Dennis Jackson - Hydrologist

P.O. Box 7664
Santa Cruz, CA 95061-7664
(831) 335-3235
djackson@cruzio.com

October 17, 2008

Tom Lippe
329 Bryant Street, Suite 3D
San Francisco, CA 94107

Re: Napa River Sediment TMDL

Dear Mr. Lippe:

You have asked me to review and comment on the following documents

a) the revised Proposed Basin Plan Amendment: Napa River Sediment Reduction and Habitat Enhancement Plan
b) the revised Napa River Sediment Total Daily Maximum Load Staff Report dated September, 2008
c) the environmental review document for the Proposed Basin Plan Amendment, pages 94-141 of the Staff Report.

These documents were obtained from the San Francisco Bay Regional Water Quality Control Board web site.

Your specific questions were:

1) To what extent do the amendments sufficiently address the concerns stated in your letter? For concerns that are not addressed at all, it may be most efficient to just point that out. For concerns that are addressed, either sufficiently or not sufficiently, please say why.

2) To what extent do the amendments raise new concerns?

3) The new performance standard for peak flow increases (i.e., "Effectively attenuate significant increases in storm runoff. Runoff from vineyards shall not cause or contribute to downstream increases in rates of bank or bed erosion." (Table 4.1)) is not stated in numerical terms, in your opinion, will the TMDL be able to achieve this?

   I do want you to review the CEQA part. I have asserted that the Board has a legal obligation to evaluate the environmental impacts of the TMDL implementation measures - e.g., using compliance with the Napa County Conservation Regulations as a performance standard. I am interested in your view of how well the Board has done so.

Apply TMDL to the Entire Watershed

The Basin Plan Amendment (BPA) gives the impression that the TMDL applies to the entire watershed including the area upstream of the municipal water supply reservoirs. Page 5 of the revised BPA states that:

> The Napa River sediment TMDL is established at 185,000 metric tons per year, which is approximately 125 percent of natural background load (based on sediment load estimates from the 1994-2004 period) calculated at Soda Creek. Natural background load depends upon natural processes, and varies significantly. Therefore, the TMDL and allocations are expressed both in terms of sediment mass and percent of natural background. The percentage based TMDL, 125% of natural background, **applies throughout the watershed**. In order to achieve the TMDL, controllable sediment delivery resulting from human actions needs to be reduced by approximately 50 percent from current proportion of the total load (Tables 3a and 3b). TMDL attainment will be evaluated at the confluence of Napa River with Soda Creek, which approximates the downstream boundary of freshwater habitat for salmon and steelhead. Attainment of the TMDL will be evaluated over a 5-to-10-year averaging period. (Emphasis Added)

The revised BPA shows deleted language in *strikeout*. The following sentence, which occurs in Tables 4.1 through 4.4, is printed in *strikeout* font in the revised BPA.

> ~~Does not apply to parcels upstream of municipal reservoirs, where measures required per Napa County Code (Chapter 18.108), are sufficient to achieve sediment load allocations, and/or parcels classified by Napa County as "rural residential" (2% of unincorporated area in Napa County), where Water Board will rely on education and outreach and participation in voluntary programs~~.

However, the Environmental Checklist (page 95 of the revised Staff Report) states:

> 9. Surrounding Land Uses and Setting:
>
> The proposed Basin Plan amendment would affect the entire Napa River watershed, **except for land areas upstream of municipal water supply reservoirs**. Implementation would involve specific land and water management actions throughout the watershed. Napa River watershed land uses include a mix of open space, agricultural, commercial, residential, and municipal uses. (Emphasis Added)

The discussion about the Project Description on page 108 of the revised Staff Report states that:

> The proposed Basin Plan amendment would affect all segments of Napa River and its tributaries located downstream of municipal water supply reservoirs.

It appears to me that the intent of the Water Board staff is to exclude the areas upstream of the municipal water supply reservoirs. I have repeatedly requested that the TMDL be applied to the entire Napa River Watershed. The following discussion explains why it is important for the Water Board to apply the TMDL to the entire Napa River watershed.

Page 10 of the revised staff report states:

> We note that four municipal reservoirs constructed on Kimball Canyon, Bell Canyon, Conn Creek, and Rector Creek drain 17 percent of the watershed. Prior to dam construction, each of these tributaries provided high quality spawning and rearing habitat up and downstream of these dams.

This acknowledges that high quality habitat was lost to anadromous fish with the construction of the dams. However, landlocked steelhead trout, known as rainbow trout still use the habitat upstream of the reservoirs.

Excluding the TMDL from the area upstream of the municipal water supply reservoirs is unjustified for the following reasons. First, the water supply reservoirs provide municipal drinking water which is a very important Beneficial Use of Water. The TMDL must take action to protect municipal water supplies. Second, sediment loads in excess of the natural background sediment load are being deposited in the reservoirs which diminish their life span. Reducing the sediment loads entering the municipal reservoirs will extend the operational life time of the reservoirs. Third, all of the streams above the municipal water supply reservoirs support populations of rainbow trout. Rainbow trout (Oncorhynchus mykiss) are considered to be landlocked steelhead trout (Oncorhynchus mykiss). Fourth, the construction of the municipal water supply reservoirs significantly reduced the habitat area available to support anadromous runs of steelhead and salmon.

Figure 1 shows the current status of steelhead trout in Napa County (Center for Ecosystem Management and Restoration, 2005). The locations of the four municipal water supply reservoirs have been marked on Figure 1. The map shows that rainbow trout (*Oncorhynchus mykiss*), the landlocked version of steelhead trout are found in all of the streams above the municipal water supply reservoirs. The map in Figure 1 was constructed from data in Leidy et al, 2005.

The rainbow trout (*Oncorhynchus mykiss*) upstream of the municipal water supply reservoirs are a valuable genetic reservoir in the event that the population of Napa River steelhead trout (*Oncorhynchus mykiss*) collapses. Therefore, it is very important to provide the rainbow trout upstream of the municipal water supply reservoirs the same level of protection as the steelhead trout (*Oncorhynchus mykiss*) downstream of the reservoirs.

Turbidity Monitoring

I have recommended that turbidity be continuously monitored in select streams with geologic conditions that are associated with chronic turbidity. I have also recommended that numeric targets for chronic turbidity be set in the TMDL.

The turbidity monitoring proposed by the Water Board is insufficient to assess the progress of the TMDL implementation. The revised BPA (page 18) states:

> In addition to the above described monitoring program to evaluate attainment of numeric targets for sediment, the Water Board will monitor turbidity and residual pool volume. Monitoring will be conducted in a subset of the channel reaches where spawning gravel permeability and/or redd scour are measured. Stream temperature and baseflow persistence will be monitored as part of the Surface Water Ambient Monitoring Program.

The Water Board is proposing to monitor turbidity and residual pool volume while they are assessing if the numeric targets for permeability and redd scour have been obtained. This suggests that the turbidity monitoring will be spot measurements and not continuous (e.g. every 15-minutes). Spot measurements of turbidity can not be expected to detect chronic turbidity problems. Repeated turbidity measurements should be done in watersheds that have soils types and rock types that are known to be capable of producing chronic turbidity.

