

**Dorsey, Kelly@Waterboards**

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**From:** Michael Fitts <gostodas1@yahoo.com>  
**Sent:** Thursday, February 21, 2013 10:59 AM  
**To:** Bradford, Darren@Waterboards  
**Subject:** Comments re Tentative Order No. R9-2013-0007; Place ID: 785677  
**Attachments:** Tesoro\_letter\_plus\_figures\_out.pdf

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Dear Mr. Bradford:

The Endangered Habitats League (EHL) respectfully submits the attached letter dated February 15, 2013 to Michael Fitts from Christian Nilsen of PWA/ESA Associates regarding the above-referenced Tentative Order for Waste Discharge Requirements (WDR) for the proposed Tesoro Extension in Orange County, California.

The attached letter explains why the WDR application from the project sponsor, the Foothill/Eastern Transportation Corridor Agency, fails to implement the adopted Southern Orange County Hydromodification Management Plan (Orange County, 2011). Since waste discharge "requirements *shall* implement any relevant water quality control plans that have been adopted" (Water Code Sec. 13263), the WDR application must be denied as a matter of law.

Can you please confirm receipt of this email and the attachment in good order by responding to this email? Thank you for your consideration of these comments.

Very truly yours,

Michael D. Fitts  
Staff Attorney  
Endangered Habitats League



550 Kearny Street  
Suite 900  
San Francisco, CA 94108  
415.262.2300 phone  
415.262.2303 fax

March 13, 2013  
Item No. 8  
Supporting Document No. 7

February 15, 2013

Michael Fitts  
Endangered Habitats League  
8424 Santa Monica Blvd., Suite A 592  
Los Angeles, CA 90069

**Subject:** Review of TCA's Report of Waste Discharge Application for the Tesoro Extension Project

Dear Michael:

At your request, we have reviewed the Report of Waste Discharge Application Package (RBF, 2012) for the Tesoro Extension Project in Orange County, California. The report was submitted by the Transportation Corridor Agencies (TCA) to the San Diego Regional Water Quality Control Board (RWQCB) to obtain authorization for discharge of clean fill to waters of the State. The RWQCB issued a tentative order of Waste Discharge Requirements (WDR) for the project with a date of adoption of March 13, 2013 (RWQCB, 2013).

In summary, we have found that:

- The applicant's report does not analyze impacts from the project on bedload (coarse sediment) on receiving waters as required by the Southern Orange County Hydromodification Management Plan (HMP) (Orange County, 2011).
- The impacts of stormwater on bedload transport are higher, and the sensitivity of the receiving water greater than would be the case for more typical urban development due to the steep channels and hillslopes being graded by the project (15 to 20 percent slopes).
- As proposed, the project would eliminate headwater channels, likely resulting in a significant reduction in bedload to receiving waters.
- The proposed mitigation for the project is focused in a watershed that contributes less bedload, potentially resulting in less than equivalent mitigation of lost bedload supply.
- As proposed, the project is expected to result in channel incision, bank failure and habitat degradation in Wagon Wheel Creek, Canada Gobernadora, and Chiquita Creek. These project effects would contribute to the further reduction of coarse sediment supply to San Juan Creek. San Juan Creek is a coastal stream which has habitat and public safety concerns directly related to existing reduced levels of coarse sediment supply.

The conclusions are supported in the discussion below.

## PROJECT UNDERSTANDING

The 241 Tesoro Extension Project would extend the existing State Route 241 from Oso Parkway to just north of Ortega Highway – a distance of 5.5 miles. As proposed, the project would impact waters of the state within the Cañada Chiquita watershed, Cañada Gobernadora watershed, and Wagon Wheel Creek watershed (a tributary to Cañada Gobernadora).



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According to the applicant, the project would result in permanent impacts to 5,297 linear feet of ephemeral channels. These impacts would be a result of grading and filling, necessary for construction of the proposed roadway.

