INTERNAL MEMO
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
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ORIGINAL SIGNED BY

TO: Chris Adair **FROM:** Mark Angelo

DATE: April 1, 2004 **SIGNATURE:**

SUBJECT: Assessment of Sediment Conditions and Possible Impacts to Beneficial Uses from Sediment on the Kelegian and Pierson Properties

As you requested, I accompanied Jennifer Bitting and Bruce Paine from our office to the Pierson and Kelegian properties in order to assess sediment conditions and possible beneficial use impacts in watercourses that may have received excessive sediment from grubbing activities on the above properties. We visited the properties on Friday, March 26, 2004. Brad Hagemann from our office and the owners' representatives Jeff Emrick (Principal Project Manager) and Josie Joosten (Project Coordinator) from Engineering Development Associates, Inc. of San Luis Obispo also accompanied us.

My observations are given below for each property and my general findings are given in the last section of this memo.

Pierson Property

The Pierson property lies about 6 miles northeast of Santa Margarita in San Luis Obispo County just north of State Highway 58. The Pierson property consists of the Sec. 36, T.28.S, R.13.E, MDBM, Assessor's Parcel Number 043-291-001 (approx 674 acres).

Average annual rainfall for the property is 14 inches with elevations ranging from approximately 1160 ft along the Middle Branch of Huerhuero Creek to 1857 ft along the western boundary of the property. The property consists of steep canyons with intervening ridgelines with steep slopes along Middle Branch of Huerhuero Creek (see Figure 1). Soils found on the property are primarily coarse sandy loams on steep slopes. Natural vegetation consists of chaparral with oaks and pine in some areas. The soil erodibility factor (k-factor in Table 1) is a measure of the susceptibility of a soil to particle detachment and transport by rainfall. The possible range of values of the k-factor is 0.02 to 0.69. The higher the value, the more susceptible the soil is to erosion.

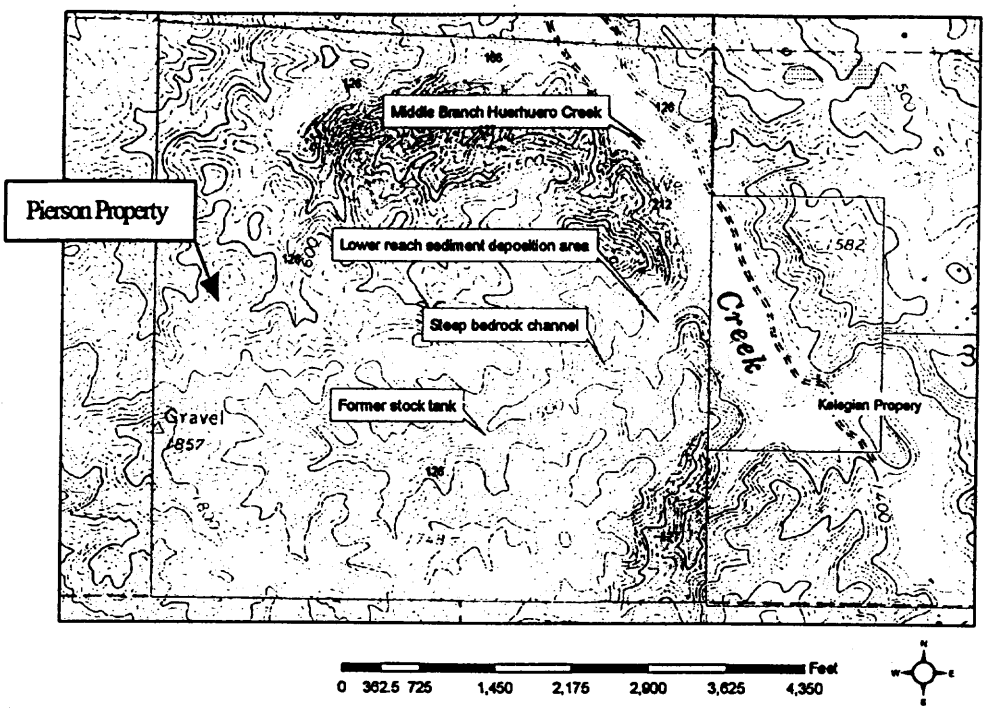

Figure 1 Pierson property showing soil units with 7.5-minute quad background (Soil Map Units on the map correspond to Soil Map Units in Table 1)

