SUMMARY OF INTERIM REPORT ON MONITORING 1964 SPRUCE BUDWORM AERIAL SPRAY PROJECT SALMON NATIONAL FOREST, IDAHO

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FOREWORD

This ia a preliminary summarization of information available to date covering the intensive monitoring program carried on in conjunction with the 1964 Spruce Budworm Control Project on the Salmon National Forest. The monitoring program was aimed at investigating effects on many elements of the forest environment all of which will be fully documented when the many evaluations are completed. The large number of samples taken overloaded available laboratory facilities, consequently, some analyses are still to be done. This account is an interim progress report of work completed to date with no attempt to draw conclusions. Most of the remainder of the work will be finished within the next few months. A final report on the short-range program will be prepared at that time. Results of the long-term monitoring will be reported at a later date, possibly a year to two years hence.

INTRODUCTION

A spruce budworm infestation within the Salmon and Challis National Forests, spreading and intensifying since 1958, increased to one and one-half million acres by 1963. In July 1964, approximately 525,000 acres of the infestation were sprayed with DDT. Tributary drainages of the Salmon River from Horse Creek upstream to Carmen Creek below the town of Salmon, Idaho, were sprayed by helicopters (about ten percent of the area comprising the more sensitive portions) and fixed-wing planes.

PLANNED PROTECTION

Provisions were made for the control of spray materials in order to protect other forest resources. Observers were assigned in additional fixed-wing planes and helicopters to help guide spray pilots and to check on the proper control and application of spray materials. Pilots and observers were briefed daily and given orientation flights to acquaint them with terrain, protection measures, and flight patterns for their respectively assigned spray blocks. Spraying was terminated when weather conditions exceeded those established as safe maximums for control of insecticide. Homesteads, pastures, irrigation ditches, reservoirs, streams, nontimber types over 160 acres, and noninfested timber types were designated as nonspray zones.

MONITORING

Controls

Intensive monitoring was conducted to evaluate the effectiveness of the controls and some of the possible impacts of spraying on other components of the forest environment. Trained wildlife personnel of the Forest Service were detailed to the project to conduct monitoring. Assistance was provided by other Federal agencies such as the Bureau of Sport Fisheries and Wildlife, the Agricultural Research Service; and by Idaho State agencies--the Department of Fish and Game, the Department of Agriculture, and the Department of Health.

Chinook and sockeye salmon, as well as steelhead trout, are reared or migrate through streams within the project area. The importance of the sport and commercial fisheries of these anadromous species as well as the resident rainbow and cutthroat trout populations, necessitated adopting stringent measures for stream protection. Nonspray zones were established on each side of streams flowing five cubic feet per second or more. Reduced dosages of DDT were sprayed by helicopter in strips immediately adjacent to the nonspray zones. Beyond that, fixed-wing planes were used to apply one pound of DDT per acre.

Evaluation of Controls

The effectiveness of controls for keeping DDT out of the streams was evaluated by determining changes in numbers of drifting aquatic insects during and after spraying, and by laying out transects of oil-sensitive dye-cards to measure spray distribution. As a result of these evaluations, nonspray zones were widened twice during the operations of the project and fixed-wing application was moved back from the streams to twice the distance originally determined to offer the required degree of protection.

Aquatic Monitoring

Fish in live-boxes

Chinook salmon and rainbow trout were held in live-boxes in streams within the project area and fish in control boxes were placed in streams outside. Acute mortality of fish at most test sites was no higher than mortality in the control boxes. Where mortality of test fish was higher, analyses of fish carcasses for DDT residues are being made. When completed, these analyses may shed some light on the cause of loss.

Wild Fish

Wild fish were taken by use of an electric shocker before and after spraying. These are being analyzed for DDT residues but results are not yet available.

Aquatic Insects

Increases in drifting aquatic insects were recorded in many instances immediately after spraying. Bottom insect sampling was carried on at a number

of stations before and for up to three months following spraying and in areas where numbers of insects in drift samples increased the most immediately after spraying, little re-building of bottom insect populations occurred during the three months following spraying. Most other stations, however, showed increases in numbers of bottom insects by fall. Some changes in the composition of sampled insects were recorded. Insects of the orders Trichoptera (Caddis flies) and Ephemeroptera (May flies) made up a smaller percentage in the fall samples compared to the samples collected before and just after spraying. Seasonal fluctuations in aquatic insect numbers and composition are normal. However, previous measurements for the sample streams are lacking, thus it is impossible to know what part of the measured changes may be natural and what may be due to repopulation stimulated in some manner by spray materials in the streams.

