Wood Chip Management in Park Operations to Slow the Spread of Jumping Worms

Developed by the Three Rivers Park District with input from the University of Minnesota and the Minnesota Department of Natural Resources

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Purpose

Jumping worms (*Amynthas* and *Metaphire* species) are non-native, invasive earthworms that can damage forest ecosystems. Since these invasive earthworms are primarily moved to new areas by people, park workers can play an important role in preventing the introduction and spread of jumping worms within park environments. This document highlights actions that staff can take regarding wood chips used in park operations.

Jumping worms can enter wood chip piles and feed on the organic material in the pile. They can also deposit cocoons (egg cases) in the pile. As a result, when wood chips that are infested with jumping worms are moved to a new location for storage or for use as landscape mulch, they can introduce jumping worms to that site. If wood chip piles are hot enough for long enough it reduces the chances of live earthworms and their eggs being present. The following guidance is intended to reduce the risk of spreading jumping worms within and among parks through wood chips infested with jumping worms.

Wood chip storage and application as mulch

People are encouraged to use the best management practices listed below whenever possible. While acceptable practices listed can limit the risk of spreading jumping worms, some risk still exists. The "alert" sections highlight what *not* to do.

Activity: Storing wood chips from recent tree removal projects

Best practices:

- Do not add fresh wood chips to existing piles. Fresh chips are unlikely to have jumping worms, so keeping them away from existing chip piles that may have jumping worms lowers the risk of the new chips getting jumping worms.
- Store new chips on a paved surface and ensure equipment coming and going out of the area is clean. While jumping worms can cross paved surfaces, storing on paved surfaces is lower risk than storing on soil adjacent to woodlands.

Acceptable practices:

- New wood chip piles can be established on unpaved surfaces away from woodland edges (please consult natural resource management staff for guidance and recommendations on alternative locations).
- Add fresh wood chips to the top and middle section of an existing wood chip pile *if* the pile is consistently reaching temperatures over 104° F. A study found that exposing materials infested with jumping worms to a temperature of at least 104° F for at least three days will kill jumping worm cocoons as well as the jumping worms themselves.

Alert:

- Do not move an existing wood chip pile to a new location within the park.
- Do not move wood chips that have been stored on the ground (paved or not) to a different park.
- Do not import wood chips from outside the park.

Activity: Spreading wood chips within a park

Best practices:

- Use wood chips from recent tree removal operations that have been stored away from infested locations.
- Use wood chips from existing piles if temperature readings indicate 104° F or higher AND if efforts are made to scoop wood chips from the top or mid-sections of the piles.
    - Mixing the wood chips in the piles can ensure that all wood chips are exposed to lethal temperatures.

Acceptable practices:

- If wood chips were previously spread on a site from an existing wood chip pile, you can continue to use woodchips from that same existing pile at that same site because any species in that pile have already been introduced to the site.
- Only purchase and use wood chip mulch from trusted suppliers that follow established jumping worm prevention practices – i.e., companies that inspect incoming sources for jumping worms, monitor their storage areas, and regularly check the temperatures within their wood chip piles. If the company does not post their jumping worm prevention practices on their website, contact them to learn if they are taking appropriate actions to prevent the spread of jumping worms.
    - For more information on best practices, see the Minnesota Department of Natural Resources "Jumping worm information for businesses" webpage and the Minnesota Nursery and Landscape Association's guidance document "Nursery and Industry Best Management Practices to Reduce the Potential for Spreading Jumping Worms".

Alert:

- Do not spread wood chips from existing wood chip piles to areas that have not been previously mulched with wood chips.
- Do not purchase and use bagged wood chip mulch or other organic mulches (or compost) from vendors and suppliers that do not implement jumping worm prevention precautions. Bagged mulch from vendors with few or no measures in place to limit the introduction and spread of invasive species are higher risk for introducing jumping worms.
- Do not use wood chips that have been stored on the ground (paved or not) in a different park.

Activity: Dealing with existing wood chip piles that are known to contain jumping worms

Best practices:

- Do not use the wood chips.
- Avoid disturbing the site.
- Allow wood chips to decompose in place.

Long-term management of large wood chip piles

As a result of ash tree removals in response to emerald ash borer, many parks currently have extremely large wood chip piles. With the help of equipment operators, Three Rivers Park District staff monitored the temperatures within two large wood chip piles at Baker Park Reserve and Carver Park Reserve. Temperatures were monitored throughout the piles, and it was confirmed that temperatures at the top and middle sections of the piles were well above lethal limits to jumping worm adults and cocoons during late summer and early fall. Temperatures *were no*t hot enough to kill jumping worms in all parts of the piles and were below lethal limits at the bases of the piles (the layer of wood chips within two feet of the ground and less than 1 foot in from the outer surface of the pile). See Image 1 for a visual diagram of a cross section of a wood chip and best areas to take wood chips.

Based on these observations, using chips from established piles is safest when these two practices are followed:

1. Use a compost thermometer (Image 2) to verify that temperature thresholds 104° F or higher have been reached. Ideally, park staff should create a schedule and regularly monitor and record temperatures within wood chip piles with a temperature probe in the parts of the pile where wood chips will be sourced. If wood chip temperatures are not being monitored regularly, be sure to take temperature measurements before wood chips are removed.
2. Take wood chips from the middle and top of wood chip piles.

Image 1: Diagram of sloped wood chip pile showing key areas in cross-section. Collect chips from the top and center of the pile as this is the hottest area. Do not take chips from the outer edges of the pile as temperatures may be cooler in these areas. Do not take chips from the bottom one third of pile as the ground can be a source of jumping worms. Photo credit: Three Rivers Park District.

The way a wood chip pile is constructed and managed can help ensure that operators are adding to and taking chips from safe zones of the pile. Follow these practices:

- Construction of a **new** wood chip pile:
    - Contour the chips into a gently sloped ramp that is wide enough for a tractor or loader to drive up (Images 3 and 4). Then deposit fresh loads of chips into the safest and hottest part of the pile.
    - If a chip pile is not large enough to build a ramp with it, the pile should be constructed as high and as compact as possible. This reduces the amount of space where invasive worms could thrive

within the pile and helps ensure that the main section of the pile will heat up. We have found that worms prefer to be at the bottom of the piles, at the interface with soil, where conditions are cooler and moister.

- Management of **existing** wood chip pile:
    - Scoop chips from the top and middle of the pile that you have been temperature monitoring. This helps ensure that chips taken for trail projects or landscaping work have been hot enough to kill invasive worms.
    - ***Chips should never be taken from the bottom or outer edges of a pile.***

Image 2: A temperature probe. Photo credit: Three Rivers Park District

Image 3: A wood chip pile contoured so that a tractor may deposit material at the top of it. Photo credit: Three Rivers Park District

Image 4: A tractor driving up a wood chip pile. Photo credit: Three Rivers Park District