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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

March 13, 2008

Dorothy Rice
Executive Director
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

Dear Ms. Rice:

The U.S. Environmental Protection Agency (EPA) has re-evaluated its decisions concerning several waters addressed in California's 2006 Clean Water Act Section 303(d) List submittal. Specifically, we have reconsidered our prior approval of the omission of microcystin toxin listings for three segments of the Klamath River, and have determined to add a listing for microcystin toxin for one of those segments.

EPA has reviewed California's Section 303(d) List and supporting documentation received on November 24, 2006, EPA's previous listing decisions on November 30, 2006 and June 28, 2007, EPA's administrative record supporting its decisions, as well as supplemental material referenced in the enclosed staff report. EPA re-examined available data and information for three Klamath River segments: Oregon to Iron Gate, Iron Gate to Scott River, Scott to Trinity River. Based on this review, EPA has concluded that one Klamath River segment is impaired due to the presence of elevated concentrations of microcystin toxins, specifically the Oregon to Iron Gate segment which includes the Copco and Iron Gate reservoirs.

EPA hereby withdraws its prior decision to approve, and now disapproves, California's decision not to include the "Klamath River HU, Middle HA, Oregon to Iron Gate" on its 2006 Section 303(d) List due to microcystin toxin. Pursuant to 40 CFR 130.7(d)(2), EPA is hereby identifying for inclusion on California's Section 303(d) List "microcystin toxins" as an additional cause of impairment for that Klamath River segment.[1] The basis for EPA's decision is described in the enclosed staff report. EPA's reconsideration of its decisions with respect to the subject segments of the Klamath River, and its determination to include the "Middle HA, Oregon to Iron Gate" segment due to microcystin toxins do not affect EPA's determinations regarding any other portion of California's Section 303(d) List.

[1] California's 2006 Section 303(d) List already identifies "Klamath River HU, Middle HA, Oregon to Iron Gate" as impaired due to Nutrients, Organic Enrichment/Low Dissolved Oxygen, and Temperature. Neither EPA's approval of those Klamath River listings, nor today's action, extends to any water bodies located within Indian country, as defined in 18 U.S.C. 1151.

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Pursuant to 40 CFR 130.7(d)(2), today's action is considered a final decision although the regulations provide for public review following EPA's decision to include this additional listing. EPA will promptly open a public comment period to invite comments concerning our decision, consider any comments received from the public, and revise this decision if warranted in response to comments received.

As part of the material supporting its 2006 Section 303(d) List, California provided schedules for development of the Total Maximum Daily Loads (TMDLs) for its listed waters and we understood these TMDL schedules to serve the purpose of priority rankings as required by 40 CFR 130.7(b). We understand that the North Coast Regional Board has revised the schedule for the Klamath River TMDLs addressing Nutrients, "Organic Enrichment/Low Dissolved Oxygen", and Temperature, and now anticipates completing these TMDLs in 2009. State Board is likely take action in 2010 and then submit to EPA for approval. EPA expects the State to continue to update its schedules as appropriate and to fulfill its TMDL commitments in the future.

We would like to discuss this additional listing with you during the comment period; and will contact you to arrange a mutually convenient time. If you have questions concerning our decisions or the supporting analysis, please call me at (415) 972-3572 or Peter Kozelka at (415) 972-3448.

Sincerely yours,

/signed/

Alexis Strauss
Director, Water Division

Enclosure

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Staff Report

Reconsideration of California's 2006 Section 303(d) List Omission of Microcystin Toxin Listings for three Klamath River Segments and

Determination to Add Microcystin Toxins Listing for Klamath River Hydrologic Unit (HU), Middle HA Hydrologic Area (HA), Oregon to Iron Gate

Review of Statutory and Regulatory Requirements Concerning Section 303(d) Listings

Section 303(d)(1) of the Clean Water Act directs States to identify those waters within its jurisdiction for which effluent limitations required by Section 301(b)(1)(A) and (B) are not stringent enough to implement any applicable water quality standard. Waters that do not or are not expected to attain applicable water quality standards are to be included on the Section 303(d) list unless required technology-based controls are sufficient to remedy the impairment or threat. Federal regulations define applicable water quality standards that must be evaluated in the listing process to include designated beneficial uses, narrative criteria, numeric criteria, and antidegradation policies. See, 40 CFR 130.7(b)(3), 130.2, and 131.3.

