

Douglas-fir Tussock Moth: A Long History of Outbreaks in Idaho

State Board of Land Commissioners

August 20, 2019

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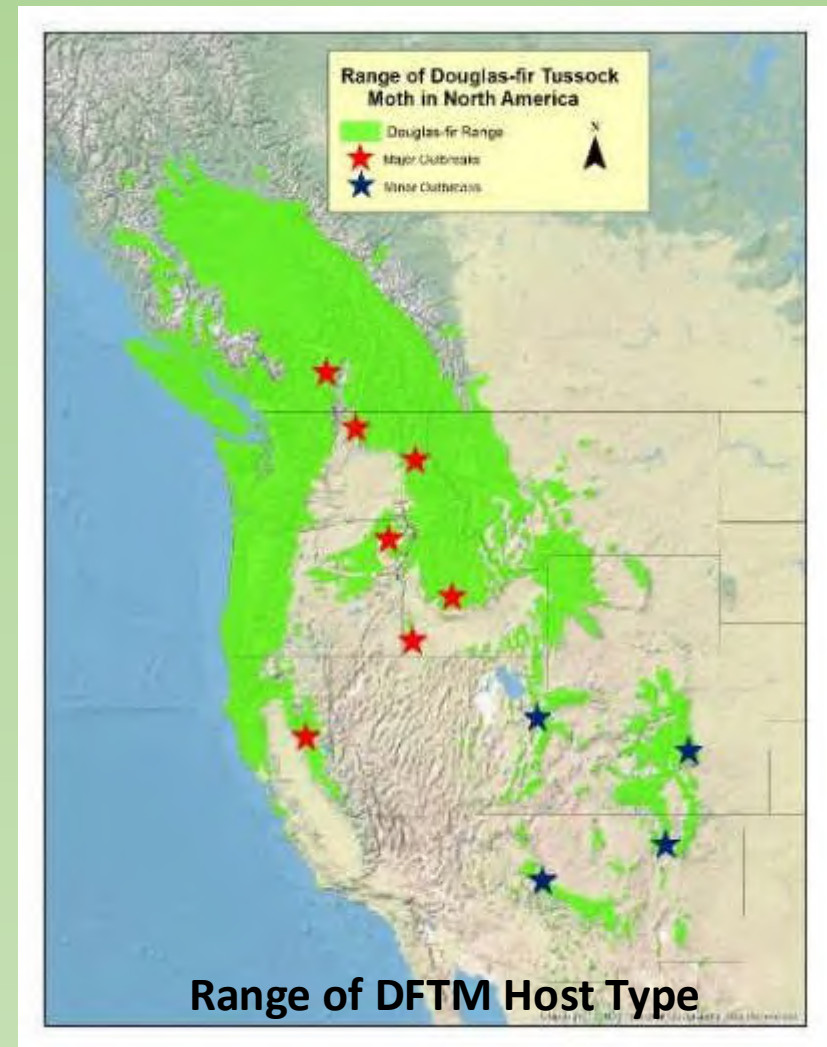


Douglas-fir Tussock Moth (DFTM) Native Defoliator That Occurs Throughout the Interior West

Outbreaks tend to occur in
the same general locations

In Idaho outbreaks occur
once per decade

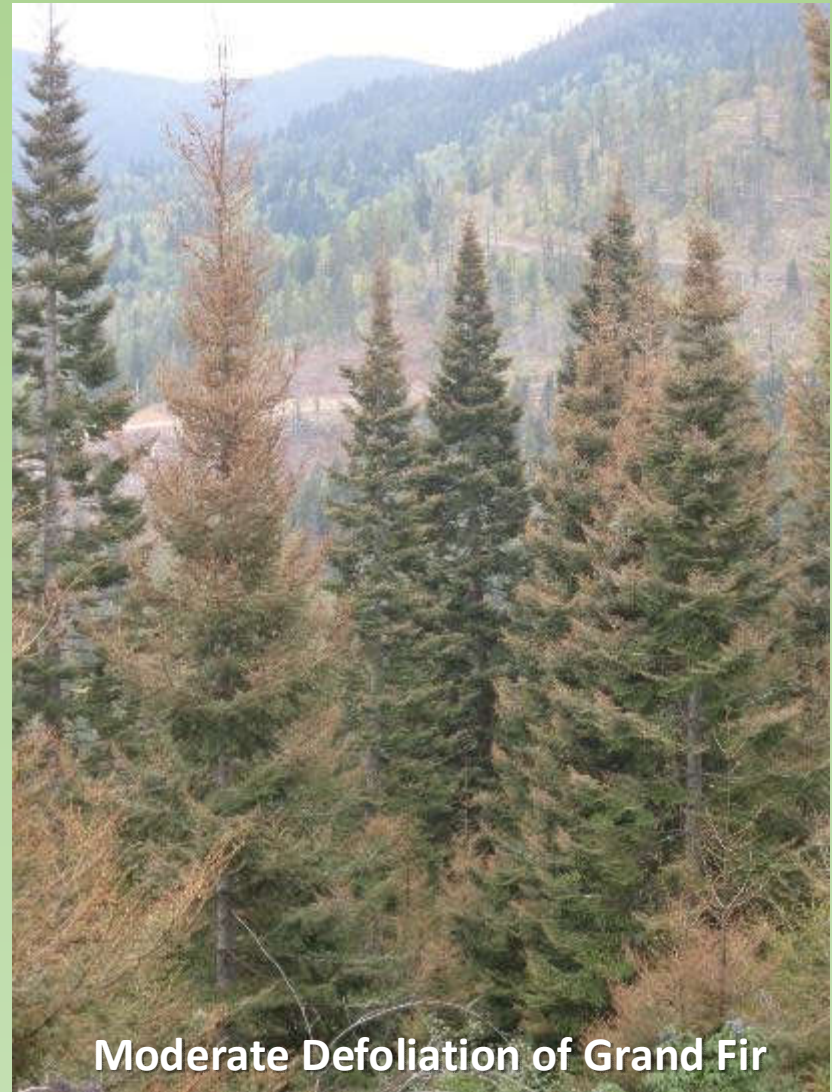
Outbreaks usually
last 3-4 years



Preferred Hosts: Grand Fir and Douglas-fir



Heavy Defoliation of Douglas-fir



Moderate Defoliation of Grand Fir



IDAHO DEPARTMENT OF LANDS

Rarely Feeds on Spruce, Pines, and Larch in Forest Setting (Incidental Feeding)

Ornamental Spruce in Landscape



Ponderosa Pine 8/2011



Western Larch 8/2010



Damage is usually minor on these species

Four life stages

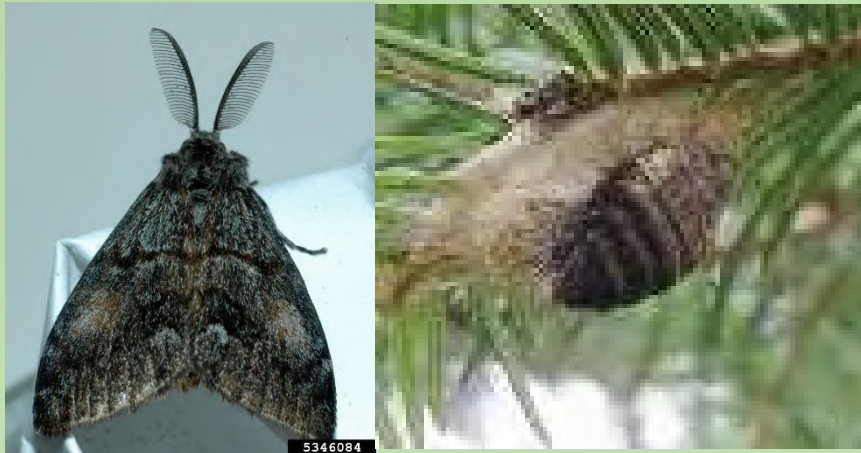
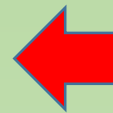
Egg (overwinters)



Larva (June-Aug)



Pupa (Aug-Sept)



Adults (Aug-Oct)



