



Oak Wilt: Guidelines for Reducing the Risk of Introduction and Spread¹ March 15, 2007 (map revised 09/2014)

Oak harvest guidelines website: <http://dnr.wi.gov/topic/foresthealth/OakWiltGuide.html>

Purpose of this guide: This guide is designed to provide information for landowners, managers and loggers on the relationship between the risk of *introduction of oak wilt* (caused by the fungus *Ceratocystis fagacearum*) and the timing of any activities that may wound oaks or leave oak stumps. This guide also provides information on the relationship between various site and stand factors and the expected level of disease impact (based on root-graft spread). Information on the biology and management of oak wilt may be found in UW Extension Publication # G3590, Oak Wilt Management: what are the options? <http://learningstore.uwex.edu/Assets/pdfs/G3590.pdf>

When should I use this guide?

- When your management plan includes retaining oak as part of the timber type
AND
- When your oak type includes any of the following red oak-group species (northern red, *Quercus rubra*; black, *Q. velutina*; and northern pin oak, *Q. ellipsoidalis*) alone or mixed with white oak-group species (white oak, *Q. alba*; bur, *Q. macrocarpa*; and swamp white oak, *Q. bicolor*). The risk of spread will decrease as the component of white oak-group trees increases because root grafting is rare between white and red oaks.

Am I required to use this guide?

- If your property is part of the Managed Forest Law (MFL) program, the guide should be used to help make decisions about when harvesting may occur. Other factors that influence the timing of harvest (such as site factors, soil moisture) that are not related to oak wilt must also be considered.
- If you desire to follow generally accepted practices that minimize the impact and risk of introducing oak wilt, you should follow the guide.

When is it not necessary to use this guide?

- If you are converting to a non-oak type or if oak is not considered to be an important part of the stand's future.

Consideration:

- If you choose *not* to use the guide or if you make decisions that could introduce oak wilt, be aware of the potential impact of introducing oak wilt from your property onto adjacent properties through root-graft transmission.

If I follow this guide, will all risk of introduction and spread be eliminated?

- *It is impossible to eliminate all risk of introducing oak wilt into a forest stand.* Use of this guide is not intended to eliminate risk but to provide information on the levels of risk of introduction and spread so you may make informed decisions.

What forms the scientific basis of this guide?

- Climate data and research on vector activity and fungal mat formation have shown that the risk for overland spread through fresh wounds increases significantly around April 1 south of the tension zone

¹ Dr. Jennifer Juzwik, USDA Forest Service research scientist lead this team effort. The team included consulting, industrial, county and DNR foresters, forest health specialists and a forest ecologist.

and April 15 north of the tension zone. The risk of overland infection decreases significantly after July 15 statewide; risk for overland infection drops further around October 1.²

- Additional research has shown that root grafts, which facilitate underground spread, are more common in light textured soils and less common in heavy soils. Observations in varying terrain has revealed that root grafts are more common in areas that are flat or rolling (0-12% slope) and less common in terrain that has steep hills and deep valleys (>12% slope).

Under what circumstances might it be appropriate to vary from the guidelines?

- Your stand is in an area where oak wilt is rare and locations are well documented (contact your DNR regional forest health specialist for location information). If there is no oak wilt within 6 miles of your stand, and you wish to harvest oak during the high risk time period, the risk of introduction will be reduced, thus cutting during high risk time periods (April 1 (south) or April 15 (north) to July 15) may be acceptable. In general, oak wilt is so common in the southern two-thirds of Wisconsin that it would be unusual to have an area that is oak-wilt free for 6 miles in all directions.
- If multiple forest health issues are affecting your stand and unusual circumstances prohibit harvesting during low-risk time periods, varying from the guidelines may be appropriate.

What should I do if I want to vary from the guidelines?

