream channel incision is generally maximum at and near the tributary outlet at the mainstem channel, and the degree and extent of incision upstream varies depending on local geologic conditions. South-facing tributary stream channel incision is also generally maximum at and near the tributary outlet at the mainstem. South-facing tributary channels cut in the Quaternary alluvium are actively incising and widening. Tributary channel incision continues upstream from the Quaternary terrace into the south-facing hillslopes wherever grade control is not provided. An abandoned railroad grade appears to have halted upstream channel incision on several south-facing tributaries. As channel incision and widening historically propagated and continues to propagate upstream through the channel network, sediment production increases due to increased

frequency of bank failures and near-channel landslides, hydraulically-connected gullies, and unstable, advancing headcuts.

Other continuing sediment sources in the watershed include downslope soil creep, mass-wasting on hillslopes by deep-seated landsliding, and road-related erosion. Roads can increase landscape erosion by direct inputs from road and road cut and fill surfaces and failures, or by initiating landsliding, gullying, or tributary headcut advance by focusing rainfall runoff. The majority of the fire road network is at or near the top of the ridges on the watershed divide and does not contribute sediment directly to the channel network.

Hecht (1992) estimated that the San Geronimo Creek watershed delivers about 4,000 tons/year of bedload to Lagunitas Creek, or about 425 tons/square mile/year. This estimate is consistent with the results of a detailed sediment budget study for a smaller, less developed Coast Range watershed in western Marin County, where the bedload sediment yield was estimated to be about 350-400 tons/square mile/year (Lehre 1982). Consistent with other detailed sediment budget studies in Coast Range watersheds (Lewis and Rice 1989, Kelsey 1982), Lehre (1982) found that landslides and landslide scarp/scar erosion produced about 75 percent of the sediment yield, and channel bank, headcut, and gully erosion produced about 24 percent of the yield. Downslope soil creep and sheetwash erosion were small components of the budget.

Previous studies of long-term bed and bank erosion rates in Marin County streams (Stetson Engineers 2000, Collins 1998, Haible 1980) have shown that 0.04 and 0.1 feet/year are rather consistent values for channel bed incision and bank retreat rates, respectively, both for the long-term (100 years) and recent periods (e.g., 1970-2000). These values appear to be appropriate estimates for the San Geronimo Creek watershed, where at least several feet of bed incision and bank erosion have occurred throughout the mainstem and alluvial tributary network since 1900. Using these values, past and ongoing San Geronimo Creek mainstem and tributary channel incision and widening would produce approximately 2,900 tons/year for delivery to Lagunitas Creek (Table 1). About 75 percent of this bed and bank material, or about 2,000 tons/year, is within the identified range of problem-sized sediment that would be delivered to Lagunitas Creek.

Assuming a relatively high erosion rate from road and trail surfaces (e.g., 0.02 feet/year direct surface erosion), and assuming 50 percent delivery to the channel network and 50 percent composition of bedload or problem-sized sediment sizes, the 22.7-mile-long mapped road and trail network would produce about 300 tons/year.

In summary, a review of the geomorphic conditions and processes in the San Geronimo Creek watershed indicates that the significant majority of problem-sized sediment being delivered to Lagunitas Creek is produced by periodic deep-seated landsliding into the channel network and continuing bed and bank erosion in the mainstem and tributary channels on the valley floor, with lesser contributions from upland tributary erosion, headcut advance, and road and trail sources.

Table 1
Estimated Long-Term Annual Average Sediment Production from Channel Bed and Bank Erosion
San Geronimo Creek Watershed

	Total Channel Length (mi)	Average Channel Width (ft)	Average Bank Height (ft)	Average Bed Erosion (ft/year)	Average Bank Erosion (ft/year)	Annual Sediment Production (tons/year)
Mainstem	5.1	15	7	0.04	0.1	1,695
Alluvial Tributaries	6.0	5	2.5	0.04	0.1	688
Upland Tributaries	49.3	3	1	0.01	0.01	501
						2,884

7. Volunteer Training and Sediment Source Site Inventory

The sediment source site inventory was made by volunteer crews trained in the field by Stetson Engineers. Volunteer crews included MMWD and Marin County Open Space District (MCOSD) personnel and several private citizens (see Acknowledgments). Stetson Engineers prepared a Site Inventory Field Methods Manual (Appendix C) and Site Assessment Data Sheet (Appendix C) and conducted a number of volunteer training sessions to explain the Data sheet and data collection process to the volunteer crews in the field at a range of typical sediment source sites. Field training emphasized the importance of recording site measurements or otherwise providing best judgment estimates that, taken together, would be sufficient for estimating the average annual production of coarse sand and fine gravel directly into the channel network from the site. Crews were then assigned portions of the watershed (by groups of subwatersheds) and directed to search for erosion source sites along the tributary channel networks, at channel heads, along roads, and on open hillslope areas, if applicable. Separate crews focused on mainstem San Geronimo Creek sites and road and trail sites. Volunteer crews worked throughout the Summer and Fall of 2001. The volunteer crews inventoried every subwatershed in the entire basin (36) except for areas where access permission was withheld by the landowners (subwatersheds 12, 13, and 30 and parts of 11, 14, 15, and 16).

Following the Field Methods Manual and the Field Data Sheet (Appendix C), the volunteer crews were directed to document each identified sediment source site by:

assigning a subwatershed and location number;
marking the site location on prepared large-scale air photo and topographic base maps;
identifying erosion type and briefly discussing the erosion process;
entering complete dimensions of the eroding area;
entering any evidence of erosion rate or erosion activity;
estimating the percentage of the source material that is coarse sand to fine gravel;
sketching the site in plan and profile showing measured dimensions on the sketch;
photographing the site and referencing photograph numbers to individual sites; and
entering a value between 1-4 for overall repair priority (4 being the highest).

8. Field Data Sheet Review and Analysis

The volunteer crews identified a total of 298 individual sediment source sites. MMWD collected the resulting Data sheets and film, developed site photographs, and combined site photographs and site data sheets as far as feasible – there were evidently several incomplete or inconsistent references between site photographs and site numbers. MMWD provided the compiled data sheets to Stetson Engineers organized in three sets: San Geronimo Creek mainstem channel, or "creek" sites (54 sites), tributary channel or "drainage" sites (209 sites), and "road" sites (35 sites).

Stetson Engineers first reviewed the data sheets and entered site dimension and overall priority designation values for each site directly into a spreadsheet table to calculate annual estimated sediment production rate for identifying potential priority sites (Appendix A). Volunteer crew cata sheets for 161 of the 298 sites contained sufficient data to calculate annual sediment production using the Natural Resource Conservation Service (NRCS) Modified LIM method (Appendix E). Stetson Engineers used the Modified LIM method to estimate annual production of problem-sized sediment from each of these 137 sites, and ranked the sites according to annual sediment production (tons/year). The Modified LIM Method formula is shown below.

$$\frac{\text{Eroding Area [ft}^2\text{]} * \text{LIM Recession Rate [ft/year]} * \text{Density [lbs/ft}^3\text{]}}{\text{2000 [pounds/ton]}} = \text{Erosion [tons/year]}$$

To calculate the production of problem-sized sediment from the individual sites, it is necessary to multiply to the percentage of the source material that is in range of problem sizes (1-8 mm). Volunteers entered a visual estimate of this percentage on the data sheets (Appendix A). Stetson Engineers also collected eight bulk sediment source samples at 11 sites. Sieve analysis of bulk sediment samples showed a relatively large variation in percentage of problem-sized sediment by mass, both between sites and within an individual site. Percentages varied

from 46 to 91 percent between sites, and from 55 to 91 within individual sites. The average percentage for all samples was 73 percent. This average result compared well with the average of all 298 volunteer-estimated problem-sized sediment percentages from the data sheets (67 percent). Therefore, to simplify calculations, Stetson Engineers multiplied sediment production rates for all individual sites by 75 percent to determine the problem-sized sediment production.

9. Potential Priority Site Selection

Figure 1 shows the procedure Stetson Engineers used to select potential priority sites and ultimately select the top ten priority sites from the volunteer field crew data sheets. First, Stetson Engineers selected the top 43 sediment producing sites according to the Modified LIM calculation (more than 3 tons/year) and entered these sites into Table 2 for further office and possible field analysis. Also, recognizing that many of the sites producing relatively little sediment according to the LIM calculation (less than 3 tons/year), or with insufficient field data to perform a LIM calculation, may in fact be priority sites, Stetson Engineers selected the top 29 sites with the highest volunteer field priority designations (field priority of 3 or 4) and entered these sites into Table 3. Figure 3 shows the locations of the 75 sites selected for further office and field analysis. The Top 75 sites includes 43 sites from Table 2, 29 sites from Table 3, and 3 additional sites added by Stetson Engineers during an initial field reconnaissance (Table 3).

Stetson Engineers then reviewed data sheets and available site photographs for the 75 sites to determine if their estimated sediment production rate or volunteer-designated field priority were accurate, and ultimately whether or not the sites were potential priority repair sites. Stetson Engineers field-checked 21 of the top 43 sediment producing sites (Table 2), and determined that 33 of the sites could be eliminated as potential priority sites due to inaccurate or incomplete data sheets, or repair infeasibility, lack of sufficient access for repair, etc., leaving elevation potential priority sites. Stetson Engineers field-checked 28 of the top 29 volunteer-designated priority sites (Table 3), and determined that 15 of the sites could be eliminated as potential priority sites, leaving 14 potential priority sites.

Office and field analysis of the 75 sites therefore determined that there were 27 potential priority repair sites (10 from Table 2, 14 from Table 3, and 3 additional sites from Table 3). Stetson Engineers field-checked 26 of the 27 potential priority sites to refine the estimated problem-sized sediment production from the sites, and further analyze the physical access and site constraints for potential recommended repair measures. Table 4 lists the 27 potential priority sites ranked by the Stetson field adjusted problem-sized sediment production rate, and lists the access, potential repair methods, and other considerations. Figure 4 shows the locations and distribution of the 27 potential priority repair sites in the watershed.

10. Top Ten Priority Repair Site Selection

Stetson Engineers selected sites with the highest adjusted problem-sized sediment production rates and suitable equipment access for the recommended site repair. Two higher producing sites were not selected due to potential access problems -- there is limited access for construction equipment to treat Site 4-2 and Site SG-16D, both constrained by dense residential housing (Table 4). The top ten priority repair sites are comprised of 12 of the top 14 sediment producing sites listed in Table 4.

