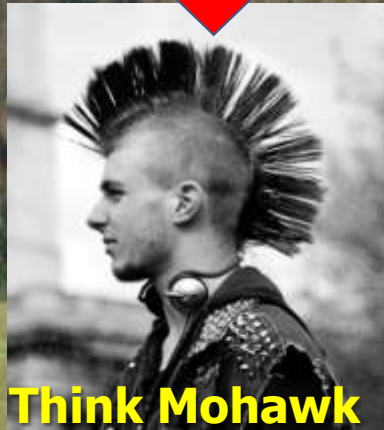


Douglas-fir Tussock Moth Identification & Management

Western Forestry & Conservation Association
June 15, 2016



Think Mohawk



L. Livingston, IDL

Tom Eckberg

Idaho Department of Lands

Plummer, ID
August 2011



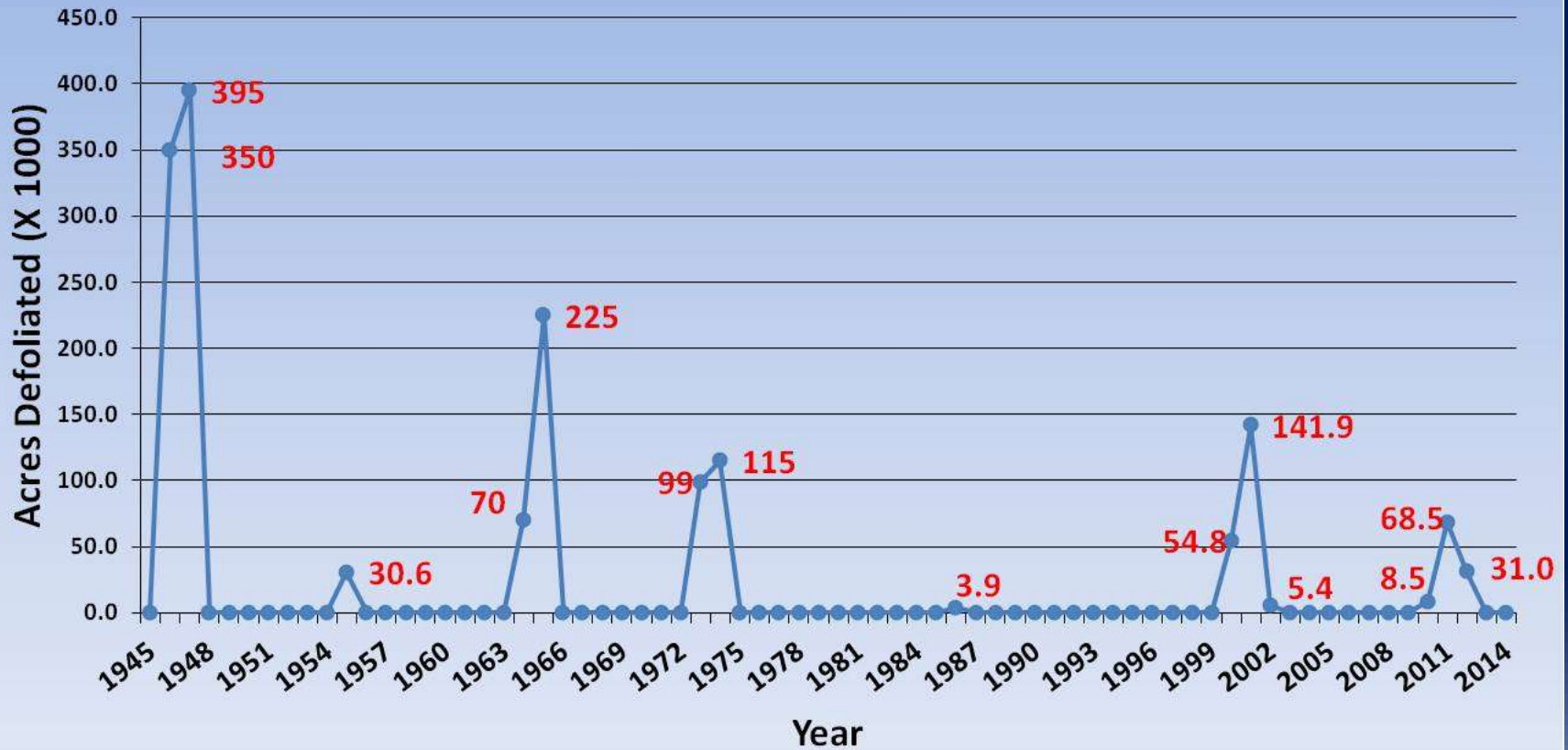
DFTM ID & Management

- Insect native to Western North America
- Can cause widespread, serious defoliation
 - Recovery very common
 - In N. Idaho, outbreaks ~ 8-10 yrs.
- Outbreaks are usually predictable
 - Often occur in same general areas
 - High hazard stands can be identified