- If the land with the stand is enrolled in the managed forest law (MFL) program, county forestry program or is state land: 1) Contact your regional forest health specialist to discuss whether or not varying from the guidelines is appropriate and 2) If determined to be appropriate by the DNR Regional forest health specialist, document justification for varying from the guidelines and include the documentation or a reference to it into your normal approval process for harvesting i.e. on form 2460-001 (timber sale and cutting report) for public lands and on form 2450-032 (cutting notice) for MFL lands. Documentation is the responsibility of the landowner.

How does the “stump treatment” option work?

- Treatment of stumps is recommended as an option only for stands that have a basal area of oak <15 square feet/acre, if you are cutting in the spring and are in a county with oak wilt. To treat stumps apply a tree wound dressing product (available at most hardware stores) to the last 3 growth rings. Only one treatment is necessary but this must be done each day to the stumps that were created that same day.

Are there other ways I can minimize the overland spread of oak wilt?

- Yes. Trees that wilt during the summer and early fall will produce small mats of the fungus under the bark the following spring and early summer. If you are moving oak firewood or logs that were killed by oak wilt, utilizing the material before April 1 will minimize the risk of the fungus spreading overland via sap-feeding beetles. Wood is no longer infectious once the bark has fallen off.

²A research study further examining the risk of cutting in the summer was recently conducted (2006-2009). Twelve stands in Adams, Clark, Jackson, Waupaca, and Wood counties were monitored for two years after thinning. Seven stands were thinned in mid-summer to early fall (7/15-10/15) and 5 stands were unthinned control. Though mortality of red oak was observed on some stands after thinning, oak wilt was not confirmed by the lab test. The study showed no evidence that the pathogen *Ceratocystis fagacearum* initiated oak wilt in any of the stands that were cut from 7/15-10/15 due to harvesting.

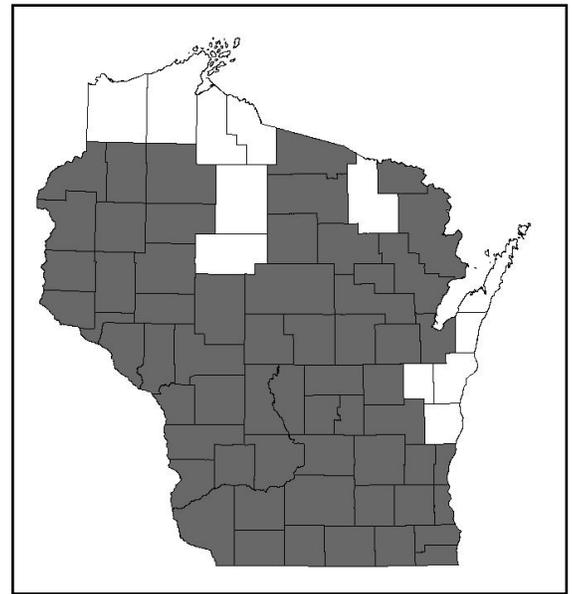
HOW TO USE THIS GUIDE:

1. Choose which of the following guides is most appropriate.

Table 1. Your woodland is in a county that has oak wilt OR is within 6 miles of a county with oak wilt AND oak wilt is NOT in your stand.³

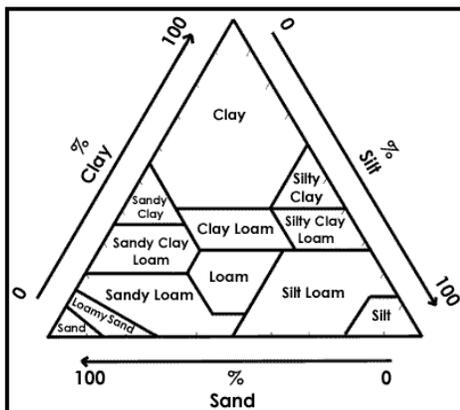
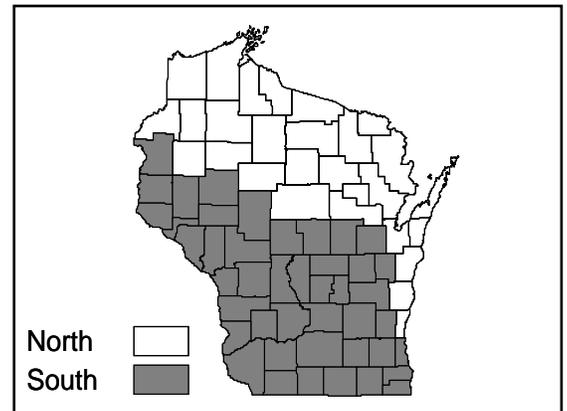
Table 2. Your woodland is in a county that does not have oak wilt AND is NOT within 6 miles of a county with oak wilt.