Table 5 shows the final selected top ten priority repair sites. Stetson Engineers combined several additional sites with sites 9-5, 9-7, and 9-9 into a larger, comprehensive repair site ST-1. Nearby sites were also combined with sites 11-7 and 11-9 to create site ST-2, and with site SG-34 to create ST-3. Stetson Engineers recalculated the sediment production for the combined sites accordingly. The remainder of the top ten sites are single sites from the sediment source site inventory. Stetson Engineers estimated the potential erosion reduction at each of the sites (Table 5) by assuming that post-project Modified LIM recession rate would be about 0.035 ft/year.

Figure 5 shows the locations of the top ten repair sites. Figure 6 shows the site locations with the parcel boundaries. Appendix G contains a partial list of parcel numbers and property owners.

11. Conceptual Site Repair Plans

Stetson Engineers prepared schematic erosion repair plans for each of the top ten priority repair sites (Appendix I). The schematic drawings show overall sites conditions and constraints and show recommended site repair methods. However, the drawings are not to scale and do not reflect site-specific design considerations. The schematic drawings are intended to illustrate the recommended site repair method. Actual site repair plans should incorporate site specific measurements and other detailed construction considerations.

12. Estimated Site Repair Costs

Stetson Engineers prepared individual cost estimates to construct each of the recommended site repairs for the top ten sites (Table 5). Stetson Engineers assumed that there will be only one contractor that will implement all aspects of erosion prevention related construction. The contractor is expected to have a one-time mobilization and demobilization fee that includes setting up an overall project staging area for equipment and materials. Costs not included in these estimates include: site-specific mob-demob; disposal of materials; preparation

of engineering plans; and coordination with landowners. Fill material is assumed to be available without charge from each site or from nearby cooperating landowner. Equipment cost estimates include operator hours. Hourly estimates for equipment and labor include only the time expected for construction activities at each erosion prevention site. Follow up repairs and monitoring are not included in cost estimates. Dump truck loads are assumed to be 9 cubic yards. Because silt fencing is only addressed in site SG-48A as an improvement to the existing fence silt fencing, recommended BMPs are not included in estimates. Table 6 lists the assumed unit costs used to develop repair cost estimates listed in Table 5.

13. Top Ten Site Descriptions

Appendix H contains an illustrated listing of top ten site descriptions.

14. Best Management Practices

Appendix F includes a list of Best Management Practices (BMPs) (March 1993 California Construction Handbook). The BMPs include basic information for properly implementing erosion and sedimentation controls, such as silt fences recommended at site ST-4.

15. Discussion and Recommendations

Stetson Engineers selected the top ten priority repair sites from the 298 sediment source sites identified by the volunteer crews by choosing sites with the highest problem-sized sediment producing sites that also have suitable access for the necessary repair construction activities. The resulting top ten sites are clustered along the deeply incised Spirit Rock tributary channels and the mainstem San Geronimo Creek, primarily downstream from the notched weir (Figure 5). One of the ten sites is a road repair site. The resulting spatial and geomorphic distribution of sites is consistent with the overall geomorphic assessment of the San Geronimo Creek watershed: continuing chronic bank erosion along the mainstem and tributaries cut in the Quaternary floodplain alluvium has historically been a significant contributor of problem-sized sediment. Channel widening and bank erosion is expected to continue until the channels are wide enough to create active floodplains at a lower elevation than the adjacent alluvial terrace.

There are existing bank protection structures throughout the mainstem and tributary channel network put in place to prevent the channel widening process at selected locations. As

has been documented elsewhere, many of these structures appear to re-focus stream flow during high flows, and thereby translate the bank erosion problem upstream and/or downstream. To minimize perpetuating this incremental effect, Stetson Engineers used the following simple hierarchy in considering potential repairs at channel bank erosion sites. Where room along the top of bank allows, cut the terrace down to the new floodplain elevation. This has the effect of accelerating the natural channel recovery process, improves riparian vegetation growth and establishment and eventual habitat value, reduces the need for rock toe reinforcement, and improves channel and erosion control structure stability. Where less room is available, lay back the bank slope to a gradual slope prior to installing toe protection and revegetating. Existing 3H:1V slopes appear relatively stable in the field, but 2H:1V slopes may be required where constraints exist. In many places, there are existing mature trees, structures or roadways close to the top of a nearly vertical, exposed channel bank. In these locations, timber crib-wall or live vegetated crib-walls were recommended to prevent continuing bank erosion and maintain the nearly vertical bank profile.

At any given potential bank repair site location, proper site repair design requires careful consideration of the mixture of opportunities and constraints that exist on the reach scale for laying back channel banks and cutting floodplain benches. Reach-scale designs using advice from river geomorphologists, landscape architects, fishery biologists, and engineers will have the best chance of both sustainably and cost-effectively reducing property damage and sediment production, and improving overall aquatic and riparian habitat conditions. Stetson Engineers combined numerous sites in subwatersheds 9 and 11 into larger, reach-scale sediment source site repair projects with this concept in mind.

There are at least two managed sedimentation basins in the San Geronimo Creek watershed allowing the direct extraction of about 400 tons/year of bedload from the drainage network (Prunuske Chatham 1997). Previous studies recommended at least two other additional sites for managed sedimentation basins (Hecht 1992:21). Stetson Engineers did not duplicate previous efforts to identify suitable sedimentation basin sites. The combined total erosion reduction potential of the top ten sites identified in this study is about 150 tons/year. It is presumable that construction and management of two additional sedimentation basins would remove this much sediment directly from the system.

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Table 2. Top 43 Sediment Producing Sites by the NRCS Modified LIM Method

Volunteer Data Sheet						Stetson Engineers Office and Field Analysis							
Sub-watershed /Site #	MMWD Site Type	Field Priority (1-4)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
8-8	Drainage	3	385	30	2	3	0.4	11550	231.0	173.3	N	Natural landslip due to water concentration at rock outcropping. Stabilization measures are limited. Access is marginal.	N
9-19	Drainage		300	100	2	2	0.13	30000	195.0	146.3	Y	Natural Land Slump. Little or no stabilization measures can be taken. Slump appears to be stabilizing due to presence of grass. Marginal access. Photo	N
20-3	Drainage	3	50	80	15	3	0.4	4000	80.0	60.0	N	Massive erosion. Repair access appears marginal due to the limitations of foot trail. Field data sheet reports vegetation on slope.	N
14-13	Drainage	3	40	40	30	3	0.4	1600	32.0	24.0	N	Natural land slip/ erosional surface;access is marginal due to steep slopes and lack of trail or road access. Photo.	N
SG-28	Creek	3	95	13	7	3	0.4	1235	24.7	18.5	Y	Field checked. Difficult to decipher the exact site without a photo. General area appears to be cut, but relatively stable compared to other mainstem sites.	N
19-8	Drainage	3	100	12		3	0.4	1200	24.0	18.0	Y	Field checked. Potential site due to the severe bank erosion and steep gradient. Repair access may be difficult, although near a road. Photo	Y
SG-42	Creek	3	360	9	3	2	0.13	3240	21.1	15.8	Y	Field checked. Assumed to be area just upstream of Dickson Ranch bridge. Less severe than many other sites. Some undercutting, but not severe. Photo	N
4-2	Drainage	4	165	15	2	2	0.13	2475	16.1	12.1	N	Attempted field visit. Repair access may be marginal for a re-grading project due to lack of roads, and existing development in area. Exagerrated severity.	Y
2-16	Drainage	3	200	4		3	0.4	800	16.0	12.0	AT	Attempted field check. Could not find this exact site. Exagerrated sediment production rate by LIM. Alders indicate bank stabilization and recovery. Photo.	N
14-8	Drainage	3	40	20	8	3	0.4	800	16.0	12.0	N	Repair access is limited due to location in steep and remote area. Photo	N
SG-32	Creek	3	57	14	6	3	0.4	798	16.0	12.0	Y	Field checked. Severe undercutting and potential bank failure due overhanging mature oak. Bank stabilization measures already in place downstream. Photo	Y
SG-33	Creek	3	148	15	12	2	0.13	2220	14.4	10.8	Y	Field checked. Depth of erosion is less than indicated, more like 5 ft. Potential site due to location and size. Many exposed roots. Photo	Y
SG-16D	Creek	3	45	14		3	0.4	630	12.6	9.5	Y	Field checked. Bank instability not due to pvc pipes, but to upstream box bridge culvert. Potential site, but access made difficult by crowded residential housing. Photo.	Y
19-4	Drainage	3	27	23	18	3	0.4	621	12.4	9.3	N	Skid road creates concentrated runoff. Field sheet describes a stabilizing system.	N
SG-34	Creek	2	45	13	9	3	0.4	585	11.7	8.8	Y	Field checked. Possible site with SG-33. Both on MMWD property. Potential for future erosion if bank collapses. Photos.	Y
SG-37	Creek	2	104	16	8	2	0.13	1664	10.8	8.1	Y	Field checked. Could not find the stump -- assumed to have left the site during high flows. Area is slightly undercut. Banks are gradual and stable. Photo	N
8-2	Drainage	3	200	2.5		3	0.4	500	10.0	7.5	N	Incised tributary stream -- similar to Spirit Rock area but smaller scale. Repair access is marginal for stream bank restoration. Possible site. Photo.	N
4-4	Drainage	2	80	18	9	2	0.13	1440	9.4	7.0	AT	Attempted field visit. Repair access is through private subdivision and is questionable due to limits of trail and steep slopes.	N
28-2	Drainage	2	46	30	2.5	2	0.13	1380	9.0	6.7	N	Description is a natural land slump. Field sheet states that it does not access the channel. Appears to run off over the golf course.	N
20-1	Drainage	3	80	5	10	3	0.4	400	8.0	6.0	N	Natural deep-seated landslide. No practical stabiliazation measures. Access is marginal. Photo.	N
18-2	Drainage	2	20	50	5	2	0.13	1000	6.5	4.9	N	Steep bank slip. Appears to be stabilizing due to presence of vegetation. Photo.	N
14-11	Drainage	3	30	10	8	3	0.4	300	6.0	4.5	N	Deep-seated landslide. Access appears to be marginal. Photo	N
SG-17	Creek	3	88	10	2	2	0.13	880	5.7	4.3	Y	Field checked. Vegetation is prominent. Some small erosion sites -- maybe recommend planting. 4 photos.	N

