

**PETITION TO THE SECRETARY  
UNITED STATES DEPARTMENT OF AGRICULTURE**

**Noxious Weed Listing Petition to Add the Entire Genus *Caulerpa***

**Submitted by:** International Center for Technology Assessment and Susan Williams, Ph.D.

**Date:** April 29, 2003

**Endorsements:** 105 endorsers to-date, including 10 groups and organizations; see attachment.

**STATUTORY AUTHORITY**

The Federal Plant Protection Act, codified at 7 USC § 7701 *et seq.*, regulates Federal noxious weed (FNW) listings as follows:

- § 7702(10), defines a *noxious weed* as:

*- any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment.*

- § 7712(f) provides:

*(1) Regulations - In the case of noxious weeds, the Secretary may publish, by regulation, a list of noxious weeds that are prohibited or restricted from entering the United States or that are subject to restrictions on interstate movement within the United States.*

*(2) Petition to add or remove plants from regulation - Any person may petition the Secretary to add a plant species to, or remove a plant species from, the regulations issued by the Secretary under this subsection.*

*(3) Duties of the Secretary - In the case of a petition submitted under paragraph (2), the Secretary shall act on the petition within a reasonable time and notify the petitioner of the final action the Secretary takes on the petition. The Secretary's determination on the petition shall be based on sound science.*

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### BACKGROUND

On December 4, 1998, APHIS published in the Federal Register (63 FR 67011-67014, Docket No. 98-063-1), a proposal to amend the FNW regulations by adding *Caulerpa taxifolia* (Mediterranean clone)” (hereinafter, MC) to the list of aquatic weeds in 7 CFR § 360.200(a). On March 16, 1999, APHIS finalized this listing in a published rule (64 FR 12881-12884, Docket No. 98-063-2).

By separate petition dated April 30, 2003, Petitioners seek a change in the current FNW listing of *C. taxifolia* to explicitly cover the whole species on the grounds that the limitation in the listing to the “Mediterranean clone” is arbitrary and unenforceable, and violates APHIS’s own FNW regulations. Here, Petitioners more broadly request APHIS to list the entire *Caulerpa* genus to provide full and adequate protection to U.S. environmental and economic interests.<sup>1</sup>

### ARGUMENT IN SUPPORT OF PETITION

#### Biological realities support listing the entire genus

Factual support for listing the entire genus is in the appended Affidavit of Susan Williams, Ph.D., which, together with its attachments, is incorporated into this Petition by reference.<sup>2</sup> Dr. Williams, the Director of the Bodega Marine Laboratory and a Professor at the University of California at Davis, is a leading *Caulerpa* expert. She states, in pertinent part:

*Species of Caulerpa are some of the most difficult seaweeds to identify, either by morphology or current molecular (DNA) methods (Olsen et al. 1998).... The genus Caulerpa is known as one of the most morphologically variable, with morphology strongly influenced by the environment (Taylor 1972; Carruthers et al. 1993, Meinesz et al. 1995, Ceccherelli and Cinelli 1999, Collado-Vides and Robledo 1999.)*

*Caulerpa cupressoides, as an example, has at least 9 varieties, one of which can be mistaken for C. taxifolia (C. cupressoides var. lycopodium). Caulerpa taxifolia is very similar to C. scalpelliformis from Australia and the Mediterranean, another*

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<sup>1</sup> Note that approval of the present petition would make the other petition to list the whole *Caulerpa taxifolia* species redundant.

<sup>2</sup> The same Affidavit of Dr. Williams also is submitted in support of the other petition.

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*species reported to be invasive (Davies et al. 1997). In the Mediterranean, morphs intermediate between C. taxifolia and C. mexicana were confused and debated (the 'taxmex' morph), to the detriment of taking efforts to eradicate C. taxifolia (Olsen 1997). In the past, C. mexicana was once considered the same as C. taxifolia, indicating how similar the species can appear (Taylor 1972).*

*All Caulerpa species have the capacity to be invasive because of their phenomenal growth rates (up to 3"/day) and their ability to regenerate from very small fragments, even when buried (Williams et al. 1985, Smith and Walters 1999). Other species in addition to Caulerpa taxifolia have become invasive. Examples include C. racemosa in the Mediterranean (Olsen et al. 1998, Ceccherelli et al. 2000, Piazzi et al. 2001, Dr. Enrico Sala, Scripps Inst. Oceanography, pers. comm.), C. scalpelliformis (Davis et al. 1997), as well as already very harmful invasions of C. verticillata in the Florida Keys (Science News, Vol. 157:373, 6/10/00), and C. brachypus, also in the Florida Keys (Drs. Mark Littler and Steven Murray, pers. com.) and on reefs off the Palm Beaches and Treasure Coast (Lazaroff 2003). In a replicated experimental study in two different habitat types, Caulerpa racemosa completely covered the habitat within 6 months after introduction, overgrowing native seaweeds within 4 months (Piazzi et al. 2001).*

