

Forest Health Issues for Fertilization of Spruce in the Prince George & Quesnel TSA's for 2015

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&

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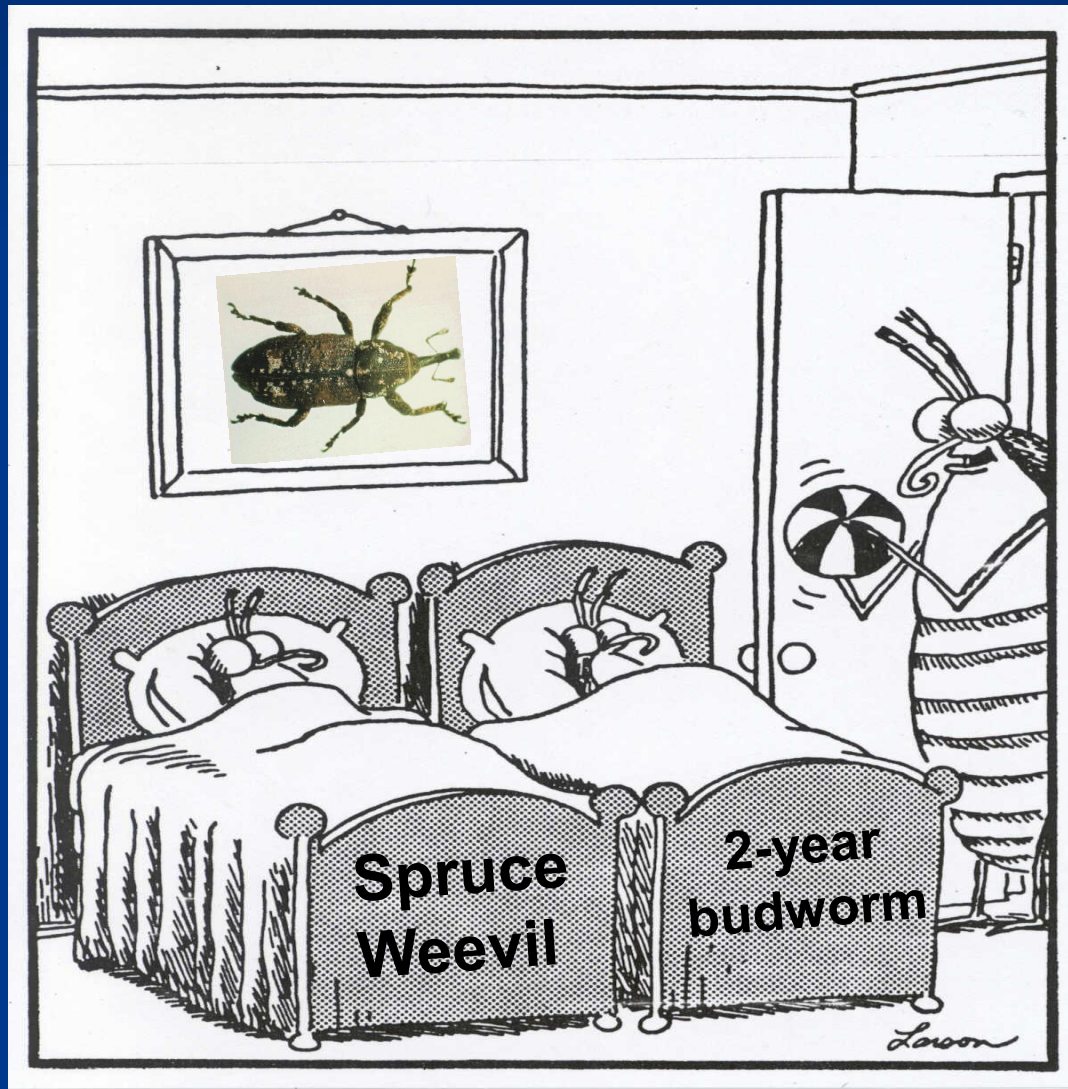
**Ministry of Forests, Lands and Natural Res. Ops.
Omineca & N.E. Regions**