In my opinion, the Water Board staff has been overly influenced by the dry year (2001) turbidity sampling conducted by Stillwater Science (2002). The USGS stream gauging record for their Napa River near St Helena station shows that only 15 of the 63 years (23%) of record had lower streamflow than 2001. During the turbidity study a near-bankfull storm in January 2002 was also sampled but the samples at most of the stations were taken 10 days after the event.

The geology of a watershed has a profound affect on the turbidity of the stream. The Stillwater Limiting Factor Analysis (2002) sampled only during a dry year and did not look at the relationship between geology and turbidity. Personal experience in the Napa River watershed suggests that Tertiary pyroclastic volcanic flows and mudflow deposits are capable of producing chronic turbidity.

On February 25, 2006 I observed elevated turbidity levels in Conn Creek near Angwin, see Figure 3. The photo in Figure 3 was taken 6 days after the last recorded daily rainfall of 0.32”, at the Angwin rain gauge. Figure 4 shows the daily rainfall at the Angwin rain gauge prior to time of the photo in Figure 3. A total of 0.72 inches was recorded at the Angwin rain gauge between 2/17/2006 and 2/19/2006. Prior to 2/17/2006 there were 12 days with no recorded rainfall. The discharge, at the Napa River near St Helena gauge, on February 25, 2006 was 78 cfs, which is the median discharge for January and February over a 61 year period. The occurrence of turbidity in Conn Creek six days after a minor rainfall event suggests that chronic turbidity has the potential to occur in some of the tributaries to the Napa River.

Figure 2 is a geologic map of the Napa River (Stillwater Sciences, 2002). The location where I observed chronic turbidity on February 25, 2006 is marked on Figure 2. The geologic map shows that map units Tertiary volcanic flow rocks (Tv) and Tertiary pyroclastic volcanic and mudflow deposits (Tvp) occur upstream of where the chronic turbidity was observed. It is likely that the mudflow deposits or the tufts of the Tvp map unit were the source of the chronic turbidity I observed on February 25, 2006.

Comparing Figure 1, the map of the current distribution of steelhead trout (*Oncorhynchus mykiss*), with Figure 2, the geologic map, shows that the streams that cross the Tvp geologic mapping unit support steelhead trout. Chronic turbidity impairs the growth of steelhead trout (*Oncorhynchus mykiss*). Therefore, monitoring turbidity in watersheds with Tvp geology is reasonable step to help manage steelhead trout populations and to assess the effectiveness of implemented restoration actions.

Chronic turbidity may affect only some of the tributary watersheds. But when chronic turbidity occurs it reduces the growth rate of steelhead and salmon (Trush 2002). Therefore, chronic turbidity reduces the probability that juvenile fish will be able to successfully reach the ocean and return to spawn. Spawning success may not be the critical limiting factor in a stream impacted by chronic turbidity. Monitoring turbidity in the tributary watersheds whose geology has the potential to generate chronic turbidity will help guide restoration efforts in those watersheds.

The numeric target for chronic turbidity could be set to Trush’s “chronic turbidity thresholds” for anadromous salmonid populations (Trush, 2002).

Dams

Dams play a significant role in channel incision. Dam owners should be encouraged to take actions to minimize the impact of their dams on the Napa River channel network. I recommended three things that could be done to reduce the impact of dams on the Napa River and its fisheries.

- Investigate winter release operations for dams that can control flood releases. Sustained releases near the bankfull discharge saturate banks and lead to failures often after the release is reduced.
- Start a program to use aerial photography and the high resolution digital elevation map (CALM) to find on-stream reservoirs that have not properly permitted and require the owner obtain a water right permit and to move the reservoir off the channel or to at least provide fish passage and passage of coarse sediment. Small dams will capture the coarse bed load need to build fish habitat but can pass fine sediment that can damage fish habitat. If the length of the reservoir is not

sufficiently long to allow all sands to settle out they will be passed through the reservoir. Small water supply reservoirs are not designed to be sediment retention basins.

- Use the high resolution digital elevation map (CALM) to find dams that would make sense to require a fish bypass.

The CEQA document contained in the revised Staff Report looked at alternatives to the proposed BPA.

> Alternative 5: Management of Coarse Sediment and Flow Releases from Municipal Reservoirs
>
> This alternative presents several questions regarding technical feasibility and efficacy, and potential environmental impacts (e.g., downstream flood risk, impacts to reservoir water quality, potential air quality, noise, and/or traffic impacts associated with reservoir dredging and/or transport and introduction of coarse sediment at downstream locations). Additionally, the management of reservoir flow releases to facilitate a balance between sediment supply and transport capacity downstream of the reservoirs has the potential to have a significant impact on municipal water supply and/or downstream flood risk.

I asked for an investigation into the operation of the dams because the impact of dam operations on the river channel network is a complex question. Alternative 5 raises questions about changing the way dams release winter runoff but the Water Board has not definitively answered the questions they posed. I request that the Water Board actually do the studies required to answer the questions I have raised and that their staff has raised.

I request that a carefully crafted study be undertaken to improve the operations of the reservoirs in respect to their impact on the channel. For example, can the effect of the four municipal water supply reservoirs be minimized by coordinating their flood releases? Dams often release water near the bankfull discharge for extended periods of time. Such releases saturate the bank materials and lead to bank collapse after the releases are reduced.

On-stream reservoirs play an important roll in both channel incision and blocking access to miles of spawning and rearing habitat. Therefore, owners should actively participate in mitigating the environmental effects of their on-stream reservoirs. This could take the form of contributing funds to improve spawning and rearing habitat downstream of the reservoirs. The Regional Board and State Board should develop a process that will allow the owners of on-stream reservoirs to either change the design of a reservoir to mitigate or reduce the environmental damage caused by the reservoir or to contribute monetarily to habitat restoration projects or find some other equitable way offset the problems created by the reservoirs.

My request to identify small dams that block fish passage may be addressed by the proposed program to identify fish passage barriers in the 10 key tributaries outlined in Table 5.3 of the revised BPA. It would depend on the how “barrier” is defined by the agencies doing the fish passage surveys.

Low Flows

The revised BPA and revised Staff Report do not adequately address the low-flow problem occurs in dry years with a cold spring. Many landowners protect crops from spring frosts by spraying water. The California Department of Water Resources was appointed the Frost Protection Watermaster for the Napa River. They have authority over pumping and streamflow from March 15 to May 15 each year. They have set 10 cfs as the minimum streamflow for fish and wildlife. This value may have been determined in the mid 1970’s and has not been adjusted since then. The California Department of Water Resources uses the

USGS stream gauge at Oak Knoll to set streamflow and pumping rates. I question whether the 10 cfs flow is sufficient to protect fish given the degraded condition of the channel.

The following excerpt is from my January 28, 2001 letter report to Tom Lippe describing the Cumulative Impacts to salmonids in the Napa River.