Volunteer Data Sheet						Stetson Engineers Office and Field Analysis							
Sub-watershed /Site #	MMWD Site Type	Field Priority (1-4)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
SG-18	Creek	3	40	7	4.5	3	0.4	280	5.6	4.2	Y	Field checked. Exposed cutbank. At confluence of mainstem and subwatershed 16. Possible site in combination with SG-20. Repair access is good from golf course. Photos.	Y
SG-30	Creek	2	56	14	4.5	2	0.13	784	5.1	3.8	Y	Field checked. bank is in poor condition. Potential site. Bank shows signs of recent sluffing. Photo	Y
9-14	Drainage		65	12	4.5	2	0.13	780	5.1	3.8	Y	Field checked. Natural land slip due to channel headcutting. Vegetated and stabilizing. Photo.	N
2-17	Drainage	2	20	38	0.5	2	0.13	760	4.9	3.7	Y	Field checked. Dimensions create a large LIM value. But not deep gullies and relatively healthy stream segment. Better erosion control can be implemented.	N
22-5	Drainage	2	50	15	4	2	0.13	750	4.9	3.7	N	Repair access appears marginal. Difficult to locate site due to poor site mapping and sketch and no site photo.	N
18-4	Drainage	2	25	30	5	2	0.13	750	4.9	3.7	N	Repair access is marginal. Located in a steep upland channel.	N
SG-1	Creek	3	30	8	6	3	0.4	240	4.8	3.6	Y	Field checked. Bank slopes should be layed back and toe-reinforced. Partially vegetated. Possible site.	Y
21-1	Drainage	2	45	16	12	2	0.13	720	4.7	3.5	N	Located in a steep drainage. Field sheet describes the site as incaccessible.	N
SG-11	Creek	2	35	20		2	0.13	700	4.6	3.4	Y	Field checked. Area is well vegetated. Slopes are gradual. Lies on the inside of a bend -- appears very stable.	N
SG-29	Creek	2	55	12.5	5.5	2	0.13	687.5	4.5	3.4	AT	Attempted field check. Hard to locate in the creek with small-scale site photo.	N
29-2	Drainage	3	20	10	3	3	0.4	200	4.0	3.0	AT	Attempted field check. Not located on master field site map. Possible sites in this area, however. Dickson Ranch trail is in general disrepair along the stream. Photos.	N
14-12	Drainage	3	20	10		3	0.4	200	4.0	3.0	N	Headcut in channel head. Possible site. However, exact location is questionable.	N
8-13	Drainage	3	23	8	3	3	0.4	184	3.7	2.8	Y	Field checked. Site does produce sediment, although it appears much more stable, and smaller than noted in the field sheet.	N
SG-8	Creek	4	8	18	12	4	0.5	144	3.6	2.7	Y	Field visit. Culvert has eroded quite a bit below the outlet. However, the site has a low potential for future erosion relative to other creek sites. Photo.	N
8-3	Drainage	3	45	4	4	3	0.4	180	3.6	2.7	N	Natural headcut and land slip. System is naturally stabilizing. Stabilization measures are limited. Photo.	N
2-15	Drainage	3	22	8	3	3	0.4	176	3.5	2.6	Y	Field checked. Vegetation has grown on cutbank. Culvert is large enough and not obstructed. Photo	N
17-2	Drainage	2	65	8	3	2	0.13	520	3.4	2.5	N	Not clear where the site is or what it looks like -- poor site description and sketch, no photo.	N
SG-21	Creek	1	45.5	11	6	2	0.13	500.5	3.3	2.4	Y	Field checked. Possible site. Repair access to this side of channel may be limited. Photo.	Y
SG-49	Creek	2	66	7.5	3.5	2	0.13	495	3.2	2.4	Y	Attempted field check. Not clear where the site is without photo or obvious references.	N
8-19	Drainage	2	48	10	2.5	2	0.13	480	3.1	2.3	N	Natural land slip on open grassland slope. Limited stabilization measures. Described as stabilizing slump.	N

Table 3. Top 29 Field Priority Sites

Volunteer Data Sheet							Stetson Engineers Office and Field Analysis								
Sub-watershed /Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	Bulk Density (PCF)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
9-9	Drainage	4	50					#N/A	0	95	#N/A	#N/A	Y	Field checked . Large cutbank due to upstream channelization and surrounding development. Good access. Possible site. Photo.	Y
9-7	Drainage	4	50					#N/A	0	95	#N/A	#N/A	Y	Field checked. Multiple cutbanks up to 8 ft high. Cut through Quaternary alluvium. Problem grain sizes. Obvious recent sluffs. Possible site. Photo.	Y
9-6	Drainage	4	70					#N/A	0	97	#N/A	#N/A	Y	Field checked. Channel incised up to 6.5 ft. Exposed, vertical banks. Previous bank reinforcement in portion of site. Possible site. Photo.	Y
14-21	Drainage	4	80					#N/A	0	98	#N/A	#N/A	Y	Field checked. Large bank failure due to toe erosion and undercutting. Huge Redwood has fallen in. Potential for more tree-throw erosion. Possible site. Photo.	Y
5-9	Drainage	4	80					#N/A	0	98	#N/A	#N/A	Y	Field checked. Site has been stabilized with rip-rap since site was documented by volunteer.	N
9-8	Drainage	3	70					#N/A	0	97	#N/A	#N/A	Y	Field checked. Multiple cutbanks up to 8 ft high. Cut in Quaternary alluvium. Problem grain sizes. Obvious sluffs. Possble site. Photo.	Y
9-5	Drainage	3	80					#N/A	0	98	#N/A	#N/A	Y	Field checked. Channel incised 6.5 ft. Exposed, vertical banks. Previous bank reinforcement. Possible site. Photo.	Y
9-3	Drainage	3	80					#N/A	0	98	#N/A	#N/A	Y	Field checked. Channel incised up to 6.5 feet. Exposed, vertical banks. Previous bank reinorcement. Possible site. Photo.	Y
9-1	Drainage	3	65					#N/A	0	96.5	#N/A	#N/A	Y	Field checked. Severe gullying at margin of concrete hill drainage. Large cavity appears to funnel water to Dickson trail underpass. Possible site. Photo.	Y
SG-48	Creek	3	75					#N/A	0	97.5	#N/A	#N/A	Y	Field checked. Large outlet pipe causing obvious chronic bank erosion. Easy access. Ranch property just above bank. Photo.	Y
SG-39	Creek	3	90					#N/A	0	99	#N/A	#N/A	Y	Field checked. Large vertical cutbank due to upstream bridge box directing flow into bank. Access is good. Limited room at top of bank. Possible site. Photo.	Y
11-9	Drainage	3	95					#N/A	0	99.5	#N/A	#N/A	Y	Field checked. Massive bank erosion in gully related both to ag and channelization. Possible site. Photos. Multiple sites in this area.	Y
11-7	Drainage	3	99					#N/A	0	99.9	#N/A	#N/A	Y	Field checked. Massive erosion of banks in gully. Both ag and channelization related. Possible site. Phtotos. Multiple sites in this area.	Y
R22-5	Road	3	75					#N/A	0	97.5	#N/A	#N/A	Y	Site is not in the San Geronimo Creek watershed -- drains to Lagunitas Creek upstream from San Geronimo Ck confluence	N
R22-4	Road	3	70					#N/A	0	97	#N/A	#N/A	Y	Found sites in the area which are similar to the description. Roadcuts produce sediment, however, they appear to be in stable/good condition. Photo.	N
R18-3	Road	3	60					#N/A	0	96	#N/A	#N/A	Y	Field checked. Road is in relativley good conditon. Some rilling is occuring, but no direct runoff into stream. Empties into flat meadow area.	N
R17-4	Road	3	30					#N/A	0	93	#N/A	#N/A	Y	Road is badly gullied. Grading is not an option due to bedrock outcropping. But not that much of a problem due to catch basin at bottom of hill. Photo	N
R17-2	Road	3	75					#N/A	0	97.5	#N/A	#N/A	Y	Gullying in road is not extreme. This area may be regraded, but is not a severe problem considering its location.	N
R17-1	Road	3	85					#N/A	0	98.5	#N/A	#N/A	Y	Field checked. Unable to find exact referred to in data sheet. This part of the road is in moderate condition.	N
9-21	Drainage	3	100					#N/A	0	100	#N/A	#N/A	Y	Field checked. Area appears to be stabilizing. Channel is in split area of Spirit Rock and empties into a marshy field near railroad bed.	N

Priority Key 1 = Low, 2 = Med, 3 = High, 4 = Very High

Volunteer Data Sheet							Stetson Engineers Office and Field Analysis								
Sub-watershed /Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	Bulk Density (PCF)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
SG-50	Creek	3	95					#N/A	0	99.5	#N/A	#N/A	Y	Field checked. This entire reach has erosion issues. However, access is a problem due to large redwoods in the channel.	N
15-2	Drainage	3	95					#N/A	0	99.5	#N/A	#N/A	Y	Field checked. Although sediment is funneled into the drain, it is minimal, and near the natural levels in this area. Photo.	N
14-16	Drainage	3	90					#N/A	0	99	#N/A	#N/A	Y	Field checked. Piles no longer exist.	N
R17-6	Road	3	50					#N/A	0	95	#N/A	#N/A	Y	Field checked. Culvert pipe is new, as well as woody debris protection structures. Inboard ditch appears to be in good condition. Photo.	N
9-26	Drainage	3	85					#N/A	0	98.5	#N/A	#N/A	Y	Field checked. Severe trail related erosion. Possible site. Easy access. Photo	Y
9-11	Drainage	3						#N/A	0	100	#N/A	#N/A	Y	Field checked. Natural land slip common in this area. Stabilization measures are limited. Photo	N
8-4	Drainage	3	75					#N/A	0	97.5	#N/A	#N/A	Y	Field checked. Four large lanslides related to road location below ridge (small catchment). Probable site. Photos.	Y
5-10	Drainage	3	70					#N/A	0	97	#N/A	#N/A	Y	Culvert draining some French Ranch properties. Properties upstream are in better condition than when noted in the field sheet.	N
14-9	Drainage	3						#N/A	0	100	#N/A	#N/A	AT	Attempted field visit. Apparently a failed check dam. Could not find this area. Possibly mismarked on the Data Sheet/field map.	N
Additional sites added by STETSON															
SG-48A	Creek	4	85	175	20		3	0.4	3500	98.5	70.0	52.5	Y	Dickson Ranch horse watering area. Large stream access areas which have mismanaged BMP's in place. Direct imput of sand-sized sediment. Photo.	Y
SG-17A	Creek	3	85	45	17		3	0.4	765	98.5	15.3	11.5	Y	Golf course property bank failure. Chronically eroding bank on south side of mainstem. Easy access and feasibility. Photo.	Y
SG-47A	Creek	3	90	30	16		3	0.4	480	99	9.6	7.2	Y	Dickson Ranch exposed bank. Large, exposed, and failing bank on north side of mainstem linng Dickson Ranch. Photo.	Y