The applicant proposes to mitigate for these impacts through creation of 4,860 linear feet of new ephemeral channels and restoration of 5,456 linear feet of ephemeral channel at a site identified as Mitigation Site B, in the Cañada Chiquita watershed. Water quality impacts would be mitigated through the use of stormwater best management practices such as swales, sand filters, and detention basins. Changes in runoff would be mitigated through detention basins that have been sized to control the post-project runoff to pre-project levels from 10 percent of the 2-year event up to the 10-year event in accordance with the South Orange County HMP. The applicant has performed continuous simulation modeling as required by the HMP to verify flow rates. Analysis of changes to bedload due to the project has not been performed.

## HYDROMODIFICATION BACKGROUND

Under the National Pollutant Discharge Elimination System (NPDES), municipalities are required to manage hydromodification from urbanization through Hydromodification Management Plans (HMPs). The South Orange County HMP applies to projects in Orange County that are within the San Diego RWQCB's jurisdiction. The proposed project is subject to the criteria laid out in the South Orange County HMP.

Hydromodification refers to the impacts of an altered hydrologic/sediment regime due to urbanization on a receiving channel. Typically, following urbanization, altered land uses (i.e. new impervious surfaces) can lead to erosion, sedimentation, and degradation of in-stream habitat. The processes involved are complex, but are caused by changes to the hydrologic regime of a watershed due to increase impervious surfaces, a more efficient storm drain network, and a change in historic sediment supply sources.

To illustrate the interaction between sediment, discharge, and channel response, a qualitative expression was presented by Lane (1955) describing a balance between sediment supply, sediment size and the erosive power of stream discharge. This expression is shown below:

$$Q_s d_{50} \propto Q_w S$$

This relationship shows that the mass of sediment<sup>1</sup> transported by a stream is proportional to the discharge and slope, with changes in the balance to the water or sediment supply resulting in channel adjustments through either erosion (degradation) or deposition (aggradation). It is helpful to display this graphically in what is known as Lane's Balance, shown in Figure 1. As illustrated in Figure 1, an increase in water discharge ( $Q_w$ ) or a reduction in coarse sediment load can both lead to channel erosion. To prevent damaging changes to stream channels, both runoff and sediment supply must be kept in balance. While older stormwater regulations have focused on preserving pre-project runoff, more recent regulations including the Orange County HMP have

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<sup>1</sup> ( $d_{50}$  is the median diameter of sediment,  $Q_s$  is the sediment discharge rate)



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recognized the importance of preserving coarse sediment supplies. These regulations also recognize the difference between fine sediment (often associated with pollution transport) and coarse sediment which provides beneficial functions to streams. For these reasons the Orange County HMP specifically requires developers to identify and preserve reaches of creeks that play an important role in generating bedload.

## SUPPORT OF FINDINGS

1. The applicant's report does not analyze impacts from the project on bedload (coarse sediment) as required by the South Orange County HMP

As stated in the South Orange County HMP, "Urbanization can reduce the mass of bed material transported through the elimination of alluvial channel sections. This occurs in site development when first order and particularly larger streams are lined or placed into underground conduits."

To properly manage bedload supply in urbanization projects, the South Orange County HMP recommends a three-step process:

1. Determine whether the site is a significant source of bed material to the receiving stream.
2. Avoid significant bed material supply areas in the site design.
3. Replace significant bed material supply areas that are eliminated through urbanization.

As an alternative to the steps above, the HMP allows "the project applicant to model the site conditions and the receiving stream and provide additional mitigation in site runoff to compensate for the reduction (or addition) of bed material. This option may only be used if the general approach outlined above is deemed infeasible by the permitting authority, or if the project site design requires significant alteration of on-site stream."

Our review of the applicant's report along with supporting materials found no bedload analysis. A limited sediment study was performed for bulking analysis of discharge for closed conduit design, but these studies do not satisfy the requirements of the HMP. At a minimum, to comply with the HMP, the applicant would need to determine whether or not impacted streams are a significant contributor of bed material. If impacted streams were found to contribute bed material, the design of the project would need to be revised to accommodate bedload supply areas, or bedload supply would need to be replaced. It is important to stress that the Orange County HMP requirement for analysis and preservation of bedload sources was specifically written with developments on steep hillslopes such as those underlying the proposed project site in mind.

