Restrictions on the Use of Marine Antifouling Paints Containing Tributyltin and Copper

A White Paper Prepared by

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October 2004
(Updated August 2005)

MASGP 04-052

This white paper was commissioned by the California Sea Grant Extension Program to support the Program's ongoing aquatic invasive species research, education, and outreach activities. The following information is intended as advisory research only and does not constitute legal representation of California Sea Grant or any of its constituents by the National Sea Grant Law Center. It represents our interpretation of the relevant laws.

Tributyltin (TBT)-based antifouling paints have proven extremely effective at preventing the fouling of ships' hulls and consequently the transport of aquatic invasive species (AIS). The U.S. partially banned the use of TBT in 1988 and a global ban is forthcoming. The global ban may have serious implications in the management of AIS transport. This survey of the legal regime in the U.S. regarding prevention of pollution from tributyltin and copper antifouling paints was commissioned by California Sea Grant to support research, education, and outreach activities.

I. *Tributyltin (TBT)*

A. International Ban

In 2001, the International Maritime Organization (IMO) adopted the International Convention on the Control of Harmful Antifouling Systems on Ships (AFS Convention). The AFS Convention bans the use of environmentally-damaging ship hull "anti-fouling systems." Practically speaking, this means signatory nations must ban or restrict the use of organotin-based (chemical compounds containing tin and carbon) marine paints on ships flying their flags, as well as ships using any of their ports, shipyards, or offshore facilities.

Ships greater than 400 gross tonnage, sailing internationally, must be screened before receiving a required International Antifouling System Certificate. The Certificate must be renewed when antifouling systems (like paint) are changed or replaced. Ships over 24 meters in length, but less than 400 gross tonnage must keep onboard a "Declaration on Antifouling Systems," including proof of compliance with the Convention, such as a paint receipt or contractor invoice.

The ban on applying or reapplying organotin-based systems began January 1, 2003. By January 1, 2008, ships must either bear no organotin compounds on their hulls or surfaces, or must have covered the non-complying organotin layer with a coating to prevent the organotins from leaching into the water. None of these rules apply to fixed platforms, floating platforms, Floating Storage Units, or Floating Production, Storage and Offshore Loading structures.

The AFS Convention is not yet in force. The Convention will enter into force twelve months after twenty-five States representing 25 percent of the world's merchant shipping tonnage have ratified it. As of July 31, 2005, eleven nations have ratified the Convention, representing 8.72% of the world's fleet.[1] The U.S. has signed the treaty, but it has not yet been sent to the Senate for ratification.

B. Federal Law

On the federal level, the sale and use of TBT is governed by two statutes – the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Organotin Antifouling Paint Control Act (OAPCA). FIFRA requires the registration of all pesticides sold or distributed in the U.S. In order to register a product, the applicant must show that the product can be used without causing "unreasonable adverse effects on the environment."[2]
In January 1986, EPA initiated a review of TBT antifoulant registrations.[3] In October 1987, EPA issued a Preliminary Determination to Cancel Certain Registrations of TBT in which the agency proposed, among other things, to cancel all registrations which exceeded a daily release rate of 4.0 micrograms and prohibit the use of TBT antifouling paints on all non-aluminum vessels under 65 feet.[4]

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[1] IMO, Summary of Status of Conventions, *at* http://www.imo.org/Conventions/mainframe.asp?topic_id=247.
[2] 7 UNITED STATES CODE § 136a(a) (2005).
[3] 51 FEDERAL REGISTER 778 (Jan. 8, 1986).
[4] 52 FEDERAL REGISTER 37,518 (Oct. 7, 1987). For a good summary of the EPA's special review, *see Atochem North America, Inc. v. U.S. EPA*, 759 F. Supp. 861 (D.D.C. 1991).