Table 4. 27 Potential Priority Repair Sites

Sub-watershed /Site #	MMWD Site Type	Field-checked (y/n)	Adjusted Problem Sediment Production (tons/yr)	Access Factor (1-3)	Potential Site Repair	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
SG-48A	Creek	Y	20	1	layback/ revegetate/ reinforce	Dickson Ranch horse watering area. Large stream access areas which have mismanaged BMP's in place. Direct imput of sand-sized sediment. Photo.	Y
8-4	Drainage	Y	14	1	rocked inboard ditch and cross drains/ revegetate slides & gullies	Field checked. Four large lanslides related to road location below ridge (small catchment). Probable site. Photos.	Y
4-2	Drainage	N	12	2	regrade and revegetate	Attempted field visit. Repair access may be marginal for a re-grading project due to lack of roads, and existing development in area. Exagerrated severity.	Y
SG-33	Creek	Y	11	1	layback/ revegetate/ reinforce	Field checked. Depth of erosion is less than indicated, more like 5 ft. Potential site due to location and size. Many exposed roots. Photo	Y
SG-16D	Creek	Y	9	2	rip-rap fill/ crib wall/ revegetate	Field checked. Bank instability not due to pvc pipes, but to upstream box bridge culvert. Potential site, but access made difficult by crowded residential housing. Photo.	Y
9-7	Drainage	Y	9	1	layback/ revegetate/ reinforce	Field checked. Multiple cutbanks up to 8 ft high. Cut through Quaternary alluvium. Problem grain sizes. Obvious recent sluffs. Possible site. Photo.	Y
SG-32	Creek	Y	9	1	layback/ crib wall/ revegetate	Field checked. Severe undercutting and potential bank failure due overhanging mature oak. Bank stabilization measures already in place downstream. Photo	Y
SG-39	Creek	Y	9	1	layback/ crib wall/ revegetate	Field checked. Large vertical cutbank due to upstream bridge box directing flow into bank. Access is good. Limited room at top of bank. Possible site. Photo.	Y
SG-48	Creek	Y	9	1	rip-rap fill/ revegetate	Field checked. Large outlet pipe causing obvious chronic bank erosion. Easy access. Ranch property just above bank. Photo.	Y
9-9	Drainage	Y	9	1	layback/ revegetate/ reinforce	Field checked . Large cutbank due to upstream channelization and surrounding development. Good access. Possible site. Photo.	Y
SG-34	Creek	Y	9	1	crib wall / layback/ revegetate/ reinforce	Field checked. Possible site with SG-33. Both on MMWD property. Potential for future erosion if bank collapses. Photos.	Y
11-9	Drainage	Y	8	1	layback/revegetate	Field checked. Massive bank erosion in gully related both to ag and channelization. Possible site. Photos. Multiple sites in this area.	Y
11-7	Drainage	Y	8	1	layback/revegetate	Field checked. Massive erosion of banks in gully. Both ag and channelization related. Possible site. Phtotos. Multiple sites in this area.	Y

Access Key: 1 = Hvy Eqpt; 2 = No Eqpt/Trks; 3 = Hand/ATV only, Steep

Sub-watershed /Site #	MMWD Site Type	Field-checked (y/n)	Adjusted Problem Sediment Production (tons/yr)	Access Factor (1-3)	Potential Site Repair	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
9-5	Drainage	Y	8	1	layback/revegetate/ reinforce	Field checked. Channel incised 6.5 ft. Exposed, vertical banks. Previous bank reinforcement. Possible site. Photo.	Y
9-26	Drainage	Y	8	1	regrade/ revegetate	Field checked. Severe trail related erosion. Possible site. Easy access. Photo	Y
SG-18	Creek	Y	7	1	crib wall/ layback/ revegetate	Field checked. Exposed cutbank. At confluence of mainstem and subwatershed 16. Possible site in combination with SG-20. Repair access is good from golf course. Photos.	Y
19-8	Drainage	Y	6	2	log step installation	Field checked. Potential site due to the severe bank erosion and steep gradient. Repair access may be difficult, although near a road. Photo	Y
SG-47A	Creek	Y	5	1	layback/revegetate/crib wall	Dickson Ranch exposed bank. Large, exposed, and failing bank on north side of mainstem linng Dickson Ranch. Photo.	Y
14-21	Drainage	Y	5	1	beam piles/ tie wall/ backfill	Field checked. Large bank failure due to toe erosion and undercutting. Huge Redwood has fallen in. Potential for more tree-throw erosion. Possible site. Photo.	Y
SG-17A	Creek	Y	5	1	layback/revegetate	Golf course property bank failure. Chronically eroding bank on south side of mainstem. Easy access and feasibility. Photo.	Y
9-8	Drainage	Y	4	1	layback/revegetate/ reinforce	Field checked. Multiple cutbanks up to 8 ft high. Cut in Quaternary alluvium. Problem grain sizes. Obvious sluffs. Possble site. Photo.	Y
SG-30	Creek	Y	4	1	layback/ re-vegetate/ reinforce	Field checked. bank is in poor condition. Potential site. Bank shows signs of recent sluffing. Photo	Y
SG-1	Creek	Y	4	1	layback/ revegetate	Field checked. Bank slopes should be layed back and toe-reinforced. Partially vegetated. Possible site.	Y
SG-21	Creek	Y	2	1	crib wall/ revegetate/reinforce	Field checked. Possible site. Repair access to this side of channel may be limited. Photo.	Y
9-6	Drainage	Y	2	1	layback/revegetate/ reinforce	Field checked. Channel incised up to 6.5 ft. Exposed, vertical banks. Previous bank reinforcement in portion of site. Possible site. Photo.	Y
9-3	Drainage	Y	2	1	layback/revegetate/ reinforce	Field checked. Channel incised up to 6.5 feet. Exposed, vertical banks. Previous bank reinorcement. Possible site. Photo.	Y
9-1	Drainage	Y	1	1	rip-rap fill	Field checked. Severe gullying at margin of concrete hill drainage. Large cavity appears to funnel water to Dickson trail underpass. Possible site. Photo.	Y