2. The proposed project would likely result in a significant reduction in bedload to receiving waters

It has been well documented that headwater channels (also referred to as first-order channels) are the primary coarse sediment source for downstream channels (Schumm and Hadley, 1961; Boyce, 1975; Strand, 1975; Schumm, 1977; Dietrich and Dunne, 1978). Headwater channels are characterized by



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steep, ephemeral drainages, where a mix of fluvial and hillslope processes transport sediment. These are high sediment areas that episodically deliver coarse sediment to higher-order streams, which in turn transport and store sediment.

Figure 2 shows several headwater channels within the Wagon Wheel Creek watershed that would be affected by grading activities due to the project. The proposed project would fill in the steep-headwater valleys and move the stream channels to hardened underground conduits. The applicant has not analyzed the effect of these actions on bedload transport rates to receiving streams, but knowing what we know about sediment production in headwater channels, we would expect this action to have a significant effect on the supply of bedload to Wagon Wheel Creek, Canada Gobernadora, Chiquita Creek, and San Juan Creek.

According to sediment transport principals as illustrated graphically by Lane's balance, reduced bedload supply to these channels would result in channel degradation consistent with observations of channel response due to hydromodification. These effects would be channel incision, headcut migration, bank failure and loss of aquatic habitat, all of which would negatively affect beneficial uses of downstream channels.

3. The proposed mitigation for the project would not replace lost bedload

While impacts to bedload supply would be expected to occur in three watersheds (Wheel Creek, Canada Gobernadora, Chiquita Creek, and San Juan Creek) mitigation for channel loss is proposed in only one watershed- the Chiquita Creek watershed. The currently proposed mitigation areas do not appear to match the area impacted by coarse sediment reduction.

Moreover, according to the applicant's report, the Chiquita Creek watershed produces substantially less sediment than Canada Gobernadora:

“Several active headcuts are present in Cañada Chiquita Creek, and the channel is presently incising in several locations. Continued channel incision will increase the sediment generation for the sub-basin by increasing in-channel sediment generation. The Chiquita subbasin produces substantially less sediment than Gobernadora Canyon (US Army Corps of Engineers 2005)<sup>2</sup>.”

Mitigation in the Chiquita Creek watershed will likely produce substantially less bedload than the impacted streams in the Wagon Wheel/Canada Gobernadora and therefore would not replace the lost bedload. In addition, the proposed project is expected to reduce coarse sediment supply in San Juan Creek, a coastal stream.

4. As proposed, the project would be expected to result in channel incision and bank failure in Wagon Wheel Creek, Canada Gobernadora, and Chiquita Creek. In this way, the project would contribute to the

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<sup>2</sup> Section 2.1.2 of the Runoff Management Plan. Section E of the applicant's report.



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further reduction of coarse sediment to San Juan Creek, a coastal stream which has several habitats and public safety concerns which could be exacerbated by the reduced sediment supply

The flow control requirements in the Orange County HMP (controlling flows from 10 percent of the 2-year event up to the 10-year event) are average controls that encompass a diverse range of channel sensitivities across the County. Some receiving waters are more sensitive while some are less so. Steep headwaters such as the project site are especially sensitive to hydromodification.

The effects of hydromodification on stream channels have been well documented (Hawley, 2009; Hawley, Bledsoe and Stein, 2011). We expect the project as proposed to cause channel degradation consistent with observed hydromodification effects including large-scale channel enlargement, general scour, stream bank failure, loss of aquatic habitat and degradation of water quality.