Female Moths Cannot Fly

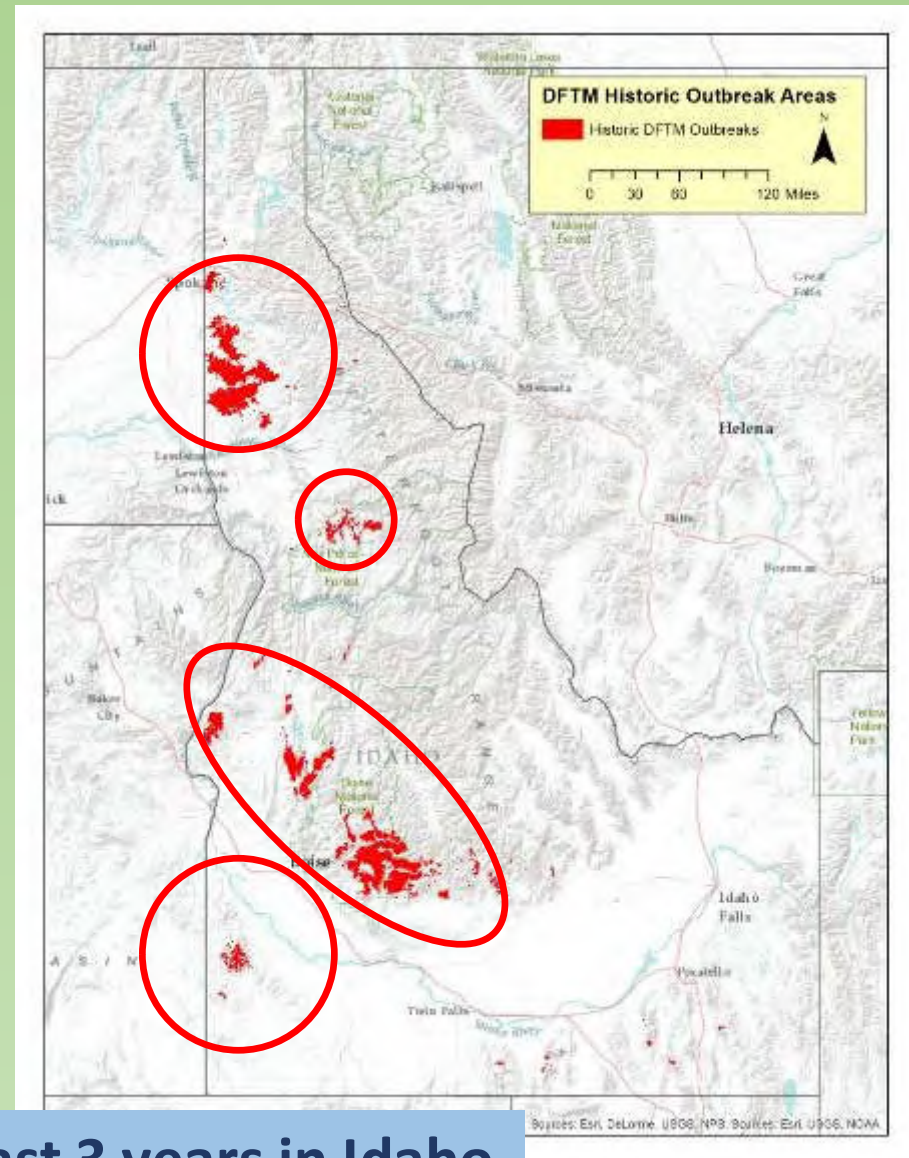


Short range dispersal of young larvae is by wind



Periodic Outbreaks Occur in Idaho

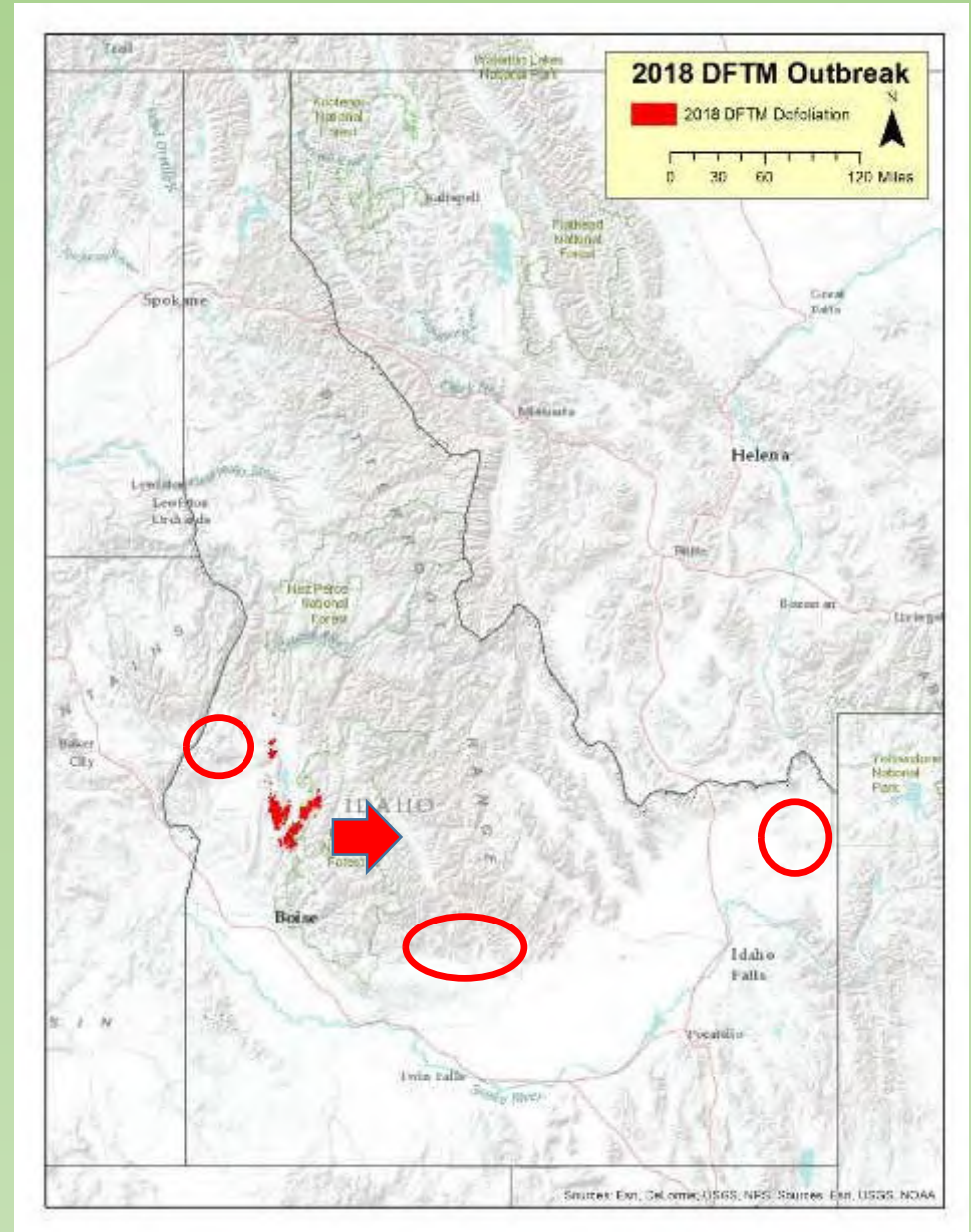
- **Latah, Benewah and Kootenai Counties**
 - 1940s-2010s
- **Nez Perce NF**
 - 1970s-2010s
- **Boise, Sawtooth and Payette NFs**
 - 1990s-today
- **Owyhee Mts.**
 - 1950s-2000s



Outbreaks typically last 3 years in Idaho

2019 Defoliation Updates

- 200 acres in Teton County west of Driggs
- Increased defoliation on the Sawtooth NF
 - Ketchum
- Defoliation in the Weiser River Drainage (Payette NF)

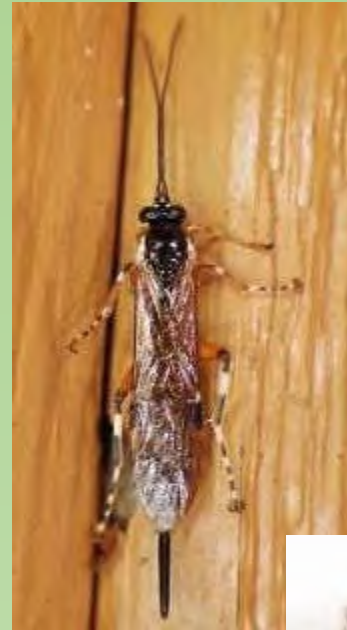


Outbreaks Collapse Due to Starvation...



Eggs laid on severely defoliated trees will not have enough food

...Natural Enemies



Parasites of eggs, larvae and pupae

Predation by spiders, insects and birds

...Viral Disease

Disease is specific to DFTM

Virus is always present in forest

Takes several years to build up in DFTM population



Ketchum, 8/2019

Virus polyhedron



What Kind of Damage is Possible?

Variable Defoliation



Mortality Pocket



Latah County, 2000

What Kind of Damage is Possible?