Aquatic Vegetation

Aquatic vegetation was sampled before and after spraying. Results from residue analyses of these samples are not yet available.

Water

Water samples were taken to help determine possible correlations between aquatic insect losses and DDT in streams. Residue analyses were determined to a minimum detectable level of 0.2 part per billion. Even though only two samples indicated levels greater than one part per million, smaller amounts could in some cases be correlated with increases of aquatic insect losses, but not in all. Water samples taken continuously for periods of an hour or more seemed to provide better evaluations of DDT in the stream than did periodic dip samples.

Hughes Creek Special Study

A special study was conducted on the Hughes Creek drainage where spray application patterns differed from those on the main project. Samples of wild fish, aquatic vegetation, drifting aquatic insects, stream bottom populations of aquatic insects, and water were taken. Live-boxes containing test fish were also used. Idaho Fish and Game Department personnel conducted this study and are preparing a report which will be included in the full monitoring report to be published later.

Long-Range Study

The Game Department is also conducting a study on some long-range impacts of DDT on aquatic insects and fish. This will extend into 1965 and will be the subject of a separate report when completed.

Terrestrial Monitoring

Big-Game Adipose Tissues

Evaluations of terrestrial wildlife and habitat dealt primarily with levels of DDT residues. Mule deer were sampled before the project started and

mule deer, elk, and mountain goats were sampled in both the project and various control areas after spraying was completed. Residue levels in adipose tissues of prespray samples of deer ranged from .01 to .033 parts million of DDT and DDT-metabolites. Samples of adipose tissue from mule deer taken one month after spraying ranged from 9.6 to 48.14 parts per million. Results have not been received for analyses of samples taken during the 1964 hunting season. Additional samples of deer adipose tissues will be taken during the hunting seasons of 1965 and 1966.

Rumen Samples (1st stomach)

Prespray rumen content samples from deer contained no detectable DDT residues. Samples taken one month after spraying ranged in content from 27.0 to 185.3 parts per million. Other tissues of deer were sampled also but residue analyses of these have not been completed.

Birds

Robins and blue grouse were taken for residue analyses. Laboratory analyses are not yet completed

Terrestrial Vegetation

Ten species of vegetation were sampled and are being analyzed for DDT residue levels. Analyses of four species have been completed. Prespray and control samples show no detectable levels. Immediate postspray samples showed DDT residue levels of 148 parts per million for sagebrush, 313 for balsamroot, 384 for wheatgrass, and 79 for Douglas-fir. In the three months following spraying residue levels decreased by about 50 percent for all four species. Results of analyses of the other species will be available later.

AGRICULTURAL PRODUCTS

Cream

Cream from producers living both inside and outside the project area was sampled before and periodically after spraying. Analyses indicated all to be negative for DDT and DDT-metabolites at detectable levels of one part per billion or more.

Milk

Grade A milk samples were obtained from producers living both near the project area and well away from it, before and after spraying. These also tested negative for DDT residues.

Beef

A plan to obtain adipose tissue samples from beef cattle which had grazed within the project area was not successful. Up to the time of this writing no cattle from the project area were reported processed through the Salmon slaughterhouse.

CULINARY WATER

Culinary water samples from sources utilized by the communities of Gibbonsville, Cobalt, and Forney were tested before and after spraying. Analyses showed all negative for DDT residues at detectable levels of one part per billion.

SPECIAL MONITORING TASKS

A large fixed-wing spray plane partly loaded with between 350 and 700 gallons of insecticide crashlanded attempting to return to base. The pilot jettisoned the load over the project area. When the jettison site was found two days later, it was obvious that a portion of the insecticide had been dropped across a small tributary of Panther Creek. Water samples had been taken in Panther Creek the day of the crash and again the day the jettison site was found. These tested negative for DDT. Bottom aquatic insects, wild fish, and aquatic vegetation were also sampled. Residue analyses are not completed so the impact of this jettisoned load on the stream cannot be fully evaluated at this time.

A TBM spray plane which crashed with almost a full load of 700 gallons of insecticide was found upon investigation to have landed in thick timber a considerable distance from water.