In short, all species in the genus are potentially invasive; several species (*C. brachypus*, *racemosa*, *scalpelliformis*, and *taxifolia*) already are documented to have caused harmful invasions in this country or elsewhere.<sup>3</sup> Additionally, members of the genus are so morphologically variable and difficult to reliably distinguish that it is unsafe to continue the import trade in the genus. The genus as a whole poses invasiveness risks, but many species have not been fully studied or characterized until after-the-fact of an invasion. No one can predict when and where, but future invasions in U.S. waters are likely to occur if the trade continues.

Future invasions leading to widespread monocultures of various *Caulerpa* species could destroy the attractiveness of U.S. marine areas for diving, fishing, and other activities, as the *C. taxifolia* invasion already has in the Mediterranean Sea. Native species would be at risk of being outcompeted and

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<sup>3</sup> Some *Caulerpa* occurs as a native in portions of Hawaii, the Florida keys, and elsewhere in U.S. waters, but nothing in the Plant Protection Act prohibits the listing of a globally distributed seaweed that occurs in small portions of the United States. The definition of weed in § 7702(10), above, is broad and inclusive, without reference to being of exclusively non-U.S. origin. Under § 7712(f)(1), above, the effect of a listing is not to require the seaweed's elimination, rather it is to prohibit further import and interstate movement.

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literally covered up and extirpated. APHIS has an obligation under the Plant Protection Act to stop this from happening. Only a proactive approach will succeed.

### **Enforcement realities support listing the entire genus**

It is not practically feasible for enforcement officials to try to exclude just the well-documented invaders in the genus, as they lack the sophisticated knowledge needed to reliably identify this morphologically variable genus down to the species level. This was illustrated in an enforcement situation in California, documented in the attached 10 page fax transmission from the California Department of Food and Agriculture (CDFA), Pest Exclusion Branch.<sup>4</sup>

The information shows the permitted shipment of many boxes of aquarium products from the Indonesian company CV. Cahaya Baru to the Martinez, California, company Salt Water Connection. Unspecified “Caulerpa Spec.” appears on the invoice six times, as well as several instances of *Caulerpa sertulariodes*, despite its being banned in California, and *Caulerpa racemosa*, also banned in California. “Caulerpa Spec.” could have included the Federally banned strain of *C. taxifolia* (Mediterranean clone), but the whole shipment was passed nonetheless; as shown on the cover page and the stamps on page 3, it was released by USDA APHIS PPQ and the U.S. Fish and Wildlife Service on the date of arrival, 10-24-01.

The reason these documents came to Petitioners’ attention is because Dr. Williams was called by CDFA officials. They reportedly were upset that the shipment had been released by the Federal border officials despite the clear presence of State-prohibited species and the potential for the “Caulerpa spec.”-labeled items to be *C. taxifolia* or other State-prohibited species (S. Williams, pers. comm.). Further, the CDFA officials sought Dr. Williams’ taxonomic expertise because they lacked confidence in their ability to identify whether retail stores were selling the prohibited species.

The CDFA faxed documents show that some importers do not distinguish among *Caulerpa* species when they import, label and sell their products. As further example of this, the commercial website of a leading wholesaler of aquarium products, Quality Marine, shows numerous different products, likely representing different species, sold as “*Caulerpa sp.*” (see [www.qualitymarineusa.com/inverts/plants.html](http://www.qualitymarineusa.com/inverts/plants.html) printout attached to the Williams Affidavit). This also illustrates the trade practice of frequently importing and selling the genus on “live rock.” That is, the seaweed is sold on imported rocks, often cryptically as tiny pieces in crevices in the rock, and then it grows out later in the purchaser’s aquarium. This practice intensifies the species identification problem as inspectors cannot necessarily see the live material clearly.

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<sup>4</sup> These documents were obtained from CDFA; they are submitted here for illustrative regulatory purposes only.

