

## RIVER BOTTOM MOSQUITO CONTROL

• By ROBERT H. PETERS, *Manager*

*Northern San Joaquin County Mosquito Abatement District*

Of particular concern in the mosquito control program of the Northern San Joaquin County Mosquito Abatement District is the Mokelumne River, which rises to flood stage in the late spring owing to the snow melt. At that time the bottom land area, ranging in width from a few yards upwards to a half mile in places, is covered by overflow or seepage water which pockets in the lower levels for a time sufficient to allow the *Aedes* mosquitoes (*vexans* and *lateralis*) to emerge in countless swarms.

Our Board of Trustees, realizing the futility of attempting to penetrate the jungle foliage covering this river bottom, initiated a program of clearing, which was begun under the direction of the previous manager of the District, Mr. Ernest Campbell. This program has consisted in the use of heavy equipment (two D-7 Caterpillars) which have been operated on a cost basis in a cooperative arrangement between the District and the land owner (usually a farmer). As such this plan has been highly successful, since it has resulted both in effective elimination of many points of origin of mosquitoes as well as to reclaim land for beneficial agricultural purposes. Rather than to interfere with private enterprise in the soil moving business, this program has acted as a boost to this field of activity, since it has rendered considerable land into a condition from which it can be finished by contractors for agricultural or other useful purposes.

In addition to conversion of these lands to farm uses, the District has constructed waste and wine sumps and retainer levees. At present the City of Lodi is contemplating the enlarging of their city park, which will include a large area of this densely overgrown river bottom. It is anticipated that the District will cooperate with the city in this endeavor and consequently eliminate or provide easy access to numerous points of heavy mosquito infestation.

This form of land clearing consists of the following steps:

1. Brushing—in which the tractors, equipped with 13½-foot blades, open up the areas between the larger trees, piling the brush as the work proceeds.
2. Digging around trees—this is preliminary to felling the larger trees.
3. Tree felling—this is done in either of two ways, by the tractors pushing the smaller trees down or by the use of cables in which two tractors pull down the larger trees aided by a crew of three men who handle the cable.
4. Piling of trees—this step consists of pushing the fallen trees to spots convenient for burning.
5. Filling and rough leveling—this is done both by blade and with the bucket scrapers, which move 10 to 12 cubic yards of soil for redistribution.

Needless to say, real progress is being made in this field of permanent control of some of our worst areas along the river, and considerable credit for the feasibility of this program goes to the efficiency of our operators in this work.

*Mr. Mulhern:* All of our speakers, Bob included, have indicated, I think, that our best deal whenever possible is to

get voluntary cooperation. Harold Gray here again will speak to you and show you that although we do like to walk softly we do still carry that big stick which we can swing if it's absolutely necessary. Harold.

*Mr. Gray:* I'll make it snappy, the hour is getting late; it's short anyway.

## ELIMINATIVE MOSQUITO CONTROL MEASURES IN RELATION TO INDUSTRIAL OPERATIONS

By HAROLD F. GRAY, *Engineer-Manager*

*Alameda County Mosquito Abatement District*

There are a number of industries which use large volumes of water in their processes, and which produce liquid wastes which may be very productive of mosquitoes. To suggest just a few, we have logging and lumber mills, canneries, sugar refineries, paper mills, wineries, slaughter houses, milk processing plants, etc.

If these are located in cities, the wastes are discharged to the sewer system and in themselves do not then present a mosquito breeding problem. But many such industries may be located in rural unsewered areas. Direct discharge of such wastes to streams is prohibited by laws against pollution, and the wastes are usually discharged onto land, almost invariably presenting a serious mosquito control problem.

In some cases the liquid wastes may be subjected to a treatment process, to remove coarse solids (screening) or fine solids (sedimentation), but the end product is still water, containing appreciable amount of dissolved, colloidal, or finely divided suspended organic solids which are usually nourishing pabulum to mosquito larvae. The result is large numbers of foul-water breeding mosquitoes such a *Culex pipiens*, *C. tarsalis*, and similar species.

