

ALTERNATE PROCEDURE FOR CALCULATING LAKE VOLUMES TO A DEPTH OF TEN FEET FOR PROPOSED FLURIDONE TREATMENTS

This is an alternate procedure used to calculate the volume of water within a the upper 10-feet of a lake and to determine the appropriate application amount of aqueous solution of fluridone (Sonar A.S.® and AVAST!™). The goal of this procedure is to achieve rapid and uniform distribution of a given fluridone concentration by treating water within the 0-5 foot depth contour and those areas with depth greater than 5 feet separately with different amounts of fluridone. This procedure determines the amount of product necessary to treat an entire lake to a depth of 10 feet at a given concentration. An example is presented for calculating the amount of product necessary to treat a lake at a concentration of 5 parts per billion (ppb) fluridone. The lake has a surface area (0-foot) of 239 acres, an area of 189 acres at the 5-foot depth contour, and 71 acres at the 10-foot depth contour. A1, A2, and A3 represent the areas for those depth contours, respectively.

Volume Calculations

STEPS

1. Determine the acres of the 0-, 5-, and 10-foot depth contours.

Example: 0-, 5-, and 10-foot depth areas are 239, 189, and 71 acres, respectively.

2. Use the following formula to calculate the volume of water between the surface (0-foot) and 5-foot depth contour “donut “ area.

$$V = (A1-A2) \times 2.5 \text{ feet}$$

Where: V = volume, A1 = surface area of the entire lake, A2 = area of the 5-foot depth contour, and 2.5 feet is the average depth between 0 and 5 feet.

Example: $V = (239 - 189) \times 2.5 \text{ feet} = 125 \text{ acre feet}$

3. Multiply the results of Step 2 by 2.72 (pounds of active ingredient in a one part per million solution in an acre-foot of water). Then multiply that value by the target concentration in parts per **million**, not parts per billion. One quart of product (Sonar A.S.® or AVAST!™) contains one pound of the active ingredient fluridone.

Example: At 5 ppb; $125 \text{ acre feet} \times 2.72 \times 0.005 \text{ ppm} = 1.7 \text{ pounds of fluridone or } 1.7 \text{ quarts of product (Sonar A.S.® or AVAST!™)}$.

4. Use the following formula to calculate the volume of water between the 10-foot contour depth and the 5-foot depth contour “donut-hole” area.

$$V = (A2 - A3) \times (D + 2.5) \times 2.72 \times 0.005 \text{ ppm}$$

Where D is the depth of the layer between the two depth contours.

Examples:

- a. 5-foot contour = A2 = 189 acres, 10-foot contour = A3 = 71 acres

$$V = (A2 - A3) \times (D + 2.5) \times 2.72 \times \text{target fluridone concentration in ppm}$$

$$V = (189 - 71) \times (5 + 2.5) \times 2.72 \times 0.005 = 12.0 \text{ pounds of fluridone or 12.0 quarts of product (Sonar A.S.® or AVAST!™).}$$

- b. Area greater than 10 feet deep.
10-foot contour = A3 = 71 acres.

$$V = 71 \times 10 \times 2.72 \times 0.005 = 9.7 \text{ pounds of fluridone or 9.7 quarts of product (Sonar A.S.® or AVAST!™)}$$

5. To determine the total amount of product needed to chemically treat the entire lake, add Steps 3 and 4.

Example: (1.7 quarts+ 12.0 quarts + 9.7 quarts) = 23.4 quarts.

Product Distribution

Distribute the fluridone in the 0- to 5-foot depth contour “donut” area by zigzagging the boat within the water that is 0 to 5 feet deep as evenly as possible. Distribute the fluridone in the water deeper than 5 feet (the “donut hole” area) in a crisscross pattern. Distributions are best when these areas are broken into smaller section areas and just the amount of product used for that subsection is placed in the mixing tank. However, this requires additional calculations for the respective subsections.