> The February 1972 report (Anderson, 1972) addressing the 25 water rights applications recommended minimum bypass flows on the mainstem of the Napa River for each season. A minimum flow of 15 cfs or the natural flow was set for the period of November 15 to February 29. A subsequent study found this "totally inadequate for the maintenance of a healthy steelhead run in the Napa River." (Cox and Ellison, 1982).
>
> Cox and Ellison studied 7 critical riffles (see Figure 1 of my 2001 letter) in the late 1970's. They reported their findings in June 1982. Their study showed that 58 cfs was needed in the Napa River below Sulphur Creek to provide steelhead passage over the critical riffles. Upstream of Sulphur Creek they found a flow of 50 cfs was required for passage. The minimum flow amount set in the February 1972 report is about one-fourth of the amount determined to be the minimum required for passage. Unfortunately, the inadequate minimum winter flows have been written into at least 38 water rights agreements on the Napa River (DWR Bulletin 216, 1982).
>
> Cox and Ellison observe that:
>
> > The environmental factor most important to the successful completion of the steelhead life cycle is sufficient water flow. Sufficient flow is needed for steelhead to ascend the river to their spawning grounds; sufficient flow is needed over the spawning gravels for completion of the spawning act; sufficient flow is needed to provide oxygen to the eggs and fry in the gravel; sufficient flow is needed for the downstream migration of both adults and juveniles to the ocean. Most critical of these needs in the Napa River at the present time is sufficient flow for the upstream spawning migration and the maintenance of nursery habitat in the summer and fall.
> >
> > The prime agricultural land of the Napa Valley requires a tremendous amount of water during the summer for irrigation and heat control, during the spring for frost control, and during the winter for refilling off-stream storage ponds. The source of much of this water is the Napa River. Domestic and municipal diversions also take substantial amounts from the Napa River drainage. As a result, the cumulative, unregulated demand for water is so great it appears possible for even winter flows to be entirely diverted in some years.
>
> DFG created a "Napa River Management Plan" in about 1982 or 1983. The document is not dated but its references indicate that it was written after February 1982 but prior to the juvenile steelhead sampling during the summer of 1983. The Management Plan describes the Napa River, notes the dramatic decline in steelhead, sets a management objective, lays out a plan to gather more information, and proposes to rear juvenile steelhead to offset the loss of nursery habitat. The Management Plan states,
>
> > The single most important impact has resulted from the cumulatively large diversions of surface waters for frost protection and irrigation. In all likelihood, there is currently no unappropriated surface water in the summer and fall in the Napa River system. There may be excess water in the winter; unfortunately, irrigation and frost protection are not necessary then.
> >
> > To better utilize excess winter water, many storage facilities have been built. The major impoundments, built for storage of municipal water, have been constructed at the expense of anadromous resources. Almost without exception, large dams built in the Napa Valley are blocking anadromous fish runs. The most obvious example is Conn Dam on Conn Creek, which impounds Lake Hennessey on Conn Creek. Built in 1946, Conn Dam blocks steelhead access to approximately 24 km (15 miles) of spawning and nursery habitat (Ellison, 1982).

The 1972 Fish and Game report found that the 15 cfs bypass flow for the November 15 through February 29 required in 25 appropriative water rights was inadequate to protect the fishery. Adequate flows of water are crucial for fish. The apparent need to modify existing water rights is a difficult legal issue but it should still be addressed.

Department of Fish and Game documents demonstrate that water diversions and on-stream reservoirs have played a significant role in the decline of salmonids in the Napa River watershed. Many appropriative water rights have bypass flows that are lower than those recommended by studies conducted by the Department of Fish and Game.

Surface water diversions, groundwater pumping and the process of channel incision can all decrease the flow in the Napa River and its tributaries. The actions of the Division of Water Rights (SWRCB) and of the Watermaster (California Department of Water Resources) should be considered under the cumulative impact discussion of the CEQA analysis for the sediment TMDL.

The revised BPA's approach to addressing low flows is laid out in Table 5.2. The action to deal with "Low flows during the dry season" is to have "

> Local, state, and federal agencies to participate in a cooperative partnership to develop a plan for joint resolution of water supply reliability and fisheries conservation concerns.

The implementing parties are listed as:

> Local municipalities working with Water Board, State Water Board (Division of Water Rights), National Oceanic and Atmospheric Administration Fisheries Service (NOAA), and California Department Fish and Game (DFG)

The TMDL schedule calls for the resulting plan to be implemented by fall of 2010.

The approach to low flows outlined in Table 5.2 of the revised BPA is incomplete since it does not recognize the impact of spring frost protection as a "stressor" and does not specifically name the Department of Water Resources Frost Protection Watermaster as one of the "Implementing Parties". The approach to low flows is also incomplete because it does not recognize that many water rights require bypass flows of 15 cfs during the November 15 through February 29 period which Fish and Game documents show as being inadequate. Low flows are not just a problem in the dry season but have the potential to occur any time of year.

Can the Water Board guarantee that the adverse impacts from insufficient flows, during anytime of year, to federally listed fish be solved by having agency representatives discuss the problem? The proposed inter-agency discussions may never result in a plan to effectively deal with low flows that are adversely impacting federally listed fish. What action will the Water Board take if the inter-agency plan to deal with low flows is not implemented by fall of 2010?

The revised BPA and Staff Report do not address my recommendation that near-stream wells should be examined to determine if they are impacting streamflow either by directly tapping the underflow of a stream or by contributing to lowering the water table.