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Also attached to the Williams Affidavit is a 2001 survey of San Diego and Orange country aquarium and pet shop owners, which indicates that the responding employees of stores that sold *Caulerpa* products did not know which particular species they were selling. A separate, as yet unpublished, study by a student with adequate training to do identification has found that at least 10 different species of *Caulerpa* in fact are being sold in Los Angeles aquarium and pet shops, many of them on live rock (S. Williams, pers. comm.).

Put simply, even the well-documented invaders in the genus can be readily imported and sold under the generic name. Common sense says that the whole genus must be listed to stop further invasions. The live rock trade in particular is a very risky pathway.

Because of these problems, it is reasonably foreseeable that the prohibited *C. taxifolia* strain is being imported now under the cover of the generic name in violation of the current APHIS FNW listing and as a result, according to Dr. Williams “there is a risk of re-introducing it to California’s waters.” This is a completely unacceptable risk considering that millions of dollars are being spent to attempt to eradicate the species in two separate locations, infestations that very likely originated from hobbyists who dumped unwanted home aquaria into public waters or cleaned out their aquaria near a storm drain. Similar future introductions of *C. taxifolia* and other harmful members of the genus must be stopped by all reasonable regulatory means.

### **The entire genus may be legally listed**

As Dr. Williams states, the various species that comprise the *Caulerpa* genus pose risks of invasion that merit listing the whole taxon. APHIS’s noxious weed list includes other potentially harmful genera, such as *Homeria* spp., *Striga* spp., and several other parasitic genera. Thus, FNW precedents exist for APHIS to forego a species-by-species approach. Further, as indicated above, the ongoing commercial trade in unspecified “*Caulerpa* spp.” provides a pathway that can hide trade in even the well-documented harmful species, particularly when sold cryptically in live rock. Trade in the genus threatens direct and indirect injuries to U.S. natural resources and environmental interests within the meaning of the Plant Protection Act, § 7702(10), quoted above, so as to justify listing the genus to prevent the threats.

The present petition also fits well with the more proactive national invasives policy declared in the Management Plan adopted in 2001 by the National Invasive Species Council, including USDA, pursuant to Executive Order 13112. The “Prevention” chapter of the Plan (p. 31), states:

*Another line of attack is to identify high-risk invasive species not yet established, the likely pathways for their entry, and then management of the pathways to prevent introduction.*

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Again, the pathway in need of more strict management here is the commercial import and interstate commerce in high-risk *Caulerpa* products that cannot be readily identified to the species level.

### **CONCLUSION**

The genus *Caulerpa* meets the specifications of a noxious weed under APHIS's own "Pest Risk Analysis Guidelines for Qualitative Assessments." Under Petitioners' analysis, the genus receives high scores in almost every applicable risk category in the guidelines, scoring highest in the "environmental impact" and "likelihood of introduction and spread" categories.

In view of the evidence and arguments, APHIS should list the entire genus. No vital interest is served by continuing this trade pathway. Its overall value is minor and alternative, less-threatening, aquarium vegetation is available. On the other hand, vital ecological and economic interests will be damaged, perhaps irrevocably, if further *Caulerpa* invasions occur in California waters and elsewhere. Without a strict preventative approach, more invasions by various *Caulerpa* species are foreseeable. Petitioners urge USDA to act soon or else it will, according to Dr. Williams, be "courting ecological and economic invasive species disasters."

Petitioners look forward to your earliest formal response. The statute calls for a response based on "sound science" within "reasonable time," which, given the risks of inaction, we will assume to be no more than 120 days from the date of this Petition. Please promptly publish notice of this Petition in the Federal Register and create a formal open docket for it and communicate that to us. For further information, please contact me at 202.547.9359 or email: [peterjenkins@icta.org](mailto:peterjenkins@icta.org).

Respectfully submitted on behalf of Petitioners,

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International Center for Technology Assessment  
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Washington, DC 20003

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**Attachments**

List of Petition Endorsers

California Dept. of Food and Agriculture, Pest Exclusion Branch, fax transmission, with cover sheet dated Oct. 30, 2001, from Courtney Albrecht to Susan Ellis (10 pages)

Affidavit of Susan L. Williams, Ph.D., dated Feb. 19, 2003.