The San Juan Creek watershed has been shown to be a sediment starved system that has shown significant degradation since 1970. Below is an excerpt from ACOE (2005):

“Results of the geomorphic analyses on San Juan Creek from Bell Canyon to the ocean outlet show significant degradation from 1970 to 1984 and continuing lower rates of degradation through 1998...The net effect of bed degradation is its impacts on associated resources, both natural and manmade. Bed degradation will eventually cause (and has already caused) the bed elevation to reach the level of buried pipelines, causing failure of water and sewer lines. It will cause erosion of bed sediments resulting in disappearance of habitat within the bed. If continuous, the resource will disappear permanently.”

## CONCLUSION

The proposed project will develop a series of steep hillslopes drained by channels that are highly sensitive to disruptions of their runoff or sediment supply. While the proposed project has submitted a Waste Discharge Application that appears to address the flow control portion of the HMP, it does not address the bedload preservation portion of the HMP. As such we expect that receiving waters will experience a reduction in bedload that would negatively affect beneficial uses. The project's proposed mitigation does not properly address the anticipated impacts. We expect that the project would cause significant damage to receiving waters if built as proposed.

Sincerely,

A handwritten signature in blue ink that reads 'Christian Nilsen'.

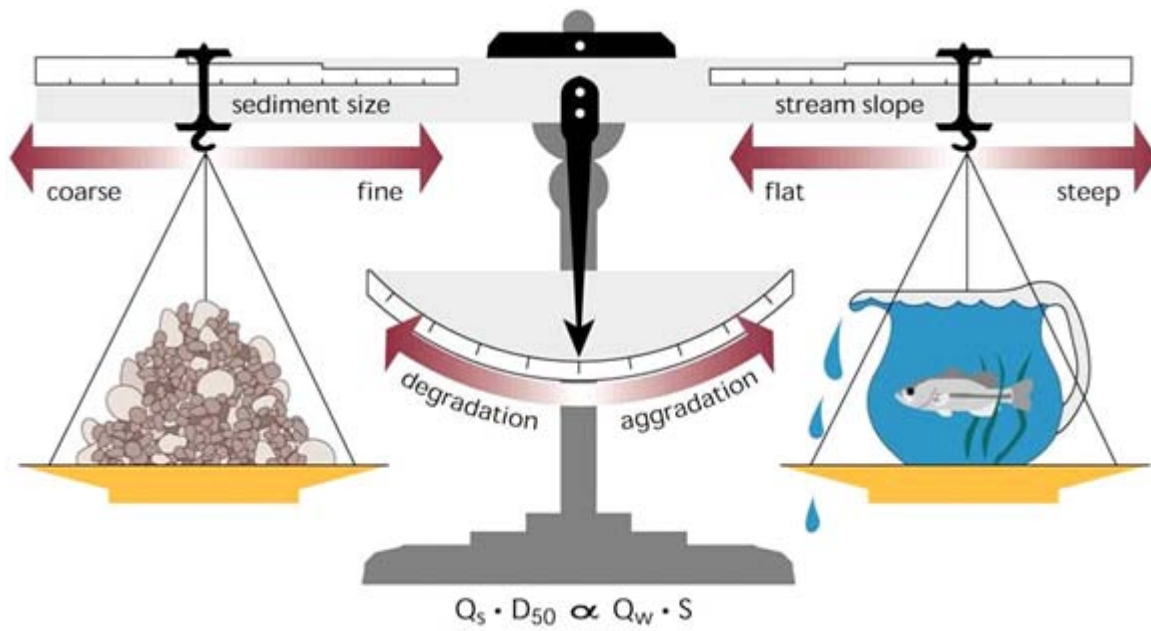
Christian Nilsen, PE  
Senior Hydrologist



