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PROBLEMS IN COUNTY-WIDE RODENT CONTROL PROGRAMMING

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It is a great pleasure to have the privilege of participating in this conference. However, my subject recalls to mind an old story about a little girl in Sunday School. When her teacher asked her what she was doing, she replied that she was drawing a picture of God.

"But Mary, said the Sunday School teacher, "No one knows what God looks like".

"They will when I get through", retorted little Mary.

Please do not infer from this story that you will know all about vertebrate pest control programs when I get through. What I mean to imply is that my remarks, like little Mary's picture, will amount to no more than a personal concept of the subject.

Vertebrate pest control is recognized and sanctioned as a legitimate function of county government in California, not only by statute but also by a century of tradition. This is an anomaly. Ordinarily, regulatory agricultural pest control programs are part of our plant quarantine system, undertaken against newly introduced pests or those which are not of common occurrence.

Programs against vertebrate pests, on the other hand, are carried on where the species involved are common, usually are abundant and often are indigenous. The reason for this lies buried in a bit of history that is very pertinent to my subject.

To start at the very beginning, when Sir Francis Drake visited the coast of central California in the year 1579, he remarked in his journals, "We found the whole country to bee a warren of a strange kinde of conies –". These "conies" were Beechey or California ground squirrels, named and described by Richardson some 250 years later.

After becoming a state in 1850, the leisurely, pastoral society of California's Spanish missions and ranchos rapidly changed to the more vigorous and demanding economy of cultivated crop production. Drake's "strange kinde of conies" found this new environment very much to their liking, and they caused great damage to the crops of the American settlers.

By 1870, public clamor for assistance in the settler's battle with the ground squirrels had become so great that the State legislature took action. It passed what probably was California's first attempt at regulatory pest control legislation; a bounty law. This law empowered certain counties to levy a tax, creating a fund for the payment of a 5¢ bounty on squirrel scalps and an 8¢ bounty on gopher scalps.

The deficiencies of the bounty system as a field rodent control program quickly became evident. Most counties abandoned the payment of bounties after a few years of trial; but the system was tried, off and on, in other counties until about 1917. Not only was It unsuccessful, but it was also horribly expensive. In 1913 and 1914, for example, my own county of Modoc paid the sum of $14,761.51 for bounties on squirrel tails, the equivalent of well over $50,000 by today's values.

In the meantime, the problem was evidently being studied by the best legal and agricultural brains in the state, for the legislature later enacted what I will refer to as the Squirrel Inspection District Act of 1874.

This remarkable piece of legislation empowered the Boards of Supervisors of Contra Costa and Alameda Counties to create Squirrel Inspection Districts, and to appoint Squirrel District Inspectors. Landowners were required to control ground squirrels on their properties within said districts. If they failed to do so, the District Inspector was authorized to hire men to do the work. If costs so incurred were not repaid by the landowner, they became a lien against his property.

It has been suggested that this program was unsuccessful mainly because the District Inspectors were underpaid and incompetent. This might well be so, and I might further venture the opinion that the Squirrel Inspection District Act of 1874 suffered the disadvantage of being 100 years ahead of its time.

However, the great significance of this long forgotten law is not that it was unsuccessful, but rather that it introduced certain concepts of regulatory pest control which have persisted to this day. One of these is the legal concept of abatement, which places responsibility upon the landowner for the control, on his property, of pests in the public nuisance category. The other is that of district organization to combat pests of community-wide importance.

During the next half century suitable bait formulas and knowledge of the life history of ground squirrels were developed. Finally, in 1917, County Horticultural Commissioners appeared on the scene, and, concurrently, a Rodent Control Division was established in the Office of the State Commissioner of Horticulture. As a result, leadership was provided and substantial progress was made, probably for the first time on a statewide basis, in reducing the magnitude of California's ground squirrel problem.