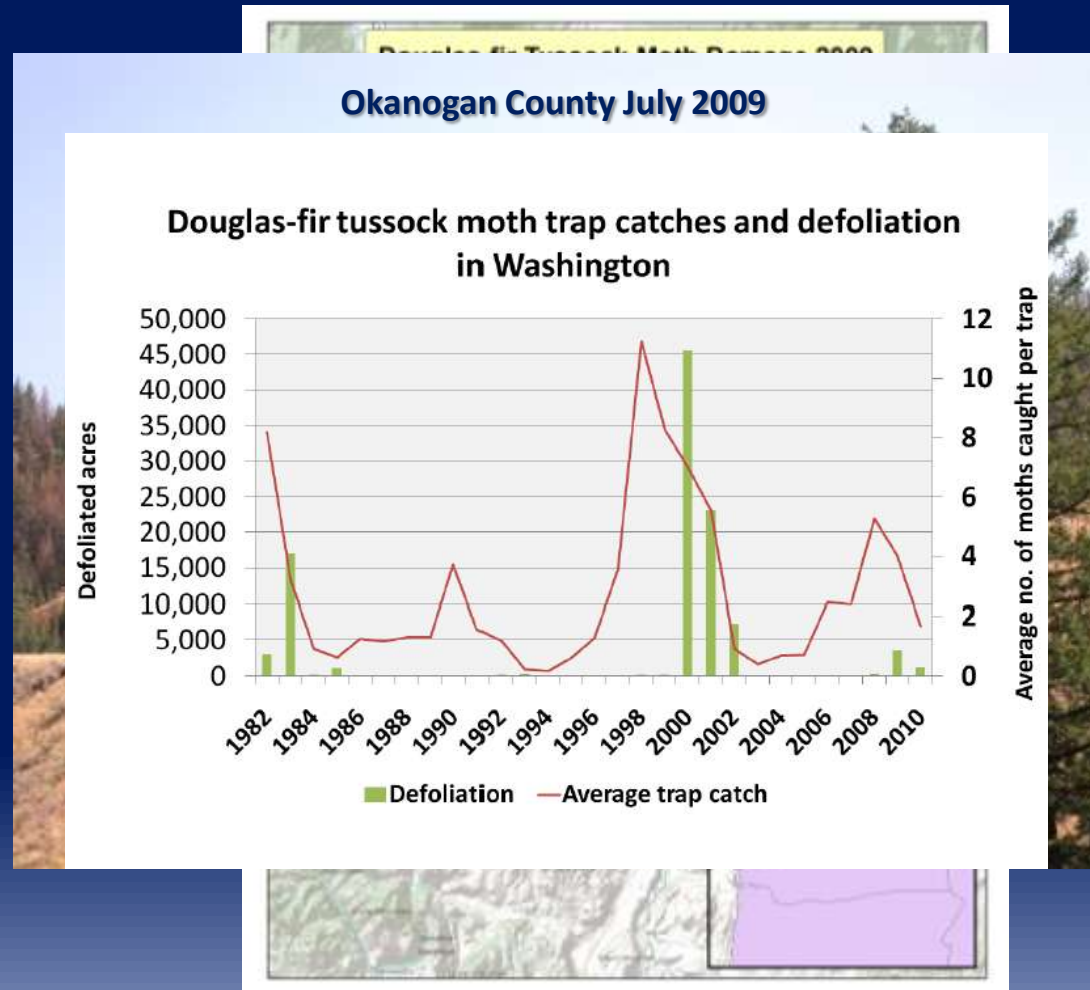
Cyclical Outbreaks

DFTM Outbreak History in Northern Idaho, 1945-2015



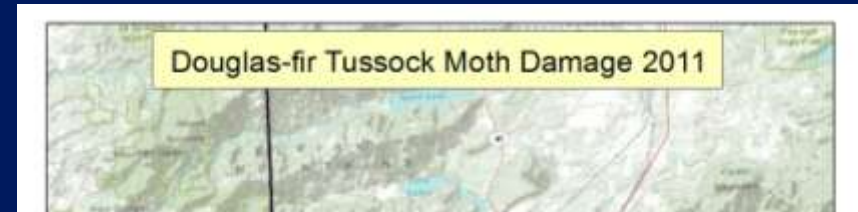
Problem Areas in Washington

- Okanogan Co.-
(3500 acres in 2009)
- Blue Mountains
- NOT the West Side
 - Tussock moth typically likes it DRY...
- WA has long history of outbreaks
 - Most of this defoliation is in Blue Mtn. area



