UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
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Dorothy Rice
Executive Director
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

Dear Ms. Rice:

On March 13, 2008, the U.S. Environmental Protection Agency (EPA) identified microcystin toxins as an additional cause of impairment to one Klamath River segment (Middle Hydrologic Area: Oregon to Iron Gate) previously listed by California in its 2006 Clean Water Act Section 303(d) List. EPA solicited public comment on its action, and has now completed its review of the comments received. Based on comments from the North Coast Regional Board, EPA agrees that the description of the segment which EPA is listing as impaired due to "microcystin toxins" should be revised. EPA hereby identifies this impaired portion as the reach of the Klamath River including the Copco and Iron Gate Reservoirs. Accordingly, this segment does not include Klamath River upstream of Copco I Reservoir to Oregon. I understand EPA's revision is consistent with the comment received from the Regional Board. After consideration of all comments received, EPA has concluded that no other revision of its March 13, 2008, decision is warranted.

I am hereby transmitting to you the listing adding to California's 2006 Section 303(d) List "microcystin toxins" as a cause of impairment for the Klamath River including the Copco and Iron Gate reservoirs. A responsiveness summary explaining public comments received and EPA's responses is also enclosed. We look forward to working with the State during the 2008 303(d) listing process. If you have questions, call me at (415) 972-3572 or Peter Kozelka at (415) 972-3448.

Sincerely yours,

Laura Tom Bose
for Alexis Strauss
Director, Water Division

Enclosure
cc: Catherine Kuhlman, North Coast RWQCB

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Responsiveness Summary

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 for Klamath River Hydrologic Unit (HU), Middle HA Hydrologic Area (HA), Oregon to Iron Gate

Introduction

EPA reconsidered its prior approval of the omission of microcystin toxin listings for three Klamath River segments, and on March 13, 2008, determined to add to California's 2006 Section 303(d) List a listing for microcystin toxin for one of these three segments, "Klamath River HU, Middle HA, Oregon to Iron Gate". California's 2006 Section 303(d) List already identifies each segment of the Klamath River within California as impaired due to Nutrients, Organic Enrichment/Low Dissolved Oxygen, and Temperature. EPA published a public notice of availability of its decision in the Federal Register on March 28, 2008, and solicited public comment on its decision to reconsider and to identify microcystin toxins as an additional cause of impairment for one segment of the Klamath River pursuant to Clean Water Act section 303(d)(2).

EPA Region 9 also posted the notice of availability and decision documents on its web site (http://www.epa.gov/region09/water/tmdl/303d.html). Documents related to the March 13, 2008 decision were also available upon request from Region 9. Written comments were received from the following parties:

1. Francis Mangels
2. Greta Hanelt
3. Shivani Spirit
4. Yurok Tribe
5. Karuk Tribe
6. Klamath Riverkeeper, *et al.*
7. Oregon Wild
8. PacifiCorp Energy
9. North Coast Regional Water Quality Control Board

This responsiveness summary contains summaries of comments received and EPA's responses to these comments. Similar comments were received from more than one commenter; accordingly, the responsiveness summary identifies and responds to similar comments as a group. General comments are addressed first, followed by comments concerning specific water body listings.

After considering the comments, EPA is revising the description of the segment of the Klamath River which EPA is identifying as impaired due to microcystin toxins, but EPA is not otherwise revising its decision.

General Comments and Responses

1. Several commenters supported EPA's decision to add "microcystin toxins" as one of several causes of impairment for the Klamath River segment, Oregon to Iron Gate.

Response: The response to comment #12, below, addresses the revision to the description of the Klamath River segment that EPA is identifying as impaired due to microcystin toxins.

2. EPA made an arbitrary choice to use the World Health Organization's microcystin toxin benchmark of 20 ug/L associated with moderate health risk for recreational uses in surface waters.

Response: EPA disagrees. As described in the Staff Report regarding EPA's March 13 decision, EPA provided a range of policy and technical reasons to support its choice of 20 ug/L. Although, as indicated by commenters, there are a number of other potential choices, the commenters did not provide data or analysis demonstrating that EPA's choice of 20 ug/L is unreasonable. EPA relied on the WHO guidance, in part, because California does not have numeric water quality objectives directly pertaining to microcystin toxin levels. EPA considered the relevant water quality standard to be the State's narrative toxicity objective for recreational uses in surface waters, and interpreted this narrative by using a numeric value from the WHO guidance document (2003). The WHO guidance provides two microcystin toxin benchmark values: 1 ug/L for drinking water and low health risk for recreational uses and 20 ug/L for moderate health risk for recreational use; however, the WHO guidance provides no specific microcystin value for high probability of adverse health effects. The WHO guidance's drinking water benchmark of 1 ug/L is inappropriate, in part because the Klamath River waters are not designated by the State for drinking water purposes. In light of these considerations, EPA maintains the moderate health risk guideline value (20 ug/L) is a reasonable choice for interpreting the State's narrative toxicity objective in this case.