In developing Section 303(d) lists, States are required to assemble and evaluate all existing and readily available water quality-related data and information, including, at a minimum, consideration of existing and readily available data and information about the following categories of waters: (1) waters identified as partially meeting or not meeting designated uses, or as threatened, in the State's most recent Section 305(b) report; (2) waters for which dilution calculations or predictive modeling indicate nonattainment of applicable standards; (3) waters for which water quality problems have been reported by governmental agencies, members of the public, or academic institutions; and (4) waters identified as impaired or threatened in any Section 319 nonpoint assessment submitted to EPA. See, 40 CFR 130.7(b)(5).

If a Section 303(d) list submitted by a State for EPA review does not comply with federal listing requirements, EPA is required to disapprove the list and develop listing decisions that meet federal requirements. See, 40 CFR 130.7(d)(2), and *Pronsolino v. Nastri*, 291 F.3d 1123, 1128 (9th Cir., 2002). EPA is also required to invite public comment concerning its determination to revise a State's list, and make changes to those revisions if warranted based on comments received. See, 40 CFR 130.7(d)(2).

California's 2006 Section 303(d) Submittal and EPA's Initial Decision

California's 2006 Clean Water Act Section 303(d) List identified "Klamath River HU, Middle HA, Oregon to Iron Gate", "Klamath River HU, Middle HA, Iron Gate Dam to Scott River", and "Klamath River HU, Middle HA, Scott River to Trinity River" as each impaired due

to “Nutrients”, ”Organic Enrichment/Low Dissolved Oxygen”, and “Temperature” (SWRCB 2006). Each of these segments had also been previously included by the State on its 1998 and 2002 Section 303(d) Lists for each of those pollutant/stressors.

The State received public comments requesting that it include in its 2006 Section 303(d) List portions of the Klamath River as impaired due to “toxic algae”.[2] See, e.g.: letter dated Oct. 18, 2006, from Regina Chichizola to David Leland; letter dated Oct. 20, 2006, from Regina Chichizola to Tam Doduc; and transcript of Oct. 26, 2006 meeting of State Water Resources Control Board. Members of the State Board and Board staff also addressed the issue of additional listings for the Klamath River, and whether such an action was warranted given the already listed pollutant/stressors for the Klamath River. See, transcript of Oct. 26, 2006 meeting of State Water Resources Control Board, pp. 47-49, and 152-63. The State Board ultimately determined to approve the 2006 Section 303(d) List which identified the subject segments of the Klamath River as impaired due to “Nutrients”, ”Organic Enrichment/Low Dissolved Oxygen”, and “Temperature”, as noted above, but which did not identify toxic algae as an additional pollutant/stressor. The State’s List was transmitted to EPA on November 21, 2006 (SWRCB 2006).

On November 30, 2006, with one exception not relevant here, EPA approved the State Board’s 2006 Section 303(d) List of impaired waters and associated pollutants. Letter dated Nov. 30, 2006, from Alexis Strauss to Tom Howard. On March 8, 2007, EPA disapproved the State Board’s decision not to list certain additional waters and associated pollutants. Letter dated Mar. 8, 2007, from Alexis Strauss to Tom Howard. On March 15, 2007, EPA published a notice of availability in the Federal Register providing the public an opportunity to comment on EPA’s March 8, 2007, decision. 72 Fed. Reg. 12175.

EPA received and reviewed several comment letters, including one from Klamath Riverkeeper, which requested that EPA add to the 2006 Section 303(d) List the Klamath River and the Copco and Iron Gate Dam reservoirs[3] as impaired due to *Microsystis aeruginosa* (“blue-green algae”) and microcystin toxin. Letter dated Apr. 13, 2007, from Regina Chichizola to Peter Kozelka; letter dated Apr. 16, 2007, from William F. Grader to Peter Kozelka; and letter dated Apr. 16, 2007, from Linda Sheehan to Peter Kozelka.