Recent Outbreak in N. ID-NE WA

- Defoliation started in 2009, N. of CDA
- Aerially visible in 2010
 - S. of Post Falls and Mica Peak WA
- Greatly increased in 2011
- Outbreak collapsed in 2012
- North of typical N. ID outbreak area
 - No records of Mica Pk. defoliation before



Historic Outbreak Areas in ID

- Outbreaks in N. Idaho are usually in the Palouse, CDA Reservation, and Moscow Mountain
- In the 1990's, there was a big outbreak on the Boise and Payette NF's (approx. 400,000 acres)
- Populations are building up there now

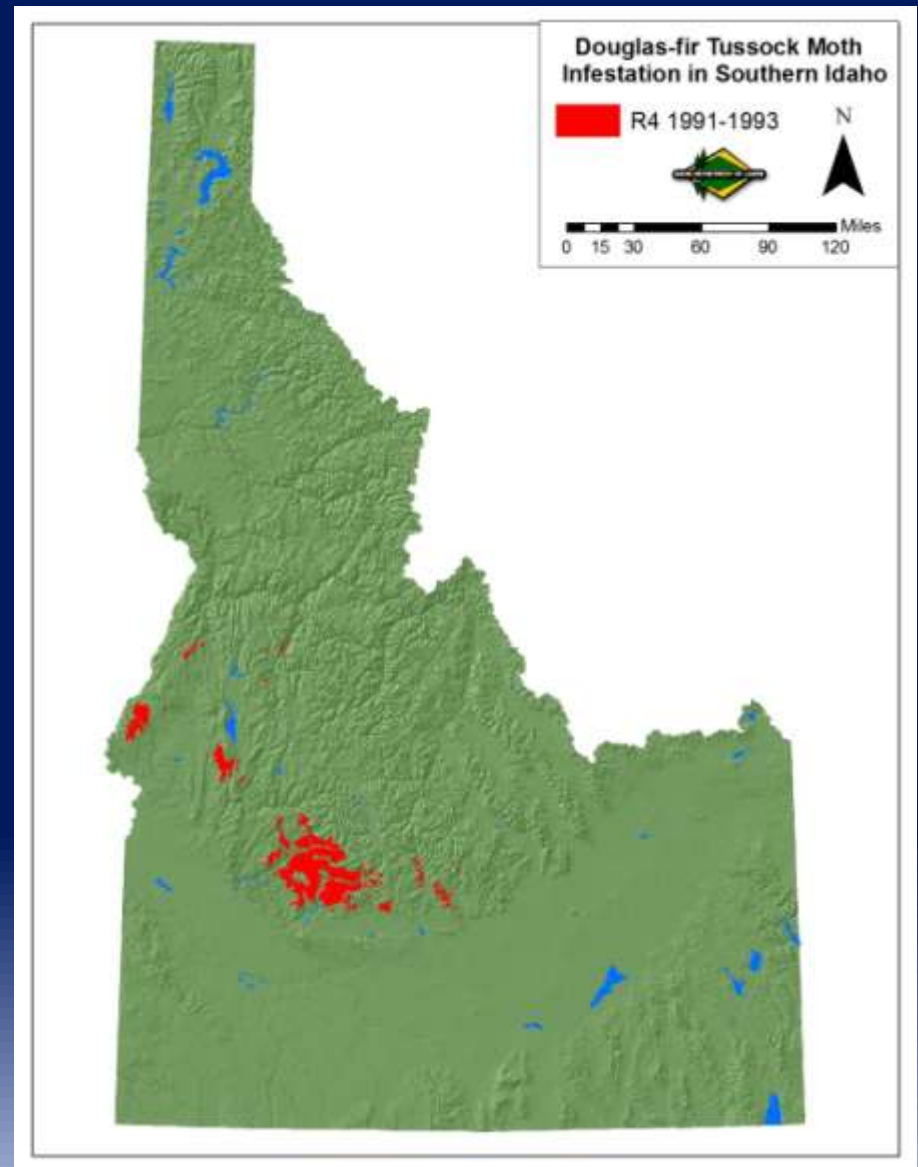




Photo taken Sept 2010

DFTM Identification

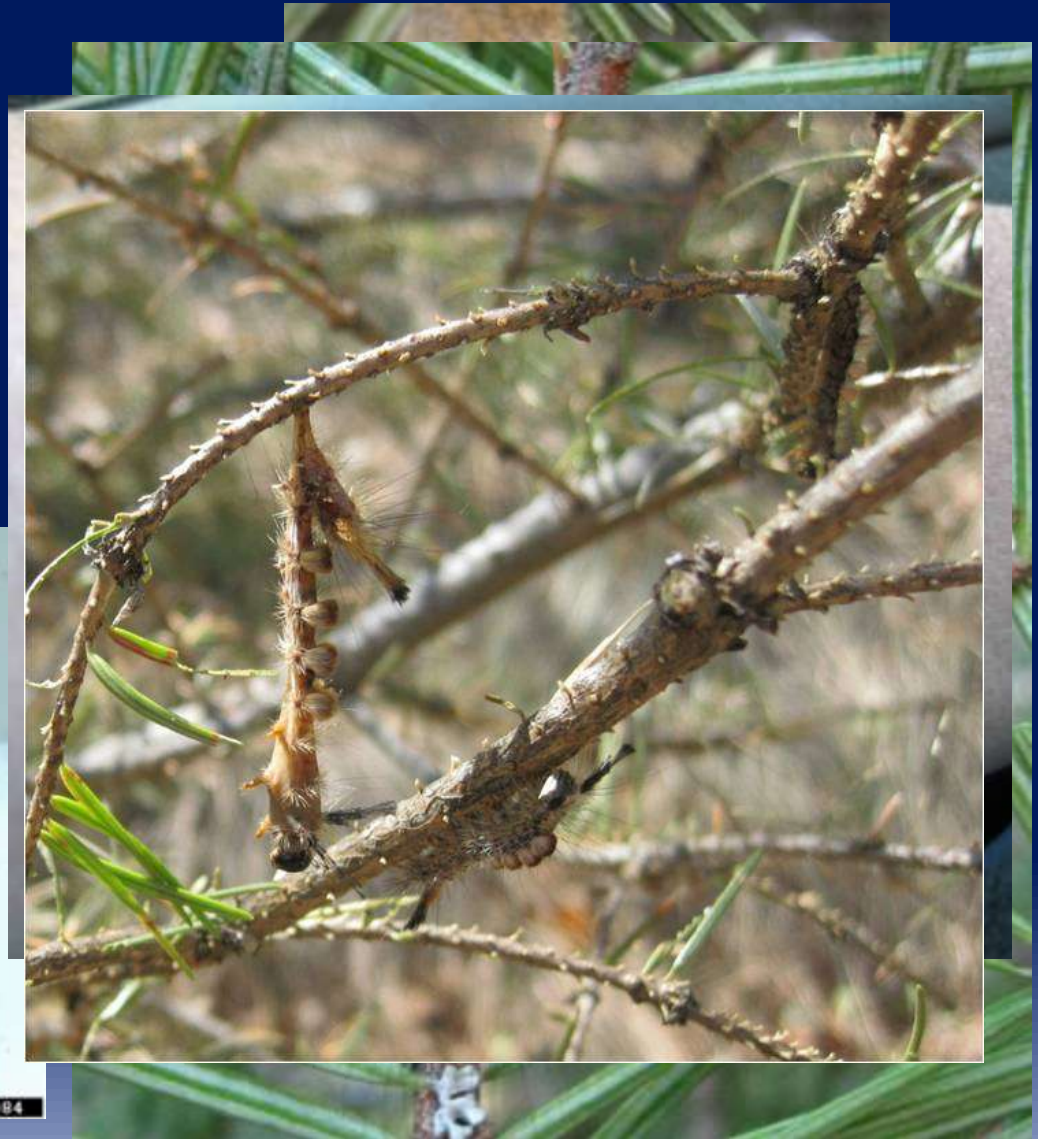
Females flightless

Males fly, locate females through pheromones

Larvae are striking creatures

Hairs can be irritating

Outbreaks usually crash through natural controls (NPV)



DFTM Identification

Flightless female
adult on cocoon...



female laying eggs
in the fall



...calling male with pheromones



young larvae hatching the following June, wind dispersed

DFTM Hosts

These are the major hosts in this area...

Grand Fir



Douglas-fir



Subalpine fir



They also feed on ornamental spruce....



Hwy 53 and Ramsey Rd



Rathdrum City Park



USFS Coeur d'Alene Nursery



**Young larvae wind dispersed,
or drop from above ,so they
can land on unusual hosts**



“Blonde “ form on western larch



“Brunette “ form on ponderosa pine

Damage usually minor

Four life stages

Egg



October-May

Egg laying Aug-Sept

Adults



August-October

Adults emerge Aug

Eggs hatch late May-early June

Larva



May-July

5-7 larval stages (instars)

Pupation
late July to
early Aug

Pupa



July-August



2011 defoliation near Post Falls

Typical Damage

- Egg hatch coincides with budbreak
- Young larvae **MUST** have new growth
- Cold winter won't kill eggs, but a late frost won't do them any favors...



Typical Damage



Later instars aren't as picky about what they eat...

As they grow and temps warm, their appetite increases

When things get crowded, they can drop on silk to new feeding sites...

