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from Region 1, State and Private  
Forestry

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DOUGLAS-FIR TUSSOCK MOTH  
(Problem Analysis)

THE INSECT

The Douglas-fir tussock moth is an important native defoliator of true firs and Douglas-fir. Outbreaks of the Douglas-fir tussock moth sometimes develop almost explosively but, after a year or two, may subside abruptly. However, some outbreaks have persisted at low levels for as long as 8 years. The average life of an outbreak is 5 years.

DAMAGE CAUSED

The Douglas-fir tussock moth is a quick killer of trees. Complete tree defoliation may occur in a single season. In heavy infestation centers the needles of all conifers present are destroyed. Defoliation by the tussock moth not only retards tree growth but also kills trees. In 1956, on the Stanislaus National Forest in California, 60 percent of the white fir trees that were defoliated (90 percent by the tussock moth) failed to recover.

Many other trees were so seriously damaged that the tops died or the trees were killed by attacks of other insects and fungi. Mature grand fir trees are killed more quickly than younger age classes. Serious forest fire hazards develop in all heavily damaged stands.

THE OUTBREAKS

It is not known why tussock moth outbreaks occur. In 1964, extensive areas were infested in California, Oregon, Washington, Idaho, and Montana.

The current Idaho tussock moth infestation was first detected in 1961 in and near several towns in northern Idaho. These infestations were kept under surveillance during 1962 and 1963. It was suspected that the outbreak might decline before spreading into extensive forest stands. However, intensive ground and aerial surveys in 1964 detected tussock moth egg masses on 320,000 acres of forested lands in Benewah and Latah Counties, while the infestations in Bonner, Boundary, and Kootenai Counties remained static or appeared to be declining.



Of the 320,000 acres of infested stands, 115,000 acres on the outer fringe of the main outbreak supported only occasional egg masses with no detectable defoliation. Most entomologists think that 1965 control efforts should be concentrated on the 205,140 acres of moderate to heavy infestation where tree mortality will occur in 1965.

The landownership of the main tussock moth infestation is:

<u>Landowner</u>	<u>Acreage</u>
Potlatch Forests, Inc.	40,030
Diamond National	1,940
Northwest Timber Company	680
Northern Pacific Railroad	760
Milwaukee Land Company	4,840
University of Idaho	3,600
State of Idaho	20,910
Small private (557 owners)	85,700
Bureau of Land Management	2,810
Coeur d'Alene Indians	220
National Forest	<u>43,650</u>
<b>Total</b>	<b>205,140</b>

#### BIOLOGICAL EVALUATION

The 1964 biological evaluation of the Benewah-Latah tussock moth infestation indicates that heavy defoliation will occur in 1965 and that extensive tree mortality and damage will result.

Some polyhedral virus is present in the infested area. To attain a better knowledge of the amount of virus present, 10 egg masses each from 25 sample plots are being reared at the Forest Insect Laboratory at Corvallis, Oregon. This information will be available in early March 1965.

#### CONTROL METHODS

The only proven control method for the tussock moth is the aerial application of DDT at the rate of 1 pound per acre in 1 gallon of fuel oil. The cost per acre for this type of control is approximately \$1, which would break down as follows:

DDT insecticide formulated	\$0.36 per acre or gallon
Aerial application (flying)	.35 per acre
Observation planes	.05 per acre
Overhead--administration	<u>.24 per acre</u>
<b>Total</b>	<b>\$1.00 per acre</b>



Control through the aerial application of a polyhedral virus has good potential, but has not been fully perfected and tested. Enough polyhedral virus is available to treat 50,000 acres at the rate of 100 million particles per acre. This should be applied to critical areas and pilot test areas.

The cost of treatment by virus would be about the same as DDT. Treatment by virus would save little of the tree foliage in 1965 that would have been consumed by the tussock moth if no control was applied.

#### STAND VALUES

The infested stands represent some of the most productive and accessible forest lands in Idaho. The annual yield per acre ranges between 200 and 250 board feet. The current stumpage value is about \$5 per thousand. The growth loss alone after 2 years' defoliation would more than pay for the cost of the project. In addition to growth loss, heavy tree mortality will occur in patches throughout the 205,000 acres of moderate to heavy infestation. The currently thriving Christmas tree industry will be lost for several years if no control action is taken. It is estimated that the total dollar loss per acre would average between \$15 and \$20 if no control action is taken. This means that the total stand loss would be 15 to 20 times the cost of control. In addition to this there would be a considerable loss in esthetic values plus the high forest fire hazard potential created by the dead trees.

#### OTHER VALUES

Within the spray area there are only a few fishing streams and these are of poor quality. However, the tussock moth infested area is, for the most part, well stocked with elk, deer, and upland game birds.

The Troy municipal watershed and possibly other watersheds, plus all critical or sensitive areas, would need to be treated with virus.

#### FINANCES

The project would be financed as follows:

1. The Forest Service would pay the total cost of spraying Federal lands plus one-third of the cost of spraying all State and private lands; total Forest Service cost--\$100,000.

2. The State of Idaho will pay for two-thirds of the treatment cost on all State lands plus one-half of the cost to private landowners; total State of Idaho cost--\$60,000. This \$60,000 must be secured by a special appropriation of the Idaho State Legislature.

3. The remaining cost for treating private lands will be paid from the State of Idaho emergency pest control 5 percent slash fund. Estimated cost--\$45,000. This would give a grand total of \$205,000. All funds are currently available except the \$60,000 from the State of Idaho.

#### PROJECT REVIEW

It is expected that this project will be reviewed by the Federal Committee on Pest Control in early March. If the project is not approved for DDT it will be necessary to treat the heavily infested areas with virus or cancel the project. However, State and private landowners may proceed on their own.

#### MONITORING

If conducted, this project will be fully monitored by all related State and Federal agencies.

#### ZONE OF INFESTATION

Zone of infestation is being established by State Forester Roger Guernsey, as required by law.

#### PRIVATE LANDOWNER COOPERATION

It appears that all large and almost all small landowners are highly in favor of the control project. Although not required by Idaho State law, it is suggested that permission to spray be secured from each private landowner.

#### FOLLOWUP ACTION

It will be necessary to keep all Douglas-fir tussock moth infestations in the Northern Region under close surveillance during 1965 in order to determine what control action may be required in 1966.