On June 28, 2007, EPA transmitted to the State Board its final list of waters and associated pollutants that EPA added to the 2006 Section 303(d) List. Letter dated June 28, 2007, from Alexis Strauss to Dorothy Rice. In its June 28 decision, EPA concluded that the 2006 Section 303(d) List and TMDLs submitted by the State Board would sufficiently address the blue-green algae and microcystin toxin issues in these waters, and therefore approved the 2006 Section 303(d) List without adding the Klamath River and Reservoirs as impaired due to

2 Toxic algae is also referred to as toxic blue-green algae. Certain blue-green algae species produce toxins; e.g., *Microsystis aeruginosa* produces microcystin toxins.

3 The Copco and Iron Gate Dam reservoirs (“Reservoirs”) are within the Klamath River segment identified as “Klamath River HU, Middle HA, Oregon to Iron Gate”.

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Microsystis aerugosa or microcystin toxin. *Id.* at Responsiveness Summary, pp.7, 10. In making its determination, EPA also considered the fact that, in addition to the TMDL development described above, other actions on the part of EPA and the State Board were addressing blue-green algae in the Klamath River and Reservoirs.

The *Klamath Riverkeeper* Litigation

On July 30, 2007, Klamath Riverkeeper filed suit against EPA seeking to set aside EPA's June 28, 2007 decision approving the 2006 Section 303(d) List without adding the Klamath River and Reservoirs as impaired due to *Microsystis aeruginosa* and microcystin toxin. Plaintiff filed a summary judgment motion with supporting material on December 19, 2007. *Klamath Riverkeeper v US EPA*, Docket No. C 07-3908 (SBA) (N.D. Cal.), complaint, and motion for summary judgment.

On January 18, 2008, EPA and Klamath Riverkeeper filed a stipulation and proposed order with the Court that jointly requested the Court remand the challenged agency action to EPA for reconsideration. The stipulation indicated EPA had re-examined the record relating to the State of California's applicable water quality standards and re-examined the designated uses for the Klamath River and Reservoirs. The stipulation further indicated that EPA, in considering the unique circumstances of this case and the particular waters involved, now believes that a reconsideration of its decision not to disapprove the State's decision not to list portions of the Klamath River that include the Reservoirs as impaired due to microcystin toxin is warranted. *Klamath Riverkeeper v US EPA*, *supra*, stipulation and proposed order to remand. On January 22, 2008, the Court issued the order sought by EPA and Klamath Riverkeeper.

EPA's Reconsideration of Omission of Microcystin Toxin Listings for Klamath River Segments: "Middle HA, Oregon to Iron Gate", "Middle HA, Iron Gate Dam to Scott River", and "Middle HA, Scott River to Trinity River"

Summary of EPA's Decision on Reconsideration

EPA's reconsideration of the omission of microcystin toxin listing for the subject Klamath River segments is based on a number of exceptional factors. First, California's 2006 List process was unique in that State Board staff were responsible for reviewing data and generating individual waterbody assessment recommendations prior to action only by State Board members. In prior years, Regional Board staff evaluated data, provided 303(d) recommendations and produced draft Regional Lists for approval by their Regional Board members prior to collation by State Board into one comprehensive State List, for State Board action and submittal to EPA. As participants in the Klamath Blue-Green Algae workgroup, Regional Board staff had raw data and information pertaining to microcystin toxins in Klamath River; however, State Board was evidently not made aware of this data and information and thus

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it was not included in State's Administrative Record. Nonetheless, EPA considers this to be readily available information that should have been considered by the State and included in its 2006 303(d) list administrative record. Second, EPA, another participant on the Blue-Green Algae workgroup, also overlooked this available data and information when we approved the State's 2006 submittal that omitted microcystin toxin amongst other listed stressors for the subject Klamath River segments. Third, during the course of EPA's action on California's 2006 list, EPA received comments and data on the Klamath River segments. Commenters included numerous attachments providing monitoring results and information regarding water quality conditions; e.g., technical reports (and raw data therein) and press releases. This information contains 2004-2006 data and is within EPA's administrative record. Fourth, EPA stated in its June 2007 decision documents that it "remains open to re-assessing its present determination regarding the listing impairments in the Klamath River and will coordinate with Regional Board and the State Board during the 2008 listing cycle." In addition, as part of EPA's reconsideration, we also evaluated water quality information collected in 2007 for the subject Klamath River segments.