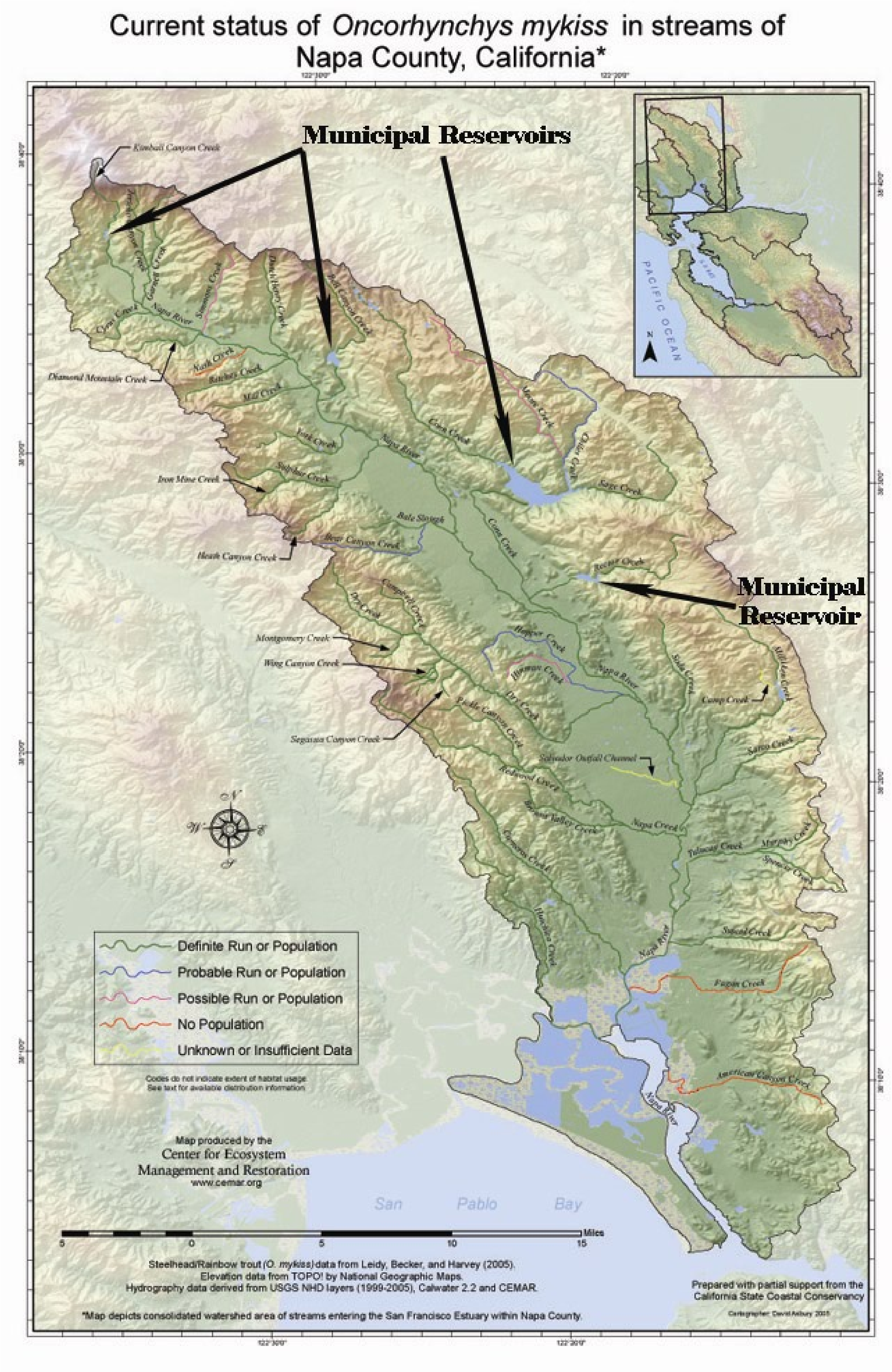

Figure 1. Current status of steelhead trout (*Oncorhynchus mykiss*) in the streams of Napa County. The locations of the four municipal water supply reservoirs are shown. The map shows that rainbow trout (*Oncorhynchus mykiss*), the landlocked version of steelhead trout are found in all of the streams above the water supply reservoirs. Map by Davis Asbury, 2005, obtained from CEMAR http://www.cemar.org/estuarystreamsreport/images/NewMaps/Napa_County_Current.pdf.

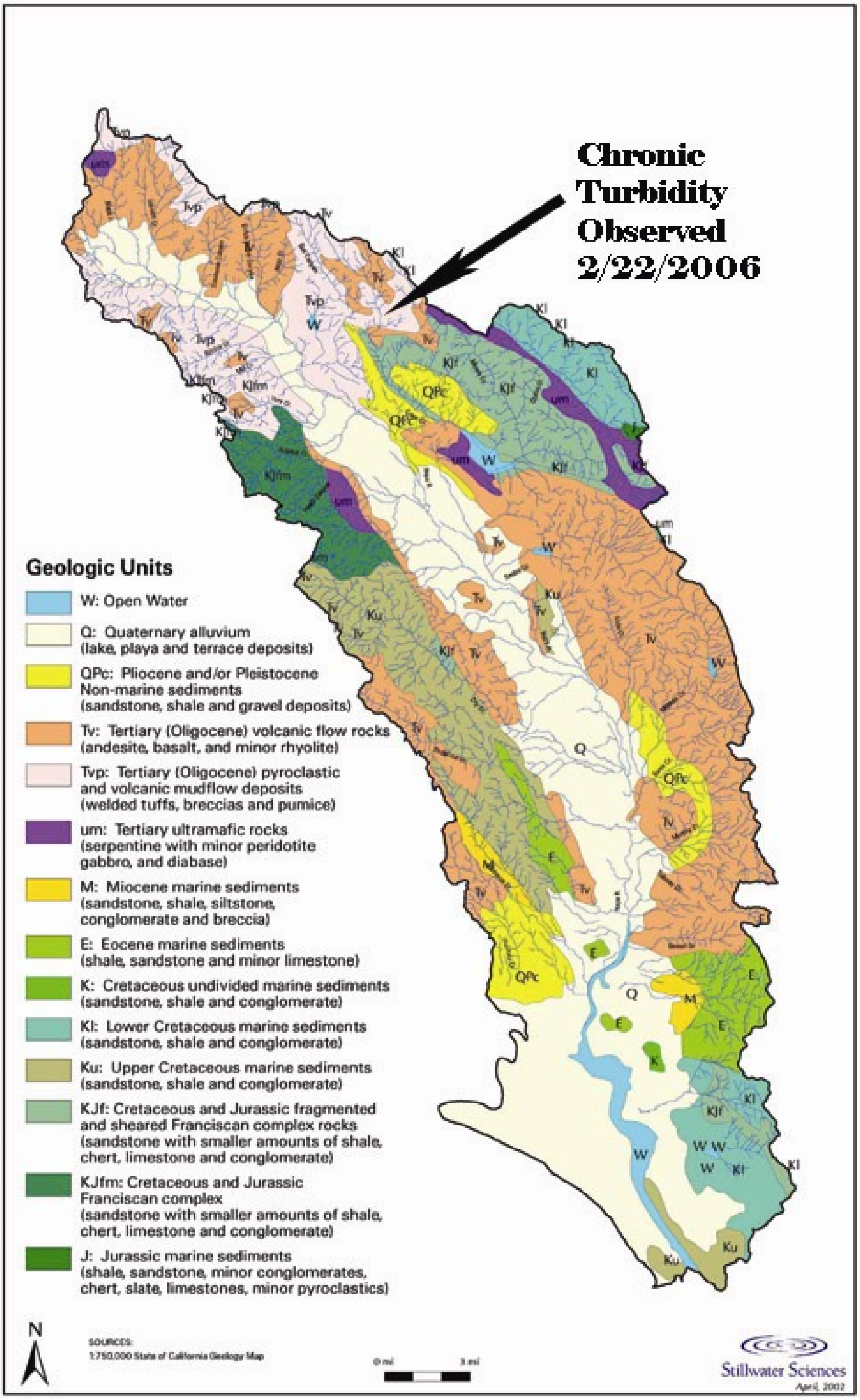

Figure 2. The Geology map from the Stillwater Sciences *Napa River Limiting Factors Analysis* report date June 14, 2002. On February 25, 2006 I noted that Con Creek was cloudy near Angwin, CA six days after the last recorded rainfall of 0.32”. The geology upstream of the point I observed the turbid water is listed as Tv and Tvp on the Geologic map. It is reasonable to expect that watersheds with a geology similar to upper Conn Creek to experience chronic turbidity.

