

## SCCWRP Annual Report 2013

### Coastal upwelling linked to toxic *Pseudo-nitzschia australis* blooms in Los Angeles coastal waters, 2005-2007

Astrid Schnetzer<sup>1,2</sup>, Burton H. Jones<sup>1,3</sup>, Rebecca A. Schaffner<sup>1,4</sup>, Ivona Cetinic<sup>1,5</sup>, Elizabeth Fitzpatrick<sup>1</sup>, Peter E. Miller<sup>4,6</sup>, Erica L. Seubert<sup>1</sup> and David A. Caron<sup>1</sup>

<sup>1</sup>University of Southern California, Department of Biological Sciences, Los Angeles, CA

<sup>2</sup>North Carolina State University, Department of Marine, Earth and Atmospheric Sciences, Raleigh, NC

<sup>3</sup>King Abdullah University of Science and Technology, Thuwal, Saudi Arabia

<sup>4</sup>Southern California Coastal Water Research Project, Costa Mesa, CA

<sup>5</sup>University of Maine, School of Marine Sciences, Walpole, ME

<sup>6</sup>University of Guelph, Canadian Centre for DNA Barcoding, Biodiversity Institute of Ontario, Guelph, Canada

#### ABSTRACT

Harmful algal blooms dominated by the diatom *Pseudo-nitzschia* spp. have become a perennial, but variable, event within surface waters near the greater Los Angeles area. Toxic blooms during spring seasons from 2005 to 2007 strongly varied in their overall toxicity and duration. Differences in bloom dynamics were linked to differences in storm-induced river discharge following episodic rain events and coastal upwelling, both major coastal processes that inject nutrients into coastal surface waters. Heavy river runoff during early 2005, a record-rainfall year, favored a phytoplankton community mainly comprised of algal taxa other than *Pseudo-nitzschia*. The spring bloom during 2005 was associated with low domoic acid surface concentrations and minor contributions of (mainly) *P. delicatissima* to the diatom assemblage. In contrast, highly toxic *P. australis*-dominated blooms during spring 2006 and 2007 were linked to strong upwelling events. River discharge quotas in 2006 and 2007, in contrast to 2005, fell well below annual averages for the region. Surface toxin levels were linked to colder, more saline (i.e., upwelled) water over the three-year study, but no such consistent relationship between domoic acid levels and other physiochemical parameters, such as macronutrient concentrations or nutrient ratios, was observed.

#### Full Text

[http://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2013AnnualReport/ar13\\_259\\_272.pdf](http://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2013AnnualReport/ar13_259_272.pdf)