Public Health and Environmental Impacts Associated with Microcystin Toxins

Many species of cyanobacteria or blue-green algae produce toxins that are human health hazards if ingested in water or food, inhaled or absorbed via direct skin contact. The cyanobacterial species *Microcystis aeruginosa* produce microcystin toxins which are capable of inducing skin rashes, sore throat, oral blistering, nausea, gastroenteritis, fever, and liver toxicity. Animal studies with these toxins show adverse effects such as acute livestock poisoning or tumor production in fish guts and liver. These aqueous toxins are released into surface waters when cyanobacterial cells die or cell membranes degrade. Chemical analyses have detected over 70 microcystin variants (or isomers) that may exist, although the most commonly studied variant is microcystin-LR (Zurawell, et al. 2005).

Available Klamath River monitoring results of microcystin toxin are often analyzed via ELISA (enzyme-linked immunosorbent assay), which reports one concentration as equal to total microcystin toxins. That is, ELISA test results yield one value as the sum of all measurable microcystin toxins[4]. Chemical analyses, via liquid chromatography mass spectrometry (LCMS) of one Klamath river sample collected in 2005, also analyzed by ELISA, found the abundance of the variant, microcystin-LR to be nearly 100% (Kann 2006b). Other recent studies have revealed the complexities of interactions between microcystin variants and biota, and have indicated that variants other than microcystin-LR can be abundant and that less toxic variants such as microcystin-RR are possibly more ecologically relevant because they may be preferentially taken up by plankton and fish (Xie, et al. 2005).

[4] This is analogous to total PCBs based on measurement of a sub-set of PCB congeners.

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Evaluation of Whether Microcystin Toxin(s) Are Causing Standards Violations

Discussion below summarizes EPA's re–evaluation of the available monitoring results and information concerning microcystin toxin, its impacts on water quality, and applicable water quality objectives and beneficial uses for three Klamath River segments.

California has not established numeric water quality objectives for microcystin toxins in surface waters. The North Coast Regional Board Basin Plan contains a narrative toxicity objective: "All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life." To evaluate this narrative objective and complete this 303(d) assessment, EPA relied on the World Health Organization (WHO) recommended guideline value of 20 ug/L for aqueous microcystin toxins in recreational waters.[5] WHO states this value is associated with moderate probability of adverse health effects and "microcystin concentrations of 20 ug/L should trigger further action" (WHO 2003). This WHO moderate risk guideline value has been used by other states for 303(d) purposes and it is also consistent with the cyanobacterial cell count value discussed within California's voluntary guidance for posting health advisories in recreational waters, we used it to evaluate possible impairment of primary recreation (REC-1) beneficial use as defined in the North Coast Regional Board Basin Plan (NC RWQCB 2007): "Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white-water activities, fishing, or use of natural hot springs."

California has developed voluntary guidance for posting waters for health advisories in recreational waters by evaluating cyanobacterial cell counts (SWRCB 2007). California's voluntary posting guidance is based on cell density values provided within the WHO document. WHO used a number of studies to estimate an approximate microcystin concentration that would be expected from a given cell density of *Microcystis aeruginosa*. However, WHO acknowledges the cyanobacterial cell density measure may not be a reliable proxy for microcystin toxin concentrations, because different cyanobacterial strains may be present and their genetic capacity may not produce toxins. In fact, some blooms of *Microcystis aeruginosa* may produce little to no microcystin toxins; this has been observed in Klamath River waters (A. Lincoff, pers. commun.). For Section 303(d) purposes, EPA considered the cyanobacterial cell density results as part of our assessment but we did not rely on this ancillary information as definitive evidence of corresponding ambient concentrations of microcystin toxins.

California has not established numeric objectives or reference guidelines for microcystin toxins in fish tissue. To assess available fish monitoring results, EPA utilized a fish tissue residue guideline value to assess microcystin toxins in finfish fillets (250 ug/kg); this value is

[5] The World Health Organization has recommended a moderate health risk guideline value of 100,000 cyanobacterial cells/mL in recreational waters; this cell count value is associated with 20 µg/L concentration for microcystin toxins. No specific microcystin concentration is provided by WHO for high probability of adverse health effects.