Access Key: 1 = Hvy Eqpt; 2 = No Eqpt/Trks; 3 = Hand/ATV only, Steep

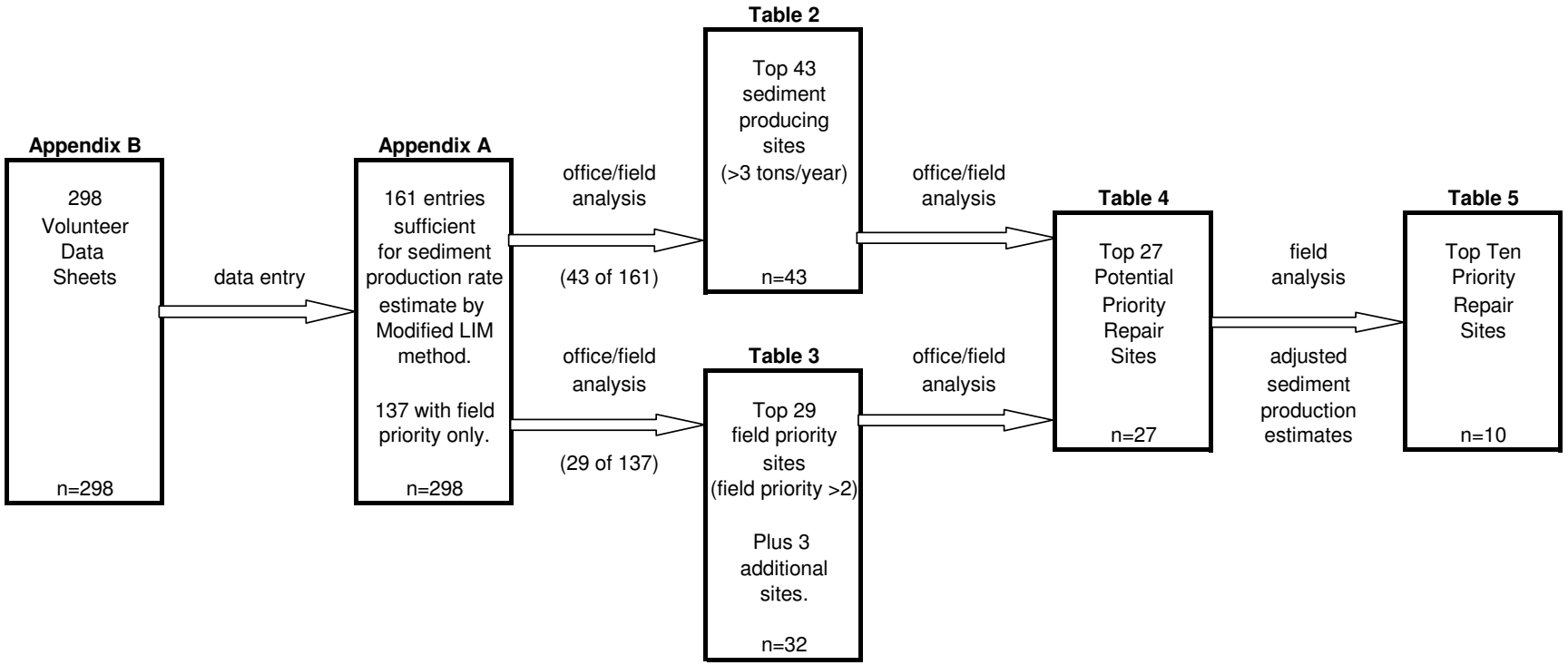
Table 5. Top Ten Priority Repair Sites

Stetson Priority Site Number	Site Description	Sediment Source Site(s)	Landowner Contact	Adjusted Problem Sediment Production (tons/year)	Access Factor (1-3)	Recommended Site Repair	Estimated Sediment Reduction Potential (tons/yr)	Estimated Repair Cost ($)	Estimated Repair Cost Per Ton ($/tons/yr)
ST-1	Tributary channel along Spirit Rock entrance road	9-3;9-4;9-5;9-6;9-7;9-8;9-9	Spirit Rock	44	1	Layback, reinforce, and vegetate vertical cutbanks; reinforce toes. Reinforce and save existing undercut riparian vegetation. Vegetated crib walls at 9-9.	40	$28,600	$715
ST-2	Tributary channel in Spirit Rock leased cattle grazing area, eastern allotment	11-1;11-2;11-3;11-4;11-5;11-6;11-7;11-8;11-9;11-10	Spirit Rock	30	1	Layback and vegetate vertical cutbanks; reinforce toes. Reinforce and save existing undercut riparian vegetation. Prevent in-channel grazing using barbed wire fence protection.	27	$26,200	$970
ST-3	Mainstem bank erosion at MMWD water treatment plant	SG-33; SG-34	MMWD	26	1	Install steep, vegetated crib walls where possible. Reinforce existing undercut trees. Layback slopes at bend and reinforce toes.	23	$15,700	$683
ST-4	Dickson Ranch runoff and channel bank management	SG-48A	Dickson Ranch	20	1	Install crib steps in between existing redwoods, maintaining access while reducing erosion. Install necessary BMP's where structures cannot be built.	15	$12,300	$820
ST-5	North Ridge Fire Road Repair	8-4	Spirit Rock	14	1	Install inboard ditch below roadcut. Install gravel cross-drains to distribute and slow runoff;vegetate outlets to prevent downslope erosion.	11	$6,000	$545
ST-6	Mainstem bank erosion below box bridge culvert	SG-39	Unknown	9	1	Install steep, vegetated crib wall. Reinforce downstream banks and bed where possible.	8	$25,000	$3,125
ST-7	Mainstem bank erosion at culvert pipe outlet	SG-48	Dickson Ranch	9	1	Vegetate banks; reinforce toes and culvert outlet with rip-rap.	8	$7,000	$875
ST-8	Mainstem bank erosion below Woodacre Creek	SG-32	Unknown	9	1	Install crib wall flush with upstream bedrock outcropping and with downstream private property bank reinforcements;vegetate wall.	8	$21,700	$2,713
ST-9	Old fire road/trail repair at Spirit Rock	9-26	Spirit Rock	8	1	Re-grade the slope; vegetate and install crib-stepped narrower walking trail. Install larger foot bridge and vegetate exposed water entry areas.	6	$6,000	$1,000
ST-10	Mainstem bank erosion at golf course	SG-18	San Geronimo Golf Course	7	1	Install vegetated crib walls on vertical exposed banks. Reinforce and save existing ovehanging trees. Lay back and revegetated banks where feasible.	6	$13,800	$2,300
Total							152	$162,300	$1,068

Table 6
Unit Costs Used in Preparing
Site Repair Cost Estimates

Material	Unit Cost ($)	Unit
Hydroseeding	0.08	sq-ft
Geotextile	0.45	sq-ft
Cable 1/8"	0.21	ft
Anchors 3'	1.55	ea.
Clamp	0.22	ea.
Galv. Pipe 3/4"	0.75	ft
Galv. Cap	0.74	ea.
Straw Wattles	2.25	ft
Rebar	0.34	ft
7"x9"x8' RR ties	30	ea.
4"x4"x8' construction timber	7.75	ea.
3"x8' landscape timber	1.97	ea.
12" stakes	0.17	ea.
Staples	0.1	ea.
3"-6" rip-rap	20	ton
18"-24" rip-rap	23	ton
24"-30" rip-rap	23	ton
live willow shoots	1	ea.
Labor	45	hr
Excavator w/operator	175	hr
Backhoe w/operator	125	hr
Bobcat w/operator	120	hr
D-5 Tractor w/operator	150	hr
Dump Truck	85	hr

Figure 1. Priority Repair Site Selection Procedure Flow Chart



Field Priority Key 1 = Low, 2 = Med, 3 = High, 4 = Very High

Volunteer Data Sheet							Stetson Engineers Office and Field Analysis							
Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
2-1	Drainage	1	70	8	5.5	2	1	0.025	44	0.1	0.0	N		
2-2	Drainage	1	90	9	5	2.5	1	0.025	45	0.1	0.0	N		
2-3	Drainage	1	20	20	6	2	1	0.025	120	0.2	0.1	N		
2-4	Drainage	1	50	10	6	2	1	0.025	60	0.1	0.1	N		
2-5	Drainage	1	10	65	12	6	1	0.025	780	1.0	0.7	N		
2-6	Drainage	1	85	34	5	1.5	1	0.025	170	0.2	0.2	N		
2-7	Drainage	1	85	15	6.5	3	1	0.025	98	0.1	0.1	N		
2-8	Drainage	1	70	8	4	1.5	1	0.025	32	0.0	0.0	N		
2-9	Drainage	1	90				1	0.025	0	0.0	0.0	N		
2-10	Drainage	1	95				1	0.025	0	0.0	0.0	N		
2-11	Drainage	1	85					#N/A	0	#N/A	#N/A	N		
2-12	Drainage	1	80	20	6	3	1	0.025	120	0.2	0.1	N		
2-13	Drainage	1	75	30	5	2.5	1	0.025	150	0.2	0.1	N		
2-13A	Drainage	1	85	25	5	3	1	0.025	125	0.2	0.1	N		
2-14	Drainage	1	85	25	6	5	1	0.025	150	0.2	0.1	N		
2-15	Drainage	3	70	22	8	3	3	0.4	176	3.5	2.6	Y	Field checked. Vegetation has grown on cutbank. Culvert is large enough and not obstructed. Photo	N

Field Priority Key 1 = Low, 2 = Med, 3 = High, 4 = Very High

Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
2-16	Drainage	3	75	200	4		3	0.4	800	16.0	12.0	AT	Attempted field check. Could not find this exact site. Exagerrated sediment production rate by LIM. Alders indicate bank stabilization and recovery. Photo.	N
2-17	Drainage	2	75	20	38	0.5	2	0.13	760	4.9	3.7	Y	Field checked. Dimensions create a large LIM value. But not deep gullies and relatively healthy stream segment. Better erosion control can be implemented.	N
2-18	Drainage	2	80				2	0.13	0	0.0	0.0	N		
2-19	Drainage	2	70				2	0.13	0	0.0	0.0	N		
2-20	Drainage	1	80				1	0.025	0	0.0	0.0	N		
2-21	Drainage	1	75				1	0.025	0	0.0	0.0	N		
2-24	Drainage	1	75				1	0.025	0	0.0	0.0	N		
2-25	Drainage	1	80				1	0.025	0	0.0	0.0	N		
2-27	Drainage	1	70				1	0.025	0	0.0	0.0	N		
2-28	Drainage	1	70	17	5	7	1	0.025	85	0.1	0.1	N		
2-29	Drainage	1	75	34	5	2	1	0.025	170	0.2	0.2	N		
2-30	Drainage	1	80	30	6	3	1	0.025	180	0.2	0.2	N		
2-31	Drainage	1	70	24	10	4	1	0.025	240	0.3	0.2	N		
2-32	Drainage			60	40	2		#N/A	2400	#N/A	#N/A	N		
2-33	Drainage	2	90	26	18		2	0.13	468	3.0	2.3	N		
2-34	Drainage	1	95	5	1	5	1	0.025	5	0.0	0.0	N		
2-35	Drainage	1	80				1	#N/A	0	#N/A	#N/A	N		

Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
2-36	Drainage	2	85				2	0.13	0	0.0	0.0	N		
2-37	Drainage	2	85				2	0.13	0	0.0	0.0	N		
2-38	Drainage	2	90				2	0.13	0	0.0	0.0	N		
2-39	Drainage	1	80				1	0.025	0	0.0	0.0	N		
2-40	Drainage	1	50				1	0.025	0	0.0	0.0	N		
2-41	Drainage	2	100				2	0.13	0	0.0	0.0	N		
2-42	Drainage	1	60				1	0.025	0	0.0	0.0	N		
2-43	Drainage	2	50				2	0.13	0	0.0	0.0	N		
4-1	Drainage	2	85	50	5	4	2	0.13	250	1.6	1.2	N		
4-2	Drainage	4	65	165	15	2	4	0.5	2475	61.9	46.4	N	Attempted field visit. Repair access may be marginal for a re-grading project due to lack of roads, and existing development in area. Exagerrated severity.	Y
4-3	Drainage	1	75	69	6	9	1	0.025	414	0.5	0.4	N		
4-4	Drainage	2	80	80	18	9	2	0.13	1440	9.4	7.0	AT	Attempted field visit. Repair access is through private subdivision and is questionable due to limits of trail and steep slopes.	N
5-1	Drainage	1		35	10	1.5	1	0.025	350	0.4	0.3	N		
5-2	Drainage							#N/A	0	#N/A	#N/A	N		
5-3	Drainage	2	40	18	9	6	2	0.13	162	1.1	0.8	N		
5-4	Drainage	1	40				1	0.025	0	0.0	0.0	N		
5-5	Drainage	2	75	12	4		2	0.13	48	0.3	0.2	N		

Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
5-6	Drainage	1	50				1	0.025	0	0.0	0.0	N		
5-7	Drainage		50	100				#N/A	0	#N/A	#N/A	N		
5-8	Drainage	1	30				1	0.025	0	0.0	0.0	N		
5-9	Drainage	4	80					#N/A	0	#N/A	#N/A	Y	Field checked. Site has been stabilized with rip-rap since site was documented by volunteer.	N
5-10	Drainage	3	70					#N/A	0	#N/A	#N/A	Y	Culvert draining some French Ranch properties. Properties upstream are in better condition than when noted in the field sheet.	N
5-11	Drainage	1	30	5	5	3	1	0.025	25	0.0	0.0	N		
5-12	Drainage	2	40	13.5	6	4.5	2	0.13	81	0.5	0.4	N		
5-13	Drainage	3	25				3	0.4	0	0.0	0.0	N	Natural land slump concentrating water and creating gullies. Location implies poor access.	
5-14	Drainage	2	30	40	12		2	0.13	480	3.1	2.3	N		
6-1	Drainage		60					#N/A	0	#N/A	#N/A	N		
7-1	Drainage	1	10	36.7	10	14	1	0.025	367	0.5	0.3	N		
7-2	Drainage							#N/A	0	#N/A	#N/A	N		
7-3	Drainage	1	20	15	4	1	1	0.025	60	0.1	0.1	N		
7-4	Drainage	2	20				2	0.13	0	0.0	0.0	N		
7-5	Drainage							#N/A	0	#N/A	#N/A	N		
7-6	Drainage			2	2	0.5		#N/A	4	#N/A	#N/A	N		
7-7	Drainage	1	40	10.5	2	1.5	1	0.025	21	0.0	0.0	N		

Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
7-8	Drainage	1	20	25	5.5	2.5	1	0.025	138	0.2	0.1	N		
7-9	Drainage	1	10	1.5	1		1	0.025	2	0.0	0.0	N		
8-1	Drainage	1	10	23	3	2	1	0.025	69	0.1	0.1	N		
8-2	Drainage	3	30	200	2.5		3	0.4	500	10.0	7.5	N	Incised tributary stream -- similar to Spirit Rock area but smaller scale. Repair access is marginal for stream bank restoration. Possible site. Photo.	N
8-3	Drainage	3	50	45	4	4	3	0.4	180	3.6	2.7	N	Natural headcut and land slip. System is naturally stabilizing. Stabilization measures are limited. Photo.	N
8-4	Drainage	3	75					#N/A	0	#N/A	#N/A	Y	Field checked. Four large lanslides related to road location below ridge (small catchment). Probable site. Photos.	Y
8-5	Drainage		75					#N/A	0	#N/A	#N/A	N		
8-6	Drainage	2	70				2	0.13	0	0.0	0.0	N		
8-7	Drainage	2	70				2	0.13	0	0.0	0.0	N		
8-8	Drainage	3	75	385	30	2	3	0.4	11550	231.0	173.3	N	Natural landslip due to water concentration at rock outcropping. Stabilization measures are limited. Access is marginal.	N
8-9	Drainage							#N/A	0	#N/A	#N/A	N		
8-10	Drainage	1	70	21	9		1	0.025	189	0.2	0.2	N		
8-11	Drainage	2	75				2	0.13	0	0.0	0.0	N		
8-12	Drainage	1	80				1	0.025	0	0.0	0.0	N		
8-13	Drainage	3	70	23	8	3	3	0.4	184	3.7	2.8	Y	Field checked. Site does produce sediment, although it appears much more stable, and smaller than noted in the field sheet.	N
8-14	Drainage	1	90	20	7	4	1	0.025	140	0.2	0.1	N		
8-15	Drainage	2	90	27	12	13	2	0.13	324	2.1	1.6	N		

Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
8-16	Drainage	1	60	60	5	3	1	0.025	300	0.4	0.3	N		
8-17	Drainage	2	85				2	0.13	0	0.0	0.0	N		
8-18	Drainage	2	75	10	3	3	2	0.13	30	0.2	0.1	N		
8-19	Drainage	2	100	48	10	2.5	2	0.13	480	3.1	2.3	N	Natural land slip on open grassland slope. Limited stabilization measures. Described as stabilizing slump.	N
8-20	Drainage	2	95	25	2	3	2	0.13	50	0.3	0.2	N		
9-1	Drainage	3	65					#N/A	0	#N/A	#N/A	Y	Field checked. Severe gullying at margin of concrete hill drainage. Large cavity appears to funnel water to Dickson trail underpass. Possible site. Photo.	Y
9-2	Drainage	3	65	13	6	5	1	0.025	78	0.1	0.1	Y	Field checked. Earthen ditch drains a horse pasture. Possible site in combination with upstream sites. Photo.	
9-3	Drainage	3	80					#N/A	0	#N/A	#N/A	Y	Field checked. Channel incised up to 6.5 feet. Exposed, vertical banks. Previous bank reinorcement. Possible site. Photo.	Y
9-4	Drainage	2	40					#N/A	0	#N/A	#N/A	Y		
9-5	Drainage	3	80					#N/A	0	#N/A	#N/A	Y	Field checked. Channel incised 6.5 ft. Exposed, vertical banks. Previous bank reinforcement. Possible site. Photo.	Y
9-6	Drainage	4	70					#N/A	0	#N/A	#N/A	Y	Field checked. Channel incised up to 6.5 ft. Exposed, vertical banks. Previous bank reinforcement in portion of site. Possible site. Photo.	Y
9-7	Drainage	4	50					#N/A	0	#N/A	#N/A	Y	Field checked. Multiple cutbanks up to 8 ft high. Cut through Quaternary alluvium. Problem grain sizes. Obvious recent sluffs. Possible site. Photo.	Y
9-8	Drainage	3	70					#N/A	0	#N/A	#N/A	Y	Field checked. Multiple cutbanks up to 8 ft high. Cut in Quaternary alluvium. Problem grain sizes. Obvious sluffs. Possble site. Photo.	Y
9-9	Drainage	4	50					#N/A	0	#N/A	#N/A	Y	Field checked . Large cutbank due to upstream channelization and surrounding development. Good access. Possible site. Photo.	Y
9-10	Drainage							#N/A	0	#N/A	#N/A	Y	Field checked. Road related erosion due to concentration of runoff onto slope. Land slip is stabilizing due to presence of thick grasses. Photo	
9-11	Drainage	3						#N/A	0	#N/A	#N/A	Y	Field checked. Natural land slip common in this area. Stabilization measures are limited. Photo	N
9-12	Drainage	1						#N/A	0	#N/A	#N/A	Y	Field checked. Natural slip on hillslope above Spirit Rock dorms. Vegetation has stabilized the slope. Photo.	

Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
9-13	Drainage	1		67	12	15	1	0.025	804	1.0	0.8	Y		
9-14	Drainage			65	12	4.5	2	0.13	780	5.1	3.8	Y	Field checked. Natural land slip due to channel headcutting. Vegetated and stabilizing. Photo.	N
9-15	Drainage			50	4.5	4	1	0.025	225	0.3	0.2	Y		
9-16	Drainage							#N/A	0	#N/A	#N/A	N		
9-17	Drainage							#N/A	0	#N/A	#N/A	Y		
9-18	Drainage			500	8			#N/A	4000	#N/A	#N/A	N		
9-19	Drainage			300	100	2	2	0.13	30000	195.0	146.3	Y	Natural Land Slump. Little or no stabilization measures can be taken. Slump appears to be stabilizing due to presence of grass. Marginal access. Photo	N
9-21	Drainage	3	100					#N/A	0	#N/A	#N/A	Y	Field checked. Area appears to be stabilizing. Channel is in split area of Spirit Rock and empties into a marshy field near railroad bed.	N
9-22	Drainage							#N/A	0	#N/A	#N/A	N		
9-23	Drainage	2					2	0.13	0	0.0	0.0	N		
9-24	Drainage	1					1	0.025	0	0.0	0.0	N		
9-25	Drainage	2	100				2	0.13	0	0.0	0.0	N		
9-26	Drainage	3	85					#N/A	0	#N/A	#N/A	Y	Field checked. Severe trail related erosion. Possible site. Easy access. Photo	Y
10-1	Drainage	1	30	19	5	2	1	0.025	95	0.1	0.1	N		
10-2	Drainage	2	20	50	10	4	2	0.13	500	3.3	2.4	N		
10-3	Drainage	1		60	4		1	0.025	240	0.3	0.2	N		
10-4	Drainage	2	30	35	5	3	2	0.13	175	1.1	0.9	N		

Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
10-5	Drainage	2	30	80	2	2	2	0.13	160	1.0	0.8	N		
10-6	Drainage	1	30	70	3	3/4	1	0.025	210	0.3	0.2	N		
10-7	Drainage	2	30	15	12	15	1	0.025	180	0.2	0.2	Y		
10-8	Drainage	1	90					#N/A	0	#N/A	#N/A	Y		
10-9	Drainage	2	90					#N/A	0	#N/A	#N/A	Y		
10-10	Drainage		90					#N/A	0	#N/A	#N/A	Y		
10-11	Drainage	2	90					#N/A	0	#N/A	#N/A	Y		
10-12	Drainage	2	85					#N/A	0	#N/A	#N/A	Y		
10-13	Drainage	1	70					#N/A	0	#N/A	#N/A	Y		
10-14	Drainage	1	95				1	0.025	0	0.0	0.0	N		
10-15	Drainage	1	60	14	3	1.5	1	0.025	42	0.1	0.0	N		
11-1	Drainage	1						#N/A	0	#N/A	#N/A	Y		
11-2	Drainage							#N/A	0	#N/A	#N/A	Y		
11-3	Drainage	1	100					#N/A	0	#N/A	#N/A	Y		
11-4	Drainage	1						#N/A	0	#N/A	#N/A	Y		
11-5	Drainage	1						#N/A	0	#N/A	#N/A	Y		
11-6	Drainage		85					#N/A	0	#N/A	#N/A	Y		

Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
11-7	Drainage	3	99					#N/A	0	#N/A	#N/A	Y	Field checked. Massive erosion of banks in gully. Both ag and channelization related. Possible site. Phtotos. Multiple sites in this area.	Y
11-8	Drainage	2	99					#N/A	0	#N/A	#N/A	Y		
11-9	Drainage	3	95					#N/A	0	#N/A	#N/A	Y	Field checked. Massive bank erosion in gully related both to ag and channelization. Possible site. Photos. Multiple sites in this area.	Y
11-10	Drainage	2	85					#N/A	0	#N/A	#N/A	Y		
11-11	Drainage	1	95	6	4	3	1	0.025	24	0.0	0.0	N		
14-1	Drainage	2	65	11	10	8	2	0.13	110	0.7	0.5	N		
14-2	Drainage	2	70	17	8	9	2	0.13	136	0.9	0.7	N		
14-3	Drainage	2	75	17	6	7.5	2	0.13	102	0.7	0.5	N		
14-4	Drainage	2		17.5	7	3	2	0.13	123	0.8	0.6	N		
14-5,6	Drainage	2		20	12	6	2	0.13	240	1.6	1.2	N		
14-7	Drainage	3		15	8	9	3	0.4	120	2.4	1.8	N	Large bank failure. Area appears to be remote (marginal repair access). Large boulder may be forcing flow into bank. Photo.	
14-8	Drainage	3	30	40	20	8	3	0.4	800	16.0	12.0	N	Repair access is limited due to location in steep and remote area. Photo	N
14-9	Drainage	3						#N/A	0	#N/A	#N/A	AT	Attempted field visit. Apparently a failed check dam. Could not find this area. Possibly mismarked on the Data Sheet/field map.	N
14-10	Drainage	2	60	15	8	4	2	0.13	120	0.8	0.6	N		
14-11	Drainage	3	70	30	10	8	3	0.4	300	6.0	4.5	N	Deep-seated landslide. Access appears to be marginal. Photo	N
14-12	Drainage	3	60	20	10		3	0.4	200	4.0	3.0	N	Headcut in channel head. Possible site. However, exact location is questionable.	N
14-13	Drainage	3		40	40	30	3	0.4	1600	32.0	24.0	N	Natural land slip and erosion surface. Repair access is marginal due to steep slopes and lack of trail or road access. Photo.	N

Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
14-14	Drainage	2	50				2	0.13	0	0.0	0.0	N		
14-15	Drainage	2	90				2	0.13	0	0.0	0.0	N		
14-16	Drainage	3	90					#N/A	0	#N/A	#N/A	Y	Field checked. Piles no longer exist.	N
14-17	Drainage	2	99				2	0.13	0	0.0	0.0	N		
14-18	Drainage	1	100					#N/A	0	#N/A	#N/A	Y		
14-19	Drainage	1	70					#N/A	0	#N/A	#N/A	Y		
14-20	Drainage	2	80					#N/A	0	#N/A	#N/A	Y		
14-21	Drainage	4	80					#N/A	0	#N/A	#N/A	Y	Field checked. Large bank failure due to toe erosion and undercutting. Huge Redwood has fallen in. Potential for more tree-throw erosion. Possible site. Photo.	Y
14-22	Drainage	1	90				1	0.025	0	0.0	0.0	N		
14-23	Drainage	2	100				2	0.13	0	0.0	0.0	N		
14-24	Drainage	2	80	5	4	3.5	2	0.13	20	0.1	0.1	N		
14-25	Drainage	1	75				1	0.025	0	0.0	0.0	N		
15-1	Drainage	2	80					#N/A	0	#N/A	#N/A	Y		
15-2	Drainage	3	95					#N/A	0	#N/A	#N/A	Y	Field checked. Although sediment is funneled into the drain, it is minimal, and near the natural levels in this area. Photo.	N
15-3	Drainage	2	80					#N/A	0	#N/A	#N/A	Y		
17-1	Drainage	1	60	15	5	2	1	0.025	75	0.1	0.1	N		
17-2	Drainage	2	40	65	8	3	2	0.13	520	3.4	2.5	N	Not clear where the site is or what it looks like -- poor site description and sketch, no photo.	N

Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
17-3	Drainage	1	60	14	12	3	1	0.025	168	0.2	0.2	N		
18-1	Drainage	1	10	30	15		1	0.025	450	0.6	0.4	N		
18-2	Drainage	2	50	20	50	5	2	0.13	1000	6.5	4.9	N	Steep bank slip. Appears to be stabilizing due to presence of vegetation. Photo.	N
18-3	Drainage	2	30	25	20	5	2	0.13	500	3.3	2.4	N		
18-4	Drainage	2	30	25	30	5	2	0.13	750	4.9	3.7	N	Repair access is marginal. Located in a steep upland channel.	N
18-5	Drainage	1	20	80	20	5	1	0.025	1600	2.0	1.5	N		
19-1	Drainage	2	10	25	12	2	2	0.13	300	2.0	1.5	N		
19-2	Drainage	1	50	30	5	3	1	0.025	150	0.2	0.1	N		
19-3	Drainage	2	20	20	15	2	2	0.13	300	2.0	1.5	N		
19-4	Drainage	3	60	27	23	18	3	0.4	621	12.4	9.3	N	Skid road creates concentrated runoff. Field sheet describes a stabilizing system.	N
19-5	Drainage		60	36	10	4		#N/A	360	#N/A	#N/A	N		
19-6	Drainage	3					3	0.4	0	0.0	0.0	AT	Attempted field visit. Difficult to locate due to poor sketch and no photo. There are more than two possible sites in this area.	
19-7	Drainage	2	50	50	8		2	0.13	400	2.6	2.0	N		
19-8	Drainage	3	50	100	12		3	0.4	1200	24.0	18.0	Y	Field checked. Potential site due to the severe bank erosion and steep gradient. Repair access may be difficult, although near a road. Photo	Y
19-9	Drainage		37					#N/A	0	#N/A	#N/A	N		
19-10	Drainage	3					3	0.4	0	0.0	0.0	N	Abandoned road concentrated runoff. Dense channel vegetation indicates stability. Remote area.	
20-1	Drainage	3	50	80	5	10	3	0.4	400	8.0	6.0	N	Natural deep-seated landslide. No practical stabiliazation measures. Access is marginal. Photo.	N

Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
20-2	Drainage	2	20	80	5	1	2	0.13	400	2.6	2.0	N		
20-3	Drainage	3	65	50	80	15	3	0.4	4000	80.0	60.0	N	Massive erosion. Repair access appears marginal due to the limitations of foot trail. Field data sheet reports vegetation on slope.	N
21-1	Drainage	2	60	45	16	12	2	0.13	720	4.7	3.5	N	Located in a steep drainage. Field sheet describes the site as incaccessible.	N
21-2	Drainage	2	65	30	11	3	2	0.13	330	2.1	1.6	N		
21-3	Drainage	2	40	200			2	0.13	0	0.0	0.0	N		
22-1	Drainage	1	30				1	0.025	0	0.0	0.0	N		
22-2	Drainage	1		30	12	6	1	0.025	360	0.5	0.3	N		
22-3	Drainage	1		20			1	0.025	0	0.0	0.0	N		
22-4	Drainage	1	45				1	0.025	0	0.0	0.0	N		
22-5	Drainage	2	30	50	15	4	2	0.13	750	4.9	3.7	N	Repair access appears marginal. Difficult to locate site due to poor site mapping and sketch and no site photo.	N
23-1	Drainage			60	10	1		#N/A	600	#N/A	#N/A	N		
23-2	Drainage							#N/A	0	#N/A	#N/A	N		
24-1	Drainage							#N/A	0	#N/A	#N/A	N		
24-2	Drainage							#N/A	0	#N/A	#N/A	N		
28-1	Drainage	3	80	15	2	2	3	0.4	30	0.6	0.5	N	Trail compaction due to heavy usage. Not on stream but may be contributing. Possible site.	
28-2	Drainage	2	75	46	30	2.5	2	0.13	1380	9.0	6.7	N	Description is a natural land slump. Field sheet states that it does not access the channel. Appears to run off over the golf course.	N
28-3	Drainage	2	60	210	1	1	2	0.13	210	1.4	1.0	N		

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28-4	Drainage	2	65	35	5	5	2	0.13	175	1.1	0.9	N		
28-5	Drainage	2	65	8	6	10	2	0.13	48	0.3	0.2	N		
29-1	Drainage	2		26	2	1	2	0.13	52	0.3	0.3	N		
29-2	Drainage	3	90	20	10	3	3	0.4	200	4.0	3.0	AT	Attempted field check. Not located on master field site map. Possible sites in this area, however. Dickson Ranch trail is in general disrepair along the stream. Photos.	Y
29-3	Drainage	3	90	20	2	3	3	0.4	40	0.8	0.6	N	Location not field mapped. Field checked the entire area. Equestrian trail is generally in poor condition, especially when raining. Photos of similar area.	
29-4	Drainage	2	30				2	0.13	0	0.0	0.0	N		
R2-1	Road	2	75	60	20		2	0.01	1200	0.6	0.5	N		
R5-1	Road	2	80	20	27	4	2	0.01	540	0.3	0.2	N		
R5-2	Road	2	70	75	15	3	2	0.01	1125	0.6	0.4	N		
R5-3	Road	2	80				2	0.01	0	0.0	0.0	N		
R5-4	Road	2	70				2	0.01	0	0.0	0.0	N		
R6-1	Road	2	50	30	1	6	2	0.01	30	0.0	0.0	N		
R7-1	Road	2	50	60	42	1	2	0.01	2520	1.3	0.9	N		
R7-2	Road	1	60	92	1	0.333	2	0.01	92	0.0	0.0	Y		
R7-3	Road	1	60				1	0.025	0	0.0	0.0	N		
R7-4	Road	1	68	125	0.333		2	0.01	42	0.0	0.0	Y		
R7-5	Road	1	65				1	0.025	0	0.0	0.0	N		