Further, we understand California's Office of Environmental Health Hazard Assessment (OEHHA) is currently reviewing the scientific literature and will likely develop a California-specific recreational use guideline value for microcystin toxins (and possibly other cyanotoxins) in water and fish tissue. Once California has produced this guideline value, water quality assessors will be able to use the value when assessing monitoring results for these aqueous stressors in California surface waters.

3. The fish tissue bioaccumulation data shows high levels of toxins.. Commenters provided a recent technical memorandum evaluating the fish bioaccumulation data collected in 2007 in several Klamath River segments. The report contends that elevated microcystin toxins levels in fish tissue pose human health risk to those consuming the finfish (yellow perch) or shellfish (freshwater mussels). EPA should include this data as part of its water quality assessment.

Response: As indicated in the Staff Report regarding EPA's March 13 decision, EPA considered

fish tissue data from samples collected in 2005. EPA included that data in its assessment and found there were zero exceedences of the finfish tissue guideline value for all three segments. As described in the March 13 Staff Report, EPA used a fish tissue residue guideline value in the scientific literature (Van Buynder, et al. 2001) to assess microcystin toxins in finfish fillets and shellfish samples. EPA notes the technical memorandum provided by commenters relies on a different microcystin tissue guideline value from a another scientific study (Ibelings and Chorus, 2007). Both scientific studies cited above were further analyses of information contained in the WHO document (1999); however, it does not appear the WHO has advocated one study and guidelines therein over the other, to date.

In its Staff Report, EPA also acknowledged the existence of 2007 fish monitoring results for the three segments; however, EPA noted in the Staff Report that those preliminary results were not included in EPA's assessment. EPA finds there are a number of major questions about the fish tissue data, analytical method and appropriate assessment guideline values:

a. The 2007 fish tissue results are considered "preliminary" since they have not received quality control review.

b. The analytical method is recently developed and has not yet received scientific peer review. We understand the California Department of Fish and Game is expected to submit the analytical method it has used for review and publication shortly. This review likely will not be completed for several months.

c. The fish tissue data sets for each Klamath River segment downstream of the reservoirs should be larger for EPA to reliably determine that California's listing decisions for that segment should be disapproved and an additional impairment for the segment should be identified. For example, the Iron Gate to Trinity River segment has zero tissue samples in 2005 and 2006, and eight mussel tissue samples in 2007. Of the eight individual mussel results, only one was collected during the summer bloom season. More tissue samples, including more composite samples, would significantly enhance the representation of potential human health risk exposure via consumption.

d. As noted in response to comment 2 (above) we understand that OEHHA will likely develop a California-specific recreational use guideline value for microcystin toxins (and possibly other cyanotoxins) in water and fish tissue. A California-specific guideline value for human health risk associated with microcystin toxin levels in fish would then be available when assessing the State's waters.

EPA concludes that even if the 2007 fish tissue results were included in EPA's assessment, they would not outweigh the 2005 data because of the issues outlined above that call into question the appropriateness of using it in evaluating the human health exposure risk due to consumption of Klamath River fish or shellfish, compared to the 2005 data.

4. Some commenters requested that EPA list the Klamath River as impaired based on blue-green algae cell count/cell density results.

Response: As discussed in the March 13 document, 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. For reasons

noted in both the California voluntary posting guidance and the WHO guidance documents, using the cyanobacterial cell density measure as a proxy for microcystin levels is problematic in several respects. There are both toxic and non-toxic strains of cyanobacteria; accordingly, water bodies with similar cyanobacterial cell densities may have different microcystin levels depending upon which strains are predominate. Other studies in the literature indicate there can be substantial variability in the toxin production by *Microsystis aeruginosa*. Different strains of the same cyanobacterial species can vary in their genetic capacity to produce toxin. Some blooms of *M. aeruginosa* may in fact produce little to no microcystin, an occurrence that has been observed in Klamath River monitoring results. Other strains may be neurotoxic, hepatotoxic, or both neuro- and hepatotoxic. This may be related to a variety of genetic and environmental variables that can alter the behavior of *M. aeruginosa* strains, as well as determine when genes for microcystin synthesis are activated (Zurawell *et al.*, 2004).