Severe mortality from one year of feeding

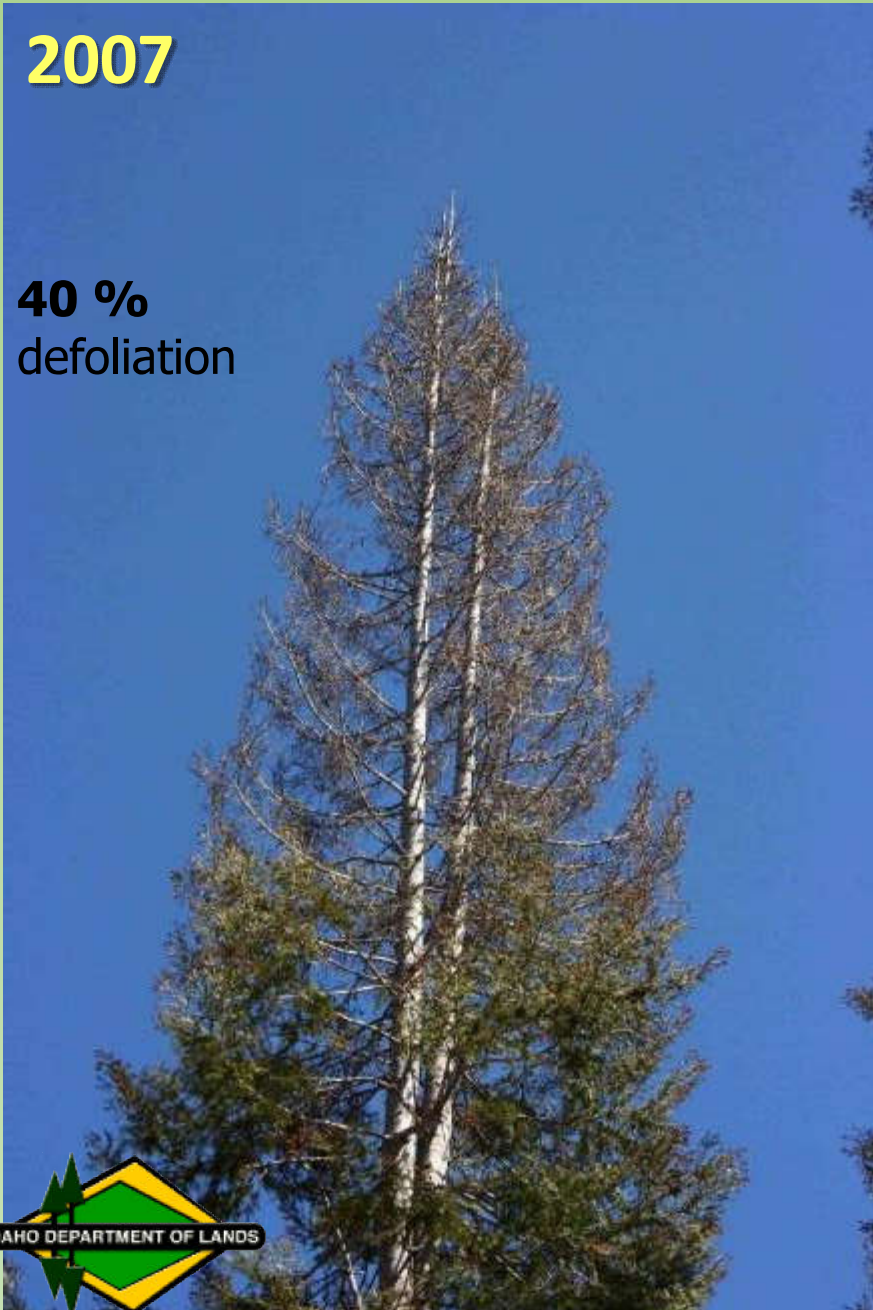


Packer John, June 2019

White Fir Recovery – Bear Mt. California Outbreak 2005-2007

2007

40 %
defoliation



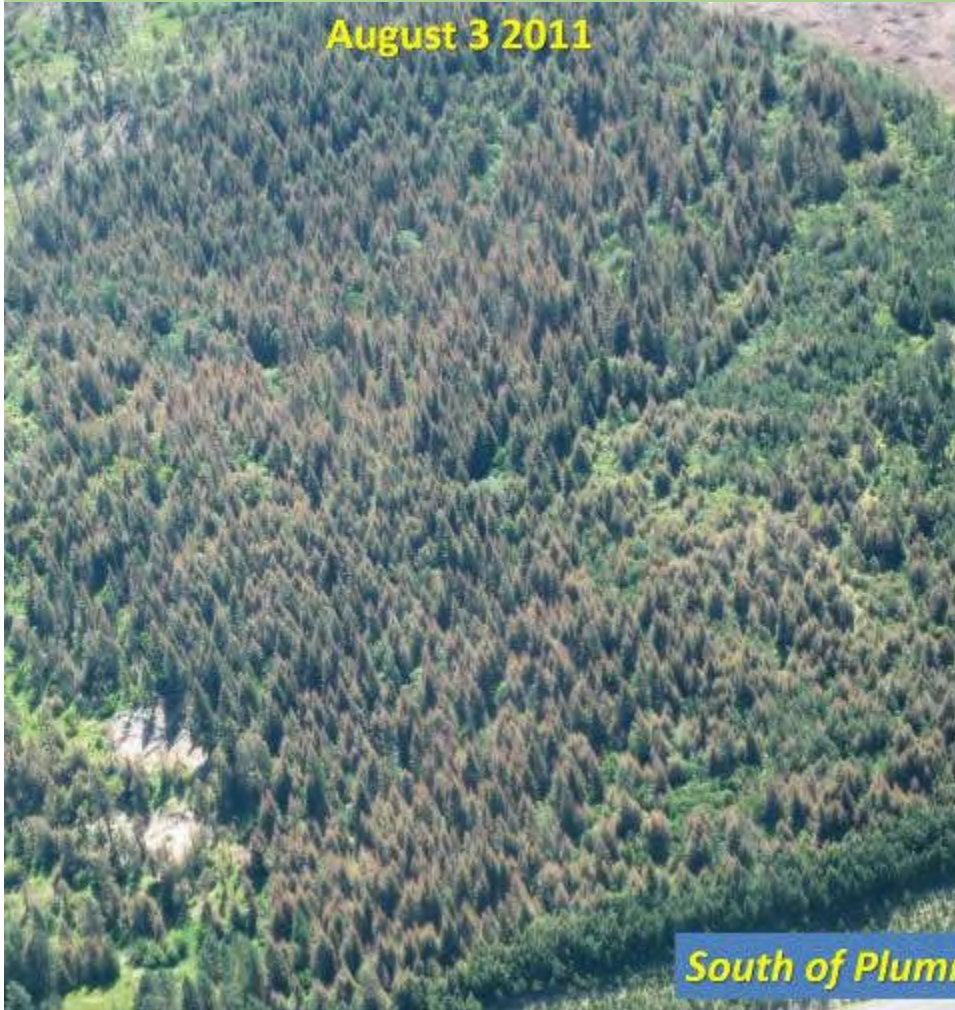
2011



D. Owens CalFire

Tree Recovery in 2012, N. Idaho

August 3 2011



August 6 2012



South of Plummer @ Hwy 95