Outline

- **Spruce Weevil**
- **Warren Root Collar Weevil**
- **2-Year Budworm**
- **Tomentosus root disease**
- **Armillaria root disease**
- **Bear Damage**
- **Summary & Conclusions**



- **The susceptibility of a stand to certain damaging forest health agents may, or may not, be increased by fertilization.**
- **The degree of damage that can be accepted will vary for forest health agent and severity of impact.**



“Rise and shine, everyone! . . . It’s a beautiful day and we’re all going down to the young spruce stand.”

Spruce Weevil, *Pissodes strobi*



Spruce Weevil

- **vanAkker, Alfaro & Brockley (2004) showed that 5 years following fertilization of spruce at Lodi Lk., more than twice as many spruce sustained weevil damage (54% attacked) compared to untreated stands (24% attacked).**
- **Although the incidence of weevil attack increased with fertilization intensity, the height losses were not as great as the height gains due to fertilization**

Warren Root Collar Weevil, *Hylobius warreni*

- Interior spruce also susceptible but only if less than approx. 17 years old



2-Year Budworm, *Choristoneura biennis*



- Defoliation, top-kill and mortality of spruce
- Can be an edge-effect in younger stands adjacent to defoliated mature stands
- Cumulative mortality of spruce (18%) occurred in the SBSmk of Ft. St. James & Mackenzie Districts in 2006

Tomentosus Root Rot, *Inonotus tomentosus*



- **The most prominent root disease in central & northern B.C.**
- **Juvenile trees die quickly & older stems suffer extensive butt rot leading to increased susceptibility to windthrow & insect attack**

Tomentosus Root Rot



Distribution of Armillaria Root Disease in BC

(Root Disease Management Guidebook, 1995)

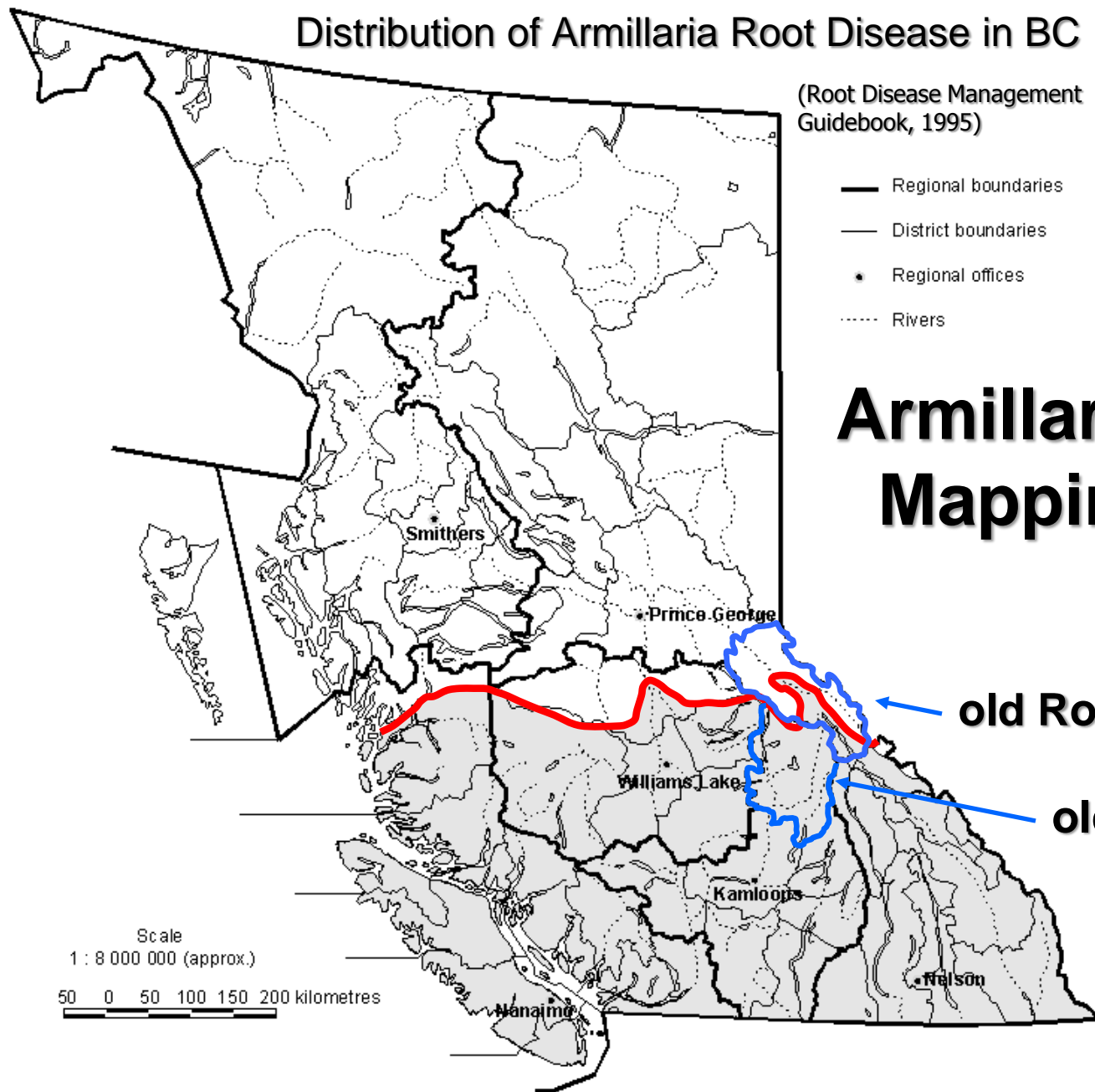
- Regional boundaries
- District boundaries
- Regional offices
- Rivers