Figure 3. Conn Creek downstream of Howell Mountain Road at Angwin on February 25, 2006. On February 19, 2006 a total of 0.32" of rain fell at the Angwin rain gauge. Note the elevated level of turbidity 6 days after the last rainfall. I estimate that the turbidity was in excess of 25 NTU. Figure 2 shows the rainfall at the Angwin rain gauge prior to the date of this photo.

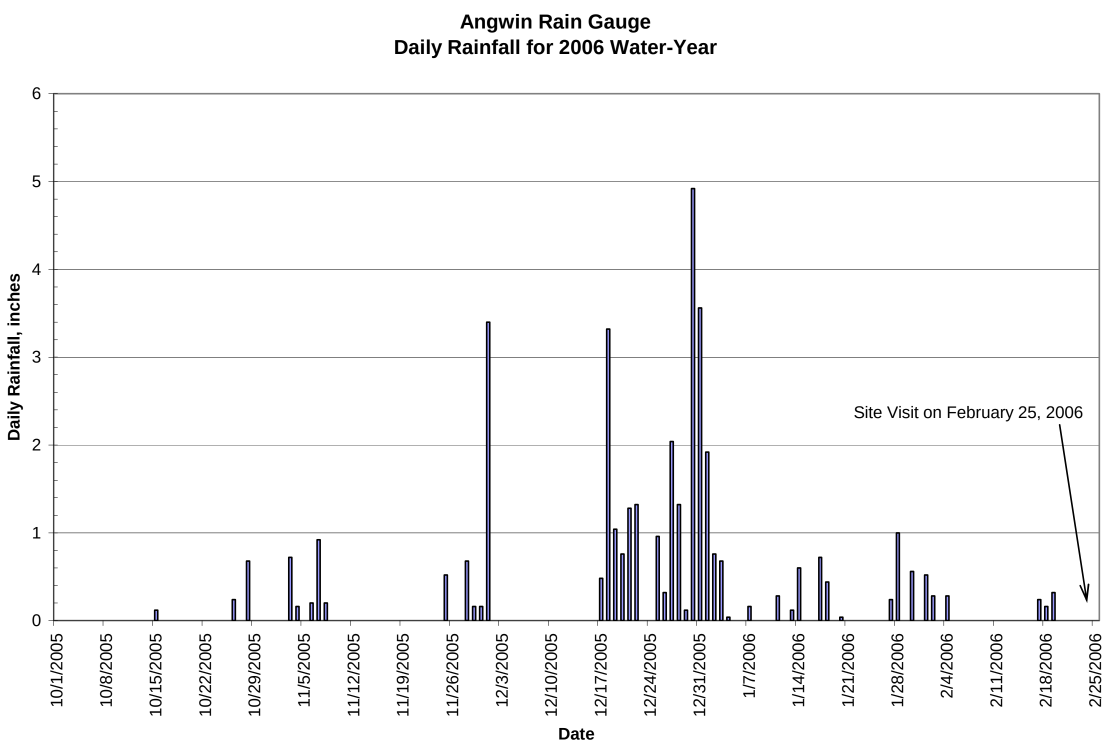

Figure 4. Daily rainfall at the Angwin rain gauge from the start of the 2006 water year to the date of the site visit to Conn Creek on February 25, 2006.=

Napa County Conservation Regulations

In my opinion, relying on the Napa County Conservation Regulations to prevent sediment related impacts from new projects is unsatisfactory. I have reviewed several vineyard conversion projects in Napa County. The hydrologic analysis for the projects I have reviewed was inadequate. County planners tend to have a superficial understanding of the complex hydrologic issues involved in significant changes in land use. The county planners have to rely on the reports prepared on behalf of the applicant.

My recent review of the Supplemental Draft EIR for the Rodgers Upper Range Vineyard Project is an example that demonstrates how difficult it will be to obtain the narrative performance standard in TMDL Table 4.1 and the less than satisfactory results of relying on the Napa County Conservation Regulations.

The narrative (non-numerical) standard for peak flow increases from TMDL Table 4.1 is:

> Effectively attenuate significant increases in storm runoff. Runoff from vineyards shall not cause or contribute to downstream increases in rates of bank or bed erosion.

To be effective in reducing sediment the TMDL must reduce the amount of sediment entering the stream channel network and must control the peak storm discharge and the duration of high discharges to avoid eroding the bed and banks of the stream. The TMDL assumes that Napa County will be able to successfully determine if the storm runoff from a given proposed development project will reduce the sediment load attributable to the project to acceptable levels and whether the project has the potential to erode the channel downstream. Napa County relies on outside experts to employ standard runoff models such as WIN TR-55 to estimate pre-project and post-project peak storm discharge. My experience indicates that, apparently, Napa County does not have the in-house expertise to evaluate the reliability of runoff models submitted in support of a project.

The following discussion of the WIN TR-55 modeling exercise submitted in support of the Rodgers Upper Range Vineyard Project Draft EIR demonstrates the problem of ensuring that the model reasonably represents real-world conditions. In the case of the Rodgers Upper Range DEIR the WIN TR-55 model was not calibrated against 14 years of peak storm discharge data collected by the USGS within a mile of the project.

WIN TR-55 Model

Mathematical models to estimate storm peak discharge are powerful tools but they need to be carefully calibrated before their results can be trusted. The Draft Hydrologic Evaluation Rodgers Upper Range Vineyard Conversion prepared by HIS, October 2005 page 2-6 concurs.

> Due to the potential for flooding of Silverado Trail, if there is any increase in runoff from the project, it is recommended that a hydraulic model of the project site be developed. **The model should be calibrated to measured data collected at the project site**. The runoff characteristics for the post-project condition should be collected from runoff measured from an adjacent vineyard with similar geology, soils, and topography. (Emphasis Added)

The WIN TR-55 model (Trso, November 2006) does not appear to have been calibrated to local pre-project conditions. The peak flood flows predicted by the WIN TR-55 model for pre-project conditions do not appear to agree with USGS data collected in a nearly adjacent Lake Hennessey Tributary watershed between 1959 and 1973. See Figure 5 for a map showing the location of the USGS Lake Hennessey Tributary gage watershed. Figure 6 shows the soil map from the Upper Range DEIR showing the stream that the USGS measured the flood peaks on. The Lake Hennessey Tributary stream gage (USGS Station Number 11456400) was operated to collect data on the flood response of small watersheds. The watershed area of the Lake Hennessey Tributary stream gage is 1.04 square miles (665 acres). The soils, land use, vegetation, and topography of the watershed of the Lake Hennessey Tributary stream gage are similar to those of Rodgers Upper Range, especially the Lake Hennessey Gulch sub-basin.

Figure 6 shows the soil map (Figure 3-8 of HIS’ Draft Hydrologic Evaluation) with the location of the USGS Lake Hennessey Tributary stream gage. The soil types mapping symbol is a three-digit number.