Field Priority Key 1 = Low, 2 = Med, 3 = High, 4 = Very High

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R14-1	Road			2640				#N/A	0	#N/A	#N/A	Y		
R14-2	Road	3	90	87	9	2	2	0.01	783	0.4	0.3	AT	Attempted field check. Checked out all of the roadcuts in the area described. Most of the roadcut is in relatively good and stable condition.	
R17-1	Road	3	85					#N/A	0	#N/A	#N/A	Y	Field checked. Unable to find exact referred to in data sheet. This part of the road is in moderate condition.	N
R17-2	Road	3	75					#N/A	0	#N/A	#N/A	Y	Gullying in road is not extreme. This area may be regraded, but is not a severe problem considering its location.	N
R17-3	Road	2	65	20	4	2	2	0.01	80	0.0	0.0	Y		
R17-4	Road	3	30					#N/A	0	#N/A	#N/A	Y	Road is badly gullied. Grading is not an option due to bedrock outcropping. But not that much of a problem due to catch basin at bottom of hill. Photo	N
R17-5	Road	2	80	8	12	0.333	1	0.025	96	0.1	0.1	Y		
R17-6	Road	3	50					#N/A	0	#N/A	#N/A	Y	Field checked. Culvert pipe is new, as well as woody debris protection structures. Inboard ditch appears to be in good condition. Photo.	N
R17-7	Road	2	70	75	3	1	2	0.01	225	0.1	0.1	N		
R17-8	Road	1	10	180	0.667	0.25	1	0.025	120	0.2	0.1	N		
R17-9	Road	1	40	150	0.833	3	1	0.025	125	0.2	0.1	N		
R18-1	Road	2	40					#N/A	0	#N/A	#N/A	Y		
R18-2	Road	2	60	110	4	0.5	2	0.01	440	0.2	0.2	Y		
R18-3	Road	3	60					#N/A	0	#N/A	#N/A	Y	Field checked. Road is in relativley good conditon. Some rilling is occuring, but no direct runoff into stream. Empties into flat meadow area.	N
R18-4	Road	2	60	200			2	0.01	0	0.0	0.0	N		
R18-5	Road	2	70	100	5	0.667	2	0.01	500	0.3	0.2	N		
R18-6	Road	2	75	290	15	0.333	2	0.01	4350	2.2	1.6	Y		

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R18-7	Road	3	75	50	30	0.5	1	0.025	1500	1.9	1.4	Y	Field checked. Deer camp area of Sylvestris fire road. Rilling is caused by concentraion of water from meadow across the low point of road. Not severe.	
R18-8	Road	1	40	320	0.667	0.208	2	0.01	213	0.1	0.1	Y		
R22-1	Road	2	70	30	1	0.667	3	0.23	30	0.3	0.3	Y		
R22-2	Road	1	70					#N/A	0	#N/A	#N/A	Y		
R22-3	Road	2	70					#N/A	0	#N/A	#N/A	Y		
R22-4	Road	3	70					#N/A	0	#N/A	#N/A	Y	Found sites in the area which are similar to the description. Roadcuts produce sediment, however, they appear to be in stable/good condition. Photo.	N
R22-5	Road	3	75					#N/A	0	#N/A	#N/A	Y	Site is not in the San Geronimo Creek watershed -- drains to Lagunitas Creek upstream from San Geronimo Ck confluence	N
SG-1	Creek	3	95	30	8	6	3	0.4	240	4.8	3.6	Y	Field checked. Bank slopes should be layed back and toe-reinforced. Partially vegetated. Possible site.	Y
SG-2	Creek	1	50	20	1	1	1	0.025	20	0.0	0.0	N		
SG-3	Creek	2	50	35	12	6		#N/A	420	#N/A	#N/A			
SG-4	Creek	1	100	7	7	6	1	0.025	49	0.1	0.0	N		
SG-5	Creek	2	100				2	0.13	0	0.0	0.0	N		
SG-6	Creek	2	100				2	0.13	0	0.0	0.0	N		
SG-7	Creek	2	75				2	0.13	0	0.0	0.0	N		
SG-8	Creek	4	90	8	18	12	4	0.5	144	3.6	2.7	Y	Field visit. Culvert has eroded quite a bit below the outlet. However, the site has a low potential for future erosion relative to other creek sites. Photo.	N
SG-9	Creek	2	100	16	6		2	0.13	96	0.6	0.5	N		
SG-10	Creek	2	95				2	0.13	0	0.0	0.0	N		

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SG-11	Creek	2	100	35	20		2	0.13	700	4.6	3.4	Y	Field checked. Area is well vegetated. Slopes are gradual. Lies on the inside of a bend -- appears very stable.	N
SG-12	Creek		80	12	4	3.5		#N/A	48	#N/A	#N/A	N		
SG-13	Creek	2	60				2	0.13	0	0.0	0.0	N		
SG-14	Creek	2	50				2	0.13	0	0.0	0.0	N		
SG-15	Creek	2	90	13	13	12	2	0.13	169	1.1	0.8	N		
SG-16	Creek		95					#N/A	0	#N/A	#N/A	N	Field checked. Scour pool, buried head control, vegetation growth on bank indicates relative stability. Photo.	
SG-16A	Creek	2	98				2	0.13	0	0.0	0.0	N		
SG-16B	Creek	2	100				2	0.13	0	0.0	0.0	N		
SG-16C	Creek		95					#N/A	0	#N/A	#N/A	N		
SG-16D	Creek	3	85	45	14		3	0.4	630	12.6	9.5	Y	Field checked. Bank instability not due to pvc pipes, but to upstream box bridge culvert. Potential site, but access made difficult by crowded residential housing. Photo.	Y
SG-17	Creek	3	70	88	10	2	2	0.13	880	5.7	4.3	Y	Field checked. Vegetation is prominent. Some small erosion sites -- maybe recommend planting. 4 photos.	N
SG-18	Creek	3	70	40	7	4.5	3	0.4	280	5.6	4.2	Y	Field checked. Exposed cutbank. At confluence of mainstem and subwatershed 16. Possible site in combination with SG-20. Repair access is good from golf course. Photos.	Y
SG-19	Creek	2	60	18.5	7	5	2	0.13	130	0.8	0.6	Y		
SG-20	Creek	2	50	21	7	5	1	0.025	147	0.2	0.1	Y	Field checked. Possible site in combination with SG-18. Entire north channel bank is variably exposed and eroding alluvium. Access is good. Photo.	
SG-21	Creek	1	60	45.5	11	6	2	0.13	501	3.3	2.4	Y	Field checked. Possible site. Repair access to this side of channel may be limited. Photo.	Y
SG-22	Creek	1	80	72	7	4	1	0.025	504	0.6	0.5	Y		
SG-23	Creek	1	90	47	12	6	1	0.025	564	0.7	0.5	Y		

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SG-24	Creek	2	50				1	0.025	0	0.0	0.0	Y		
SG-25	Creek	1	40	10.5	7.5	5	1	0.025	79	0.1	0.1	Y		
SG-26	Creek	1	45	38	8	6	1	0.025	304	0.4	0.3	Y		
SG-27	Creek	1	60	22	11	5	1	0.025	242	0.3	0.2	Y		
SG-28	Creek	3	60	95	13	7	3	0.4	1235	24.7	18.5	Y	Field checked. Difficult to decipher the exact site without a photo. General area appears to be cut, but relatively stable compared to other mainstem sites.	N
SG-29	Creek	2	65	55	12.5	5.5	2	0.13	688	4.5	3.4	AT	Attempted field check. Hard to locate in the creek with small-scale site photo.	N
SG-30	Creek	2	40	56	14	4.5	2	0.13	784	5.1	3.8	Y	Field checked. bank is in poor condition. Potential site. Bank shows signs of recent sluffing. Photo	Y
SG-31	Creek	2	90	15	13	5	2	0.13	195	1.3	1.0	Y		
SG-32	Creek	3	70	57	14	6	3	0.4	798	16.0	12.0	Y	Field checked. Severe undercutting and potential bank failure due overhanging mature oak. Bank stabilization measures already in place downstream. Photo	Y
SG-33	Creek	3	85	148	15	12	2	0.13	2220	14.4	10.8	Y	Field checked. Depth of erosion is less than indicated, more like 5 ft. Potential site due to location and size. Many exposed roots. Photo	Y
SG-34	Creek	2	75	45	13	9	3	0.4	585	11.7	8.8	Y	Field checked. Possible site with SG-33. Both on MMWD property. Potential for future erosion if bank collapses. Photos.	Y
SG-35	Creek	1	70	42	5	3	1	0.025	210	0.3	0.2	Y		
SG-36	Creek	1	40	27	7	5	1	0.025	189	0.2	0.2	Y		
SG-37	Creek	2	80	104	16	8	2	0.13	1664	10.8	8.1	Y	Field checked. Could not find the stump -- assumed to have left the site during high flows. Area is slightly undercut. Banks are gradual and stable. Photo	N
SG-38	Creek	2	80	35	10	4.5	2	0.13	350	2.3	1.7	Y		
SG-39	Creek	3	90					#N/A	0	#N/A	#N/A	Y	Field checked. Large vertical cutbank due to upstream bridge box directing flow into bank. Access is good. Limited room at top of bank. Possible site. Photo.	Y
SG-40	Creek	2	90	65	8	3	1	0.025	520	0.7	0.5	Y		

Sub-watershed/Site #	MMWD Site Type	Field Priority (1-4)	Est % Problem Sized Sediment (%)	Erosion Length (ft)	Erosion Height/ Width (ft)	Erosion Depth (ft)	Est LIM Class (1-4)	LIM Recession Rate (ft/yr)	Erosion Area (ft^2)	LIM Sediment Production (tons/yr)	Problem Sized Sediment Production (tons/yr)	Field-checked (y/n)	Stetson Preliminary Site Assessment and Evaluation Notes	Potential Site (y/n)
SG-41	Creek	2	75	48	7.5	3	2	0.13	360	2.3	1.8	Y		
SG-42	Creek	3	95	360	9	3	2	0.13	3240	21.1	15.8	Y	Field checked. Assumed to be area just upstream of Dickson Ranch bridge. Less severe than many other sites. Some undercutting, but not severe. Photo	N
SG-43	Creek	2	80	34	9	5	2	0.13	306	2.0	1.5	Y		
SG-44	Creek	1	50	24	13	3.5	2	0.13	312	2.0	1.5	Y		
SG-45	Creek	2	95	20	15	2	1	0.025	300	0.4	0.3	Y		
SG-46	Creek	1	45	45	8	4	1	0.025	360	0.5	0.3	Y		
SG-47	Creek	1	80	12	8	3	1	0.025	96	0.1	0.1	Y		
SG-48	Creek	3	75					#N/A	0	#N/A	#N/A	Y	Field checked. Large outlet pipe causing obvious chronic bank erosion. Easy access. Ranch property just above bank. Photo.	Y
SG-49	Creek	2	90	66	7.5	3.5	2	0.13	495	3.2	2.4	Y	Attempted field check. Not clear where the site is without photo or obvious references.	N
SG-50	Creek	3	95					#N/A	0	#N/A	#N/A	Y	Field checked. This entire reach has erosion issues. However, access is a problem due to large redwoods in the channel.	N