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### **ENDORSERS OF PETITIONS TO LIST CAULERPA GENUS AND CAULERPA TAXIFOLIA AS FEDERAL NOXIOUS WEEDS**

Notes: \* indicates endorsement is for the *Caulerpa* genus petition only and not for the *C. taxifolia* species petition; institutional or group affiliations are for identification purposes only, except for the **bolded** names, for which the endorsement is on behalf of the institution or group. Endorsements total 105, with 5 of those limited to the genus petition; 10 groups and organizations endorsed both petitions, including 4 large national environmental groups: American Lands Alliance, The Nature Conservancy, National Wildlife Federation, and Union of Concerned Scientists. A coalition group, the National Environmental Coalition on Invasive Species also has endorsed them. Endorsements are from 31 States and the District of Columbia.

Richard G. Baker, Ph.D., Professor Emeritus, Univ. of Iowa  
Randal T. Bartlett **for the Maui Invasive Species Committee**, Hawaii  
Ann M. Bartuska, Ph.D., Exec. Director, Invasive Species Initiative, **for The Nature Conservancy**  
James L. Ballard, Instructor, Minnesota State Univ.  
Ewann A. Berntson, Ph.D., Bonney Lake, Washington  
Martin R. Brittan, Ph.D., Emeritus Professor, California State Univ., Sacramento  
Jeb Byers, Ph.D., Asst. Professor, Univ. of New Hampshire  
Faith Campbell, Ph.D., **for the American Lands Alliance**  
James T. Carlton, Ph.D., Professor, Williams College, Massachusetts  
Kai M. A. Chan, Princeton Univ., New Jersey  
John Chapman, Ph.D., Professor, Oregon State Univ.  
Paul C. Chestnut, Ph.D., Palo Alto, California  
Janie Civile, Univ. of California, Davis  
Jamie Rapaport Clark, Vice President, **for the National Wildlife Federation**  
Andrew N. Cohen, Ph.D., Research Scientist, San Francisco Estuary Inst., California  
Ligia Collado-Vides, Ph.D., Visiting Scientist, Univ. of Miami  
Robert H. Cowie, Ph.D., Assoc. Researcher, Univ. of Hawaii  
Don Croll, Ph.D., Asst. Professor, Univ. of California, Santa Cruz  
Jeffrey A. Crooks, Ph.D., Research Coordinator, Tijuana River Natl. Est. Res., California  
Carla D'Antonio, Ph.D., Professor, Univ. of California  
Deborah Dexte, San Diego State Univ., California  
Tom Dudley, Ph.D., Research Faculty, Univ. of Nevada, Reno  
David C. Duffy, Ph.D., Professor, Univ. of Hawaii  
Jeffrey S. Dukes, Ph.D., Carnegie Institution of Washington  
Ruth Ann Dunn, MD, Londonderry, Vermont  
C. Mark Eakin, Ph.D., Boulder, Colorado\*  
Adam Eyring, Analytical Chemist, Philadelphia Water Dept., Pennsylvania  
Amy E. Frappier, Newmarket, New Hampshire  
Jed Fuhrman, Ph.D., Professor, Univ. of Southern California  
Jesse Giessow, President, **for Dendra Inc.**, Encinitas, California