Armillaria Sketch Mapping in BC

old Robson Valley FD

old Clearwater FD

Scale
1 : 8 000 000 (approx.)
50 0 50 100 150 200 kilometres



Detailed Aerial Sketch Mapping

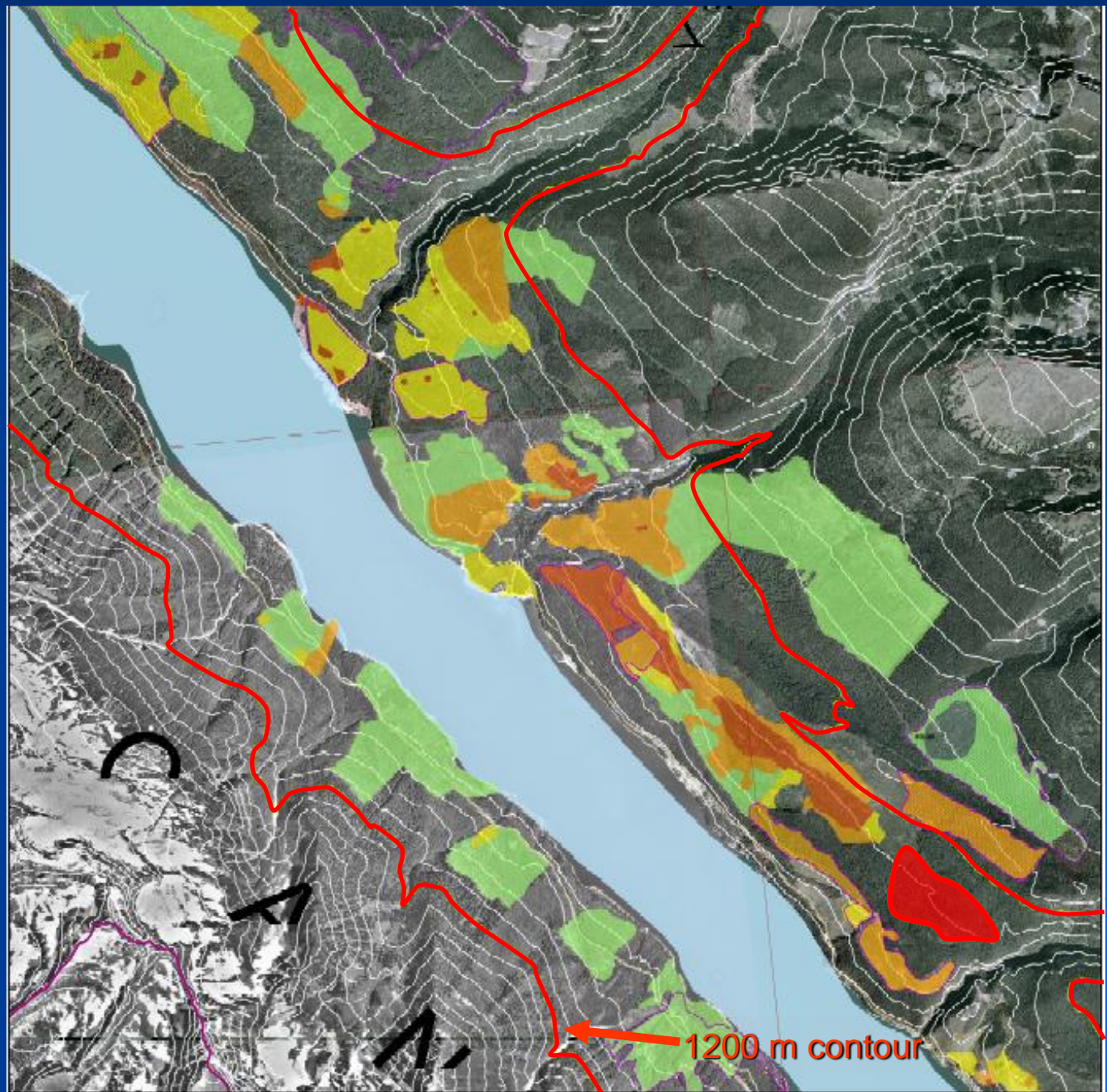
- **Second growth stand symptoms**
 - Canopy gaps with dead and dying on fringe
 - Deciduous may be more abundant