EPA has reviewed the blue-green algae cell count/cell density results. However, after consideration of those results and the other relevant information EPA concludes that, except for the change to the description of the reach that EPA is identifying as impaired due to microcystin toxins (see #12 below), no further revision of EPA's decision is warranted.

5. Commenters urge EPA separately to direct the State Board and Regional Board to amend the Basin Plan to establish appropriate water quality criteria/water quality objectives for *Microcystis aeruginosa* and microcystin toxin as part of California's implementation of its CWA Continuing Planning Process and WQS review obligations established by CWA sections 303(c) and (e), 33 U.S.C. § 1313(c), (e).

Response: Comment is noted but not within the scope of EPA's request for comment, which is limited to listing on California's 2006 303(d) list. EPA will forward the request to establish water quality criteria to both the State Board and the North Coast Regional Board for their consideration.

6. Several commenters requested EPA to list the Iron Gate to Scott River segment and the Scott to Trinity River segment as impaired due to microcystin toxins.

Response: EPA disagrees. As described in the Staff Report regarding EPA's March 13 decision, EPA reviewed the then-available data and information for these two segments. EPA has also carefully examined the technical reports, and monitoring results therein, provided in response to the request for comment on the March 13 decision. EPA concludes there is no material information contained in the comments or technical reports that had not been previously considered in support of its March 13 decision. EPA's conclusion remains there is insufficient data and information for the two segments downstream of Iron Gate reservoir to warrant disapproval of California's determination and identification of additional impairments by EPA.

Some commenters additionally asserted that the September 2007 health advisory posting for the river segments downstream of the reservoirs is evidence of impairment. However, EPA does not agree the September 2007 health advisory, when considered with the other relevant information, provides a sufficient basis for disapproving California's listing decisions with respect to those

segments. The downstream segments were not posted in 2005 and 2006. The September 2007 health advisory posting was based on blue-green algae cell counts, not on microcystin toxins concentrations.

EPA's review of the microcystin toxins concentration results for these two downstream segments revealed one exceedence of the recreational use guideline value in only one segment, in 2005. After consideration of the September 2007 posting and these other lines of evidence, EPA concludes the information is insufficient to warrant a disapproval of California's determination to omit microcystin toxins as an impairment for those segments, and an EPA determination to list microcystin toxins as an impairment in addition to those already identified by the State. Further EPA expects that California, as part of its development of the State's next Section 303(d) list, will consider information which became available after its 2006 determination.

7. Commenters requested EPA to include listing the Klamath River from Oregon border to the mouth of the Pacific Ocean.

Response: See response to comment 6 (above) regarding the two Klamath River segments: Iron Gate to Scott River and Scott to Trinity River.

The other Klamath River segment from Trinity to the mouth (or estuary) is commonly referred to as the Klamath Glen. The Klamath Glen segment lies within Indian Country and therefore it is not a candidate for listing on California's 303(d) list. EPA's decisions related to California's Section 303(d) listings do not extend to waterbodies located in Indian country, as defined in18 U.S.C. 1151. EPA's March 13 action, and its request for comment upon that action did not address waters within Indian country. EPA believes that it would be inappropriate to determine if a water body within Indian Country should now be identified as impaired in this proceeding.

8. CWA section 303(d)(1)(A) requires that the States identify all waters not meeting their WQS, regardless of whether the cause is a "pollutant" capable of being addressed by a TMDL calculation or instead due to other "pollution" causes.

Response: EPA's current 303(d) listing rules require states to identify only those "water quality-limited segments still requiring TMDLs". See, 40 CFR 130.7(b). EPA has addressed, in various guidance documents, the breadth of a State's duty to identify waters where the cause of impairment is a "pollutant", "pollution", or unknown. State's must identify, under CWA Section 303(d)(1), all waters which meet the listing criteria established in 40 CFR 130.7(b). However, where it can be demonstrated that an impairment is caused by "pollution" and not by a "pollutant", inclusion of the water on the State's "Section 303(d) List" is not required. See, EPA Assessment Guidance, 2005 and 2007.

9. EPA should identify the reaches of the Klamath River in California as impaired due to "*Microcystis aeruginosa*" or due to "algae".

EPA disagrees. See responses to comments 3 through 7 above.