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also based on WHO guidance[6] (Van Buynder et al. 2001). We used this value to evaluate possible impairment of two other beneficial uses, commercial and sportfishing (COMM) as well as subsistence fishing (FISH).

We note the North Coast Regional Board Basin Plan applies the subsistence fishing beneficial use as incorporated within the beneficial use for Native American Culture (CUL). The CUL applies only to the Klamath River segment, Middle HA, Scott to Trinity River. This CUL beneficial use is defined – "Uses of water that support the cultural and/or traditional rights of indigenous people such as subsistence fishing and shellfish gathering, basketry and jewelry material collection, navigation to traditional ceremonial locations, and ceremonial uses." Ceremonial uses include water immersion and ingestion; both are additional exposure pathways to aqueous microcystin toxins. Accordingly, the evaluation of impairment of the CUL beneficial use included an evaluation of microcystin toxin levels within fish, along with evaluation of aqueous microcystin toxin results as described above.

EPA also reviewed other relevant water quality information as part of our reconsideration. Starting in 2005, portions of the Klamath River experienced prolonged blue-green algae blooms and high microcystin toxin levels. These blooms occurred during the summer months, primarily in Copco and Iron Gate reservoirs in California. EPA joined other local, tribal, state and federal agencies and issued press releases regarding public health warnings to avoid contact with water in the reservoirs due to algal blooms that can produce harmful toxins (EPA 2005, 2006b, 2007c) In fall 2007, the first health advisory for other Klamath segments, downstream of the reservoirs was jointly issued by Humboldt and Del Norte Counties, EPA, two tribal and several state agencies (Humboldt County 2007). EPA is also aware of anecdotal evidence of pet and livestock poisoning from exposure to Copco Reservoir waters although confirmatory testing of causative agents is not available. In one case, a pet dog became ill after swimming in the reservoir and the attending veterinarian confirmed liver damage, presumably due to ingestion of microcystin toxins (B. Puschner, pers. commun.)

[6] These fish tissue guideline values are based on WHO total daily intake value for microcystin toxins. These values are derived by assuming 70 kg adult body weight and 200 grams of fish consumed per week. "These values were then increased to allow for chronicity/subchronicity over a two-week period producing a maximal acceptable toxin amount [in fish tissue]." (Van Buynder, et al. 2001)

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Water Body Specific Determinations[7]

Klamath River, Oregon to Iron Gate

This section focuses on existing and readily available data and information for the uppermost Klamath River segment within California, titled "Middle HA, Oregon to Iron Gate," and includes Iron Gate Reservoir and Copco Reservoir. Several documents provide monitoring results in both reservoirs for the data record from 2001 to 2006 (Kann 2006a, Kann 2006b, Kann and Corum 2006). Within this timeframe, numerous aqueous microcystin toxin exceedences (nearly 40%) exist above the WHO guideline value for moderate health risk (greater than 20 ug/L). All exceedences occurred in summertime and duration of elevated levels of microcystin toxins appear to be as long as two months in the reservoirs. Some microcystin toxins maxima values were above the WHO value by 100-fold or 600-fold, in 2005 and 2006 respectively. Fish tissue results, available only for 2005, show no exceedences above the finfish guideline value. Health advisories were also posted in the reservoirs in summers of 2005 and 2006. Based on the monitoring results, EPA's assessment decision is that microcystin toxins are causing an exceedence of the applicable water quality standards in this segment. The impairment within the reservoirs is substantial, and the conditions causing the impairment have occurred in two consecutive summers. Therefore, EPA concludes that in this segment microcystin toxins are causing an exceedence of applicable water quality standards, including the narrative toxicity objective and the REC-1 beneficial use.

Information that became available after the state submitted its 303(d) list is consistent with information described in the preceding paragraph and does not change EPA's conclusion. This includes available data from summer 2007 showing a similar exceedence rate (31%) and maxima microcystin toxin values of 1800-fold above the WHO guideline value for moderate health risk. As in the preceding two years, a health advisory was also posted for both reservoirs in summer 2007.