Table 1 Soils on Pierson Property

Map Symbol	Soil	Slope (%)	K-factor	Erosion Hazard	Approx Area (Acres)
126	Cieneba coarse sandy loam	30 to 75	0.24	Very High	346
127	Cieneba-Andregg coarse sandy loams	30 to 75	0.24, 0.24	Very High	96
128	Cieneba-Vista coarse sandy loams	30 to 50	0.24, 0.28	Very High	156
166	Metz loamy sand	0 to 5	0.17	Slight	4
212	Xerofluvents-Riverwash association				26

The area that was grubbed is the located along the ridgeline and steep slopes south of the unnamed tributary. Approximately 40 acres of the 674-acre site were grubbed during the summer of 2002.

I evaluated portions of an unnamed tributary to the Middle Branch of Huerhuero Creek (see Figure 1). Sediment deposits were noted in the lower reach, two small side channels and in an area of a former stock tank. The soils in the grubbed area are primarily Cieneba coarse

sandy loam that corresponds with the grain size of the sediment deposited in the unnamed tributary.

I observed freshly deposited, as well as previously deposited sediment in the lower reach of the unnamed tributary (see Figure 2 and Figure 3). The lower reach is defined as the area downstream of a section of steep bedrock channel and upstream of the confluence with the Middle Branch of Huerhuero Creek, and is approximately 1000 feet long. Unconsolidated sediment depths ranged up to 16 inches in the area depicted in Figure 2 and up to 10 inches in the area depicted in Figure 3. The width of sediment deposit in Figure 2 is approximately 21 feet and in Figure 3 is approximately 4.5 feet. Just downstream of the of the bedrock channel, there is an area that exhibited sediment deposition with subsequent downcutting (see Figure 4). The original deposition was 20 inches deep and 6.5 feet wide and was subsequently downcut a depth of 14 inches and a width of 5 feet.

Moving upstream, between the bedrock channel and the former stock tank, the slope of the watercourse is such that sediment is mostly transported through this section and not much sediment deposition occurs. The whole length of this section was not evaluated, but where it was evaluated (see Figure 5), small pockets of sediment were observed between areas were no deposition occurred. The length of this section is approximately 1200 feet.

In the area of the former stock tank, I noted sediment deposition in the unnamed tributary (see Figure 6) as well as a side drainage that drains part of the grubbed area (see Figure 7). A ranch road that runs parallel to the watercourse and two steep side roads intersect the main road adjacent to the stock tank (see Figure 8) contribute to the sediment load. A small gully system with headcuts has developed in the old sediment deposits within the former stock tank. The gullies form as the watercourse adjusts to a new base level caused by the breaching of the old earthen dam (see Figure 9).

Further upstream, where the ranch road crosses the watercourse, no new sediment deposits were observed. The area above this point had not been grubbed.

One last observation. Grubbing activities along the ridge may have functioned as a firebreak in the 2002 wildland fire that burned the adjacent watershed.

Figure 2 Pierson Property - Sediment deposition in unnamed tributary just upstream of confluence w/Middle Branch Huerhuero Creek (looking upstream)