In 1988, Congress enacted a partial ban on TBT antifouling paints, eliminating the need for EPA action.[5] The OAPCA banned the application of antifouling paint containing organotin to vessels less than 25 meters in length.[6] Organotin is defined as "any compound of tin used as a biocide in an antifouling paint."[7] The prohibition does not prevent the application of organotin antifouling paints to the aluminum hull, outboard motor, or lower drive unit of a vessel less than 25 meters in length.[8]

The Act also prohibits the sale or delivery of an antifouling paint containing organotin or the application of paint to a vessel, unless the paint is certified by the Administrator of the EPA as a "qualified antifouling paint containing organotin." A qualified paint is a paint containing organotin that is allowed to be used under the terms of a final decision of the Administrator or certified as having a release rate of not more than 4.0 micrograms per square centimeter per day.[9]

The Act directed the Administrator to issue final water quality standards for organotin compounds by March 30, 1989.[10] The EPA released its final ambient water quality criteria for TBT in January 2004, pursuant to Section 304(a) of the Clean Water Act (CWA).[11] The criteria apply to both fresh and saltwater, and were designed for use by states and Tribes in the development of their own TBT water quality standards. Though the EPA's criteria are not legally binding, National Pollution Discharge Elimination System (NPDES) permits and related environmental programs may make the criteria enforceable. EPA recommends the following criteria.

> *Freshwater:*
> For TBT, the criterion to protect freshwater aquatic life from chronic toxic effects is 0.072 µg/L. This criterion is implemented as a four-day average, not to be exceeded more than once every three years on the average. The criterion to protect freshwater aquatic life from acute toxic effects is 0.46 µg/L. This criterion is implemented as a one-hour average, not to be exceeded more than once every three years on the average.
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> *Saltwater:*
> For TBT, the criterion to protect saltwater aquatic life from chronic toxic effects is 0.0074 µg/L. This criterion is implemented as a four-day average, not to be exceeded more than once every three years on the average. The criterion to protect saltwater aquatic life from acute toxic effects is 0.42 µg/L. This criterion is implemented as a one-hour average, not to be exceeded more than once every three years on the average.[12]

EPA cautions that locally important freshwater and saltwater species that are very sensitive to TBT levels may require lower thresholds.

The EPA is also working with the U.S. Naval Sea Systems Command (NAVSEA) to address marine antifoulant leaching. Under the Uniform National Discharge Standards for

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[5] The EPA negotiated with TBT-bearing coating vendors for the voluntarily cancellation of their registrations under FIFRA. The last registered TBT coating vendor, New Nautical, requested and has been approved for voluntary cancellation. This manufacturer can sell its remaining TBT stocks to vendors until December 31, 2005.
[6] 33 UNITED STATES CODE § 2403(a) (2005).
[7] *Id.* §2402(4).
[8] *Id.* §2403(b).
[9] *Id.* §2402(6).
[10] *Id.* §2408.
[11] Notice of Availability of Final Aquatic Life Criteria Document for Tributyltin (TBT), 69 FEDERAL REGISTER 342-343 (Jan. 5, 2004).
[12] EPA, Ambient Aquatic Life Water Quality Criteria for Tributyltin (TBT) – Final, iv (December 2003), *available at* http://www.epa.gov/waterscience/criteria/tributyltin.

Vessels of the Armed Forces (commonly known as the Uniform National Discharge Standards Program), the Administrator of the EPA and the Secretary of Defense "have determined that it is reasonable and practicable to require use of a Marine Pollution Control Device for at least one class of vessel to mitigate adverse impacts on the marine environment . . . [due to] the leaching of antifoulant materials into the surrounding seawater."[13] Research is underway to develop a marine pollution control device to manage or avert these emissions into the waters of the U.S.

C. State Laws

Not all states have adopted legislation prohibiting the use of TBT-based antifouling paints. Most of the state laws summarized below were adopted prior to the OAPCA. After 1988, state action was unnecessary to prohibit the use of TBT, which most likely accounts for the lack of TBT-specific legislation in the other states. Furthermore, because antifouling paints are generally considered pesticides subject to regulation under a state's generic pesticide laws, specific legislation banning TBT may be considered redundant in some states.

1. Alaska

Alaska bans the sale or use of TBT-based marine antifouling paint or coating.[14] It is also illegal to sell, rent, lease, import or use "a vessel, fishing gear, or other item intended to be partially or completely submerged in the water, if the vessel, gear, or item has been painted or treated with TBT-based marine antifouling paint or coating."[15] Vessels include barges and aircraft equipped to land on water.