Table 1 shows the predicted peak flood discharges for pre-project conditions from Table 2, page 12, of Trso’s November 2006 report. Table 1 also shows the peak flood discharges for the USGS flood peak data for the same return period storms Trso estimated. Note that the predicted discharges for Lake Hennessey Gulch on the Upper Range project are much higher than the discharges estimated for the USGS Lake Hennessey Tributary data, even though the watershed area of the Lake Hennessey Gulch is 34.7% of the USGS watershed.

The peak storm discharges predicted by the WIN TR-55 model do not appear to agree with regional peak discharge data from other USGS stations in the Napa River watershed. Table 2 shows data about the location and length of record for the USGS gaging stations used to construct the regional peak discharge graphs shown in Figures 3 and 4. Table 3 shows watershed area and peak storm discharges for the same return period storms used by Trso (November 2006). Figure 7 shows the 2-year peak storm discharge for the Rodgers Upper Range watersheds and for the USGS stream gages versus the watershed area. Figure 8 shows the similar data for the 10-year storm.

In both Figure 7 and 8 the peak flood discharges predicted by the WIN TR-55 model plot higher than the data for the USGS stream gages indicating that the WIN TR-55 model predicts a greater storm peak discharge for a given watershed area than the storm discharges measured by the USGS. It is important to note that the Lake Hennessey Tributary gaging station discharges plot below the regression line for the USGS stations in the Napa River, indicating that the storm runoff from that station is lower than would be expected based on the other USGS Napa River stations.

The pre-project WIN TR-55 storm discharge model does not appear to have been adequately calibrated since it greatly overestimates the storm discharge relative to the regional USGS data, for all flood frequencies. Table 1 compares the Lake Hennessey Tributary storm discharges to the storm discharges for the Upper Range sub-basins. The predicted storm discharges for both the Rodgers Southeast Gulch and the Lake Hennessey Gulch are greater than the storm discharges measured by the USGS even though the watershed upstream of the USGS stream gage (665.6 acres) is much larger than either the Rodgers Southeast Gulch (107.8 acres) or the Lake Hennessy Gulch (231.2 acres)

Since the WIN TR-55 model does not appear to have been calibrated against locally available measured data that represent the pre-project condition its results for the post-project condition are highly suspect. In my opinion, all conclusions based on the WIN TR-55 model should be discarded.

Table 1. Estimated peak discharge for selected return period storms modeled by the WIN TR-55 model. Data from Martin Trso, November 2006, Table 2, page 12 for existing conditions. The Lake Hennessey Tributary stream gage peak discharges for the give return period events were calculated from measure runoff events between 1959 and 1973. Note that the predicted discharges for Lake Hennessey Gulch on the Upper Range project are much higher than the discharges estimated for the USGS Lake Hennessey Tributary data, even though the watershed area of the Lake Hennessey Gulch is 34.7% of the USGS watershed.

	Area acres	Area sq-mi	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Rodgers Southwest Gulch	24.4	0.038	14.7	20.7	26.7	38.8	44.9	51
Rodgers South Gulch	52.5	0.082	29.5	42.2	55.3	81.8	95.1	108.4
Rodgers Southeast Gulch	107.8	0.168	63.1	88.5	114.4	166.7	192.8	219.1
Lake Hennessey Gulch	231.2	0.361	134.4	188.6	243.8	355.5	411.3	467
Sage Canyon Gulch	20.4	0.032	11	15.8	20.9	31.2	36.4	41.5
USGS Lake Hennessey Trib	665.6	1.04	56	103	134	173	203	231

Table 2. Location and length of record for USGS gaging stations in the Napa River watershed with peak discharge records.

Napa River Streams	Station #	Latitude	Longitude	Start of Record	End of Record	Years of Record
Lake Hennessy Tributary	11456400	382900	1222115	1959	1973	14
Sulphur Creek Nr St Helena	11455950	382916	1222850	1956	1973	18
Redwood near Napa	14458200	381904	1222035	1959	1973	15
Tulucay Creek near Napa	11458350	381709	1221629	1972	1983	12
Napa Creek at Napa	11458300	381807	1221810	1971	1983	13
Milliken Creek near Napa	11458100	382019	1221606	1971	1983	13
Dry Creek near Napa	11457000	382123	1222150	1952	1966	15
Napa River near St. Helena	11456000	382952	1222537	1929	1996	58

Table 3. Peak storm discharge for selected return period events for USGS stream gages in the Napa River watershed listed in Table 2.

Napa River Streams	Watershed Area (sq-miles)	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
Lake Hennessy Tributary	1.04	56	103	134	173	203	231
Sulphur Creek Near St Helena	4.5	528	724	854	1,018	1,140	1,261
Redwood near Napa	9.79	1,007	1,341	1,563	1,843	2,051	2,257
Tulucay Creek near Napa	12.6	898	1,682	2,201	2,857	3,343	3,826
Napa Creek at Napa	14.9	1,472	2,441	3,083	3,893	4,494	5,091
Milliken Creek near Napa	17.3	1,649	2,778	3,525	4,470	5,171	5,867
Dry Creek near Napa	17.4	1,456	2,308	2,872	3,585	4,114	4,639
Napa River near St. Helena	81.4	5,879	9,276	11,526	14,368	16,477	18,570