If the understory happens to be GF or DF, you can expect some mortality



Heavy defoliation of understory

DFTM Management

Typical Damage



Mature stands



Effects of Heavy Defoliation

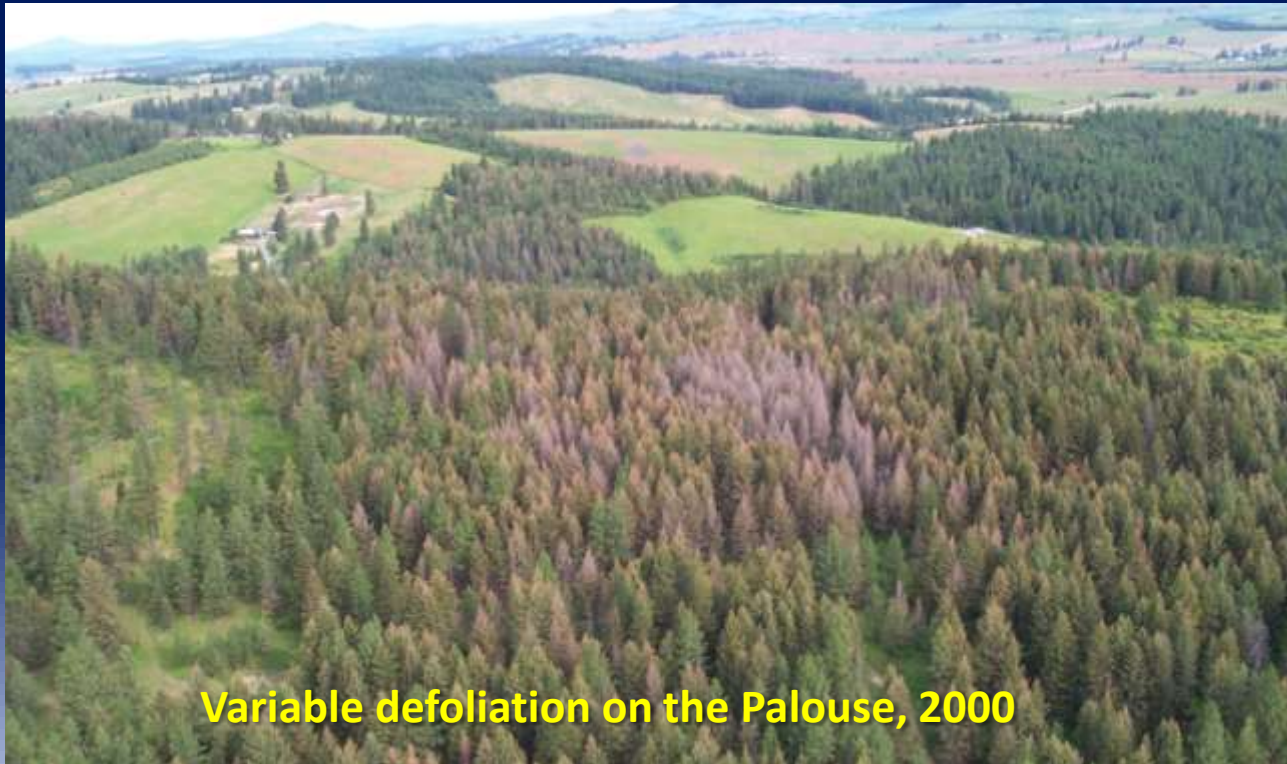


Sustained feeding can lead to top-kill or mortality

Young trees especially susceptible



Top-kill after repeated defoliation



Variable defoliation on the Palouse, 2000



Severe defoliation of understory DF

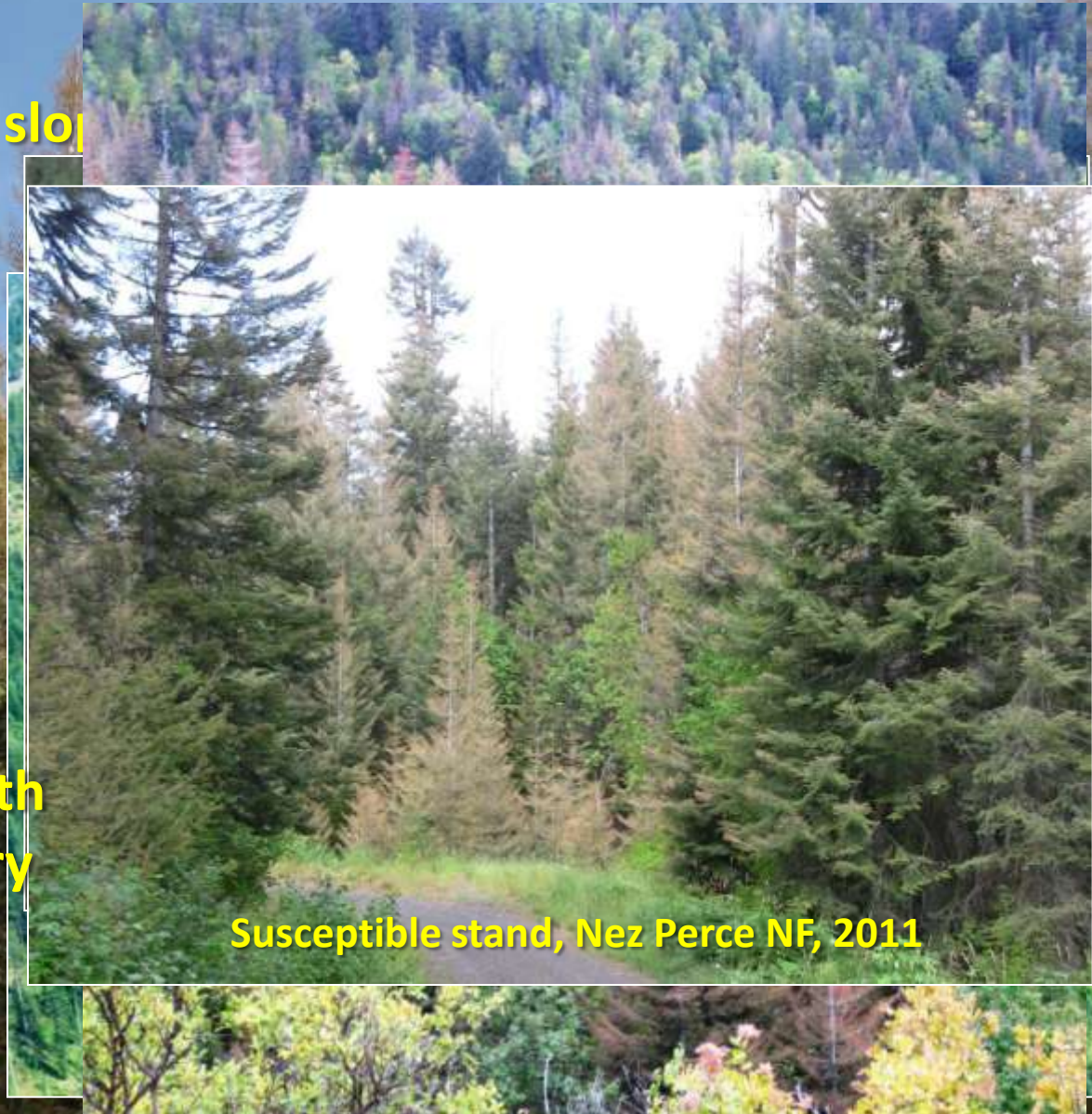
High Hazard Stands