Slow-leaching TBT-based marine antifouling paint – TBT-based paint with "a measured release rate equal to or less than the maximum release rate established for qualified antifouling paints containing organotin by the [EPA]"[16] – can be sold in and imported into Alaska. However, these paints may only be applied to aluminum vessel hulls and lower outboard drive motors.[17]

2. California

California law lists "tributyltin, organotin, or a tri-organotin compound formulated as an antifouling paint, coating or compound and labeled for the control of fouling organisms in an aquatic environment" as a restricted pesticide.[18] Except as discussed below, "antifouling paints or coatings containing tributyltin shall not be applied to any surface or object that will come into contact with the freshwater or marine environment."[19]

California allows the use of TBT-based antifouling paints or coatings on vessels over 82 feet (25 meters) in length, vessels with aluminum hulls, and outboard motors and lower drive units.[20] These paints, however, "shall have an average release rate of no more than four micrograms of organotin per square centimeter per day."[21]

Permits are not required for antifouling paints containing TBT.[22] To buy TBT antifouling paints or coatings, however, a purchaser must show the seller a copy of the vessel

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[13] 40 CODE OF FEDERAL REGULATIONS § 1700.4(u) (2005).
[14] ALASKA STATUTES § 46.03.715(a) (2005).
[15] *Id.*
[16] *Id.* § 46.03.715(e).
[17] *Id.* § 46.03.715(c).
[18] CALIFORNIA CODE OF REGULATIONS, title 3, § 6400(e) (Barclay 2005).
[19] *Id.* § 6488(b).
[20] *Id.* § 6488(a).
[21] *Id.* §6900.
[22] *Id.* §6414(c).

registration to verify that the vessel to be painted or coated meets the requirements of California law. If the buyer has no vessel registration documents, or if the paint or coating will be used on an outboard motor or lower drive unit, the buyer must make a sworn statement saying that the paint or coating will only be used on an aluminum vessel hull, a vessel hull 82 feet or longer, or on an outboard motor or lower drive.[23]

TBT oxide pesticides, sold as additives for mixing with paints or coatings, cannot be applied "to any surface that comes into contact with the aquatic or marine environment including, but not limited to, vessels, piers and fishing equipment."[24] California also limits the average release rate for TBT antifouling paints or coatings to a maximum of "four micrograms of organotin per square centimeter per day."[25] The sale or possession of a pesticide product containing TBT, used to limit fouling in cooling water systems is also prohibited in many California counties (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma).[26]

3. Connecticut

In March 1987, Connecticut prohibited the registration or use of "any antifouling paint or other substance containing a tributyltin compound for use or application on vessels or other structures or equipment in fresh water or the marine environment."[27] Seaplanes are not included in the definition of vessels. Paints with a release rate equal to or less than 4.0 micrograms per square centimeter per day may be sold and distributed to a commercial boatyard if the paint is applied only within the commercial boatyard to vessels exceeding 25 meters in length or to aluminum hulls.[28] The sale, application, or possession of antifouling paints is also permitted if the paint is in a spray can of 16 ounces or less, labeled as an outboard or lower drive unit paint, and has a release rate equal to or less than 4.0 micrograms.[29]

4. Florida

Antifouling paints containing organotin compounds with an acceptable release rate (not exceeding 4.0 micrograms per square centimeter per day at steady state conditions[30]) are listed as restricted-use pesticides and, therefore, may only be sold, distributed, and used in Florida by licensed dealers and applicators.[31] Licensed applicators may apply TBT-based paints to vessels which exceed 25 meters in length or to vessels with aluminum hulls. Florida also exempts organotin antifouling paints in aerosol cans of 16 ounces or less for use on outboard motors or lower drive units.[32]

5. Maine

In Maine, "a person may not distribute, possess, sell, offer for sale, apply or offer for application any antifouling paint or trap dip containing a tributyltin compound."[33] There are two exceptions. First, "a person may distribute or sell an antifouling paint containing a tributyltin compound with an acceptable release rate to the owner or agent of a commercial