Detailed Aerial Sketch Mapping

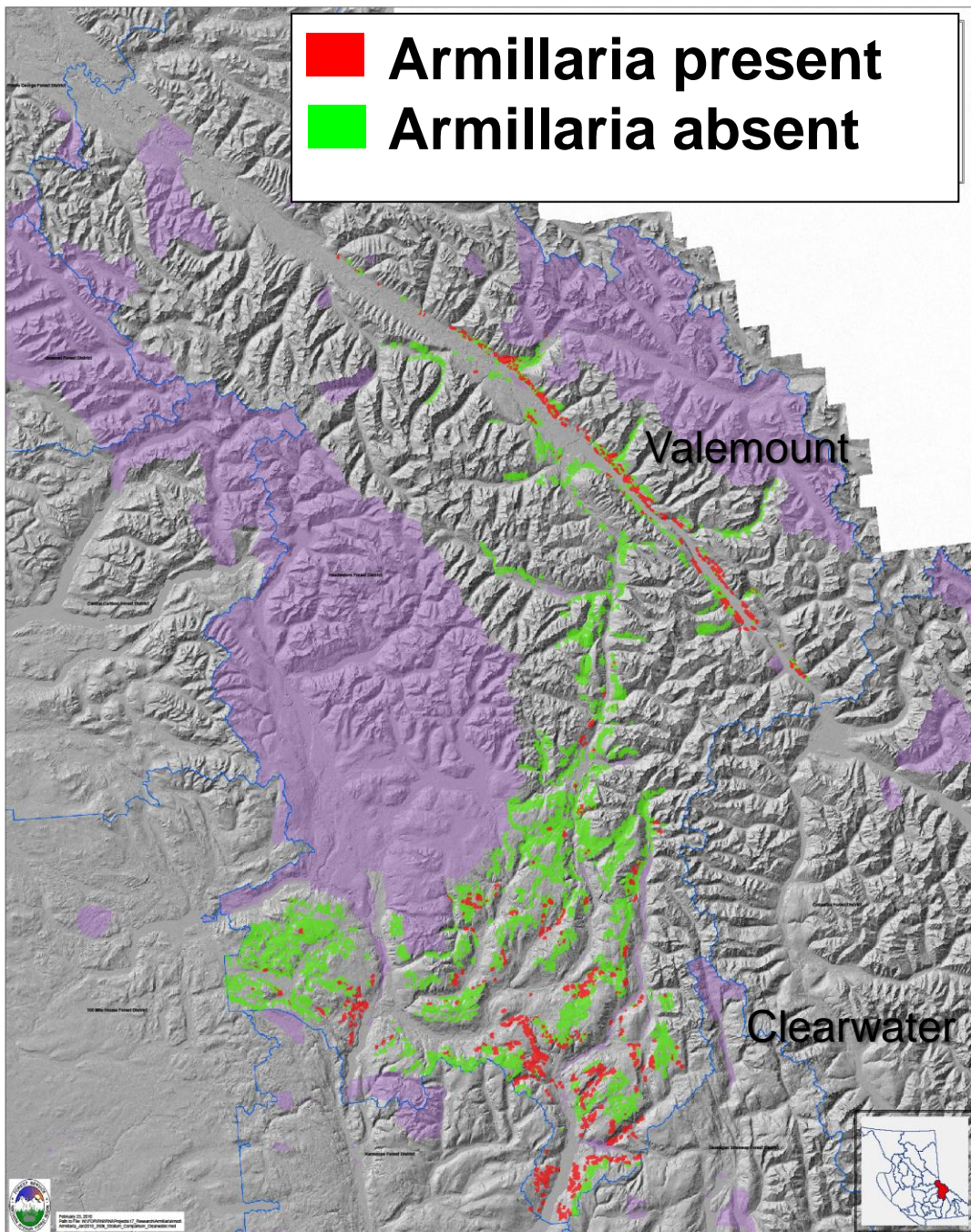
Example Area 2

Trends:

- 1) Low Risk on
Cold Aspect
vs
High Risk on
Warm Aspect
- 2) Reduced
Risk With
Increasing
Elevation