Table 3. Oak wilt is present in your stand. If oak wilt is already present in your stand, it is important to consider whether you are going to focus on managing the disease and minimizing the formation of new pockets or living with the disease and converting the stand or portions of the stand to other species. This decision will help determine the level of risk you are willing to endure.



Counties confirmed with oak wilt (shaded) – Sept 2014

2. Use the shaded map below to determine whether you are located north or south of the tension zone. The tension zone is an area where the northern and southern forests overlap and are affected by the northern and southern climate.
3. Determine the pre-harvest basal area of oak.
4. Choose the topography description that best describes the stand. In general, flat to rolling includes terrain that has 0-12% slope; hills and valleys are characterized by slopes >12%.



5. Choose either light (sandy, loamy sand, sandy loam, sandy clay loam, loam) or heavy (sandy clay, clay, clay loam, silt, silt loam, silty clay loam, clay loam) textured soil.

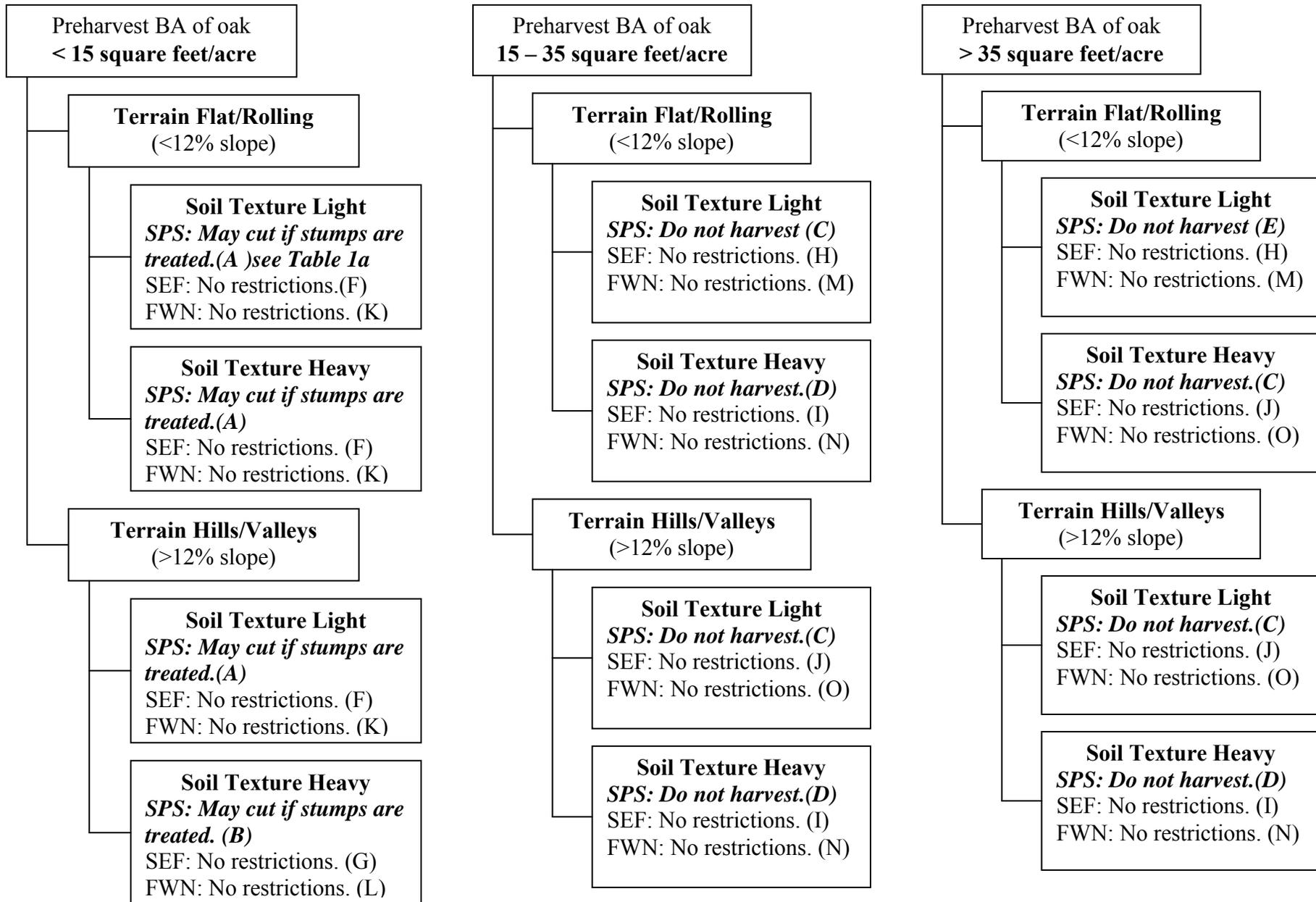
6. Use the guideline related to timing of harvest and the risk of introduction, spread and combined risk of introduction and impact to make your decision.

