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|  | **Detecting Fresh Water Pollution Using Vibrio Harvyi**  The Arroyo Del Valle runs through the small town of Pleasanton. Del Valle Lake feeds the creek through natural settings to developed areas and along side factories. It eventually flows into another small creek, Arroyo De La Laguna, which runs along the 680 freeway. The water eventually spills into the San Francisco Bay. Our belief is that different areas of the creek will give barring levels of pollution depending on their surroundings.  The creek began as a rich habitat for many birds, fish, and animals. Since then there have been many factors impacting the creek, forcing it to change dramatically. The biggest is the increase in population. We feel that this increase in population has slowly increased the pollution as well.  The eight sites we chose are very different, because of this we expect to find different levels of pollution. To test the pollution of the creek we used a strand of Bacterium Bioluminescence called Vibrio Harvyi.  Vibrio Harvyi is a type of Bioluminescence. Bioluminescence is "the production of light by living organisms" (The Bioluminescent Webpage).  Picture of a colony of bioluminscent bacterium producing light.  The picture is taken in the dark.  Bioluminescence is commonly found in ocean water, but is scare on land. If on land it is usually a glowing fungus on wood or insects, such as the Firefly. For the most part Bioluminescence is also absent in fresh water. The light given off by living organisms occurs as a chemical reaction when they are excited mostly by the movement of other animals or a natural disaster (Waters).  The chemical reaction that occurs is much like this:  Luciferin = produces the light  Luciferase = catalyzes the light  Oxgyciferin = is the light  In this chemical reaction first luciferin and oxygen bind. Then luciferase acts upon or catalyzes luciferin to produce light, oxyluciferin. To continue the cycle and make more light, energy has to be added in the form of ATP (The Bioluminescent Webpage).  Oxyluciferin, the light in the reaction is made when a photoprotein (luciferin, luciferase and oxygen bound together) is bound to a certain ion, most commonly calcium (IBID).  Luciferin, which binds to oxygen to began the cycle, is obtained in organisms in one of two ways. Either it is eaten and eventually gets to the organism by the food chain or the organism synthesizes it on their own. The luciferin in our organism, Vibrio Harvyi, which is a bacteria (IBID).  Bioluminescence plays an important role in the ecology of the land and most importantly the ocean. In the deep oceans Bioluminescence is often the only source of light. Other organisms are able to "detect and respond to the light" (Hastings 2nd edition).  There are three main ways the light of bioluminescence is used. They are offense, defense, and communication. Defensively, the light is used by the organisms to startle and divert predators. To do this the organism uses flashes of it's light. The light can also be used as camouflage. Offensively, the light is used to attract prey. The light can also be a means of communication for mating (IBID).  Although there are many types of bioluminescence, we studied and used Vibrio Harvyi in our experiment. This organism is one of the easiest to get and is fast to grow. Vibrio Harvyi is a bacteria found within the first ten feet of the Indian Ocean (Gordon).  We think there is a considerable amount of pollution in the Arroyo Del Valle. In our experiment we tested to find the pollution at different spots throughout the Arroyo Del Valle. We added Vibrio Harvyi to creek water and watched the light emitted to find if the creek was toxic. We feel Vibrio Harvyi will be an effective way to test the toxicity of the Arroyo Del Valle.  We came up with this idea from the article, Is Your Water Fit For Drinking? written by David George Gordon. To read this article click: ["Is Your Water Fit For Drinking?"](about:blank) |

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*This Web Site is Best viewed with 256 or more colors.*

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