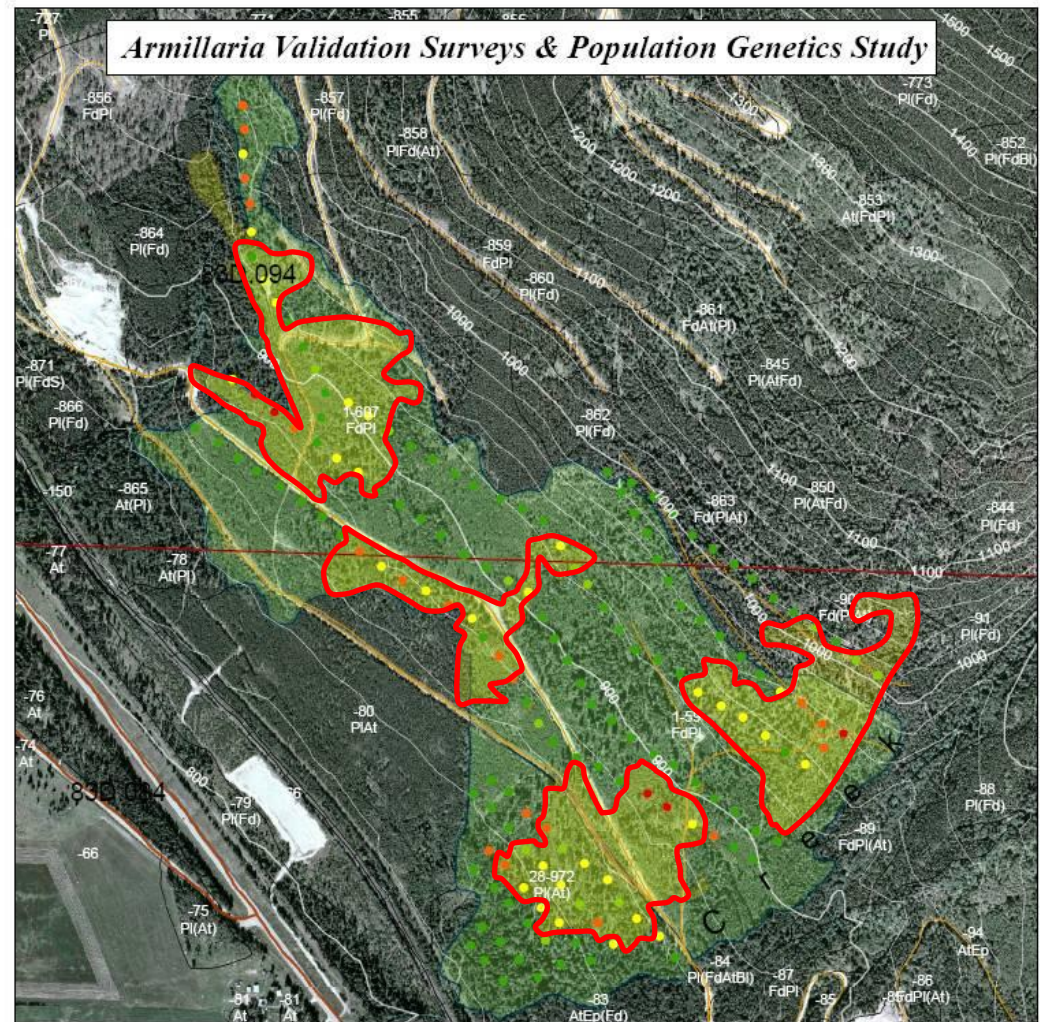
-  Armillaria present
-  Armillaria absent



Validation Ground Surveys

Example 2

- Sketch mapping classified opening as infected (2-8%)
- Ground survey confirmed infection classification, and delineated several *Armillaria* strata



Validation Survey Data (2006 to 2008)

Incidence Class

- Zero Incidence
- Very Low (1%)
- Low (2% to 4%)
- Medium (6% to 10%)
- High (> 10%)

★ *Armillaria* DNA Sample Trees (2007)