As indicated in the Staff Report supporting EPA's March 13 decision, EPA reviewed the then-available information with respect to the Iron Gate Dam to Scott River and Scott River to Trinity River segments, and found disapproval of California's listing decisions with respect to those segments unwarranted. EPA has considered the comments provided in response to its March 13 decision, but finds no data or other material that persuades EPA that California's present listings for those two Klamath River segments (i.e., "Nutrients", "Organic Enrichment/Low Dissolved Oxygen", and "Temperature") are under-inclusive.

With respect to the Klamath River segment which EPA is identifying as impaired, EPA concludes that the array of present listings (that is, "Nutrients", "Organic Enrichment/Low Dissolved Oxygen", "Temperature", and "Microcystin toxins") are sufficiently comprehensive. Those listings trigger requirements to establish TMDLs sufficiently stringent to address the impacts presently shown to exist, and meet the requirements of CWA section 303(d).

10. Adding microcystin toxins to California's 303(d) list will not address the real causes of impairment. Blue-green algae and microcystin toxins are basin-wide problems and should be addressed as such.

Response: The commenter did not explain how this factor would alter or affect EPA's listing determination. Most water quality problems are typically basin-wide issues, especially in waterbodies such as Klamath River which has relatively few wastewater discharges from treatment plants or industrial facilities over the length of this water body (200 miles). The Klamath River watershed includes portions of Oregon and California; both states are involved in current TMDL development to address nutrient, dissolved oxygen and temperature impairments that exist basin-wide. See comment/response #13 below for more details on these forthcoming TMDLs.

11. One commenter stated EPA's justification for the proposed listing is arbitrary.

Response: EPA determined that further examination of potential impairments due to microcystin toxin was warranted based on its review of a range of information, including information in public comments. The commenter provides reasons why EPA's explanation is "disingenuous" because some of the relevant information was in existence and should not have been overlooked in EPA's June 28, 2007 determination. However, even if the relevant information were in existence at that time and would originally have supported listing, that in itself would not make it arbitrary for EPA to reconsider its decision and revise it as appropriate. EPA notes that the commenter did not provide specific information or analysis showing that EPA's decision on reconsideration was unreasonable.

12. The North Coast Regional Water Quality Control Board staff reviewed the water quality data and suggested a refinement of the geographical extent of impaired conditions to the "reach of the Klamath River including the Copco and Iron Gate reservoirs."

Response: EPA recommends that states segment their waterbodies in a way that adequately characterizes the water quality attainment status of the segment based on relevant considerations including the spatial extent of to which existing data and information can be extrapolated for a water body (EPA 2005). EPA believes it is appropriate to refine the extent of a water body previously considered impaired when the monitoring results appropriately support segmentation between impaired and non-impaired areas within a named water body.

The subject water body is named Klamath River Hydrologic Unit (HU), Middle HA Hydrologic Area (HA), from Oregon to Iron Gate. Based on the North Coast RWQCB staff's comments, EPA agrees that the description of the segment that EPA is identifying as impaired due to "microcystin toxins" should be revised. EPA is identifying the portion of the Klamath River impaired due to microcystin toxins as the segment including the Copco I, Copco II, Iron Gate reservoirs and river waters in between. This does not include California waters from the Oregon border downstream to the beginning of Copco I reservoir. EPA has modified the California's 2006 303(d) list accordingly, and the state should update its documents too.

13. North Coast RWQCB provided clarification regarding current TMDL development in Klamath River. The Regional Board is currently developing TMDLs to address listings for nutrients, low dissolved oxygen/organic enrichment, and temperature. These TMDLs address California waters from Oregon to the mouth of the Klamath River at the Pacific Ocean. The Regional Board is scheduled to complete these TMDLs in 2009, then send them to State Board and OAL for their action. EPA must approve California's submitted Klamath River TMDLs or establish the TMDLs themselves by December 31, 2010. This is consistent with consent decree entered into by EPA in 1997 and revised in December 2008 (*Pacific Coast Fisherman's Associations; et al. v. EPA*).

When implemented, the TMDLs addressing nutrient, organic enrichment/low dissolved oxygen, and temperature impairments should reduce the severity of blue-green algae blooms and and associated microcystin toxins productions in the reservoirs. However the Regional Board states that full implementation of these TMDLs cannot ensure compliance with the narrative toxicity objective or full support of REC-1 in Copco and Iron Gate Reservoirs. Additional monitoring, assessment and analysis will be required to develop a microcystin TMDL for the reservoirs. The Regional Board proposes a completion date of 2019 for a microcystin TMDL for the impaired reach of the Klamath River, consistent with proposed completion dates of other new listings on the 2006 303(d) List.

Response: Comment noted.

References

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