Klamath River, Iron Gate to Scott River

This section focuses on existing and readily available data and information for the next downstream contiguous Klamath River segment, titled "Middle HA, Iron Gate Dam to Scott River". The 2005-2006 monitoring results, show no exceedences of aqueous microcystin toxins

[7] When a State does not consider and review "existing and readily available" information, then EPA may disapprove the State's 303(d) list, under EPA regulations at 40 CFR 130.7(b)(5), to the extent such information indicates impairment of applicable water quality standards. Upon review of the information that was existing and readily available at the time of the State's submittal, EPA concludes one of the segments of the Klamath River should have been included on the State list. However, as indicated in the review and analysis in the following sections of this document, even if EPA includes in its review all of the information that became available after the state made its decision, this information does not change EPA's assessment conclusions for any of the subject Klamath River segments for the 2006 list. EPA expects California to evaluate all available data and information as it develops its Section 303(d) lists.

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above the WHO guideline value for moderate health risk. No fish tissue results were available for this segment during this timeframe. There were no health advisories posted for this segment in 2005 and 2006. Based on this information, the existing monitoring results and information do not yield sufficient evidence to conclude that microcystin toxins should be added as an additional cause of impairment. Therefore, EPA does not believe there is a basis to add microcystin toxins as an additional cause of impairment for this segment.

In light of the more recent information, EPA's assessment decision is not changed. Available data from summer 2007 show no exceedences of the WHO guideline value for microcystin toxins. Although a health advisory was posted for this segment in September 2007, this posting has occurred only once in recent years, posting duration was only three weeks and EPA considers it to be insufficient information by itself to warrant listing, for reasons outlined in discussion of California's voluntary posting guidance above.

Klamath River, Scott River to Trinity River

This section focuses on existing and readily available data and information for the next downstream Klamath River segment, titled "Middle HA, Scott River to Trinity River". The 2005-2006 monitoring results show one aqueous microcystin toxins exceedence above the WHO guideline value for moderate health risk (in 2005) and no exceedences were detected in 2006. Fish tissue results are available only for 2005 and zero exceedences above the finfish guideline value. There were no health advisories posted for this segment in 2005 and 2006. Based on this information, the existing monitoring results and information do not yield sufficient evidence to conclude that microcystin toxins should be added as an additional cause of impairment. Therefore, EPA does not believe there is a basis to add microcystin toxin as an additional cause of impairment for this segment.

In light of the more recent information, EPA's assessment decision is not changed. Available data from summer 2007 show no exceedences of the WHO guideline value for microcystin toxins. Although a health advisory was posted for this segment in September 2007, this posting has occurred only once in recent years, posting duration was only three weeks and EPA considers it to be insufficient information by itself to warrant listing, for reasons outlined in discussion of California's voluntary posting guidance above.

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Conclusion

Accordingly, for the reasons outlined above, EPA is identifying for inclusion on California's Section 303(d) List "microcystin toxins" as an additional cause of impairment[8] for "Klamath River HU, Middle HA, Oregon to Iron Gate." This segment includes the Copco and Iron Gate reservoirs. For the reasons outlined above, EPA is not withdrawing or revising its prior approval of California's listing determinations with respect to "Middle HA, Iron Gate Dam to Scott River" or "Middle HA, Scott River to Trinity River". This decision does not influence any prior EPA decisions regarding the rest of California's 2006 303(d) list.

[8] EPA has not determined whether or not microcystin toxins are pollutants within the definition of CWA 502(b). EPA is not making that finding here. EPA policy, however, supports listing for impairment by microcystin toxins under these circumstances. EPA's policy is that waters shown to be impaired should be listed unless it can be demonstrated that nonpollutant stressors alone cause the impairment or that no pollutant causes the impairment (EPA 2003). In the absence of a determination that microcystin toxins are not pollutants, EPA believes that adding microcystin toxins as an additional "pollutant/stressor" to the present State-established, EPA-approved list of pollutant/stressors for the subject Klamath River segment is appropriate.