Ridge tops and Upper slope
Well drained soils
Winds, drought

Mature, dense stands

High proportion
of grand fir

Two storied stands with
susceptible understory



Susceptible stand, Nez Perce NF, 2011

DFTM Management

DFTM Early Warning System (EWS)

Delta traps set in established locations
Monitor trap counts of male moths



When counts average > 25 /trap,
follow-up sampling is conducted

(Egg mass sampling-fall)

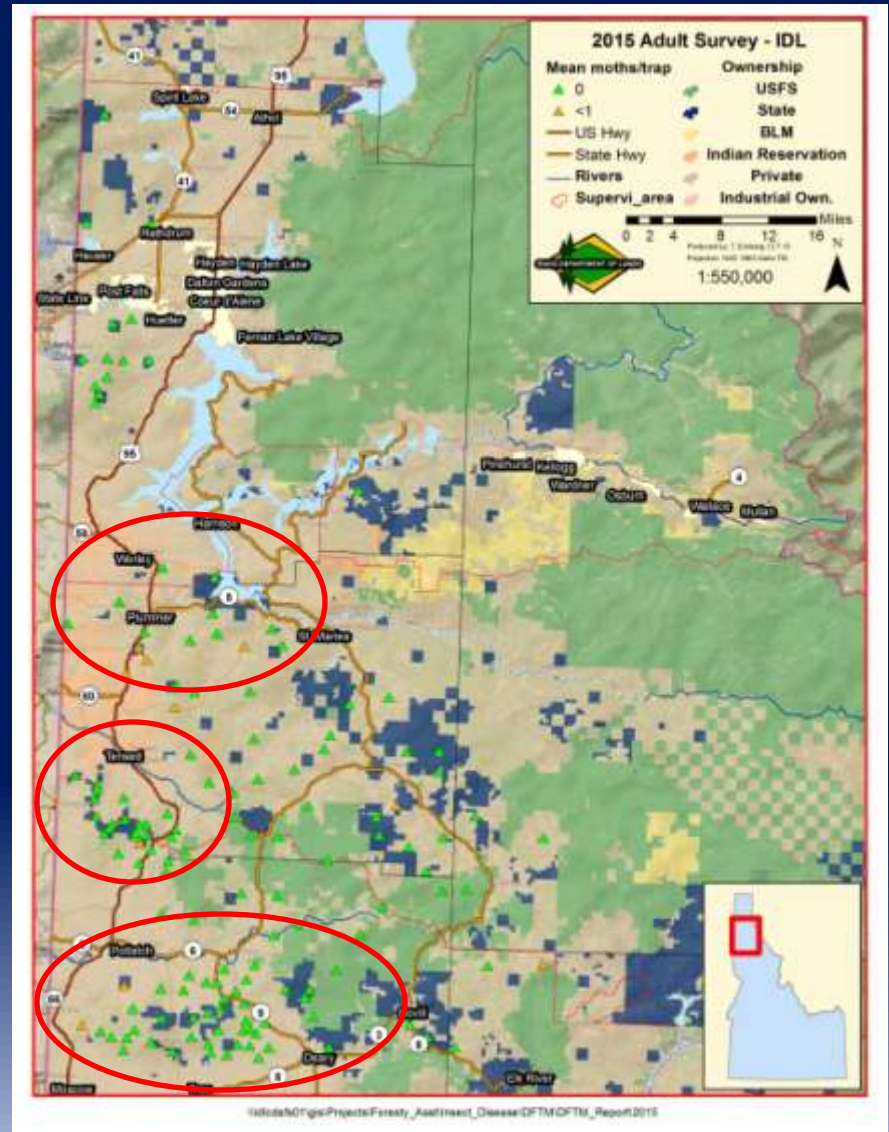
(Larval sampling-spring)