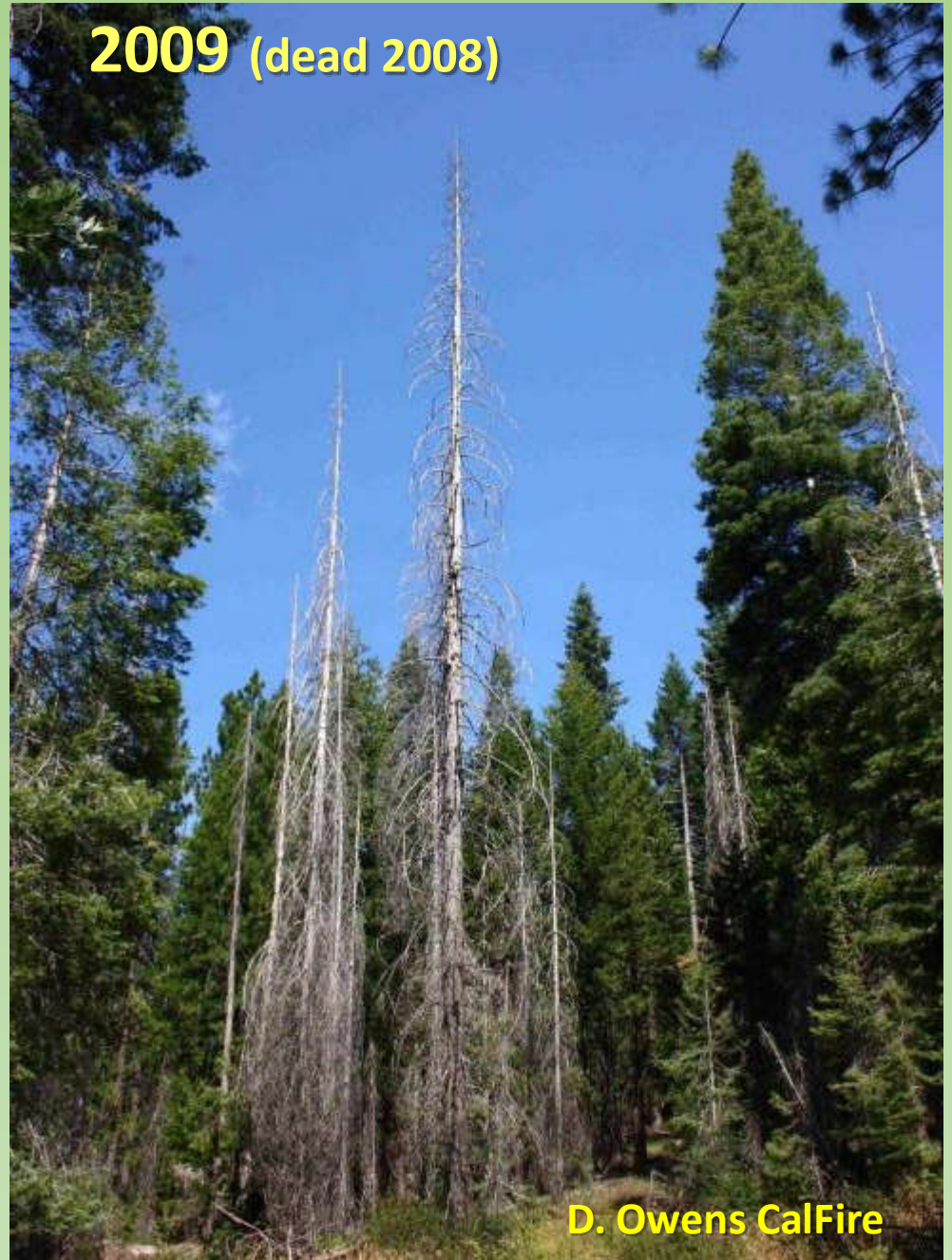
White Fir Mortality – Bear Mt. California Outbreak 2005-2007

2007

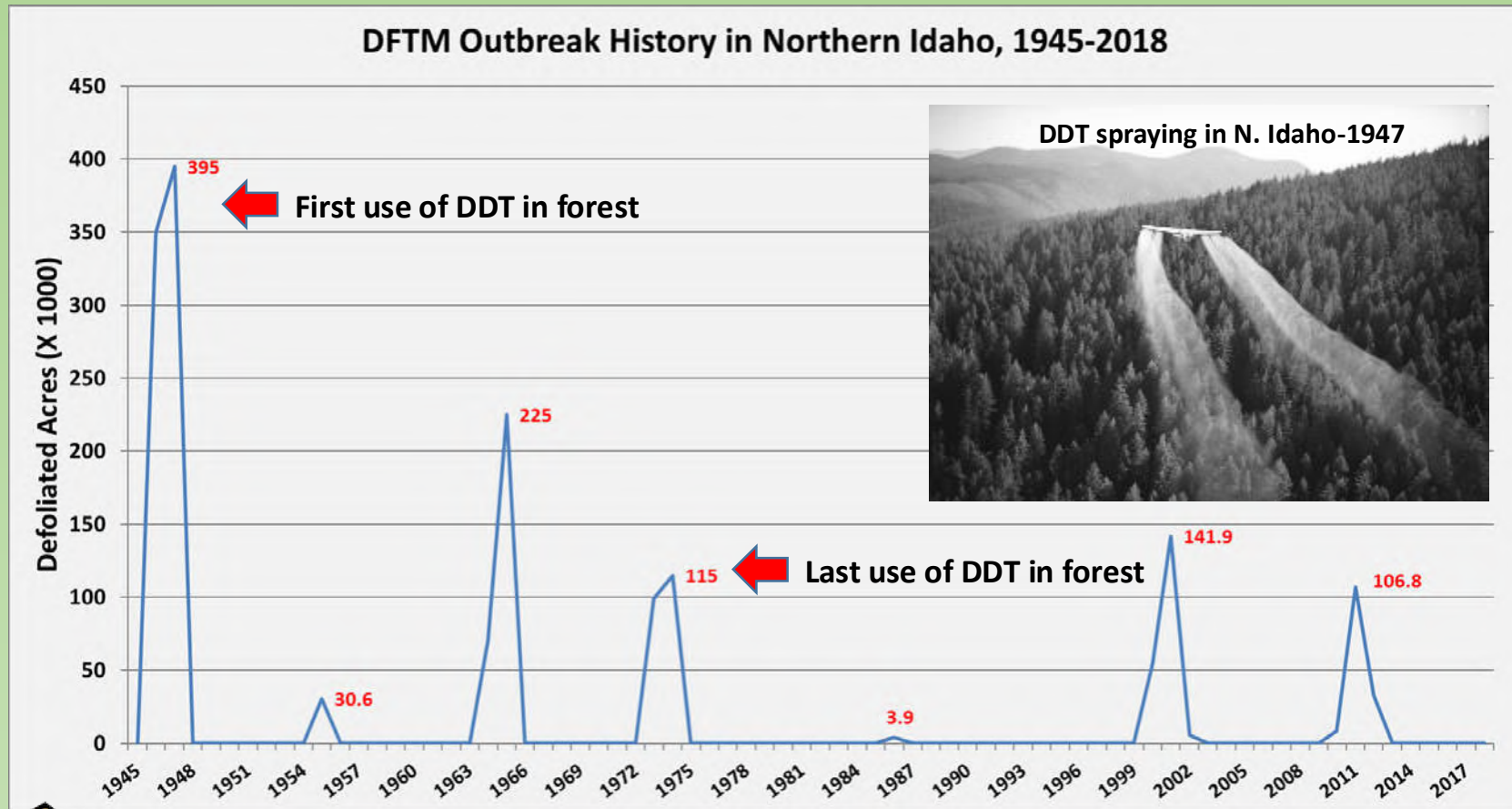
85 % defoliation



2009 (dead 2008)



In Northern Idaho, Outbreaks Occur Every 8-12 Years



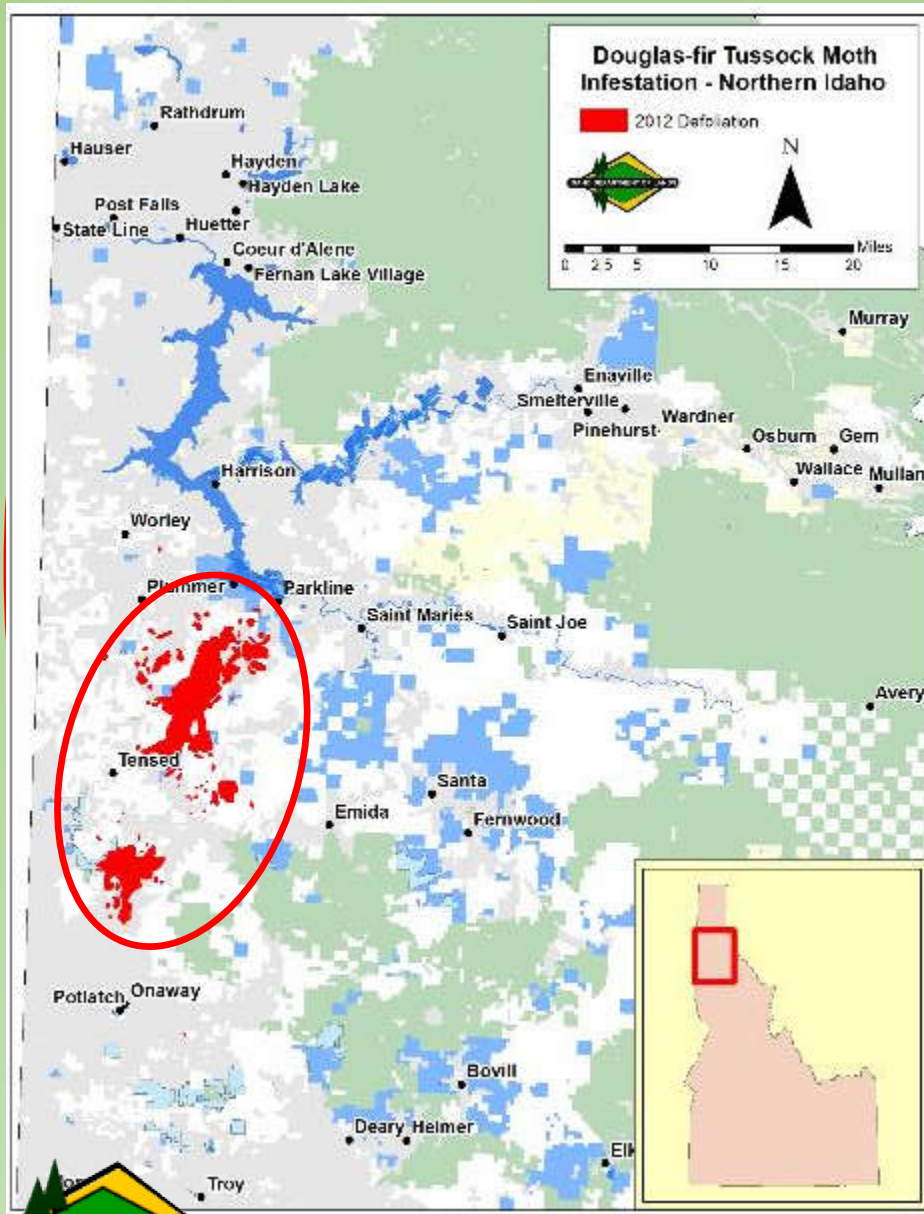
Suppression programs will not prevent outbreaks

