

Checklist for Prescribing and Applying MCH

- Determine if the stand is at high risk for Douglas-fir beetle infestation:
 - Does the stand have a significant component of large, old Douglas-fir trees?
 - Has the Douglas-fir beetle been causing mortality in the stand or adjacent stands in recent years?
 - Has there been a disturbance such as a windstorm that killed or weakened Douglas-fir trees in the stand or adjacent stands in the last two years?
- Develop MCH prescription consistent with an integrated resource management plan
- Determine size of the treatment area
- Determine number of bubble capsules needed to treat the area
- Order bubble capsules and **store in a freezer**, refrigerator or cold room whenever possible
- If necessary, flag treatment area boundaries and lines through the unit to facilitate the application
- Avoid prolonged exposure to bubble capsule fumes during transport and application
- **Wear gloves** when handling bubble capsules
- Apply bubble capsules at 75/ha before the **third week in April** in the central interior.
- Attach bubble capsules at a height of **6-8 feet on the north side** of objects with the flat side facing out
- In high use areas, attach the bubble capsules at a height that is out of reach
- If desired, collect bubble capsules no earlier than September
- Evaluate treatment effects one year after the application
- Re-treat the area each year that Douglas-fir beetle infestation is likely

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MCH Application – Rationale for Use

MCH treatment is appropriate for any stand where Douglas-fir beetle-caused tree mortality is expected to be high enough to significantly impact resource management objectives and the cost can be justified. In research and operational tests, areas from less than one acre to over 300 acres have been successfully treated. MCH effectively protects treated stands by preventing beetles from initiating new attacks. Beetles will move through a treated area and continue to disperse until they find suitable habitat elsewhere or until they die. Because beetles moving through a treated stand will spend more time searching for a host, they presumably will have a greater chance of dying as a result of natural causes. Further, there is no evidence tree mortality in areas directly adjacent to those treated with MCH is any higher than it would be in the absence of MCH treatment. Consequently, landowners and managers do not need to fear that beetles will “move” from treated stands into neighboring ones.

How to Apply MCH

MCH is most effective when it is applied before beetles begin to fly and attack trees in the spring. However, if it is applied early in the flight season but after beetles have initiated attacks on some trees, it may still reduce the number of trees that are killed within the treated area compared to doing nothing. Throughout much of the BC Central interior, Douglas-fir beetles begin flying in *late-April*, so MCH applied by the third week in April should be fully effective unless it is an unusually warm year. The bubble capsule formulation of MCH will last throughout the period that beetles fly and attack trees, but needs to be reapplied each year that protection is desired. During a typical outbreak, this may require 1-3 annual applications, depending on circumstances and beetle populations.

For areas greater than 0.2 ha, bubble capsules should be applied at a rate of 70-75/ha. If added insurance against infestation is desired and cost is not considered prohibitive, a slightly higher rate may be applied. However, there will likely be no benefit to applying rates higher than 90/ha and rates above the minimum should not be necessary in most situations. The first step in conducting a treatment is to determine the size of area to be treated and calculating the number of bubble capsules needed.

Bubble capsules are applied by stapling or otherwise attaching them to trees, snags, shrubs, fence posts or any other object. They are usually applied at a height that applicators can easily reach (i.e., 1.8-2.5 meters), but they can be placed higher in areas such as campgrounds or residential sites where it is likely that they may be disturbed. Ladders can be used to attach bubble capsules at a height where they are beyond reach. If it is necessary to achieve the proper spacing, they can also be attached to objects such as stumps or logs as low as 0.5 meters above the ground. Bubble capsules are placed with the *flat side facing out and the bubble side toward the object to which they are attached*. They should be attached on the north side of trees and snags where possible to protect them from direct sunlight, although this is not critical for an effective treatment.

MCH contained in a bubble capsule diffuses through the plastic and is dispersed by air movement. In essence, a cloud of MCH develops around the point at which it is dispensed. The shape and distribution of the MCH cloud depends upon the rate of diffusion, wind speed, and wind direction. The objective in area-wide treatment is to place bubble capsules in a pattern that results in a cloud of MCH sufficient to affect beetle behavior when beetles are searching for host trees.

Several different patterns of placing MCH bubble capsules have been used in operational treatments. Since air movement disperses MCH as it diffuses out of the bubble capsules, there is a lot of flexibility in the distribution of bubble capsules provided the entire area is covered. In the following descriptions, distances between bubble capsules are only approximate and pacing is accurate enough for effective treatments. In all cases, bubble capsules should be placed about 30 feet beyond the boundary of the area to be protected to avoid an edge effect. Two suggested methods for placement:

- 1) Place bubble capsules can around the perimeter and in parallel lines across the unit spacing them about five (5) meters (Fig. 1). The number of parallel lines and spacing between them will depend upon the size and shape of the unit. The lines of bubble capsules should be spaced 35-50 meters apart to achieve the desired dose. If possible, these lines should be placed perpendicular to the expected wind direction on warm afternoons in the spring when beetles are most likely to be dispersing. After treating the perimeter and determining the number of parallel lines that will be needed to cover the unit, the remaining bubble capsules from the predetermined number needed to treat the unit should be divided into a number of lots equal to the number of parallel lines. This will help to ensure that the bubble capsules are evenly spaced across the unit.

