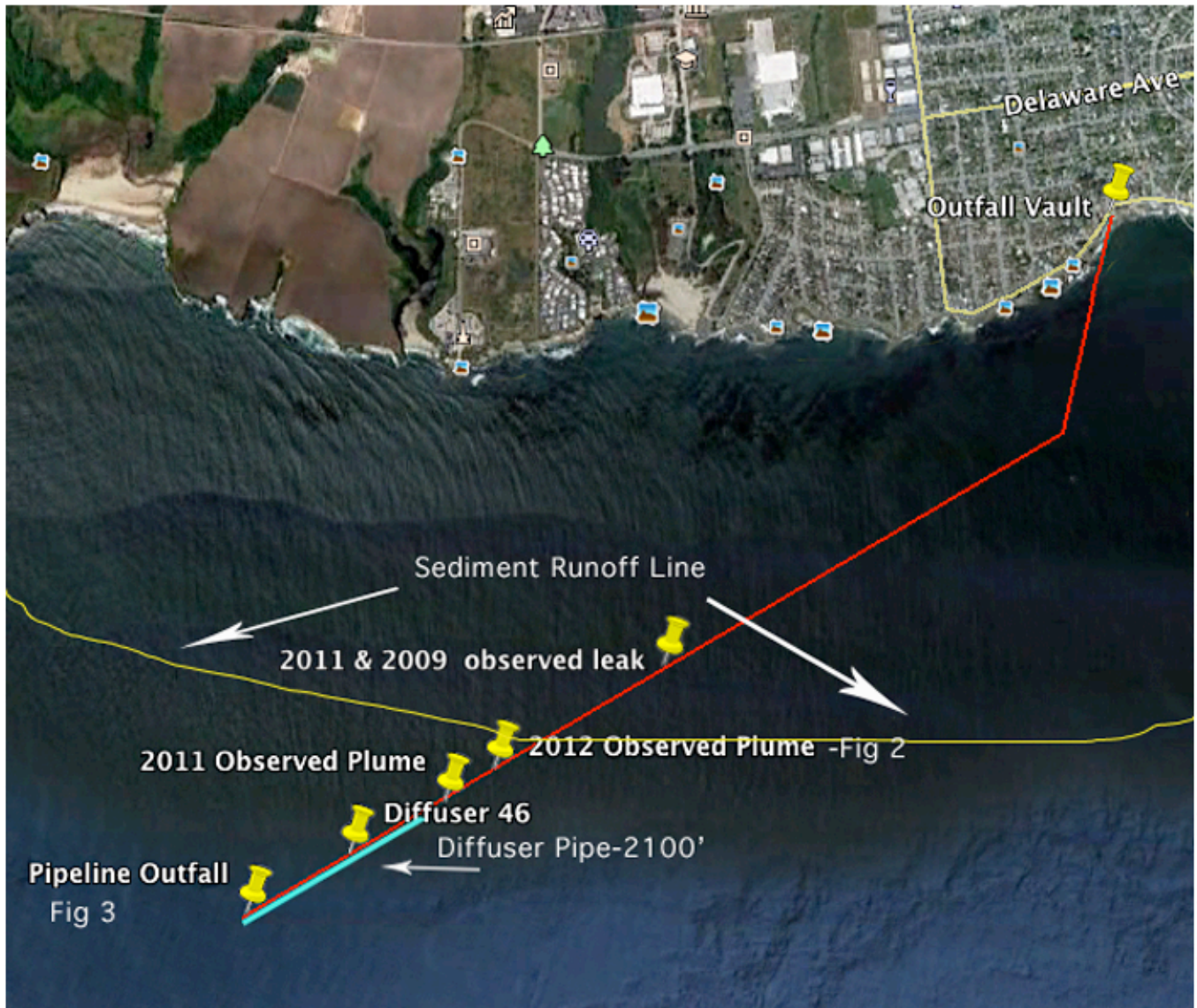


Dye Study

Wastewater Treatment Effluent Ocean Outfall Overflight

On Friday, December 7, 2013 the City of Santa Cruz conducted a dye test of the Wastewater Treatment effluent ocean outfall to visually search for leaks. An overflight was performed between 11:55 am to 12:45 pm using the aerial services of **Skywords Aerial Services**. An on-board standard global positioning system (GPS) was used for navigation and positioning.



The weather was clear with unrestricted visibility and the sea was calm. Approximately 2.5" of rain had fallen between Dec 1&5 and there was a distinct sediment runoff line apparent in the water. A decision was made that it would not be a hindrance to observation and at approximately 12:03 pm 90 gallons of yellow liquid dye were added at the Wastewater Treatment facility.