Source: http://sof.eomf.on.ca/Introduction/Physical_Geography/Soils/soils_e.htm

Revised: Sept 2014

³ “Stand” is defined as: a contiguous group of trees sufficiently uniform in species composition, structure, and age-class distribution, and growing on a site of sufficiently uniform quality, to be considered a relatively homogeneous and distinguishable unit. 2) A contiguous group of similar plants.

Table 1. Harvest guidelines: Your woodland is in a county that has oak wilt OR is within 6 miles of a county with oak wilt AND oak wilt is NOT in your stand. * Letter following guideline statement refers to Table 1a.



SPS: April 15 – July 15 (north); April 1 – July 15 (south). **SEF:** July 16 – September 30 statewide. **FWN:** October 1 – April 14 (north); October 1 – March 31 (south)

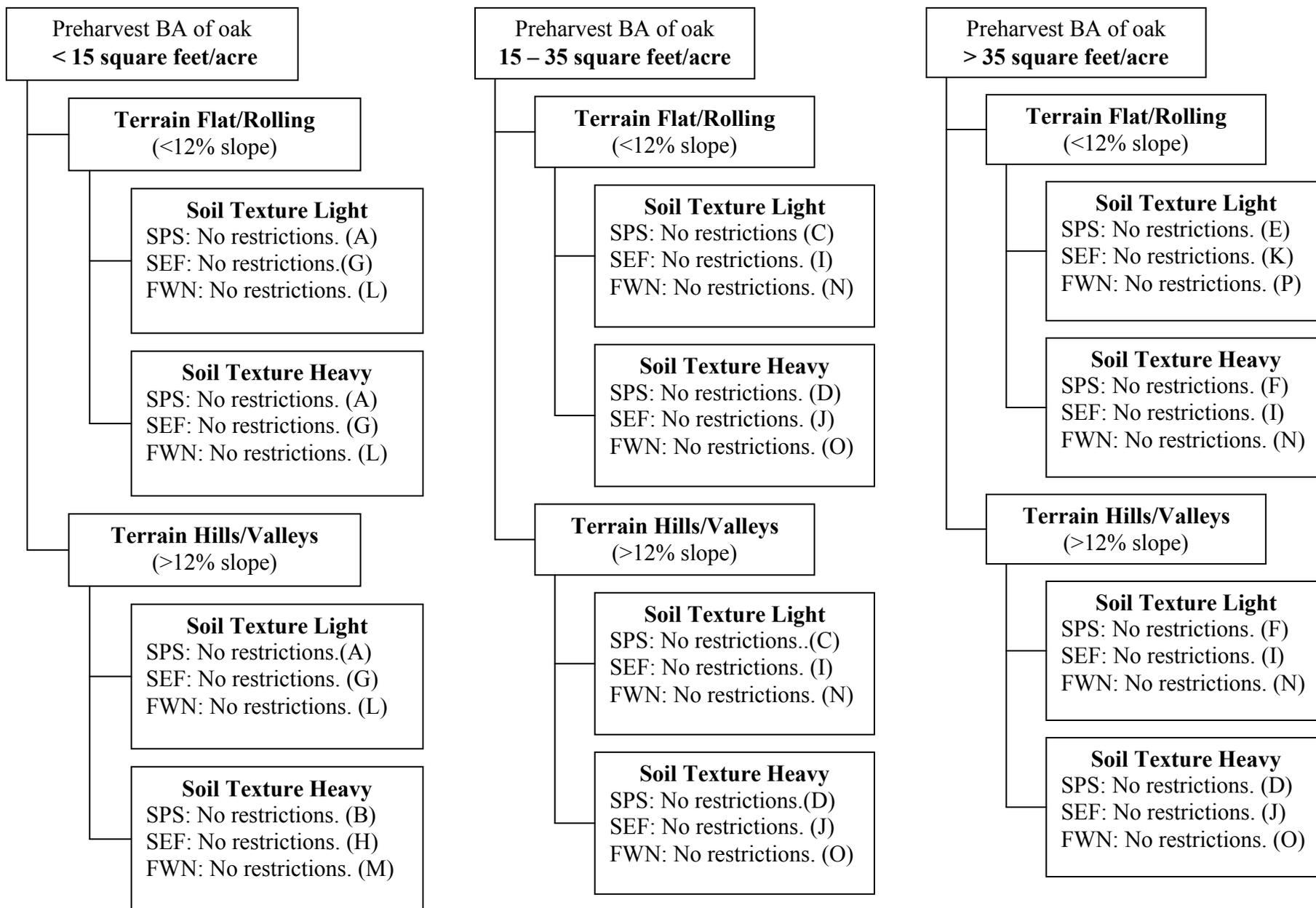
Table 1a. Risk of introduction, impact and combined risk based on time of year, basal area of oak, terrain and soil type.

| Code from Table 1 | Risk of Introduction⁴ ➤ Rationale | Predicted impact in future oak stand ➤ Rationale | Combined risk of presence and impact |