N. Idaho Outbreak 2010-2012

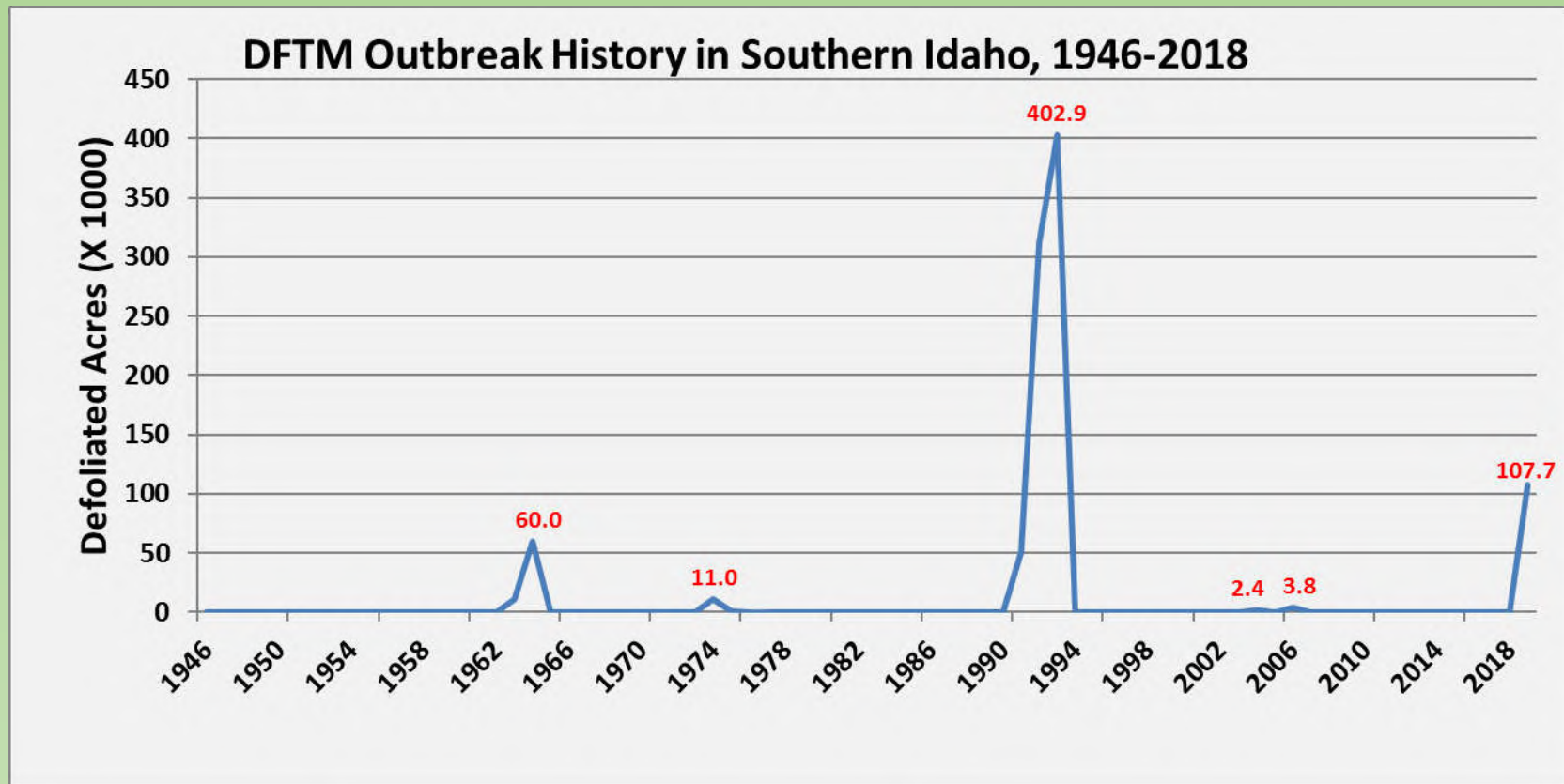
2010 - 8,600 ac
Kootenai Co

2011 - 68,500 ac
Kootenai,
Benewah Co's

2012 - 32,900 ac
Outbreak moved
south then collapsed



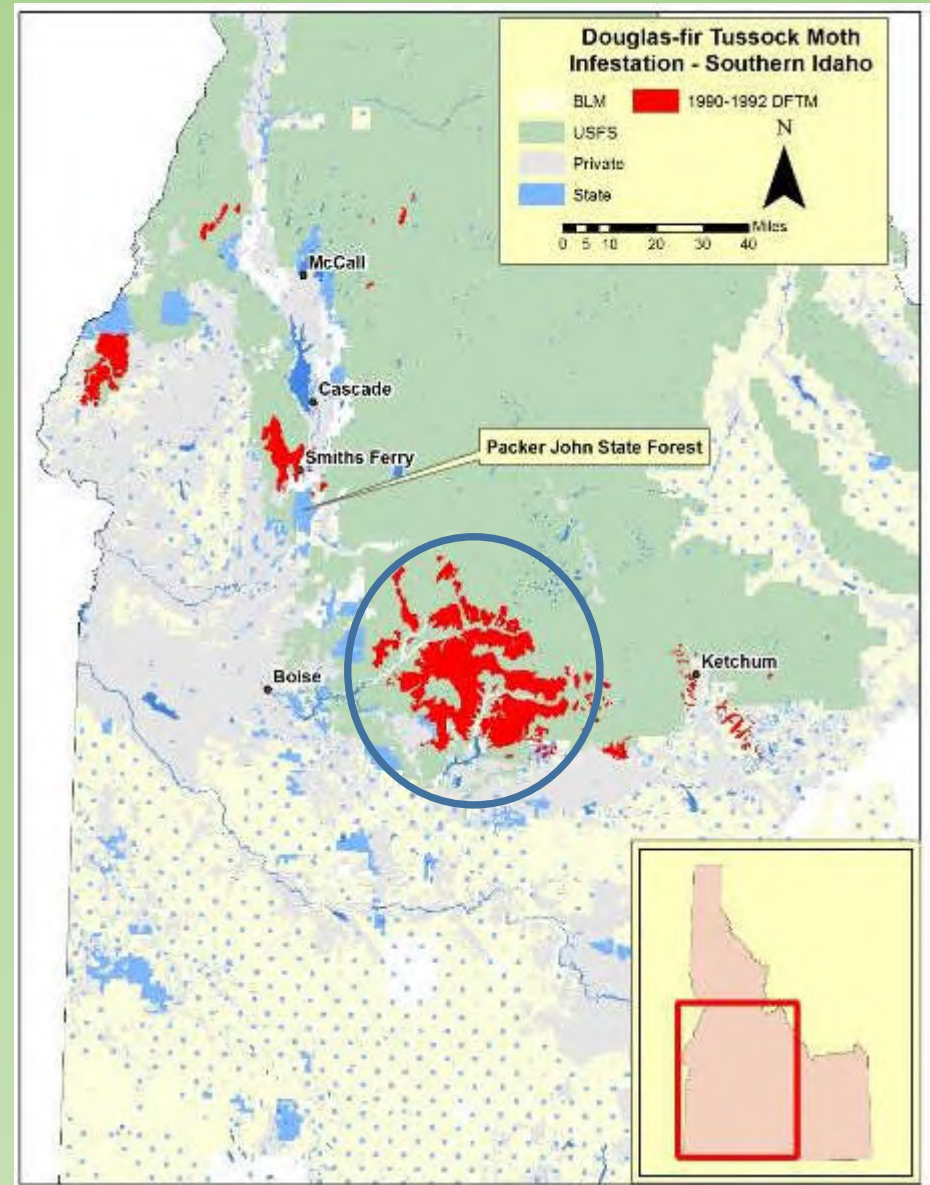
In Southern Idaho, Outbreaks Are Not As Regular