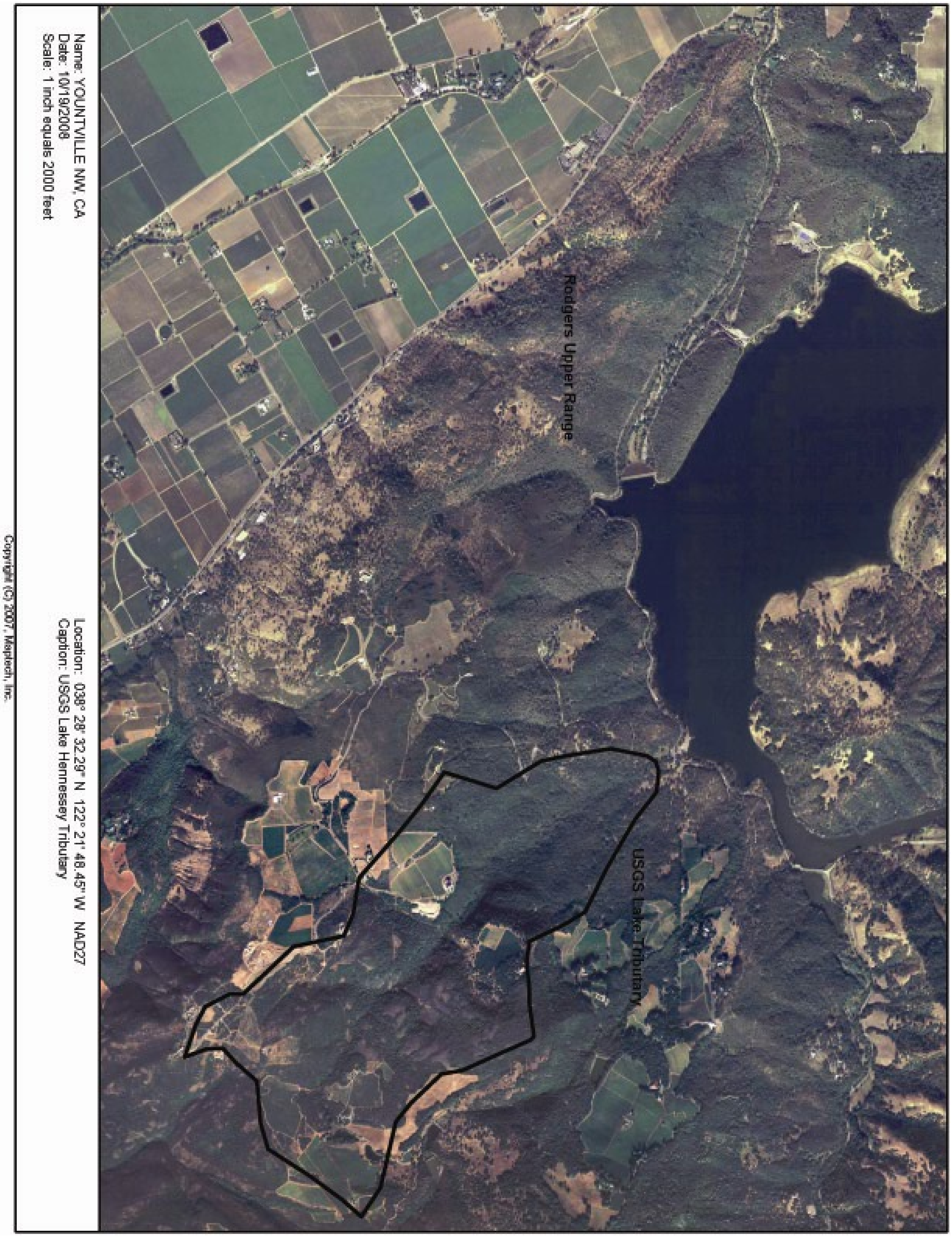

Figure 5. The USGS Lake Hennessey Tributary stream gage is almost adjacent to the Rodgers Upper Range project. The watershed area of the Lake Hennessey Tributary stream gage is 1.04 square miles.

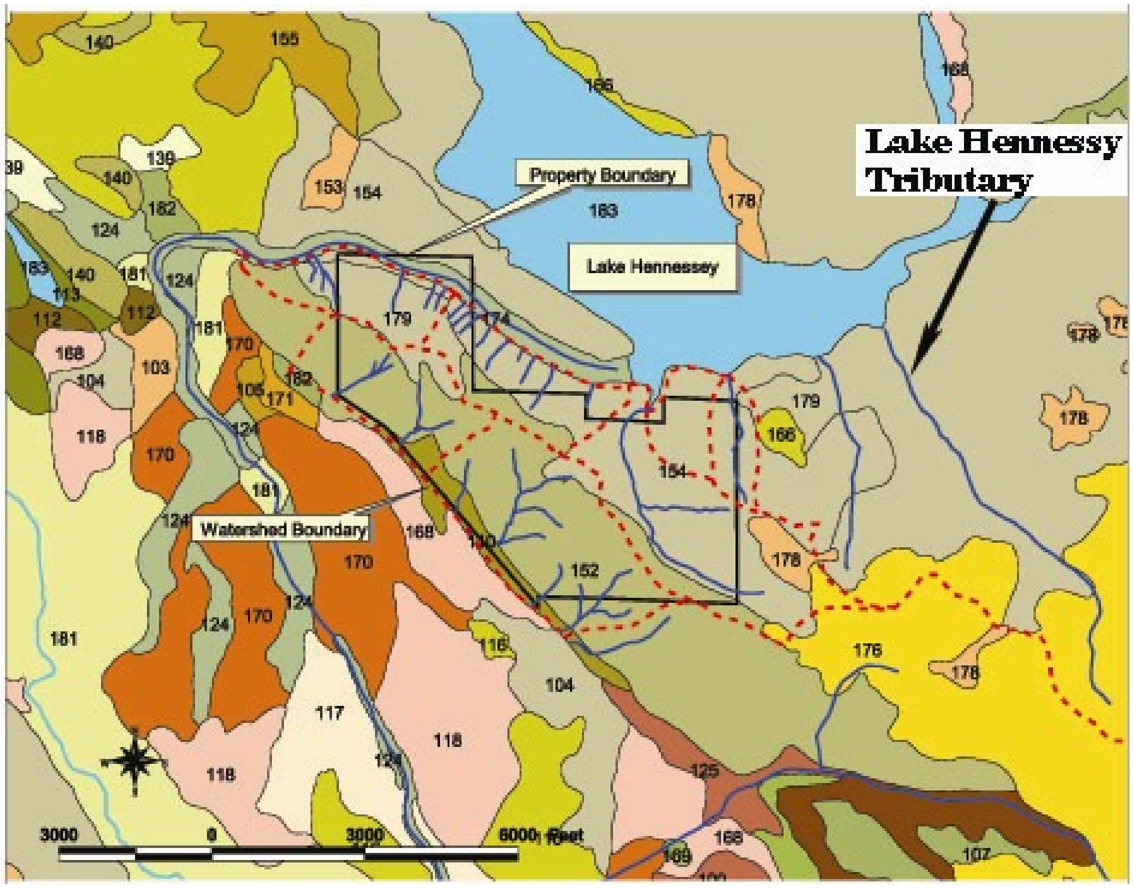

Figure 6. Soil map of the Rodgers Upper Range project showing the location of the stream that the USGS measured flood peaks on from 1959-1973. The stream gage name is Lake Hennessey Tributary and its station number is 11456400. The soil types in the watershed draining to the USGS gage are given below. Base map is Figure 3-8 of HIS' Draft Hydrologic Evaluation.