## Caulerpa Petitions Endorsers

Edwin Grosholz, Ph.D., Univ. of California, Davis  
Sander Gliboff, Ph.D., Asst. Professor, Indiana Univ.  
Danile Gluesenkamp, Ph.D., Sonoma, California  
Douglas Henderson, Commercial Manager, **for ReMetrix LLC**, Carmel, Indiana\*  
Richard Hildreth, J.D., Professor, Univ. of Oregon  
Bernadette Holthuis, Ph.D., Biologist, Gainesville, Florida  
Matthew D. Hooge, Ph.D., Univ. of Maine  
Marc Imlay, Invasives Committee Chair, Maryland Native Plant Society  
S. Taylor Jarnagin, Ph.D., Research Ecologist, Reston, Virginia  
Barbara J. Javor, Ph.D., Environmental Microbiologist, San Diego, California  
George Koch, Ph.D., Assoc. Professor, Northern Arizona Univ.  
Fred Kraus, Ph.D., Bishop Museum, Hawaii  
Doug La Follette, Ph.D., Madison, Wisconsin  
Dawn M. Lawson, San Diego, California  
Irving Leskowitz, Emeritus Professor, Southern Connecticut State Univ.  
Roy R. "Robin" Lewis III, **for Lewis Environmental Services, Inc.**, Salt Springs, Florida  
David M. Lodge, Ph.D., Professor, University of Notre Dame, Indiana  
Scott Luchessa, Assoc. Wetland Ecologist, Pentec Environmental, Seattle, Washington  
Richard N. Mack, Ph.D., Professor, Washington State Univ.  
Dan C. Marelli, Ph.D., Florida State Univ.  
Linda McCann, Edgewater, Maryland  
Ross McCluney, Ph.D., Research Scientist, Univ. of Central Florida  
Tanya Meyer, Consultant, Chico, California  
Claudia E. Mills, Ph.D., Friday Harbor Laboratories, Univ. of Washington  
Carol Moore, Beaverton, Oregon  
W. A. Morgan, M.D., Wisconsin\*  
Susanne C. Moser, Ph.D., Union of Concerned Scientists, Washington, DC  
Christa Mulder, Ph.D., Asst. Professor, Univ. of Alaska, Fairbanks  
Stephen J. Mullin, Ph.D., Assistant Professor, Eastern Illinois Univ.  
Steven N. Murray, Ph.D. Professor, California State Univ., Fullerton  
Raymond M. Newman, Ph.D., Professor, Univ. of Minnesota  
**National Environmental Coalition on Invasive Species**  
Thomas M. Niesen, Ph.D., Professor, San Francisco State Univ., California  
Ingrid M. Parker, Ph.D., Assoc. Prof., Univ. of California, Santa Cruz  
Richard M. Peters, M.D., Palo Alto, California  
Robert J. Piorkowski, Ph.D., Invasive Species Program Lead, Alaska Dept. of Fish and Game  
Mary Jean Pramik, San Francisco, California  
Edwin R. Price, Cleveland, Ohio  
Margaret S. Race, Ph.D., SETI Institute, California  
Mark J. Rauzon, Marine Endeavours, Oakland, California  
Tara Reed, Ph.D., Asst. Professor, Univ. of Wisconsin  
Sarah Reichard, Ph.D., Asst. Professor, Univ. of Washington  
Peter M. Rice, Univ. of Montana  
Gregor H. Riesser, Ph.D., Houston, Texas

## Caulerpa Petitions Endorsers

Robert E. Rutkowski, Topeka, Kansas  
Pamela Roe, Ph.D., Turlock, California  
Don C. Schmitz, Biologist, Tallahassee, Florida  
Angela Seidenberg, Biologist, Corpus Christi, Texas  
Frank J. Shaughnessy, Ph.D., Humboldt State Univ., California  
Jacob Sigg, Chair, Invasive Exotics Committee, **for California Native Plant Society**  
Daniel Simberloff, Ph.D., Professor, Univ. of Tennessee  
Annie Simpson, Entomologist, Reston, Virginia  
Doris Sloan, Ph.D., Adj. Professor, Univ. of California, Berkeley  
Jennifer E. Smith, Univ. of Hawaii  
Stefan Sommer, Ph.D., Director, Natural Heritage Center, Idaho State Univ.  
Barbara K. Sullivan, Ph.D., Adj. Prof., Univ. of Rhode Island  
D. Scott Taylor, Ph.D., Brevard Co. Environmentally Endangered Lands, Florida  
Dan Thayer, Dir., Veg. Mgmt Div., **for South Florida Water Management District**  
Mark I. M. Thompson, Ph.D., Elder/Director, Otter Clan Educ. Fdn., Nevada City, California\*  
Christina Tonitto, Ph.D., Univ. of California, Berkeley  
Cynthia D. Trowbridge, Ph.D., Research Asst. Professor, Oregon State Univ.  
Mary S. Tyler, Ph.D., Professor, Univ. of Maine  
Seth Tyler, Ph.D., Professor, Univ. of Maine  
Beatrice Van Horne, Ph.D., Vienna, Virginia\*  
Paul Van Steenberghe, Lecturer, Univ. of Maine  
Tanya Veldhuizen, Environmental Scientist, Sacramento, California  
Linda Walters, Ph.D., Assoc. Professor, Univ. of Central Florida  
Kerstin Wasson, Ph.D., Elkhorn Slough National Estuarine Research Reserve, California  
Judith S. Weis, Ph.D., Professor, Rutgers Univ., New Jersey  
David Whitacre, Ph.D., Research Ecologist, The Peregrine Fund, Boise, Idaho  
Raymond R. White, Ph.D., City College of San Francisco, California  
Howard G. Wilshire, Ph.D., Board Chair, Public Employees for Env'tl. Responsibility, Sebastopol, Cal.  
Teresa Wilson, Fisheries Biologist, Clemson, South Carolina  
Phyllis Windle, Ph.D., Senior Scientist, **for the Union of Concerned Scientists**  
Jerry Woolpy, Ph.D., Emeritus Professor, Earlham College, Indiana