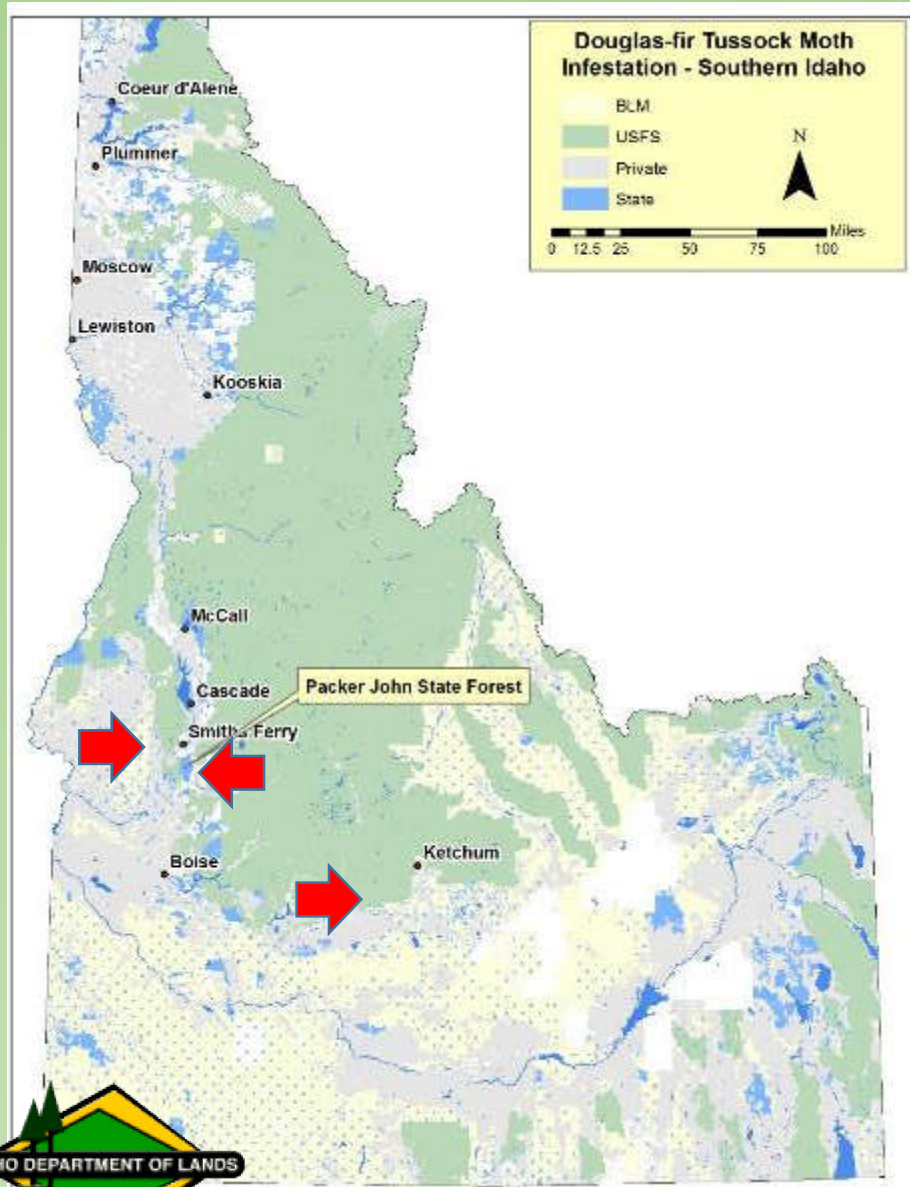
1990-1992 Outbreak

Most defoliation was east of Highway 21 on Boise NF

The entire outbreak peaked at >400,000 acres



The Current Outbreak in S. Idaho



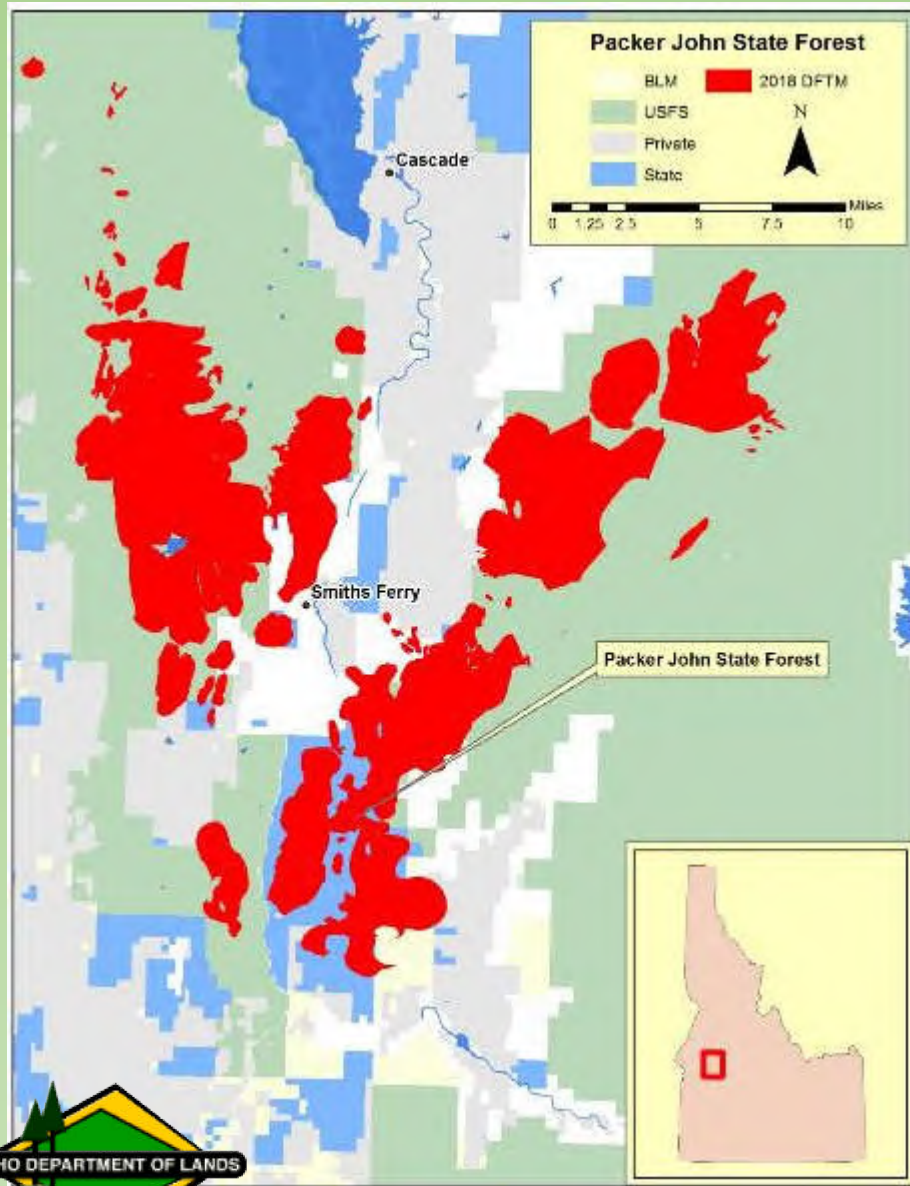
First activity observed on the ground in the Boise NF in 2016