Napa County, California (CA055)
Map Unit Symbol Map Unit Name Acres

154 Henneke gravelly loam, 30 to 75 percent slopes.

176 Rock outcrop-Hambright complex, 50 to 75 percent slopes.

178 Sobrante loam, 5 to 30 percent slopes

179 Sobrante loam, 30 to 50 percent slopes

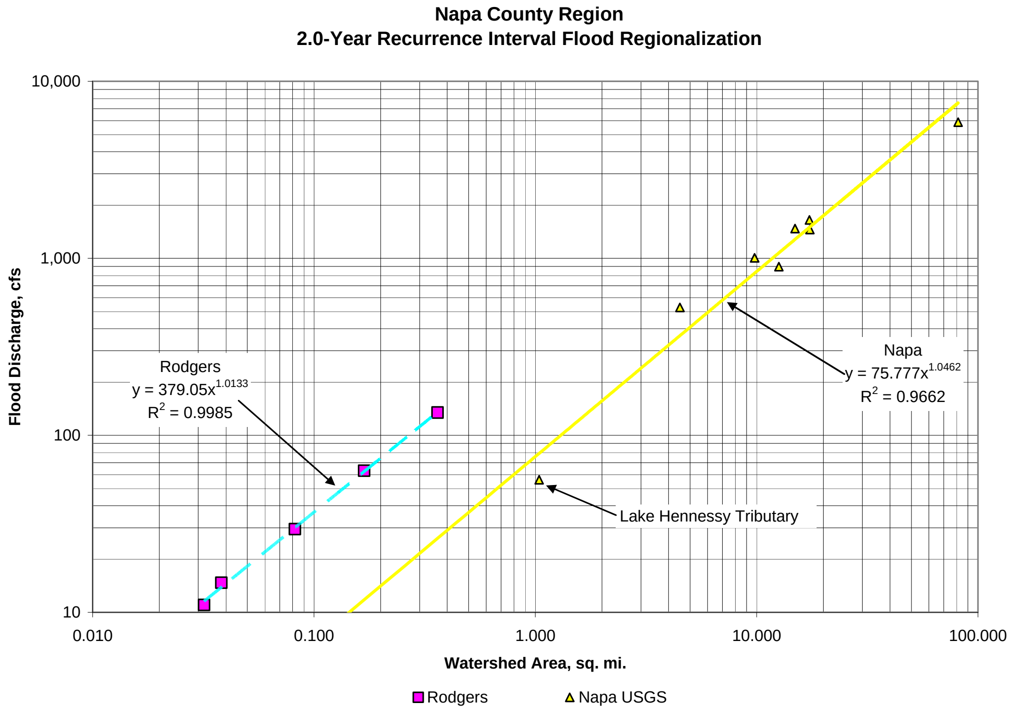

Figure 7. The estimated 2-year peak storm discharge for the Rodgers Upper Range watersheds do not agree with the 2-year storm discharge measured at USGS stream gages in the Napa River watershed.

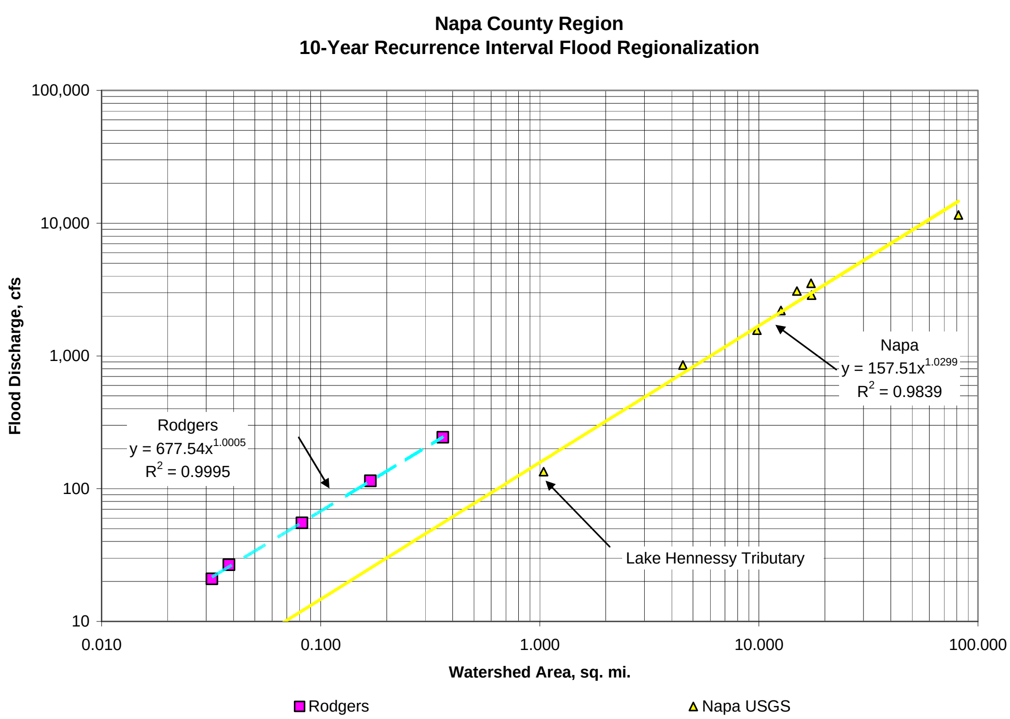

Figure 8. The estimated 10-year peak storm discharge for the Rodgers Upper Range watersheds do not agree with the 10-year storm discharge measured at USGS stream gages in the Napa River watershed.

Impacts of the TMDL Implementation

Many aspects of the TMDL rely on Napa County being able to apply their Conservation Regulations to proposed development projects. However, the Conservation Regulations have never been submitted to the CEQA process and therefore there is no guarantee that their application will not result in adverse environmental impacts.

As discussed above, Napa County lacks the technical resources to be able to ensure that proposed development projects will not generate sediment loads in excess of those specified by the TMDL and ensure that the proposed projects will, “Effectively attenuate significant increases in storm runoff”. Therefore, it is reasonable to assume that projects reviewed and approved by Napa County may have the potential to generate peak flow runoff that can contribute to downstream channel enlargement.

Conclusions

I personally observed chronic turbidity on Conn Creek near Angwin, CA in February 2006, six days after a minor rainfall event. It is likely that the source of the turbidity was the Tertiary Pyroclastic Volcanic flows and mudflows (geologic map symbol Tvp). Several watershed in the upper portion of the Napa River are underlain by the pyroclastic and mudflow units. These watersheds also support steelhead trout (Oncorhynchus mykiss) or rainbow trout (Oncorhynchus mykiss), the landlocked version of steelhead trout. These facts indicate that the TMDL should regulate the levels of turbidity to protect the Cold Water Fishery beneficial use and to protect the federally listed steelhead trout (Oncorhynchus mykiss). These facts also show that the TMDL should be applied above the municipal water supply reservoirs.

The TMDL should require studies to determine if the operation of the individual municipal water supply reservoirs can be changed in a way to decrease the erosive power of their winter storm releases or whether their collective winter releases can be beneficially coordinated.

Illegally constructed dams should be either removed or altered to allow free movement of sediment and fish.

The 1972 Fish and Game report found that the 15 cfs bypass flow for the November 15 through February 29 required in 25 appropriative water rights was inadequate to protect the fishery. Adequate flows of water are crucial for fish. The apparent need to modify existing water rights is a difficult legal issue but it should still be addressed.

The approach to low flows outlined in Table 5.2 of the revised BPA is incomplete since it does not recognize the impact of spring frost protection as a “stressor” and does not specifically name the Department of Water Resources Frost Protection Watermaster as one of the “Implementing Parties”.

I have demonstrated that Napa County does not the necessary in-house expertise to evaluate the validity of mathematical model output used to evaluate whether a project has the potential to increase peak storm discharge and sediment loads. It is crucial that mathematical models be carefully calibrated to real-world conditions.

Sincerely,

Dennis Jackson

Dennis Jackson
Hydrologist

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