

NMFS comments:

1. Need to clarify that it is water temperature that is the basis of the start dates for treatment.

Yes, water temperature at or above a daily average of 25 C would be used for the criteria. "Water" added into the text, where appropriate.

2. Need to clearly explain that listed green sturgeon are present during the herbicide treatment window, even though salmonids and Delta smelt may be absent in the area.

Ok, text added.

3. Clarify whether both aerial application and boat application are to be made or is it just by boat.

Text added into the "procedures" section.

The predominant application method will be by boat. However, there may be a need to aerial application of algaecide to target an algal bloom, especially if a surface bloom. The preferred method for aquatic weed treatment is sub-surface injection to direct the herbicide the plant zone.

4. Clarify what the target concentration of copper herbicide is for treatments with different compounds proposed.

Copper herbicides and algaecides include chelated copper products and copper sulfate pentahydrate crystals. When aquatic plant survey results indicate that *E. densa* is the dominant species, copper-based compounds will be selected due to their effectiveness in controlling this species. *E. densa* is not affected by application of Aquathol K. Copper-based algaecides are effective at controlling algal blooms (cyanobacteria) that produce cyanotoxins or taste and odor compounds.

Copper herbicides and algaecides will be applied in a manner consistent with the label instructions, with a target concentration dependent upon target species and biomass, water volume and the depth of the forebay. Applications of copper herbicides for aquatic weed control are typically applied at a concentration of 1 ppm with an expected dilution to 0.75 ppm upon dispersal in the water column. Applications for algal control are applied at a concentration of 0.2 to 1 ppm. DWR monitors herbicide concentration levels during and after treatment to ensure levels do not exceed the application limit of 1 ppm (per NPDES requirement). No more than 50% of the surface area of CCF will be treated at one time.

5. Clarify what concentrations of copper (and what copper species is being measured in WQ testing) will be the threshold for re-opening the CCFB gates and continuing operations.

Standard practice for copper treatments is a 12-24 hour contact time to maximum biological uptake and treatment effectiveness.

In prior years, DWR has not collected real-time field measurements of copper concentrations. Per NPDES permit requirements, water quality samples are collected immediately before, during and 7 days after application within or adjacent to the treatment area and submitted to a laboratory for analysis of the concentration of dissolved copper. Laboratory results are not available until several weeks after the treatment.

Real-time field measurements of copper concentration is feasible. If copper concentration drops below an effective concentration of 0.25 ppm for aquatic weed treatments, DWR may opt to open the gates prior to the maximum 24-hour hold time. Re-opening the gates prior to the post-treatment holding time would have the added benefit of rapidly diluting the residual copper and reducing the exposure duration to ESA-listed fish species.

6. Clarify what the pre-application procedure is for gate operations - is it closure at least 24 hours prior to herbicide application?

The purpose of the gate closure prior to treatment is to contain the herbicide to the CCF, prevent further entrainment of listed fish species into the Forebay, and to facilitate the movement of fish in the CCF towards the fish diversion screens and into the fish protection facility through operation of Banks Pumping Plant. The drawdown also results in a smaller volume of water in CCF, thereby decreasing the total amount of herbicide needed to achieve the target concentration. The drawdown also results in the rapid dilution of any remaining residual herbicide following the refilling of the CCF.

For applications of Aquathol K and copper-based products, the herbicide application would begin after the radial gates have been closed for 24 hours or after the period of predicted delta smelt and salmonid survival within CCF has been exceeded, whichever is shorter.

For peroxide-based algaecides, the radial gates would be closed prior to application to ensure containment with CCF, but a holding time or drawdown period prior to or following application is not proposed. The required contact time for peroxide-based algaecides, such as PAK 27, is less than 1 minute and there are no residual by-products of concern. PAK 27 algaecide active ingredient is sodium carbonate peroxyhydrate. An oxidation reaction occurs immediately upon contact with the water destroying algal cell membranes and chlorophyll. There is no contact or holding time requirement, as the oxidation reaction occurs immediately and the byproducts are hydrogen peroxide and oxygen. Peroxide-based algaecide applications target surface blooms, therefore a drawdown to reduce the overall water volume in the Forebay is not necessary. The resulting gate closure duration would be a few hours, just the time required to allow for application of the algaecide.