|--------------------------|---|---|---|
| A | VH ➤ Spring wounds ➤ Pathogen in county | L ➤ Low BA ➤ Less root grafting | Low |
| B | VH ➤ Spring wounds ➤ Pathogen in county | VL ➤ Low BA ➤ Heavy soil ➤ Hilly terrain ➤ Less root grafting | Low |
| C | VH ➤ Spring wounds ➤ Pathogen in county | H ➤ Moderate BA ➤ Light soil ➤ More root grafting | High |
| D | VH ➤ Spring wounds ➤ Pathogen in county | M ➤ Heavy soil ➤ Less root grafting | High |
| E | VH ➤ Spring wounds ➤ Pathogen in county | VH ➤ High BA ➤ Light soil ➤ More root grafting | Very High |
| F | M ➤ Summer-fall wounds ➤ Pathogen in county | L ➤ Low BA ➤ Less root grafting | Low |
| G | M ➤ Summer-fall wounds ➤ Pathogen in county | VL ➤ Low BA ➤ Heavy soil ➤ Hilly terrain ➤ Less root grafting | Very Low |
| H | M ➤ Summer-fall wounds ➤ Pathogen in county | VH ➤ Moderate-High BA ➤ Light soil ➤ More root grafting | Moderate |

⁴ VH = very high; H = high; M = moderate; L = low; VL = very low.

