

A Study of the Basic Biology of California's *Caulerpa taxifolia*

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Background

The investigator of this California Sea Grant project, Susan Williams of Bodega Marine Laboratory, wrote the scientific justification for Assembly Bill 1334, which banned the sale, possession and importation of nine species of *Caulerpa* seaweeds in California.

Williams also testified before the House Finance Committee on this bill and worked with Assemblymember Tom Harman, the bill's sponsor, to explain the scientific rationale for the ban to lobbyists for the aquarium trade.

This project was part of a broader regional effort led by NOAA Fisheries and California Department of Fish and Game that in 2006 eradicated *Caulerpa taxifolia* from California. Its eradication was a major victory, as it was the first time any group had eradicated an established population of what the European media has dubbed "the killer algae." Had the seaweed spread to the open ocean, it might have caused some of the same dire consequences as in the Mediterranean Sea and Australia, where it has converted once biologically diverse seafloor habitats into *Caulerpa* monocultures.

Project

Williams was funded to identify areas in California that might be vulnerable to infestation, either from the spread of existing *Caulerpa* or through another introduction. These areas would have become priorities for further surveying had the eradication been unsuccessful.

She also examined environmental constraints on *Caulerpa* growth and spread. Of particular interest was the relationship between *Caulerpa* propagation (stolon elongation rate) as a function of water temperature, light and salinity.

Another component of her research sought to evaluate the efficacy of chlorine treatments, which at the time were being employed to kill the seaweed. Williams' experiments led to estimates of the dose-duration regimes needed to kill *Caulerpa* under different environmental conditions. This was the only quantitative information available to assess eradication efficacy and cost. The *Caulerpa* eradication effort, which included two infestation sites, one in San Diego County, the other in Orange County, cost about \$7 million over a six-year period. Had the infestation spread, or if there had been a second infestation, her data could have helped to lower eradication costs.

As *Caulerpa* is a tropical species, it has tended to infest and spread in relatively warm water, such as that found in the Mediterranean Sea. Williams' research was vital in providing much needed data on *Caulerpa*'s response to cold-water regimes, typical of coastal California. Besides sharing her data with the Southern California *Caulerpa* Action Team (SCATT), she also shared her findings and thoughts about California's eradication effort with the U.S. Fish and Wildlife Service's Aquatic Nuisance Species Task Force, NOAA's National Estuarine Research Reserve Program, The Nature Conservancy and the Steinhart Aquarium in Germany.

Collaborators

Southern California *Caulerpa* Action Team (SCCAT: NOAA Fisheries, California Department of Fish and Game, State Water Resources Control Board, U.S. Fish & Wildlife Service, among others.)

Award

2001 Coastal Achievement Award presented by the California Coastal Coalition to SCCAT.

California Sea Grant College Program

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Publications

Williams, S.L. & E.D. Grosholz. 2002. Preliminary reports from the *Caulerpa taxifolia* invasion in Southern California. *Marine Ecology Progress Series*. 233:307-310.

Williams, S.L. 2002. The role of science in management of *Caulerpa taxifolia* in the United States. Proceedings of International *Caulerpa taxifolia* Workshop, California Sea Grant College Program.

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