Validation Survey Openings

GPS Delineated *Armillaria* Centers

083D094_001

Armillaria Aerial Survey Incidence

- 0%
- < 2%
- 2% to 8%
- > 8%
- VRI Polygons



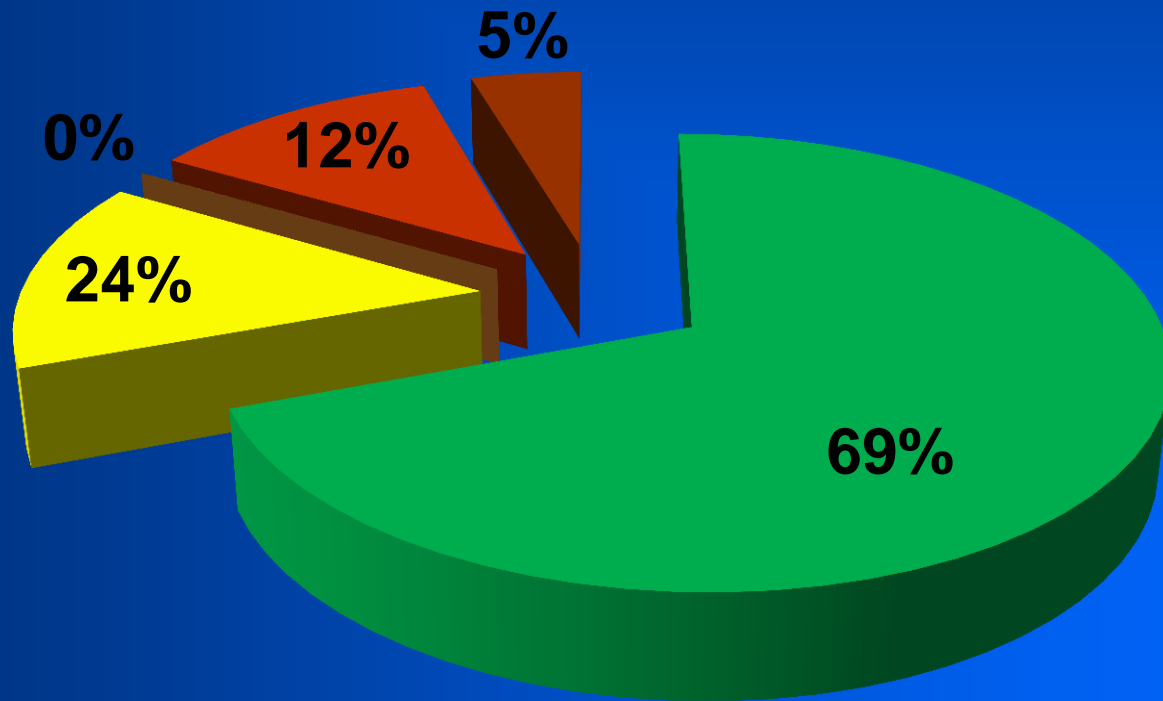
1:10,000
0 50 100 200 300 400
Meters

Path to File: \\Marble\Work\FOR_RNT\RNT\Projects\17_Research\Armillaria\used\ArmillariaField Surveys\survey_104_PopulationGenetics_Sites.mxd
Date: September 29, 2006

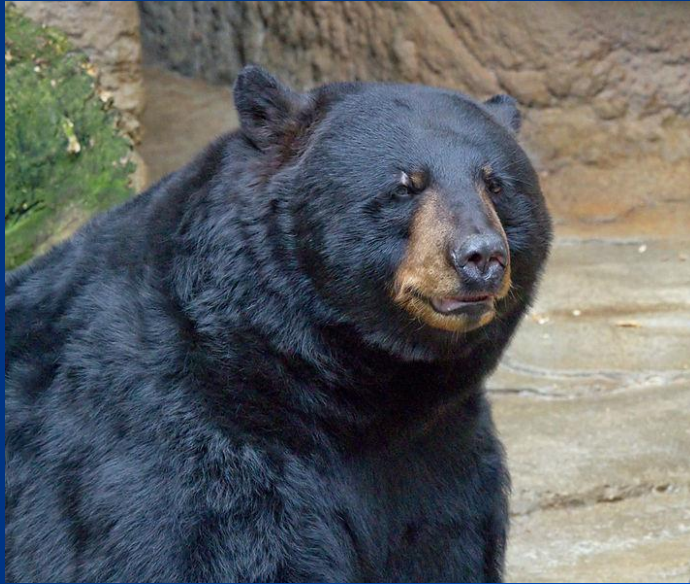
Area breakdown by ecosystem and *Armillaria* incidence

ICH mm

■ 0% ■ 1% ■ 3% ■ 5% ■ 10%



Black Bear damage



- Pole-sized or larger dbh spruce can be damaged in the spring
- Large sections of bark are stripped
- Scattered mortality



Summary & Conclusions

- **Don't fertilize any Sx stands in the Interior that are suffering chronic forest health damage.**
- **Be cognizant that other pests in certain circumstances can negate the potential benefits of fertilization.**

. . . and be careful !!



Thank you!