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[23] Id § 6488(c).
[24] *Id.* § 6489.
[25] *Id.* § 6900.
[26] *Id.* § 6910.
[27] CONNECTICUT AGENCIES REGULATIONS § 22a-66-2(c)(4) (2005).
[28] *Id.*
[29] *Id.* at § 22a-66-2(c)(4)(D).
[30] FLORIDA STATUTES ANNOTATED § 487.021(1) (2005).
[31] FLORIDA STATUTES ANNOTATED § 487.171(3) (2005).
[32] FLORIDA ADMINISTRATIVE CODE ANNOTATED § 5E-2.035(6) (2005).
[33] MAINE REVISED STATUTES, title 38, § 419-A(2)(A) (2004).

boatyard" and a commercial boatyard owner or agent may purchase a TBT compound as long as the compound is applied only within the commercial boatyard to vessels exceeding 25 meters in length or to vessels with aluminum hulls.[34] Second, the sale, application, or possession of an antifouling paint containing a TBT compound is not prohibited if the paint "is in a spray can of 16 ounces or less, is commonly referred to as an outboard or lower drive unit paint and has an acceptable release rate."[35] Acceptable release rate means "a measured release rate equal to or less than 4.0 micrograms per square centimeter per day at steady state conditions."[36] Maine also prohibits the distribution, sale, and application of any substance that contains a TBT compound in concentrated form for mixing with other paints or solvents to produce an antifouling paint for use on vessels, wooden lobster traps, fishing gear, floats, moorings, or piers.[37]

6. Maryland

In Maryland "a person may not distribute, possess, sell, offer for sale, use, or offer for use any antifouling paint containing a tributyltin compound" or "any substance that contains a tributyltin compound in concentrated form and that is labeled for mixing with paint by the user to produce an antifouling paint for use on a vessel."[38] Maryland allows the distribution and sale of TBT-based antifouling paints with acceptable release rates to commercial boatyards for application within the boatyard to vessels exceeding 25 meters in length or with aluminum hulls.[39] The sale of antifouling paints with TBT-compounds is also permitted if the paint has an acceptable release rate, is in a spray can of 16 ounces or less, and is commonly referred to as an outboard or lower drive unit paint.[40]

The Maryland antifouling paint laws have some unique provisions. First, it is important to note that Maryland deviates from the federal recommended release rate standard. Maryland defines "acceptable release rate" as "a measured release rate equal to or less than 5.0 micrograms per square centimeter per day."[41] The provision, however, has no practical effect as the more stringent federal standard in the OAPCA controls. Additionally, "out-of-state vessels that have an antifouling paint containing a tributyltin compound in excess of an acceptable release rate may travel and dock in State waters."[42]

7. Massachusetts

Massachusetts prohibits the application of antifouling products containing tributyltin "to the hull or bottom of any non-aluminum hulled boat, ship or vessel less than 25 meters in length."[43] In addition, "no person shall disperse, dispose of or deposit paint, paint scrapings, paint chips or paint waste containing tributyltin into any lake, stream, harbor, estuary, ocean, marina, canal or other water body. Tributyltin product wastes must be disposed of in a manner as not to contaminate any lake, stream, harbor, estuary, ocean, marina, canal or area subject to the [Massachusetts] Wetlands Protection Act."[44]

8. New Jersey

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[34] *Id.* § 419-A(3)(A).
[35] *Id.* § 419-A(3)(B).
[36] *Id.* § 419-A(1)(A-1).
[37] *Id.* § 419-A(2)(B).
[38] MARYLAND AGRICULTURE CODE ANNOTATED § 5-902(a) (2004).
[39] *Id.* § 5-902(b).
[40] *Id.* § 5-902(c).
[41] *Id.* § 5-901(b).
[42] *Id.* § 5-903.
[43] CODE OF MASSACHUSETTS REGULATIONS, title 333, § 13.08(2)(a) (2005).
[44] *Id.* § 13.08(2)(b).

