on any reservoir. Unusually heavy rainfall in June, a barge stranded on a mud bank outside of the channel, bridge construction or emergency repairs at a dam, or other special situations may all require temporary departures from guide curve operations. It is at these times that the close liaison which TVA provides between its water control and mosquito control staffs becomes of utmost importance.

An operations schedule which embodies the needs of all interests together with a system by means of which day-to-day needs may be considered is required to assure the most effective reservoir water management for mosquito control.

LEGAL ASPECTS OF COMPULSORY ELIMINATION OF MOSQUITO BREEDING AREAS

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In this paper, an attempt is made to discuss the subject matter from a national viewpoint. Briefly summarized are pertinent excerpts from selected state laws and some experiences under these laws pertaining to compulsory action. The states selected for this discussion are: California, Utah, Illinois, Ohio, New Jersey, and Virginia.

California. Under the Mosquito Abatement Districts Act in the California Health and Safety Code, each district mosquito abatement board has authority (a) to take necessary steps to exterminate mosquitoes in or within migrating distance of the district; (b) to abate as public nuisances artificially created mosquito breeding places; (c) to notify a property owner of the existence of a nuisance, hold hearings on the notice, determine thereafter whether abatement must be made, direct him to comply, or abate the nuisance when he fails, and initiate lien action against the property involved to enforce payment.

The California law also includes a penalty clause: Any person who retards activities of the district is guilty of a misdemeanor.

It is noteworthy that even though the district boards have been given these unique and strong powers, there have been no instances where mosquito abatement agencies have had to resort to formal court proceedings to eliminate any nuisance. The Mosquito Abatement Act has been used judiciously; the policy has been to invoke legal remedies only for the relatively few people who are completely uncooperative. In a typical case involving a recalcitrant individual, a letter from the District Attorney advises him that the presence of the nuisance is in violation of the Health and Safety Code. He is persuaded to accept responsibility for elimination of the nuisance and for prevention of its recurrence. In the majority of cases, no further action has been required.

Utah. The Utah law states that each board of trustees is authorized (a) to take all necessary steps for the extermination of mosquitoes, and (b) to abate as nuisances mosquito breeding places in or within migrating distance of the district. There is no provision for initiating a lien action, but a penalty clause makes it a misdemeanor for a person to interfere with the board in the exercise of its powers.

According to Dr. Don M. Rees, it has not been necessary for any of the mosquito abatement agencies in Utah to take compulsory legal action with respect to control operations. However, in a few instances during the early part of the program,
police protection was obtained to conduct larvicidal operations on certain properties where the owner objected to the entry of mosquito abatement personnel. In a few cases, the legal department has written letters requesting property owners to make certain improvements or asking them to desist from certain water storage activities. The mandatory compliance or penalty clause (misdemeanor) is usually cited to anyone who objects to the mosquito control operations.

ILLINOIS. Under the Illinois statutes, the board of trustees is authorized (a) to take all necessary steps for the extermination of mosquitoes within the district, and (b) to abate as nuisances mosquito breeding places. No provision is included for a lien action or penalties for violations. Mr. Charles F. Scheel has stated that none of the districts in Illinois has ever found it necessary to take any legal action.

Ohio. In Ohio the functions of mosquito control are given to sanitary districts. The regulations for the prevention and elimination of mosquito breeding places are drafted, promulgated, and adopted by the board of directors, but in a district lying wholly within one county, as in the case of the Toledo Area Sanitary District, the law provides for only one director. Therefore the regulations which are in effect were adopted by him. These regulations may be enforced in three ways: First, by the district's entering upon the land, after notice to the owner or tenant, and abating the condition violated by the regulation, the expense of such abatement becoming a lien upon the land; second, by an injunctive action filed in court to require the person violating the regulation to comply therewith by court order; and third, by criminal prosecution for failure, after notice, to comply with the regulation, such failure constituting a misdemeanor punishable by fine of not more than $100, each day's non-compliance, after notice, being made a separate offense.

According to P. B. Brockway, Jr., Superintendent of the Toledo Area Sanitary District, as yet it has not been necessary to use compulsory action. The policy of the district has been to bend over backwards in order to obtain full cooperation from a company or an individual in the controlling of mosquitoes and eliminating their breeding sites.

NEW JERSEY. Under the New Jersey statutes, the mosquito commissions have all of the powers of a local board of health insofar as they pertain to a mosquito breeding nuisance (artificially created) except over lands owned by a municipality, county, or the state. Mr. Daniel M. Jobbins has informed us that there have been a number of situations calling for legal action at the county commission level, and procedures have been well established under the boards of health and mosquito laws. Legal action is the last recourse, and experience with the cooperative approach has been good in all but extreme cases.

Although mosquito commissions have concurrent powers of local boards of health with respect to mosquito abatement, in most cases the county commission proceeds as complainant and witness before the board of health and local magistrates who officiate under their own local and state authority. Strict compliance with the law as to preliminary survey, notice to owner to abate the nuisance, and the pattern defined in the statutes assures favorable outcome of the cases.