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|---|---|---|----------|
| I | M <ul style="list-style-type: none"> ➤ Summer-fall wounds ➤ Pathogen in county | M <ul style="list-style-type: none"> ➤ Heavy soil ➤ Less root grafting | Moderate |
| J | M <ul style="list-style-type: none"> ➤ Summer-fall wounds ➤ Pathogen in county | H <ul style="list-style-type: none"> ➤ Moderate BA & Light soil ➤ High BA & Heavy or Light soil ➤ More root grafting | Moderate |
| K | VL <ul style="list-style-type: none"> ➤ Fall-winter wounds ➤ Pathogen in county | L <ul style="list-style-type: none"> ➤ Low BA ➤ Less root grafting | Very Low |
| L | VL <ul style="list-style-type: none"> ➤ Fall-winter wounds ➤ Pathogen in county | VL <ul style="list-style-type: none"> ➤ Low BA ➤ Heavy soil ➤ Hilly terrain ➤ Less root grafting | Very Low |
| M | VL <ul style="list-style-type: none"> ➤ Fall-winter wounds ➤ Pathogen in county | VH <ul style="list-style-type: none"> ➤ Moderate-High BA ➤ Light soil ➤ More root grafting | Very Low |
| N | VL <ul style="list-style-type: none"> ➤ Fall-winter wounds ➤ Pathogen in county | M <ul style="list-style-type: none"> ➤ Heavy soil ➤ Less root grafting | Very Low |
| O | VL <ul style="list-style-type: none"> ➤ Fall-winter wounds ➤ Pathogen in county | H <ul style="list-style-type: none"> ➤ Moderate BA & Light soil ➤ High BA & Heavy or Light soil ➤ More root grafting | Very Low |

Table 2. Harvest guidelines: Your woodland is in a county that does not have oak wilt and is not within 6 miles of a county with oak wilt. * Letter following guideline statement refers to Table 2a.



SPS: April 15 – July 15 (north); April 1 – July 15 (south). **SEF:** July 16 – September 30 statewide. **FWN:** October 1 – April 14 (north); October 1 – March 31 (south)