New Jersey prohibits "all marine uses of free association formulations of antifoulant paints and co-polymer formulations with release rates greater than the acceptable release rate."[45] The acceptable release rate in New Jersey is 4.0 micrograms per square centimeter per day.[46] Like most states, however, there are exceptions. Applications of a TBT antifouling paint can be made within commercial boatyards to vessels which exceed 25 meters in length or with aluminum hulls.[47]

9. New York

New York banned the sale and application of quick release tributyltin antifoulant bottom paints as of January 1, 1988.[48] Quick release means a release rate of greater than five micrograms per square centimeter per day. New York also banned the application of bottom paints with release rates of greater than one microgram or less than five micrograms to "any non-aluminum part of any vessel less than twenty-five meters in length."[49]

The New York regulations state that the distribution, sale, purchase, possession, and use of tributyltin products labeled for aquatic antifouling uses is restricted to paints with a release rate which does not exceed four micrograms per square centimeter of application area per day in containers that do not exceed 32 fluid ounces.[50] These paints may only be applied to aluminum hulls or other aluminum parts.[51]

10.Oregon

"A person may not sell, offer to sell or use in [Oregon] tributyltin-based marine antifouling paint or coating unless a method of using such paint or coating exists that does not result in the release of tributyltin or derivative or organotin into the waters of the state."[52] Oregon permits the use of low-leaching TBT marine antifouling paints and coatings on aluminum hulls and ships greater than 25 meters in length and permits the sale of low-leaching TBT paints if sold in a spray can containing 16 ounces or less and commonly referred to as an outboard or lower drive unit paint. [53] A low-leaching paint or coating "means a tributyltin-based marine antifouling paint or coating that has a steady state release rate of not more than 5.0 micrograms per square centimeter per day."[54] The Environmental Quality Commission is authorized to adopt a lower release rate by rule if necessary to protect health or the environment.[55]

11.Rhode Island

In 1988, Rhode Island enacted the Tributyltin Antifoulant Paint Control Act. The Act prohibits the distribution, possession, sale, application, or offer for sale, use or application any marine antifoulant paints containing tributyltin compounds.[56] A person, however, may distribute or sell TBT-based paints with an acceptable release rate to a commercial boatyard for application within the yard to "vessels which exceed sixty-five feet (65') in length or which have aluminum hulls or to vessels less

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[45] NEW JERSEY ADMINISTRATIVE CODE, title 7, § 7:30-2.9(b) (2005).
[46] *Id.* § 7:30-1.2.
[47] *Id.* § 7:30-10.2(o).
[48] NEW YORK NAVIGATION LAW § 40-b(1) (Consolidated Laws Service 2005).
[49] *Id.* § 40-b(2).
[50] NEW YORK CODES, RULES AND REGULATIONS, title 6, § 326.2(b)(9) (2005).
[51] *Id*. § 326.2(b)(9)(iii).
[52] OREGON REVISED STATUTES, title 49, § 634.505 (2003).
[53] *Id.* § 634.510.
[54] *Id.* § 634.500(1).
[55] *Id*.
[56] RHODE ISLAND GENERAL LAWS § 23-25.3-2(a) (2005).

than sixty-five feet (65') in length if it is applied only to the outboard or lower drive unit of the vessels."[57] The distribution, sale, and application of antifouling paints with acceptable release rates is permitted "if the paint is distributed or sold in a spray can in a quantity of sixteen (16) ounces avoirdupois [avoirdupois is a system of weight] or less and is commonly referred to as outboard or lower unit paint."[58] Acceptable release rate is a release rate that does not exceed 4.0 micrograms per square centimeter per day.[59]

12. Virginia

In Virginia, "a person may not distribute, possess, sell or offer for sale, apply or offer for use or application any marine antifoulant paint containing tributyltin compounds" unless the paint has an acceptable release rate and is distributed or sold to a commercial boatyard for application within the boatyard to vessels which exceed 25 meters in length or with aluminum hulls.[60] The distribution and sale of TBT paints with acceptable release rates is also permitted "if the paint is distributed or sold in a spray can in a quantity of sixteen ounces avoirdupois or less and is commonly referred to as outboard or lower unit paint."[61] The acceptable release rate in Virginia is up to 4.0 micrograms per square centimeter per day at steady state conditions.[62] Virginia also excludes seaplanes from the definition of vessels.[63]

13. Wisconsin

Tributyltin is classified as a limited use pesticide – "a pesticide which under certain conditions or usages constitutes a serious hazard to wild animals other than those it is intended to control."[64] Wisconsin allows the use of TBT compounds and organotin derivatives if usage does not involve addition to waters of the state or to structures in contact with waters of the state or if the paint does not have release rate greater than 4 micrograms per day and is used on a boat at least 65 feet in length or on an aluminum boat, boat part or boat accessory.[65]