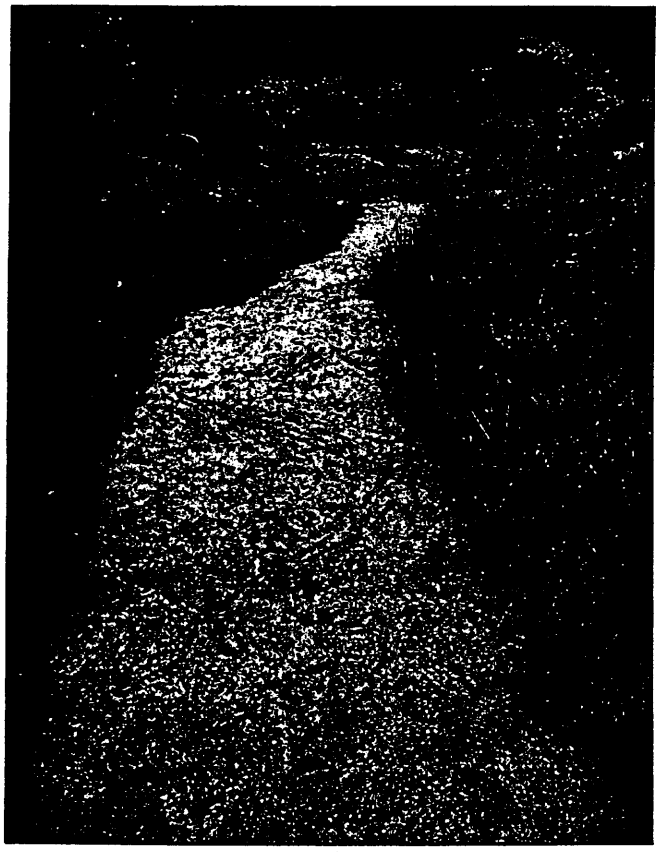

Figure 3 Pierson Property - freshly deposited sediment in lower reach unnamed tributary - just upstream of section in Figure 2 (looking upstream)

Figure 4 Pierson Property - sediment deposition with subsequent downcutting in unnamed tributary - close-up

Figure 5 Pierson Property - Small areas of sediment deposition between clear areas – reach located between bedrock channel and former stock tank. Note moisture at bottom of photo. This was the only length of watercourse (approx. 10 feet) observed with surface water.

Figure 6 Pierson Property – Small gully with headcut in former stock tank with some sediment deposition in foreground.

Figure 7 Pierson Property - sediment deposition in side drainage to unnamed tributary just upstream of confluence at former stock tank

Figure 8 Pierson Property - Looking SE into unnamed tributary (former stock tank in middle distance)

Figure 9 Pierson Property - Earthen dam with breach at former stock tank (looking downstream)

Kelegian Property

The Kelegian property lies about 6 miles northeast of Santa Margarita in San Luis Obispo County a little ways off of State Highway 58. The Kelegian Property consists of the S½, Sec. 31, T.28.S, R.14.E, MDBM and the SW¼ of the NW¼, Sec. 31, T.28.S, R.14.E, MDBM. It is composed of Assessor Parcel Numbers (APN) 43-301-01 (approx 305 acres) and APN 43-301-02 (approx 107 acres). The total acreage of the property is approximately 412 acres.

Average annual rainfall for the property is 14 inches with elevations ranging from approximately 1180 ft along the Middle Branch of Huerhuero Creek to 1700 ft at some isolated spots along the southern boundary of the property. Steep slopes occur along the Middle Branch of Huerhuero Creek while the upper part of the property consists of gently rolling hills (see Figure 10). Soils found on the property are primarily coarse sandy loams with some fine sandy loams found along the intermittent blue-line watercourse on the upper eastern portion of the property. The soil erodibility factor (k-factor in Table 2) is a measure of the susceptibility of a soil to particle detachment and transport by rainfall. The possible range of values of the k-factor is 0.02 to 0.69. The higher the value, the more susceptible the soil is to erosion. Natural vegetation consists of chaparral with oaks and pine in some areas.