Larval sampling detects
suboutbreak pops.



DFTM Management

- 2015 Trapping Summary
- Historically problem in:
 - CDA reservation
 - McCroskey State Park
 - Industrial ground near Potlatch



DFTM Management

Aerial Surveys

Determine number of defoliated acres

Pinpoint areas for treatment

Really only detect outbreak populations



Aerial Survey

Very helpful to show
course of outbreak

2010-8500 acres

2011-68,500 acres

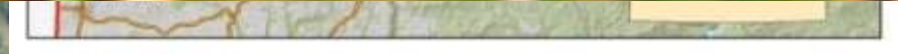
2012-33,000 acres

2013 - 0 acres

2014 - 0 acres

2015 - 0 acres

Live larvae were difficult to find
in defoliated areas in mid-August



South of Plummer, ID August 2011



2012

DFTM Management

Management approach

Will depend on land manager's objectives

Will vary depending on cost

May depend on other forest health issues

Root disease may influence thinning

May depend on the site



DFTM Management

Spray Programs

Will protect stands

Will not reduce further outbreaks

Can be a challenge to administer

Will not make everyone happy...



DFTM Management

Direct Control: Insecticide applications

Traditional pesticides

Alternative products

IGR's

Bacillus thuringiensis

NPV

Spray programs are short-term approach