D. Canada

In Canada, antifouling coatings are regulated under the Pest Control Products Act. A pest control product is defined as "any product, device, organism, substance or thing that is manufactured, represented, sold or used as a means for directly or indirectly controlling, preventing, destroying, mitigating, attracting or repelling any pest, and includes

> (a) any compound or substance that enhances or modifies or is intended to enhance or modify the physical or chemical characteristics of a control product to which it is added, and
> (b) any active ingredient used for the manufacture of a control product."[66]

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[57] *Id.* § 23-25.3-2(b).
[58] *Id.* § 23-25.3-2(c).
[59] *Id.* § 23-25.3-1(1).
[60] VIRGINIA CODE ANNOTATED, title 3.1, §3.1-249.60 (2005).
[61] *Id.* § 3.1-249.60(C).
[62] *Id.* § 3.1-249.59.
[63] *Id*.
[64] WISCONSIN ADMINISTRATIVE CODE § 80.01(4) (2005).
[65] *Id.* 80.03(13).
[66] REVISED STATUTES OF CANADA, chapter P-9, § 2 (1985).

Control products, which include biocidal antifouling paints, may not be sold in or imported into Canada unless the product has been registered, conforms to prescribed standards, and is packaged and labeled as required by law.

In 1989, Canada banned the use of TBT antifouling paints on vessels less than 25 meters in length, with the exception of vessels with aluminum hulls.[67] Canada, however, allowed the use of TBT paints on vessels greater than 25 meters long, but only if the release rate was 4 micrograms or less of TBT per square centimeter of hull surface per day. This was identical to the release rate standard established for TBT in the U.S.

As of June 2000, the Canadian Pest Management Regulatory Agency (PMRA) stopped accepting or processing applications to register new organotin antifouling paints and began a nationwide phase out of these products.[68] After a special review of TBT antifouling paints, the PMRA "determined that the use of TBT antifouling paints represents an unacceptable risk to the marine environment." Anticipating the global ban on TBT, Canada completely banned the sale and use of TBT antifouling paints in 2002. Copper-based biocidal antifouling paints are currently the only paints registered for use in Canada.

II. Copper

Due to environmental concerns regarding the effect of copper emissions on aquatic life, the Netherlands, Sweden, and Denmark have acted to reduce the use of copper-based antifouling paints. While these restrictions may indicate a European trend to restrict copper biocides, there is little evidence that the U.S. is contemplating a ban on copper biocides, at least in the near future. As will be discussed below, the EPA and the California Non-Point Source Interagency Coordinating Committee are currently investigating the environmental effects of copper emissions, but legislative action has yet to be taken. Of course, the EPA or states do not need to promulgate new regulations to severely restrict the use of copper antifouling paints. The NPDES permit program, Total Maximum Daily Load (TMDL) standards, pesticides laws, and many other environmental laws, regulations, and programs contain sufficient authority for the federal government and the states to act to protect the environment. While exhaustive research of state environmental programs was not conducted, it is reasonable to assume that some states are using their NPDES programs as well as other general environmental laws and regulations to address copper emissions in sensitive areas.

A. Federal Law

The water quality criteria (saltwater) recommended by EPA for copper are 4.8 micrograms per liter to avoid chronic toxic effects and 3.1 micrograms per liter to avoid acute toxic effects. There are currently no prohibitions on the use of copper-based marine antifouling paints, but the EPA recently released draft updated criteria for copper which are more stringent. The draft updated criteria for copper are:

> *Freshwater*
> The procedures described in the Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses indicate that, except where a locally important species is very sensitive, freshwater aquatic organisms and their uses should not be affected unacceptably if the 4-day average concentration of dissolved copper does not exceed the [Bureau of Land Management

[67] Pest Management Regulatory Agency, Special Review Announcement SRA 2000-01 Special Review of Organotin Antifouling Paints for Ship Hulls (May 9, 2000), *available at* www.pmra-arla.gc.ca/english/pdf/sra/sra2000-01-e.pdf.
[68] *Id.*

(BLM)]-derived site-water LC50 (i.e., Final Acute Value (FAV)) divided by the final acute-chronic ratio more than once every 3 years on the average (i.e., the CCC); and if the 24-hour average dissolved copper concentration does not exceed the BLM-derived site-LC50 (or FAV) divided by two, more than once every 3 years on the average (i.e., the CMC).