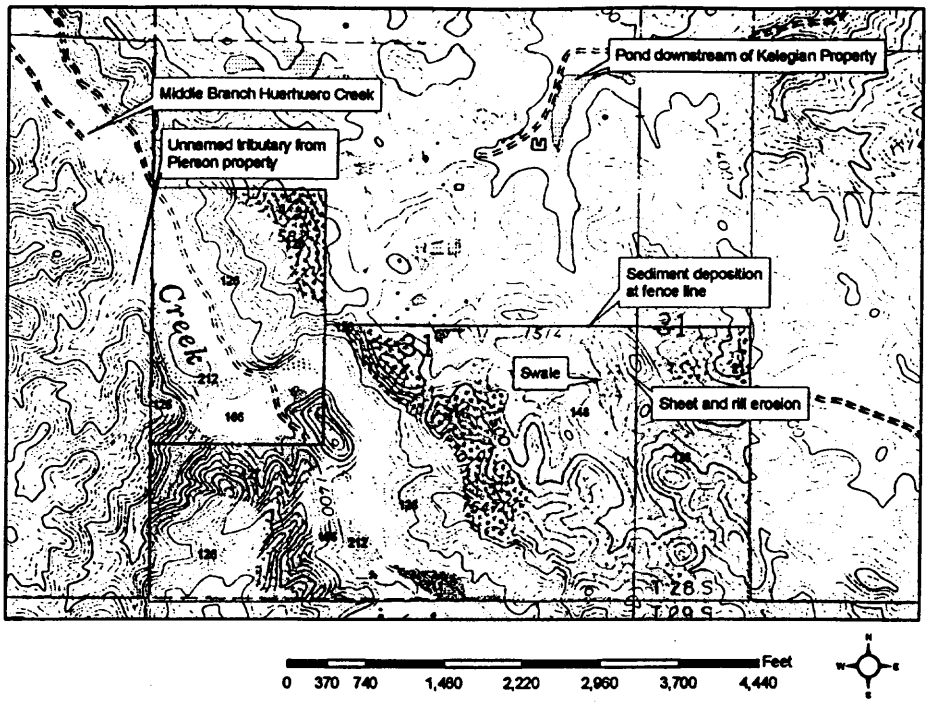

Figure 10 Kelegian property showing soil units with 7.5-minute quad background (Soil Map Units on the map correspond to Soil Map Units in Table 2)

Table 2 Soils on Kelegian property

Soil Map Unit	Soil	Slope (%)	K-factor	Erosion Hazard	Approx Area (Acres)
126	Cieneba coarse sandy loam	30 to 75	0.24	Very High	120
127	Cieneba-Andregg coarse sandy loams	30 to 75	0.24, 0.24	Very High	41
128	Cieneba-Vista coarse sandy loams	30 to 50	0.24, 0.28	Very High	104
148	Hanford and Greenfield fine sandy loam	2 to 9	0.24	Moderate	24
166	Metz loamy sand	0 to 5	0.17	Slight	19
211	Vista-Cieneba coarse sandy loams	15 to 30	0.28, 0.24	High	46
212	Xerofluvents-Riverwash association				22

The majority of the grubbed area on the Kelegian Property is located on the eastern side of the larger parcel with some occurring on a steep slope east of the Middle Branch of the Huerhuero Creek in the northeast corner of the smaller of the two parcels.

I evaluated two areas on this property. One area includes a blue-line watercourse that flows north to the East Branch of Huerhuero Creek across a fence line on the northern boundary of the property. As stated in the summary, the blue-line watercourse on the Kelegian property is more properly called a swale. It has no defined banks and it appears to be an ephemeral watercourse that runs only when run-off during storm events enters the swale. The other area was below a steep slope that drains to the Middle Branch of Huerhuero Creek.

I did not other evaluate two areas on the property that had been grubbed. These areas do not drain to the areas I evaluated, so any sediment contribution from these areas was not evaluated. These areas are located at the eastern edge of the larger parcel. On the northeast side, a grubbed area drains to the property to the north. In the southeast corner, an area drains to a blue-line watercourse that drains south towards Highway 58 and eventually to the Middle Branch of Huerhuero Creek.

I observed sediment deposits upstream of the fence (see Figure 11) located along the property line. It appears that organic matter was lodged against the fence and acted as a fairly effective barrier to sediment transport. Very little sediment was noted on the adjacent property north of the fence. The sediment deposit is fan shaped with the base located along the fence with a width of approximately 35 feet. The sediment deposit extends uphill from the fence approximately 300 feet (see Figure 12 for upper extent of deposition). Small areas of sediment deposition were observed in the swale above the larger deposit shown in Figure 11 and Figure 12. An example of the grubbed area upstream of the swale, as it appeared prior to revegetation is shown in Figure 13.

The steep slope that drains into the Middle Branch of Huerhuero Creek (see Figure 14) has been revegetated by the owner and a series of straw bale check dams have been installed to capture sediment prior to its entering the creek. No discernible impacts from this grubbed area were observed in the creek. A small length of vertical stream bank along the road below this area has failed, but this is not unusual in this type of system and it is does not appear to be associated directly with the grubbing activity on the slope above.