In the case of corporate bodies such as railroads, the injunction procedure has been employed with good effect. This consists of filing a bill in the name of the state by the local health board with the State Court of Chancery. The bill prays the court to prohibit the continuance of the mosquito nuisance. Any such action requires caution since costs are chargeable to the loser of the action; consequently, strict compliance with the law and the evidence must be well supported.

VIRGINIA. The Virginia law states that each mosquito control commission is authorized to do anything deemed necessary
for the control and elimination of all species of mosquitoes in the district. There is no provision regarding lien action; neither is there a penalty clause for violations.

Information supplied by Mr. R. E. Dorer indicates that no cases have been brought to court. It has been felt that it is better to educate rather than to prosecute. Usually a notice is all that is needed.

Conclusions. Although specific provisions of the various state laws vary considerably with respect to compulsory mosquito abatement, there seems to be unanimity of opinion regarding (a) the legal basis for mosquito control and (b) the place of the legal approach in abatement activities. These conclusions are summarized below.

1. Legal responsibility for mosquito control is associated with land ownership or operating rights. The owner on whose property a health hazard occurs should generally be held responsible for taking necessary corrective action under the laws.

2. Legal responsibility pertains to man-made situations rather than to "acts-of-God." In most instances, the individual should not be held personally liable for those acts that are not controllable by man. The California and New Jersey laws are very specific and exclude natural breeding sources in defining a nuisance.

3. The desirable approach for the control of the problem is by means of education and cooperation rather than by litigation. In California, remarkable success has been obtained by assisting the farmer in solving his problems. For example, it is the practice of many of the districts to provide the necessary heavy machinery required for source reduction techniques, particularly drainage, at cost to the landowner.

4. The legal approach should be used as a last resort for the few who will not cooperate. The legal machinery should be regarded as a "big stick" and used only infrequently, and then only when it is in the public interest to do so.

5. Legal action should not be taken unless the public opinion is in sympathy with such action. In general, public opinion will be in sympathy with the district if the district has been in strict compliance with the law and has been considerate of the violator—while the violator, in contrast, has been completely uncooperative and a hindrance.

Is there a need for new legislation or a revision of existing laws? The need for new legislation or a revision of existing laws should be based upon the problem in local areas. A specific example is a borrow pit ordinance, which was adopted by the city of Hampton, Virginia, in 1956. This ordinance was adopted to prevent the creation of mosquito breeding areas associated with a multi-million-dollar New Tunnel project. The New Tunnel is a bridge and tunnel combination across Hampton Roads, connecting the Lower Peninsula with the Norfolk area and will replace the ferry service. Since the project would require 3½ million cubic yards of fill material, considerable concern was expressed regarding borrow pits that would be created. The ordinance specifies that the borrow pits must be made self-draining, unless they are established along a navigable stream, in which case free standing water (minimum depth of 2½-3 feet) would be permitted.

In certain instances, if an inventory is taken of existing state laws it may be found that there is little need for new legislation. California may be cited as an example. Reference has already been made to the Mosquito Abatement Districts Act under the Health and Safety Code. Other statutes which can be used for the abatement of water conditions in California include various laws of Health Departments, Flood Control Districts, Agricultural Districts, and Water Conservation Districts.

In closing, we should like to emphasize that existing statutes should be studied to determine if the provisions are adequate and reasonable under present conditions. The review would indicate if adequate
protection to public health is afforded. It would also indicate if there is a need for modernization of certain sections. Our final suggestion would be that the laws of all states be studied in order to profit from the thinking and experiences of many individuals.

Summary. Briefly summarized are pertinent excerpts from selected state laws and some experiences under these laws pertaining to compulsory action. It is concluded that: (1) Legal responsibility for mosquito control is associated with land ownership or operating rights, (2) legal responsibility pertains to man-made situations rather than to "acts-of-God," (3) the desirable approach for the control of the problem is by means of education and cooperation rather than by litigation, (4) the legal approach should be used as a last resort for the few who will not cooperate, and (5) legal action should not be taken unless the public opinion is in sympathy with such action. The need for new legislation or a revision of existing laws should be studied to determine if the provisions are adequate and reasonable under present conditions.

Acknowledgment. The writer is deeply indebted to the following persons for assistance in the preparation of this paper: Mr. B. F. Keefe, Mr. P. B. Brockway, Jr., Mr. R. E. Dorer, Mr. W. H. Huneycutt, Mr. D. M. Jobbins, Mr. G. C. McFarland, Dr. D. M. Rees, and Mr. C. F. Scheel.

A DECADE OF MOSQUITO SOURCE REDUCTION IN A LOCAL MOSQUITO ABATEMENT DISTRICT PROGRAM

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The Trustees of the Northern San Joaquin County Mosquito Abatement District initiated a sound program of mosquito source reduction at the start of the agency's operations in 1945, when the district was formed. It was recognized that only through a progressive reduction of the mosquito sources, could a desirable degree of control be accomplished, within economic limits, in this area of the central valley of California.

Surveys of the main control problems, by the first manager of the District, Mr. Ernest Campbell, indicated that the jungle-covered riverbottom of the Mokelumne River, which produced three Aedes species, A. vexans, A. increpis, and A. sticticus, was the foremost problem; followed secondly by the irrigated pastures (both improved and unimproved) which produced Aedes nigromaculis and A. mel-