Saltwater
The procedures described in the Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses indicate that, except where a locally important species is very sensitive, saltwater aquatic organisms and their uses should not be affected unacceptably if the 4-day average concentration of dissolved copper does not exceed 1.9 µg/L more than once every 3 years on the average (i.e., the CCC); and if the 24-hour average dissolved copper concentration does not exceed 3.1 µg/L more than once every 3 years on the average (i.e., the CMC).[69]

B. State Laws

1. California

California currently only prohibits the possession or use of a "pesticide product containing copper sulfate for the control, in sewers and drains, of tree or other plant roots, or fungal slime in the counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma."[70] However, the California Non-point Source Interagency Coordinating Committee's Marina and Recreational Boating Workgroup has formed a Copper Antifouling Paint Sub-Workgroup "to assess the degree and geographical distribution of copper pollution caused by copper antifouling paint pesticides in California's aquatic environments."[71]

2. Washington

Washington State places limits on copper discharge from shipyard dry docks on Puget Sound. This is accomplished through NPDES permits tailored to the conditions and facilities in individual shipyards.[72]

C. Foreign Countries

1. The Netherlands

Following an environmental risk assessement, the Netherlands banned the use of copper-containing antifoulant paints for use on personal watercraft in 1999. The Netherlands also banned the cleaning or scrubbing of copper-bearing antifouling coatings. However, a Netherlands court decision in early 2005 questioned whether the risk assessment was complete. The court lifted the ban on copper paint until a new assessment, which is presently being conducted, is completed. According to an official with the Netherlands Board for the Authorization of Pesticides, (College Voor de Toelating van Bestrijdingsmiddelen or CTB) there are currently no restrictions on the use of copper-

[69] EPA, 2003 Draft Update of Ambient Water Quality Criteria for Copper (Nov. 2003) *available at* http://www.epa.gov/waterscience/criteria/copper/pdf/master.pdf.
[70] CALIFORNIA CODE OF REGULATIONS, title 3, § 6920 (2005).
[71] Copper Antifouling Paint Sub-Workgroup website at http://www.cdpr.ca.gov/docs/sw/caps.htm.
[72] Telephone interview with Steve Eberl, Water Quality Division, Washington State Department of Ecology (Oct. 8, 2004). *See also* NPDES and State Waste Discharge Permits Northwest Region, at http://www.ecy.wa.gov/programs/wq/permits/northwest_permits.html.

containing antifouling paints.[73] The CTB regulates antifouling paints as pesticides, under authority of the 1962 Pesticides Act. As a member of the European Union (EU), the Netherlands is obliged to follow the EU's Biocidal Products Directive,[74] which seeks to regulate and register all chemical biocides throughout the EU. Many different types of biocide products, including pesticides, biocides, and antifoulants, are under review through this program. Under the Directive, antifoulants produced before May 2000 may still be used, under a 10 year review program. Antifoulants produced after May 2000 require full EU evaluation and approval before sale.

14. Denmark

On September 29, 2003, new regulations went into effect in Denmark stipulating that the use of antifouling paints on pleasure boats "may maximally release 200 µg Cu/cm^2 after the first 14 days and maximally 350 µg Cu/cm^2 after the first 30 days."[75] New pleasure boats for exports and ships undertaking long journeys are exempt from the new copper emissions standards.

[73] E-mail from Jan Willem Andriessen, Biocides Assessor, Netherlands Board for the Authorization of Pesticides, to Jason Savarese, Research Counsel, National Sea Grant Law Center (Aug. 30, 2005).
[74] Council Directive 98/8/EC 1998 O.J. (L 123) 41, *available at* http://europa.eu.int/eur-lex/pri/en/oj/dat/1998/l_123/l_12319980424en00010063.pdf.
[75] Danish Environment Newsletter (Oct. 2003) *available at* http://www.mex.dk/uk/vis_nyhed_uk.asp?id=5974&nyhedsbrev_id=847.