Some defoliation observed in the Boise NF in 2017

Heavy defoliation observed at Craters of the Moon in 2017

Egg masses observed in Packer John Forest in 2017

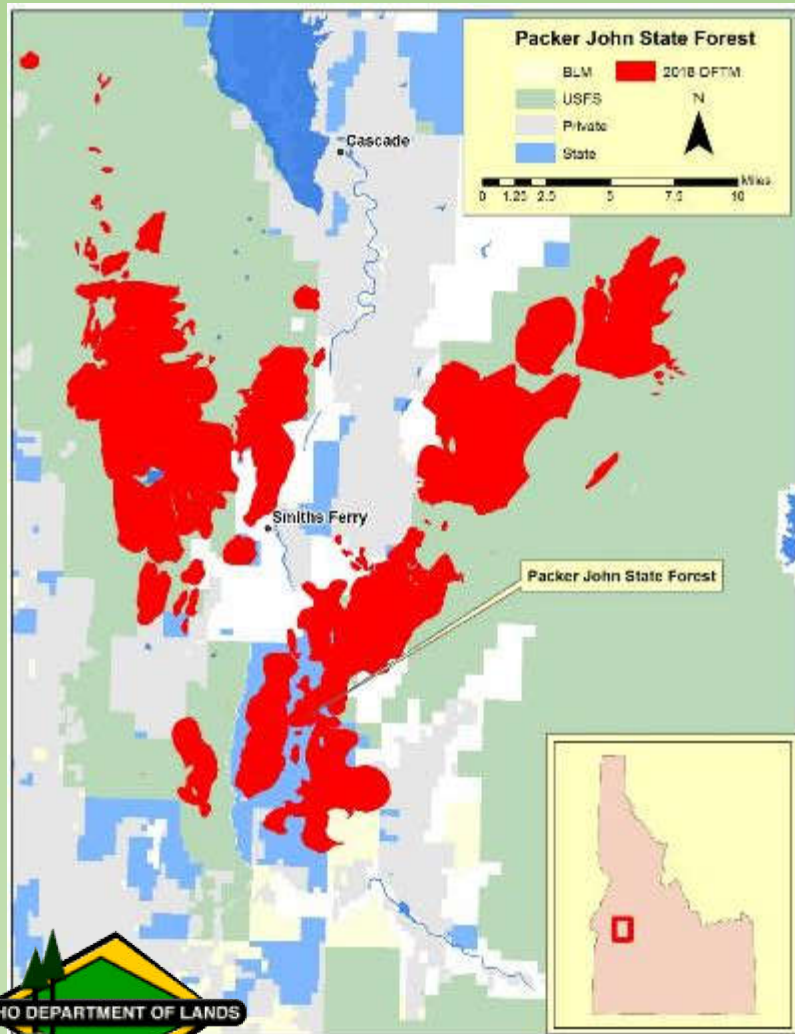
The Current Outbreak in S. Idaho



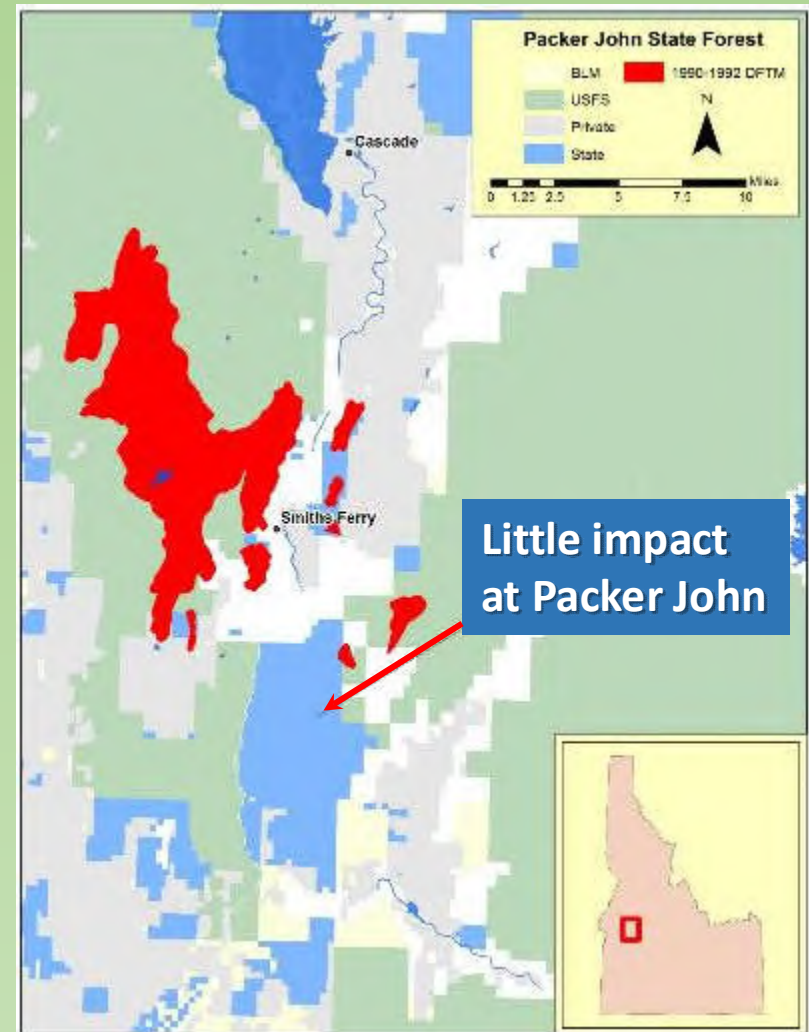
**Approximately 100,000 acres
of defoliation observed in 2018**