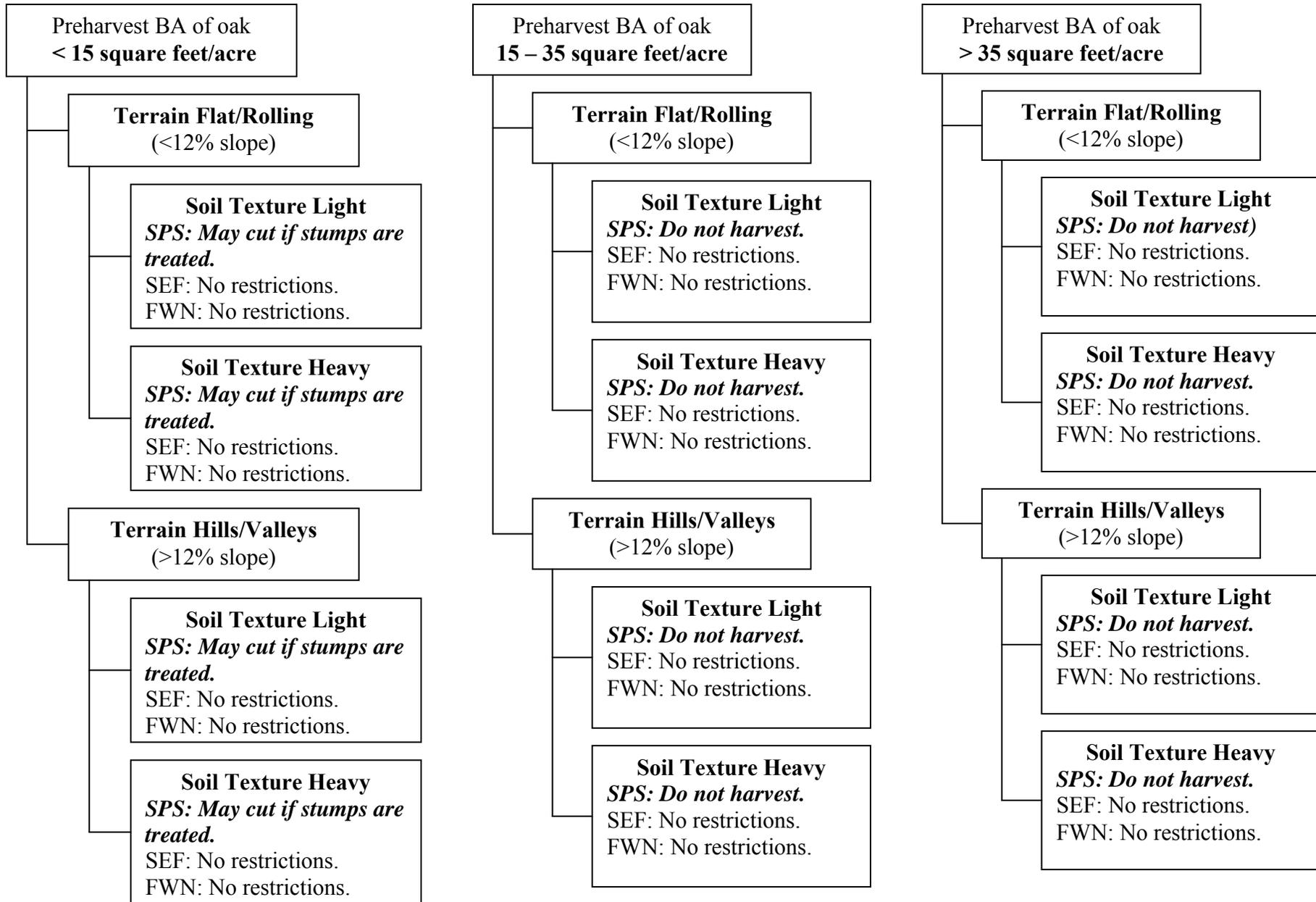
Table 2a. Risk of introduction, impact and combined risk based on time of year, basal area of oak, terrain and soil type.

| Code from Table 2 | Risk of Introduction⁵ ➤ Rationale | Predicted impact in future oak stand ➤ Rationale | Combined risk of presence and impact |
|--------------------------|---|---|---|
| A | M ➤ Spring wounds ➤ No pathogen in county | L ➤ Low BA ➤ Less root grafting | Low |
| B | M ➤ Spring wounds ➤ No pathogen in county | VL ➤ Low BA ➤ Heavy soil ➤ Hilly terrain ➤ Less root grafting | Very Low |
| C | M ➤ Spring wounds ➤ No pathogen in county | H ➤ Moderate BA ➤ Light soil ➤ More root grafting | Moderate |
| D | M ➤ Spring wounds ➤ No pathogen in county | M ➤ Heavy soil ➤ Less root grafting | Moderate |
| E | M ➤ Spring wounds ➤ No pathogen in county | VH ➤ High BA ➤ Light soil ➤ More root grafting | High |
| F | M ➤ Spring wounds ➤ No pathogen in county | H ➤ High BA ➤ Flat-rolling terrain & Heavy soil ➤ Hilly terrain & Light soil | High |
| G | L ➤ Summer-fall wounds ➤ No pathogen in county | L ➤ Low BA ➤ Less root grafting | Low |
| H | L ➤ Summer-fall wounds ➤ No pathogen in county | VL ➤ Low BA ➤ Heavy soil ➤ Hilly terrain ➤ Less root grafting | Very Low |