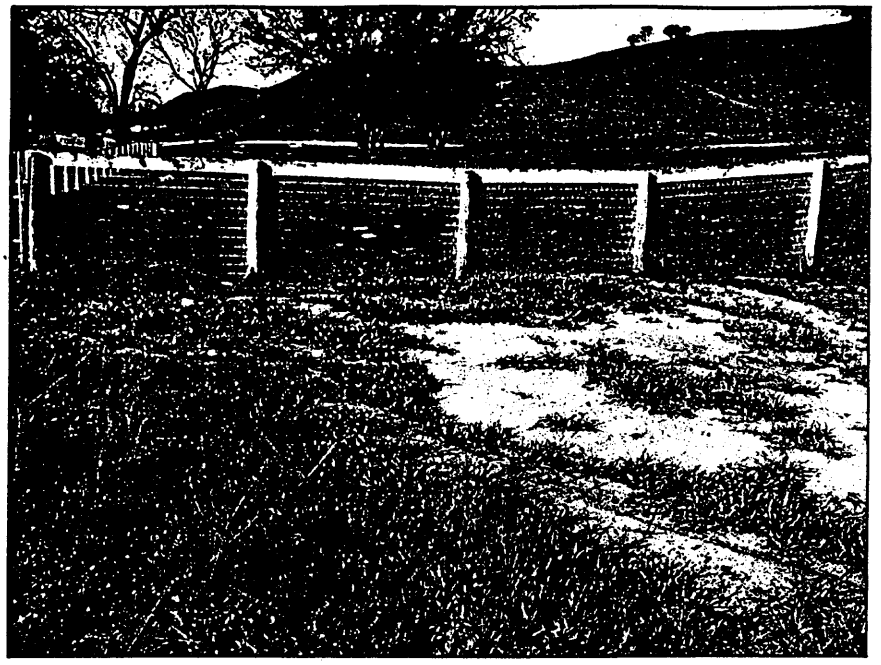

Figure 11 Kelegian Property - Sediment deposition along fence line, looking north to adjacent property (Photo: Ryan Lodge March 3, 2003)

Figure 12 Kelegian Property - Swale upstream of fence line (Photo: Ryan Lodge March 3, 2003)

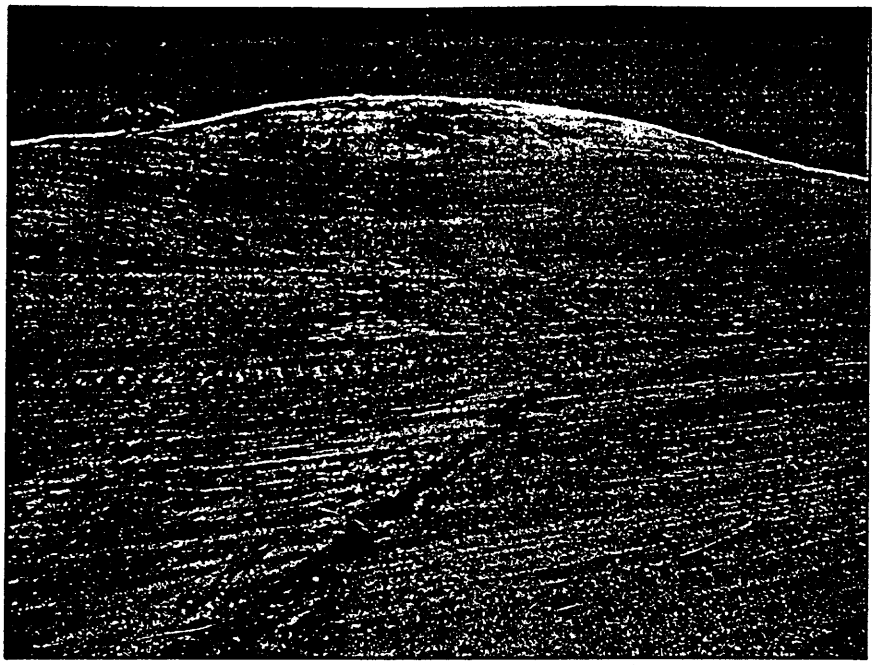

Figure 13 Kelegian Property - Sheet and rill erosion prior to revegetation on slope that drains into the swale
(Photo: Ryan Lodge November 14, 2002)

Figure 14 Kelegian Property - Grubbed area on steep slope

Comparison to Fire-Related Sediment Deposition

I have included a couple photos of watercourses that have received sediment from areas that were burned in the 2002 fire. These are presented so you can visually compare the watercourses on the two properties that I visited with the watercourse that has received increased sediment as a result of the natural disturbance regime of fire and post-fore rainfall. I did not attempt to take measurements or look at contributing areas to the watercourses in the photos below.

