



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> Emma C. Kelsey	<b>Project Number</b>  22270
<b>Project Title</b> Seasonal Changes in Little River Estuary	
<b>Abstract</b> <b>Objectives/Goals</b> My objective was to find out how the salinity, water temperature and water level changed in Little River estuary from summer to winter, and to look for long-term changes in the river channel. <b>Methods/Materials</b> I used a salinity meter and sounding line to measure water characteristics at three sites in the downstream 1.2 miles of the Little River estuary. Every month I paddled a canoe out to my measuring sites and recorded my data. I used a hand held Global Positioning Satellite system (GPS) to make a cross section of my deepest site and to map the current path of the river channel. <b>Results</b> I found that in August through October there was a salt water layer at the bottom of the estuary. With higher precipitation and stream flow in November and December, the water temperature dropped, the water level dropped, and the salt water disappeared. In January I observed salt water in the estuary again. When I compared the current path of the river channel to the mid-1960s channel, I found that the current path goes 80 to 100 m farther west, into the dunes, while the older channel had stayed next to the cliff. <b>Conclusions/Discussion</b> The changes I measured from summer to winter were related to changes at the mouth of the estuary. There was a berm blocking the mouth in August through October. In November the berm broke, the water level dropped, and all of the salt water washed out of the estuary. In January, large waves moving up the estuary started bringing salt water back in again. In the 1960s the highway bridge over the river was supported on pillars, but between then and now the bridge has been widened and the space between the pillars has been filled in by cement walls. The river was able to flow around the pillars, but when the cement walls were put in they directed the river out into the dunes where the channel tends to be shallow and smooth rather than deep and rocky like it is next to the cliff. This change is not good for salmon habitat in Little River estuary because salmon like deep pools.	
<b>Summary Statement</b> Seasonal changes in salinity, water temperature, and water level in Little River estuary reflect changes in shape of the berm at the mouth of the estuary and changes in discharge of the river.	
<b>Help Received</b> I would like to thank Mrs. Skiles for support and advice, Mitch Farro and Tom Weseloh for information on estuaries and fish, Eileen Hemphill-Haley for loaning me her salinity meter, and my parents for taking me out to Littl	