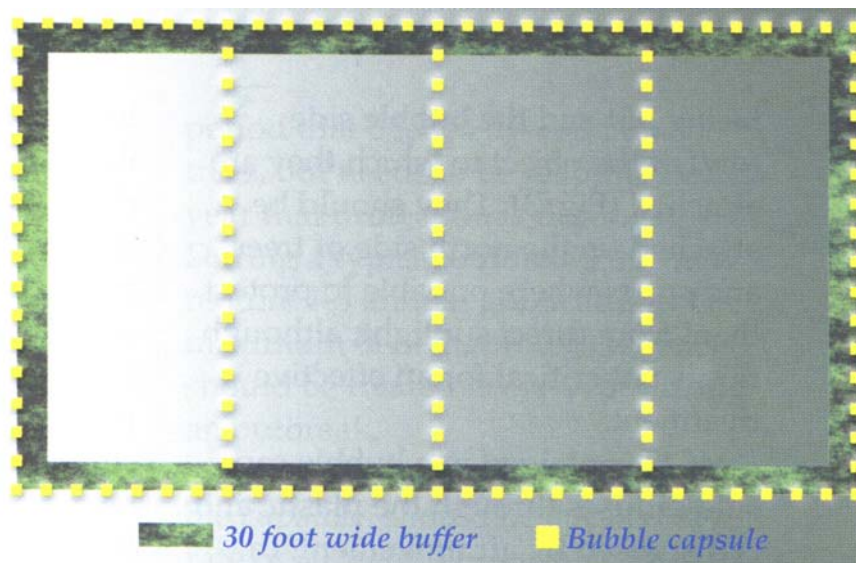


Figure 1: Diagram of the perimeter and parallel line method of deploying MCH bubble capsules. Bubble capsules are spaced 5meters apart and lines are spaced 35-50 meters apart (not drawn to scale).

- 2) Second approach is to place MCH bubble caps in an even grid pattern across the area (Fig. 2). Spacing the bubble capsules 12-13 meters apart in the grid will result in the desired dose. Using the grid pattern may require a little more time since more of the unit must be covered by applicators. However, this pattern may be easier for the applicators to follow and result in better coverage, particularly on large areas. Either pattern of deploying the bubble capsules will provide an effective treatment provided the unit is evenly covered. If bubble capsules are left over from the predetermined number needed to treat a given size unit, they should be evenly distributed throughout the unit or placed in areas with a particularly high concentration of host trees.

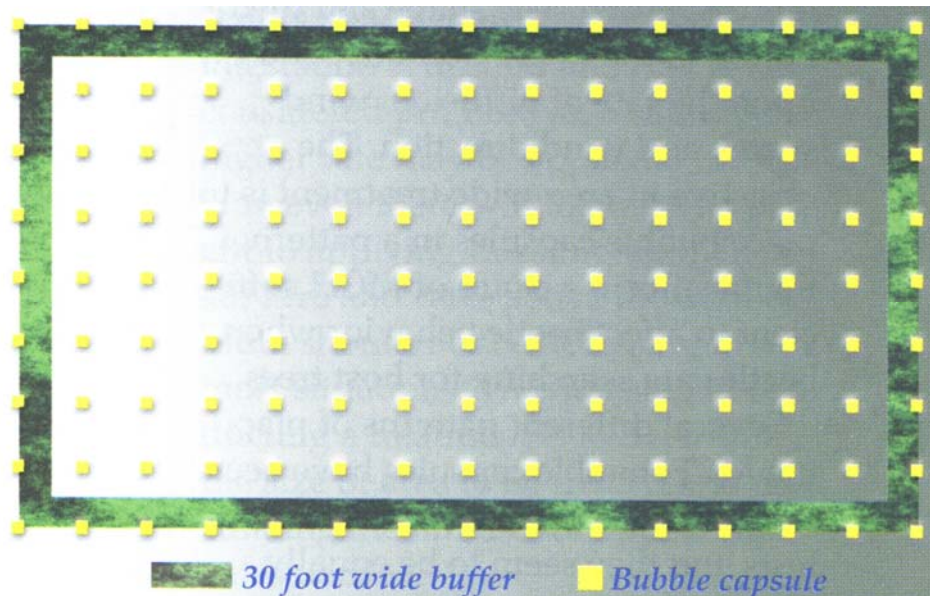


Figure 2: Diagram of the grid method of deploying MCH bubble capsules. Bubble capsules are spaced approximately 12-13 meters apart (not drawn to scale).

If bubble capsules are left in place after treatment, they will eventually fall to the ground and become less noticeable as they break apart over time. However, if this is unacceptable, they can be collected and disposed of after the beetle flight period has ended. Bubble capsules *should not* be collected before September.