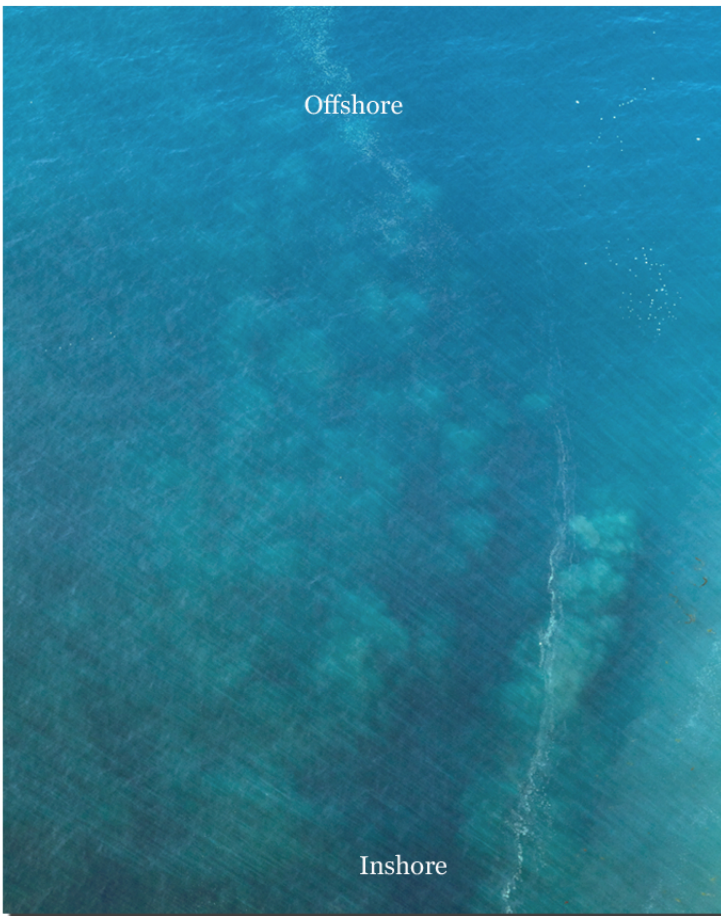


Figure 3 - At 12:34 pm a faint plume was observed at the outflow pipe end. Prior to this pass over the pipe end coordinates no plume had been observed. Subsequent observation of the area until 12:45 did not reveal a stronger plume, only a dissipation of it.

No leakage plume was detected in the areas previously observed in 2009 & 2011. This could be due to the leaks do not exist or the sediment runoff created adverse detection conditions.

A previous flight attempting the study had to be aborted due to fog over the site. Weather during the next 2 weeks continued to be unsuitable for another attempt until the December 7 date arrived. Concerns about the fair weather window of opportunity disappearing and the end of year deadline for the study completion factored into the decision to make the flight on that day. Due to the ability to obtain the dye quickly a reflight could not be considered.

To avoid repeating the current results, future studies are recommended to be conducted earlier in the year prior to the beginning of the rainy season.

Figure 2 - At 12:29 pm a plume of dye was sited at the edge of the sediment runoff line at what appears to be the beginning of the diffuser pipeline section. This plume was visible to the camera only from the area looking from onshore to offshore. It is possible this was due to the lower angle of the sun at this late date in the year.

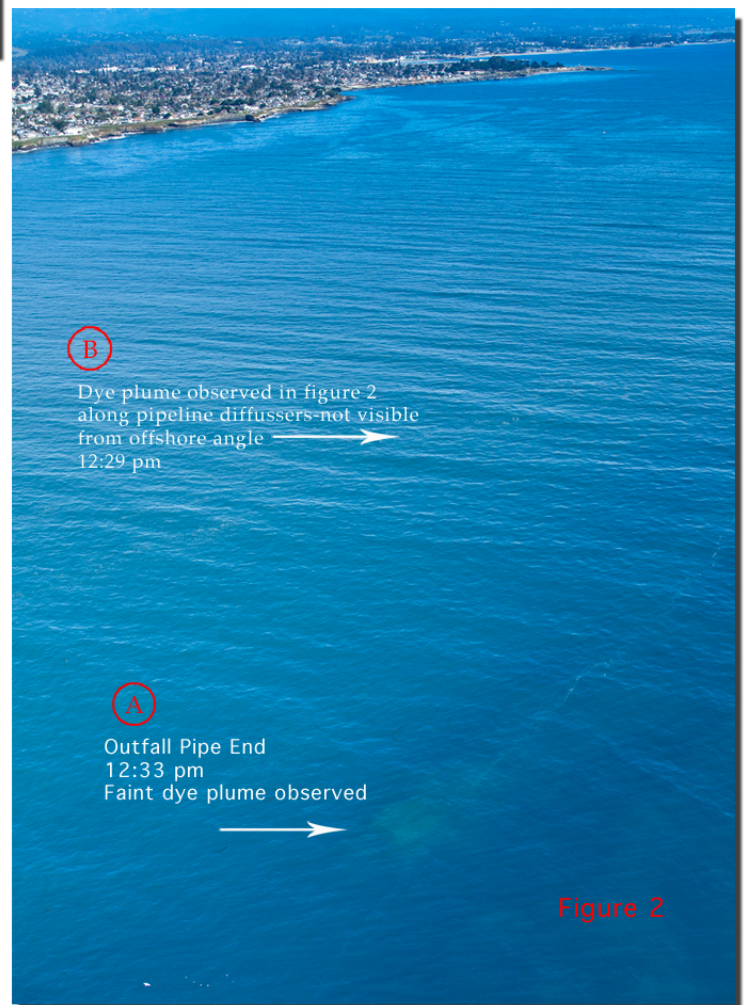


Figure 2