Comparison of Outbreaks-Packer John

2018 Defoliation



1990-1992 Defoliation



Mortality at Packer John State Forest

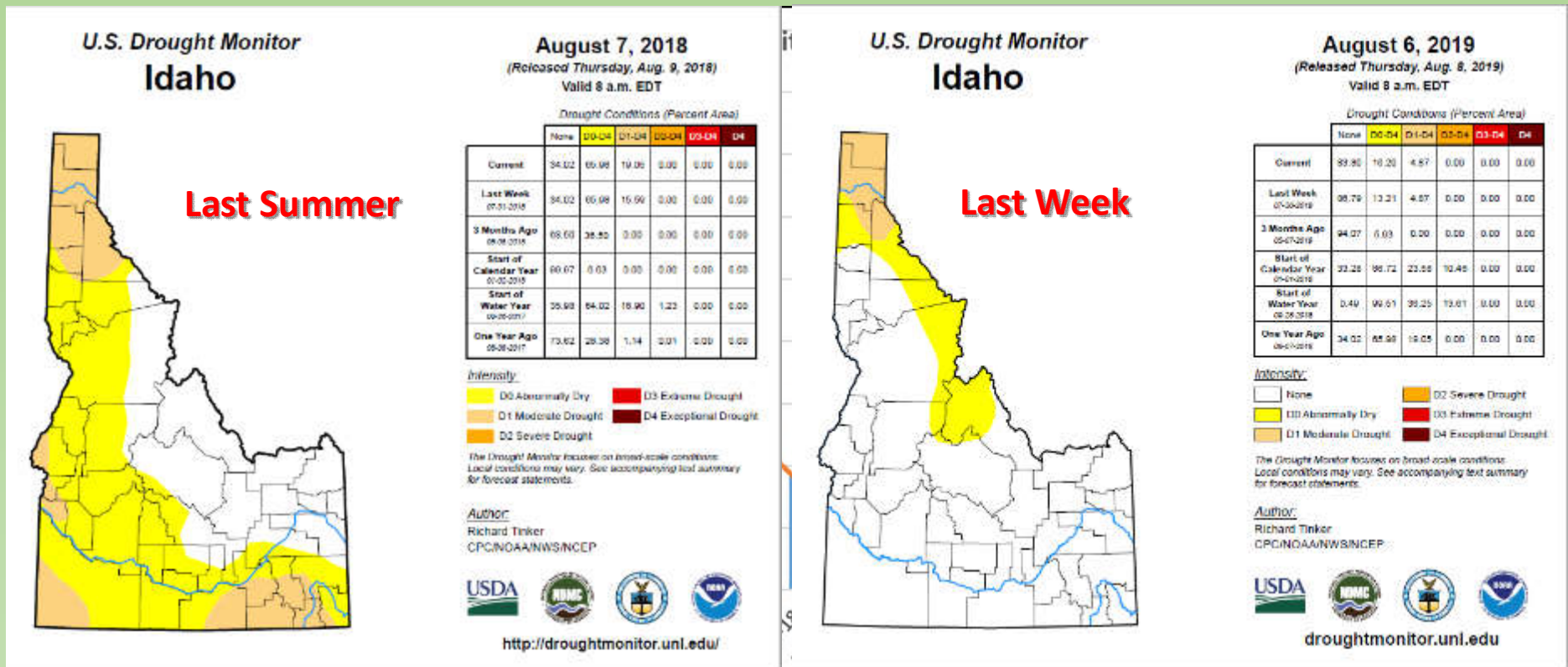
Mostly grand fir and Douglas-fir



UAV photo-IDL Tech Services -6/25/2019

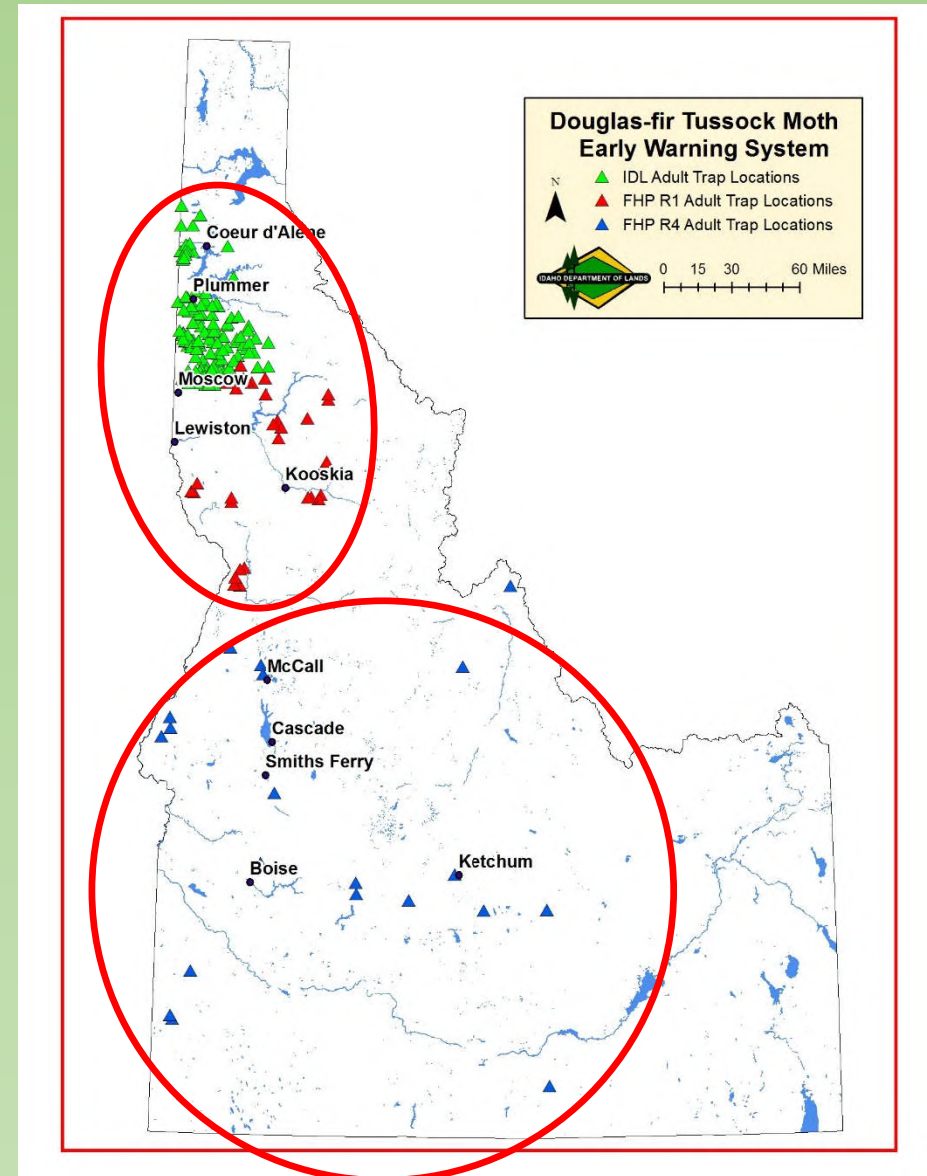
Drought in Southern Idaho

Drought stressed trees more susceptible to mortality



How Do You Manage DFTM?

- **Early Warning System**
 - Pheromone traps for adult male moths
 - 174 traps in N. ID
 - IDL – 143 traps
 - USFS R1 – 31 traps
 - S. ID – Currently >20 traps
 - USFS R4



DFTM Management

- **Early Warning System**
 - Pheromone traps for adult male moths
- When trap captures average >25 , supplemental surveys warranted



DFTM Management

- **Supplemental Surveys**
 - Larval survey the following spring
 - Indicates suboutbreak populations
 - (Before defoliation is observed)



DFTM Management

- Supplemental Surveys
 - Fall egg mass survey
- BEST indicator of defoliation the following year



DFTM Management

- **Insecticide Sprays**
 - **Expensive**
 - **\$2,900,000 was spent in 2001 in N. Idaho**
 - **New Pesticide General Permit Regulations**
 - **Will not prevent outbreaks**

Helicopter spraying during 2001 spray program



DFTM Management

- **Silviculture**
 - **Changing stand conditions to non-preferred hosts offers the best long term solution**



Grand fir & Douglas-fir stand with defoliation of all age classes

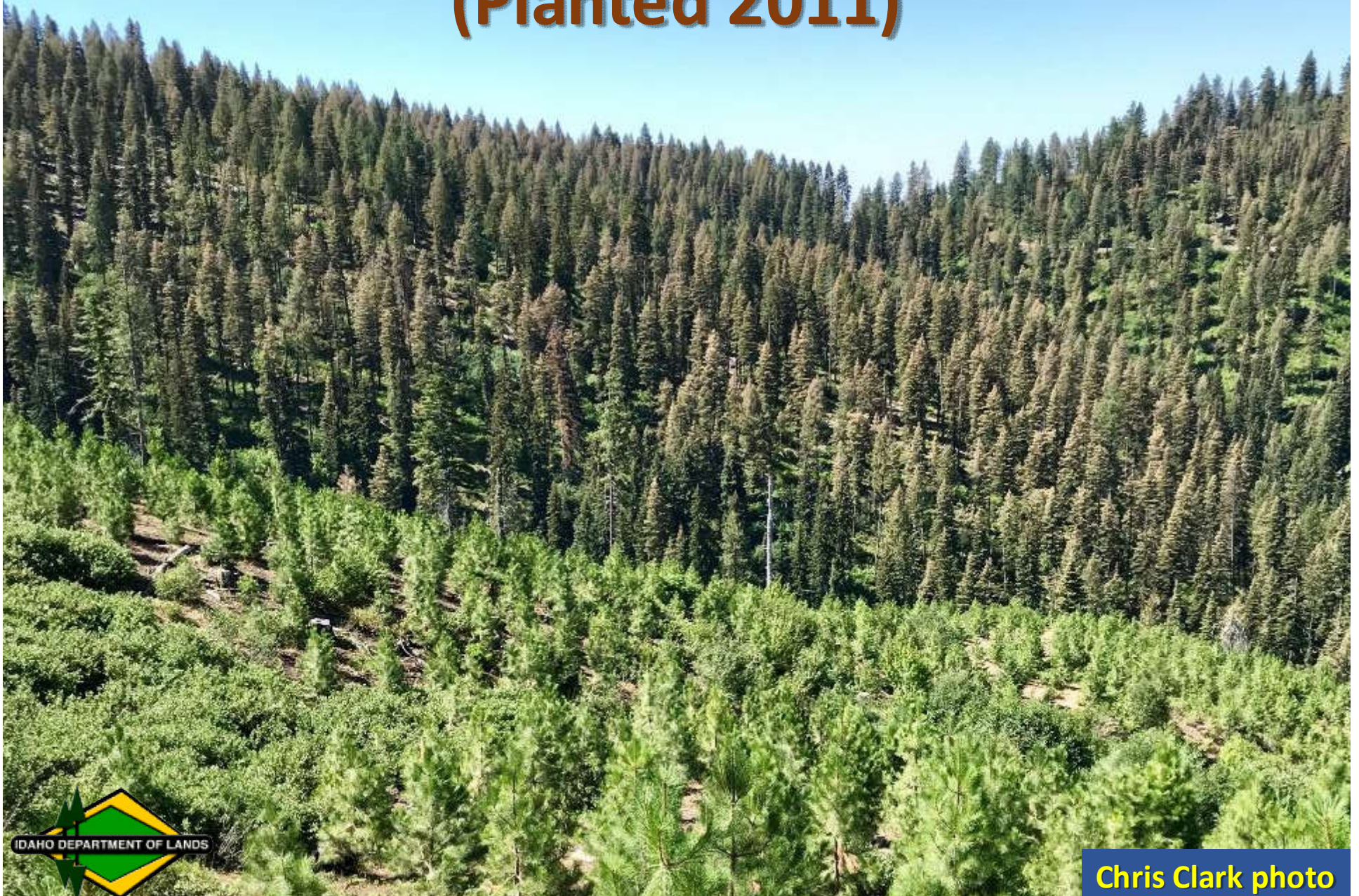


Silviculture is Best Approach



Signal Point Area, July 2012

Pine Plantation at Packer John (Planted 2011)



Chris Clark photo

Predictions

- **DFTM outbreak should crash this year in southern Idaho**
 - Virus & parasites
 - Three years of defoliation
- **Preliminary evaluation of Packer John Forest tomorrow**
 - Look for pupation success
- **Egg mass survey in September**



Predictions

- There will be more mortality from 2019 defoliation
- There is possibility of more defoliation in 2020
- DFTM numbers in Northern Idaho are increasing