Figure 15 Side drainage on south side of State Route 58 showing deposition and subsequent downcutting (sediment from burn area)

Figure 16 Sedimentation in channel adjacent to Route 58 at road crossing to side channel in previous picture

General Findings

The two unnamed watercourses that I evaluated on the Pierson and Kelegian properties are assigned the beneficial uses of Aquatic Life, Recreation and Municipal and Domestic Supply (MUN) as generically designated by our Basin Plan (Chap 2, Section I, p. II-1). For these watercourses, Aquatic Life has been interpreted to mean warm fresh water habitat (WARM). Sediment (settleable solids) would most likely impact the warm fresh water habitat beneficial use, so that is what this assessment addresses. I did not attempt to assess any impacts associated with suspended sediment because no suspended sediment data was available for the watercourses and there was no running water when I visited the properties.

Impacts to the beneficial uses in Huerhuero Creek downstream of the two properties were not assessed because no sediment deposits attributable to the grubbing operations were observed and no suspended sediment data is available. The beneficial uses assigned to Huerhuero Creek include:

1. Municipal and Domestic Supply (MUN)
2. Agricultural Supply (AGR)
3. Ground Water Recharge (GWR)
4. Water Contact Recreation (REC1)
5. Non-Contact Water Recreation (REC2)
6. Wildlife Habitat (WILD)

7. Cold Fresh Water Habitat (COLD)
8. Warm Fresh Water Habitat (WARM)
9. Rare, Threatened, or Endangered (RARE)
10. Commercial and Sport Fishing (COMM)

Potential impacts from sediment to beneficial uses in Huerhuero Creek include loss of habitat, direct smothering of aquatic organisms and, for suspended sediment, interference with feeding behavior for aquatic organisms, direct physical impacts to aquatic organisms such as clogging and/or abrasion of gills, or degradation of water due to high turbidity for MUN or AGR use.

The blue-line watercourse on the Kelegian property is more properly called a swale. It has no defined banks. It appears to be an ephemeral watercourse that runs only when run-off during storm events enters the swale. The watercourse that was evaluated on the Pierson property is an intermittent watercourse. It may only run above ground during wet years, and may only do so in certain sections of the watercourse. More detailed descriptions can be found in the individual property write-ups.

Both watercourses that were evaluated contained sediment derived from the grubbing operations that were performed on the properties.

I have no knowledge of the type of aquatic community that would be found the watercourses that on the Kelegian and Pierson properties and developing this information is beyond the scope of this assessment. Without a direct knowledge of the life history requirements of the various members of the local aquatic community, no definitive statement of impacts of sediment deposition to that community can be made. That being said, potential impacts to the aquatic community include loss of specific types of habitat due to excessive sediment deposition or death of aquatic organisms due to smothering by sediment.

Although speculative in nature, some aquatic organisms may be adapted to a disturbance regime that includes periodic inputs of sediment. The area where these properties are located is subject to extremely high natural sediment inputs, especially after fires (see Figure 15 and Figure 16). Therefore, excessive sediment may cause a shift in the aquatic community in favor of those organisms that require a sandy substrate in order to flourish.

I did not observe any sediment deposits in the Middle Branch of Huerhuero Creek that I could directly attribute to the grubbing operations. This is because the creek transports naturally high sediment loads and it is not easy to discern changes to its bed composition that are caused by sediment inputs from the grubbing operations. The Middle Branch of Huerhuero Creek is approximately 200 feet across where run-off from the two sites would enter it. The creek bottom consists of particles ranging in size from fine sand to cobbles (see Figure 17). Steep cut banks supply sediment directly to the creek bed and all tributaries deliver various levels of sediment to the creek.