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## REFERENCES

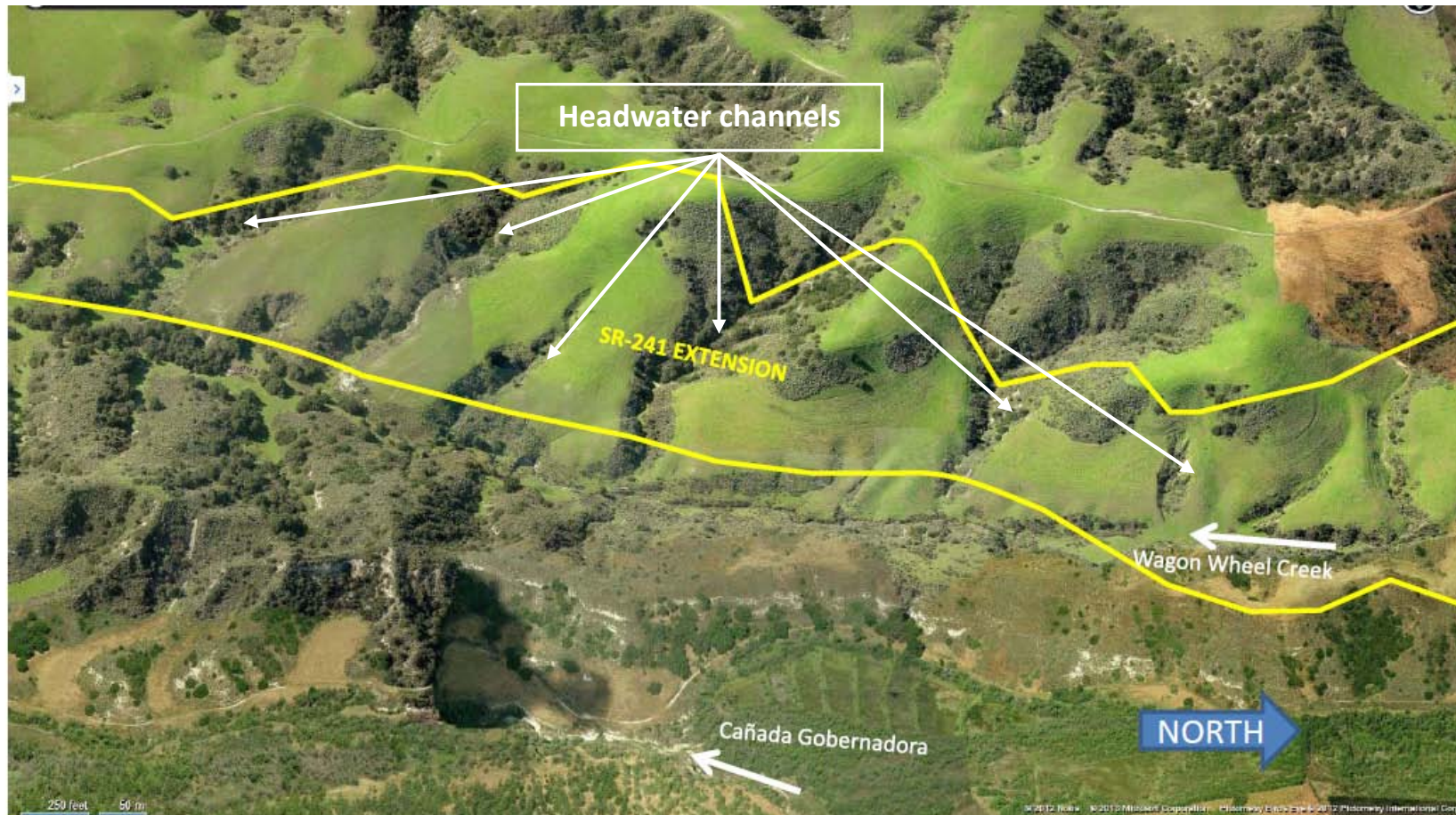
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- RWQCB, 2013. Tentative Order No. R9-2013-0007 Waste Discharge Requirements for Foothill/eastern Transportation Corridor Agency Tesoro Extension (SR 241) Project Orange County



SOURCE: Lane, 1955

Tesoro Extension Project WDR Review  
**Figure 1**  
Lane's Balance





Tesoro Extension Project WDR Review

**Figure 2**

Estimated project footprint's impact on headwater channels on Wagon Wheel Canyon