7. Clarify whether it is a 24 hour minimum after herbicide application before gate re-opening or the 12-24 hours also stated in the project element description.

For treatments occurring within the June 28-August 31 timeframe, the radial gates would remain closed for a minimum of 12 hours but up to 24 hours following Aquathol K and

copper applications. Gates would reopen immediately (as soon as operationally possible) following peroxide-based algaecide treatments.

During periods when protective measures for Delta smelt and salmonids are in place (outside of the June 28-Aug 31 window or when daily average water temperature is below 25 C), the radial gates would remain closed after the completion of Aquathol K or copper herbicide applications for a minimum of 12 hours and up to 24 hours unless it is conferred that rapid dilution of the herbicide would be beneficial to reduce the exposure duration to ESA-listed fishes present within CCF.

For peroxide-based algaecides, the gates would reopen immediately after the algaecide was applied regardless of protective measure activation status. Prior to application, the radial gates would be closed to prevent any possibility of the algaecide diffusing into the Delta, but a holding time or drawdown period is not proposed. Peroxide-based algaecides target surface blooms, therefore a drawdown to reduce the overall water volume in the Forebay is not necessary. The resulting gate closure duration would be a few hours, allowing for adequate time to apply the algaecide.

The required contact time for peroxide-based algaecides, such as PAK 27, is less than 1 minute and there are no residual by-products of concern. PAK 27 algaecide active ingredient is sodium carbonate peroxyhydrate. An oxidation reaction occurs immediately upon contact with the water destroying algal cell membranes and chlorophyll. There is no contact or holding time requirement, as the oxidation reaction occurs immediately and the byproducts are hydrogen peroxide and oxygen. There are no fishing, drinking, swimming, or irrigation restrictions following the use of this product. PAK 27 has NSF/ANSI Standard 60 Certification for use in drinking water supplies at maximum-labeled rates and is certified for organic use by the Organic Materials Reviews Institute (OMRI).

8. No mention of other methods for weed removal - mechanical harvesting is mentioned in the effects analysis as a potential method - clarify.

Mechanical methods are implemented to manually remove aquatic weeds. A debris boom and an automated weed rake system continuously remove weeds entrained on the trashracks. During high weed load periods such as late summer and fall when the plants senesce and fragment or during periods of hyacinth entrainment, boat-mounted harvesters are operated on an as-needed basis to remove aquatic weeds in the Forebay and the intake channel upstream of the trashracks and louvers. The objective is to decrease the weed load on the trashracks and to improve flows in the channel. Effectiveness is limited due to the sheer volume of aquatic weeds and the limited capacity and speed of the harvesters. Harvesting rate for a typical weed harvester ranges from 0.5 to 1.5 acres per hour or 4 to 12 acres per day. Actual harvest rates may be lower due to travel time to off-loading site, unsafe field conditions such as high winds, and equipment maintenance.

9. What about use of Aquathol?

The use of Aquathol K is specified in the proposed CCF Aquatic Weed Management.

When aquatic plant survey results indicate that pondweeds are the dominant species in CCF, Aquathol K will be selected due to its effectiveness in controlling these species. Aquathol K will be applied according to the label instructions, with a target concentration dependent upon plant biomass, water volume, and forebay depth. The target concentration of treatments is 2 to 3 ppm. DWR monitors endothall concentration levels during and after treatment to ensure levels do not exceed the Aquathol K application limit of 5 ppm. Samples are submitted to a laboratory for analysis. There is no "real time" field test for endothall. Treatment areas are typically about 900 acres, and no more than 50% of the 2,180 total surface acres.