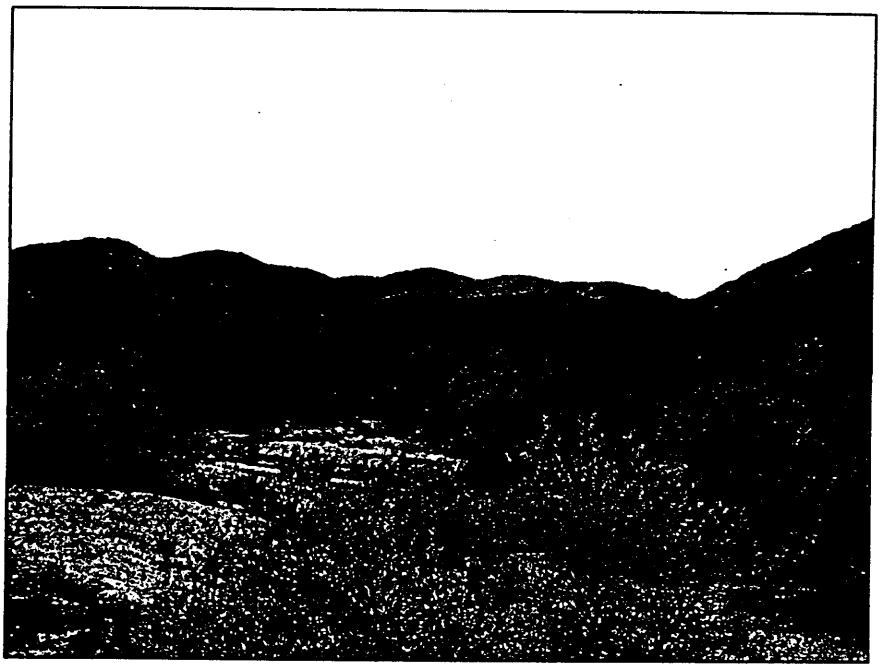

Figure 17 Looking southwest from Kelegian property across Middle Branch of Huerhuero Creek at the confluence of unnamed tributary on Pierson Property (Note light green ridgeline in center of photo. This is one of the grubbed areas on the Pierson Property that has been revegetated.)
(All photos by Mark Angelo, March 26, 2004 unless otherwise noted)

The East Branch of the Huerhuero Creek was not visited.

Observations of the main unnamed blue line watercourse on the Kelegian property and on the property just to the north of the Kelegian property led me to believe that no significant amount of sediment reached the East Branch via this watercourse. This is based on following observations:

1. Most of the sediment resulting from disturbance appears to have been deposited on the Kelegian property behind the fence at the property line,
2. Observed sediment deposits on the property immediately to the downstream and to the north is minimal,
3. There is a pond approximately 1/3 of a mile north of the property line the where most of the sediment that made it that far would settle out of the water column. Also, the distance to the East Branch of the Huerhuero Creek is approximately 1.5 miles from the northern property line along the watercourse course.

The source of the sediment in the bed of the watercourse on the Kelegian property is obvious since there is a direct connection between the grubbed land and the watercourse. The area where sediment has accumulated is limited.

On the Pierson property, the sources of the sediment are not always directly connected to the watercourse. Observations of two side drainages that were grubbed led me to believe that sediment from the grubbing entered the watercourse via these side drainages, which in turn received some of their sediment load from the grubbed areas. Other sources of sediment in this watercourse are from the ranch roads and possibly from a small area of the watershed that was burned in 2002 as part of a larger wildland fire. I observed sediment deposits in the lower section of the creek as well as at a point upstream where a side drainage enters an area that was previously used as a stock tank.

Recommendations

Some recommendations for future investigations of this type are listed below. These apply to watercourses where activities that may increase sediment supply to a watercourse have occurred:

1. Photos of watercourses should be taken. These should be taken prior to the rainy season, if possible. Follow-up photos should be taken after the rainy season. Monumented photo points should be used in order to develop a set of comparable pre- and post-rainy season photographs. The "Clean Water Team" protocol for photo documentation that has been incorporated into our Regional Sediment Assessment provides a good procedure for this.
2. An assessment of the watercourse bed conditions should be performed. This should be done prior to the rainy season, if possible. A follow-up assessment should be performed after the rainy season. This will allow for pre- and post-rainy season comparison to watercourse bed conditions. The appropriate assessment methodology would need to be selected based on the channel conditions at the site.
3. If pre- and post-rainy season data cannot be gathered, then a comparable watercourse that is not expected to have impacts from excess sedimentation should be found to use as a reference watercourse.
4. We need to develop a better knowledge base of the aquatic communities in the drier areas within our Region in order to be able to make more definitive statements of sediment impacts to Beneficial Uses.

cc. Brad Hagemann
Lisa McCann
Jennifer Bitting
Bruce Paine