Land disposal is generally the only available method of disposal of these wastes. The nature of the soil, whether relatively porous or relatively impervious, will determine the scheme of disposal, by intermittent percolation into the soil, or by ponding. In either case, the important point in mosquito control operations is accessibility for vehicles and equipment used in inspections and control work. Circumferential dykes with roadways should be provided, plus interior dykes at close enough intervals for effective spraying operations. Vegetation must be controlled on the dykes, and emergent vegetation controlled in the ponds. With intermittent application, the soil must be worked frequently with discs or harrows.

Since the cost of disposal of these wastes is a part of the cost of the manufacturing process, there should be an established policy requiring the company to install whatever facilities are necessary to make mosquito control effective and reasonably convenient, and to defray the control costs, such as labor, materials, and transportation. If strong opposition is met, there should be no hesitancy in applying the procedures for the abatement of public nuisances.

In some wastes, the organic insecticides are relatively ineffective owing to absorption or neutralization of the chemicals, and Diesel oil will be more effective. In others, oil may be ineffective because the organic matter in the waste may lower the surface tension of the water so much that the oil will not spread. In others, *Gambusia* may be used effectively, but some wastes are toxic to fish. No fixed

rule is applicable, but each case must be handled individually.

In some cases, minor changes in manufacturing processes may greatly reduce the actual use of water, and in many cases it may be possible to reduce drastically the use of water by curtailing its careless waste. A water waste survey may be profitable to the industrial plant and an appreciable help to mosquito control.

To some extent it may be possible to obtain help in mosquito control in industrial wastes through the new Regional Pollution Boards, but these are only being organized at present and the scope and nature of their work is not clearly defined in actual practice. But it would appear to be desirable for the Association to try to work out a general policy on mosquito control in industrial wastes in cooperation with the State and the Regional Pollution Boards.

*Mr. Mulhern:* Ted Raley is going to give us some word about the strengthening of the position of the mosquito abatement district by a local ordinance. Ted. Ted Raley?

*Comment:* Ted had to leave.

*Mr. Mulhern:* If Ted had to leave that winds up our speakers. We saved a few minutes of the time which was originally allotted to us, but we are still far behind schedule, and unless someone has some discussion which he particularly wants to offer I would like to turn this meeting back to the Chairman with just one comment of my own. The things which I have just heard here encourage me tremendously to feel that there is a fine opportunity for advancing our cause of mosquito control by giving more and more careful attention to the possibilities in permanent control. I do hope our program committee for next year will see fit to devote a little bit more time to this, what I think, important subject.

*Mr. Kimball:* Thank you very much, Tommy, for all the time you've put into preparing this symposium and all the members of your symposium. We certainly wouldn't want to end the technical session of this Conference without at least acknowledging and expressing the appreciation of the amount of time that all the individuals have gone in to make this program that was designed by Art Geib and his program committee. The amount of time to prepare this data and present it is tremendous, and I know that I've appreciated sitting here and listening to it and will also look forward to the Proceedings for a constant reference.

Before we adjourn I'd like to call on Dick Peters for one last announcement.

*Mr. Peters:* Those agencies which have not yet picked up the Proceedings for last year, that is, those who are entitled to them, I have a supply of them over here at this corner of the desk; if you will stop by and see me before you leave I will issue some to you. One other mention, Chet Robinson, are you going to be with us this evening at the night meeting? (No.) Thanks is due Chet, Robinson for a special treat we are going to receive after we have arrived at the Town and Gown and during dinner. Gallo Wines are going to introduce us to a new wine that they have recently developed. He is on our legislative committee for that reason, so I think Chet ought to get a hand.

*Mr. Gray:* I have just one announcement, Jack, just before we close. I regret very much that through an oversight I didn't know that he was only going to be here yesterday. Lester W. Smith, the Vice President of The American Mosquito Control Association, was here, and we should have called on him, and I expected to work him in today some time, but he had other business and so off he went, but I do think it should be in the record that he was here. He will be the next President of The American Mosquito Control Association.

*Mr. Kimball:* Just one more reminder to everyone who has forgotten to leave their paper off. Paul Jones, be sure and leave your paper at the desk. You know that seven-thirty is the time for the real highlight and we count on Dick Peters and his gang of cohorts for the program that they have cooked up, so in adjourning it has been suggested that we adjourn in memory of Professor Herms and Mr. Lilley.

The meeting is adjourned.



THE NINETEENTH ANNUAL CONFERENCE OF  
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CIATION WILL BE HELD IN RIVERSIDE, CALIF-  
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