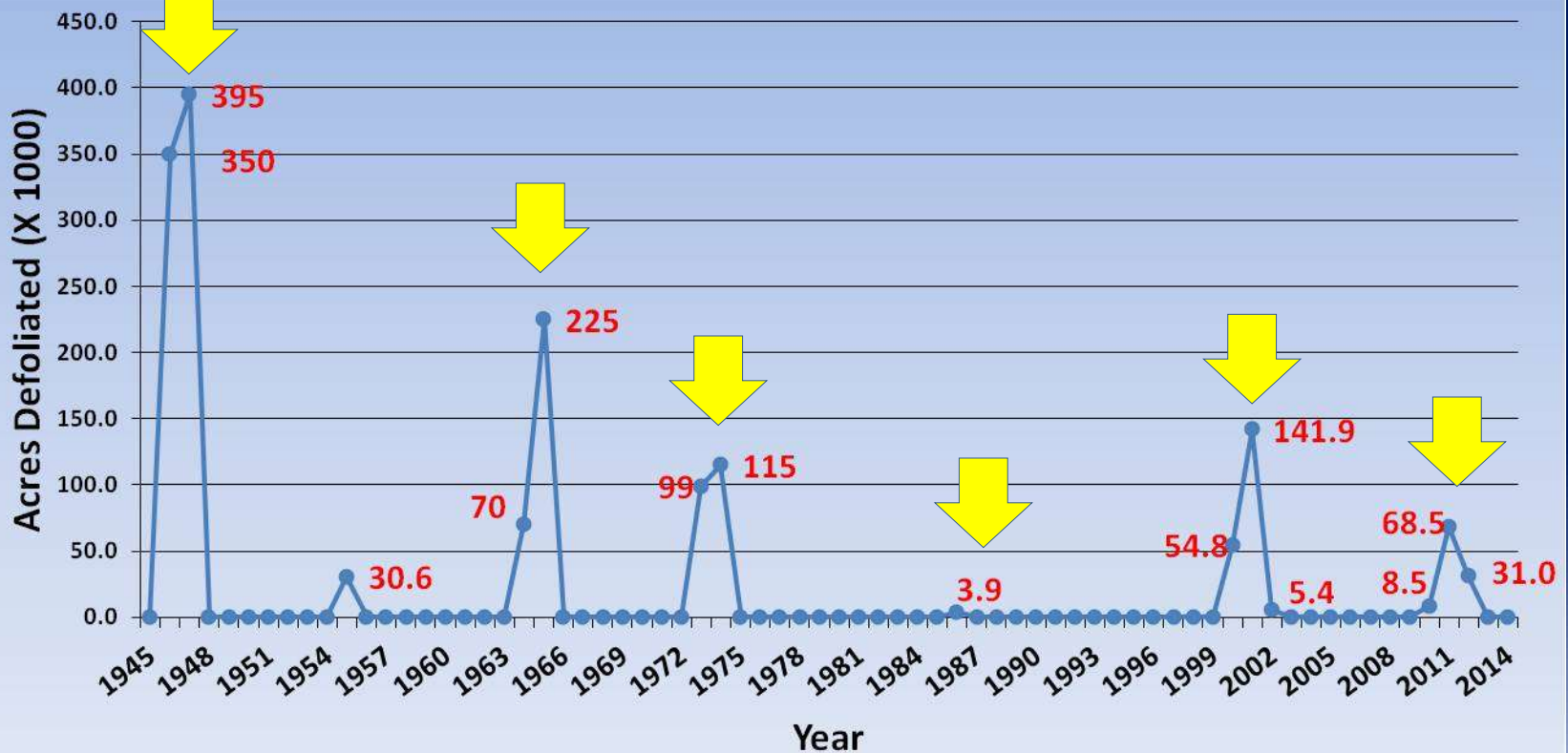
Spray programs are politically unpopular to many



Suppression Programs in Idaho

1947- 395K ac DDT
 1965- 120K ac DDT
 1974- 76K ac DDT
 1986- 2K ac Bt
 2001- 70K ac Bt, Dimilin (IGR)
 2012- 600 ac Mimic (IGR)

DFTM Outbreak History in Northern Idaho, 1945-2015



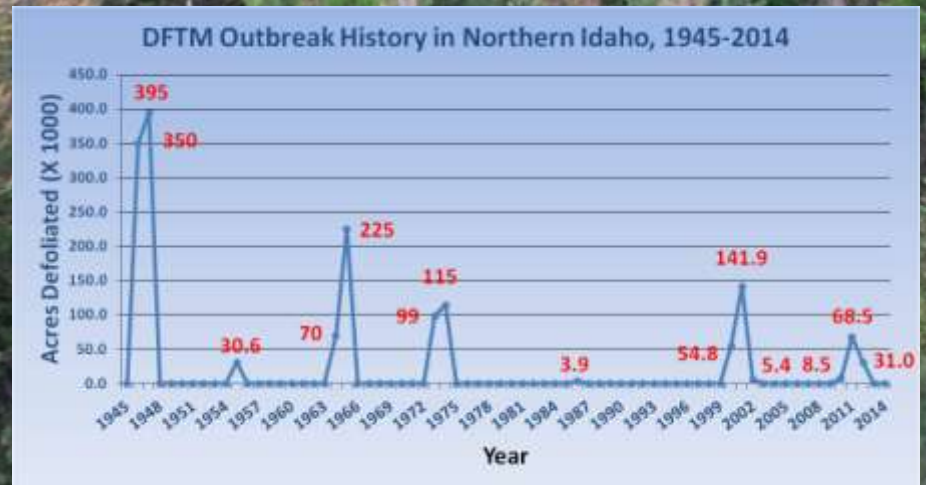
DFTM Management

Silvicultural Treatments

Are a better long-term approach
Will reduce future impact...
Treatments will depend on
stand conditions, site
species composition etc.

DFTM will return

Convert to non-host
whenever possible



DFTM Management

Silvicultural Treatments: *Mature GF-DF stands*

Harvest -convert to seral
spp. *Pines-Larch*



Dense stands on sites that can grow serals
note the **green pines**



DFTM Management

Silvicultural Treatments:

- Diverse multistoried stands
 - Remove older susceptible overstory
 - Thin to favor larch and pines

Silviculture is Best Approach

Signal Point Area, July 2012

Reduce Host Component

Pines and Larch Stay Greener

Signal Point Area, August 2012

Pines & Larch

Less grand fir and Douglas-fir in a stand is a good approach for root disease and budworm issues too