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Table 1. Assessment summary for three Klamath River segments on California's 2004 – 2006 Section 303(d) List			
RB	**Waterbody Name**	**Pollutant/ Stressor**	**data summary**
1	Klamath River HU, Middle HA, Oregon to Iron Gate	Microcystin toxins	2005: Aqueous MC (30/77 samples) exceedences of WHO moderate health risk value (>20 ug/L) 2006: Aqueous MC (35/72 samples) exceedences > 20 ug/L 2007: Aqueous MC (34/110 samples) exceedences >20 ug/L 2005: Finfish fillets MC (0/2 samples) exceedences above finfish tissue guideline value 2006: no finfish fillet results 2005, 2006, 2007: posted health advisories
1	Klamath River HU, Middle HA, Iron Gate to Scott R.	Microcystin toxins	2005: Aqueous MC (0/12 samples) exceedences > 20 ug/L 2006: Aqueous MC (0/21 samples) exceedences > 20 ug/L 2007: Aqueous MC (0/30 samples) exceedences > 20 ug/L 2005 & 2006: no finfish fillet results 2007: posted health advisory
1	Klamath River HU, Middle HA, Scott R. to Trinity R.	Microcystin toxins	2005: Aqueous MC (1/19 samples) exceedences > 20 ug/L 2006: Aqueous MC (0/15 samples) exceedences > 20 ug/L 2007: Aqueous MC (0/16 samples) exceedences > 20 ug/L 2005: Finfish fillets MC (0/4 samples) exceedences above finfish tissue guideline value 2006: no finfish fillet results 2007: posted health advisory

The World Health Organization has recommended a moderate health risk guideline value 20 µg/L for microcystin toxin in recreation waters. This is associated with total cyanobacterial cell counts of 100,000 cells/mL. California's Voluntary Guidance states "When possible, it is ideal to identify and enumerate the cyanobacteria species, and to also analyze and quantify the presence of microcystins."(SWRCB 2007, pp. 11-12). The California guidance decision flowchart describes that if cyanobacterial species are not known then the 100,000 cell/mL cell count value must be exceeded to trigger posting health advisories.

EPA acknowledges the existence of 2007 fish monitoring results for these three segments; however, as of this date these results have not received QC review and thus EPA has not included these 2007 fish results in our assessment.

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B. Puschner, pers. commun. 2007. Information provided to Klamath blue-green algae workgroup meeting, September 25, 2007.

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EPA 2007a. California Section 303(d) Listing Decision—Partial Disapproval. Letter from Alexis Strauss, EPA Region 9, to Tom Howard, SWRCB, March 8, 2007.

EPA 2007b. California Section 303(d) Listing Decision—Final Decision. Letter from Alexis Strauss, EPA Region 9, to Dorothy Rice, SWRCB, dated June 28, 2007. Includes Responsiveness Summary of Comments received by April 15, 2007.

EPA 2007c. EPA Region 9 –Press Release, Health warnings to avoid contact with blue-green algae in Copco and Iron Gate Reservoirs of Klamath River, July 5, 2007.

EPA 2006a. California Section 303(d) Listing Decision—Partial Approval. Letter from Alexis Strauss, EPA Region 9, to Tom Howard, SWRCB, dated November 30, 2006.

EPA 2006b. EPA Region 9 –Press Release, Health warnings to avoid contact with blue-green algae in Copco and Iron Gate Reservoirs of Klamath River, August 14, 2006.

EPA 2005. EPA Region 9 –Press Release, Health warnings to avoid contact with blue-green algae in Copco and Iron Gate Reservoirs of Klamath River, September 30, 2005.

EPA 2003. Guidance for 2004 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d) and 305(b) of the Clean Water Act, TMDL -01-03 - Memorandum from Diane Regas, July 21, 2003.

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Humboldt County. 2007. News Release, Health warnings to avoid contact with blue-green algae in lower Klamath River, downstream of reservoirs. Issued by County of Humboldt Dept. Health and Human Services and multiple agencies, including EPA Region 9, September 28, 2007.

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Klamath Riverkeeper 2006a. "Official Request of the Klamath Riverkeeper and allies for regulation of toxic algae in the Klamath River Watershed, and supporting comments asserting that toxic algae should be listed as a pollutant on the Klamath River." Letter from Regina Chichizola to David Leland and Matt St. John, North Coast RWQCB. October 18, 2006.

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