⁵ VH = very high; H = high; M = moderate; L = low; VL = very low.

| | | | |
|---|--|--|----------|
| I | L <ul style="list-style-type: none"> ➤ Summer-fall wounds ➤ No pathogen in county | H <ul style="list-style-type: none"> ➤ Moderate BA ➤ Light soil ➤ More root grafting | Low |
| J | L <ul style="list-style-type: none"> ➤ Summer-fall wounds ➤ No pathogen in county | M <ul style="list-style-type: none"> ➤ Moderate BA ➤ Heavy soil ➤ Less root grafting | Low |
| K | L <ul style="list-style-type: none"> ➤ Summer-fall wounds ➤ No pathogen in county | VH <ul style="list-style-type: none"> ➤ High BA ➤ Light soil ➤ More root grafting | Low |
| L | VL <ul style="list-style-type: none"> ➤ Fall-winter wounds ➤ No pathogen in county | L <ul style="list-style-type: none"> ➤ Low BA ➤ Less root grafting | Very Low |
| M | VL <ul style="list-style-type: none"> ➤ Fall-winter wounds ➤ No pathogen in county | VL <ul style="list-style-type: none"> ➤ Low BA ➤ Heavy soil ➤ Hilly terrain ➤ Less root grafting | Very Low |
| N | VL <ul style="list-style-type: none"> ➤ Fall-winter wounds ➤ No pathogen in county | H <ul style="list-style-type: none"> ➤ Moderate BA ➤ Light soil ➤ More root grafting | Very Low |
| O | VL <ul style="list-style-type: none"> ➤ Fall-winter wounds ➤ No pathogen in county | M <ul style="list-style-type: none"> ➤ Moderate BA ➤ Heavy soil ➤ Less root grafting | Very Low |
| P | VL <ul style="list-style-type: none"> ➤ Fall-winter wounds ➤ No pathogen in county | VH <ul style="list-style-type: none"> ➤ High BA ➤ Light soil ➤ More root grafting | Very Low |

Table 3. Harvest guidelines: Oak wilt is present in your stand.



SPS: April 15 – July 15 (north); April 1 – July 15 (south). **SEF:** July 16 – September 30 statewide. **FWN:** October 1 – April 14 (north); October 1 – March 31 (south)

What is the risk of introducing oak wilt into a stand that already has it?

- Research has shown that the risk of introducing new infections into a stand that already has oak wilt is higher than in stands that do not have oak wilt. This is because the overland vectors (sap-feeding beetles) in infected stands tend to be infested with the fungus more often than beetles in non-infested stands.
- If oak wilt is already in the stand, it is important to consider whether or not new introductions will impact your management objectives.

What is the predicted impact in the future oak stand?

- The disease will continue to impact the stand if root grafts are present between oak trees.
- The presence of fungal mats in the stand will provide sources of the pathogen for overland spread.

What is the combined risk of presence and impact?

- The combined risk of presence and impact is considered to be increasing over time unless there are natural or artificial breaks in the root graft connections.

What do I need to consider if I already have oak wilt in my stand?

- Consider your objectives for the stand. That will help you determine whether you are going to focus on disease management or tolerate the presence of disease.
- Consider how the presence of oak wilt affects your objectives.
- Are there ways you can tolerate the disease, encourage the growth of other species and minimize the impact?
- Is conversion to another type where oak is a minor component an option?
- Are the oak wilt pockets creating openings for other species such as white pine? Are these desirable?
- What is the cost of managing oak wilt by mechanically breaking root grafts? Is this practical?
- What will the consequences of your decisions be on your neighbor's stand? Are your planned activities creating a potential for root-graft spread to your neighbor's property?