Vertebrate pest control programs currently carried on by California counties show a considerable degree of variation. Some counties limit their activities to the preparation of bait materials, which are given free of charge or sold at cost to farmers who do their own work. These usually are counties which have no major vertebrate pest problems. In counties where vertebrate pests present a major problem, the general tendency is to carry on cooperative-type programs; organized, administered and supervised by the County, with the farmer paying his share of the costs either in cash or by furnishing labor.

Theoretically, these are regulatory or law enforcement programs; but in some ways they resemble service functions. While the pest abatement provisions of the agricultural code apply and can be used if needed, the high degree of cooperation ordinarily experienced rarely justifies the use of cumbersome abatement procedures.

Most counties appear reasonably well satisfied with their programs. However, my own experience suggests that more effective control of vertebrate pests might be possible, at least in some instances, if more consideration were given to ecological aspects in program planning. The meadow mouse problem at Tulelake is an illustration.

Although meadow mice had caused some crop damage in the Tulelake Basin prior to 1949, the first actual control program was started that year. Localized outbreaks were experienced again in 1951, and in 1954 and 1955. By then, we thought an adequate control program had been developed, but the extensive meadow mouse population eruption of 1957-58 proved otherwise. During these two years, about 185 thousand pounds of bait was used in Modoc County alone, mice were killed by the hundreds of thousands, and yet crop loss estimates ran well into a million dollars. When eruption finally subsided in the late summer of 1958, we were faced with the unpalatable fact that our control program amounted to little more than locking the barn door after the horse was stolen. This raised an interesting question.

Meadow mouse populations characteristically rise and fall in more or less regular cycles of three to four years. Whenever these cycles peak at a sufficiently high level, crop-damaging outbreaks result. The impracticability of trying to control such eruptions after they occur had been demonstrated. Could population eruptions be prevented?

A completely inadequate knowledge of meadow mouse ecology in the local environment provided no answer to this question. However, biologists of the State Department of Agriculture, the University of California and the Fish and Wildlife Service made some field studies of mice in the Tulelake area for several years after 1958, and from their data a very significant item of information emerged.

The irrigated croplands comprising the Tulelake Basin are served by an extensive network of large irrigation and drainage canals. The banks of these canals support a luxuriant vegetative cover of weeds and grasses, providing what we had considered an ideal, permanent and yearlong habitat for mice. It turned out, however, that there was a definite and regular seasonal movement of mouse populations between canal banks and croplands.

In the spring, when land is being plowed for grain and potatoes, practically all mice are concentrated on the canal banks or similar wasteland areas. Later, in early summer, vegetation on the canal banks dries up and, at the same time, annual and perennial crops become tall enough to provide the food and cover necessary for good mouse habitat. So, the mice disperse from the canal banks into the croplands, where they remain and multiply, until fall harvest and the onset of winter forces them to gradually return again to the

canal banks.

In other words, almost all of the mouse population is concentrated in a very limited area for a period of one or two months in the spring. This may be unique to the area, nevertheless once this ecological peculiarity became apparent, the planning of a preventive program became simple. However, a different kind of organization was required to carry on such a program. Inasmuch as control work would be done before mice had invaded croplands, long before crop damage was imminent and when most farmers would be unconcerned about mice, the idea of district organization and operation, rather than abatement, seemed most applicable. Furthermore, financing such a program by collecting from Individual farmers for work actually done on their property did not appear feasible.

The provisions of the California Health and Safety Code relating to pest abatement districts seemed to meet our needs. The word "abatement", as used in this context, seems to be an unfortunate misnomer. Nevertheless, the Tulelake-Newel1 Rodent Pest Abatement District was formed in 1964, covering the entire Modoc County portion of the Tulelake Basin. The District is governed by a board of five local Trustees and is financed by a tax levied upon all privately owned land in the district. The current tax rate is 8¢ per acre. Program operations are carried on by my office, under a cost reimbursement agreement with the district.

This is how our program works. The entire district is divided up into 24 sub-areas, ranging from 1,000 to 2,500 and averaging slightly over 2,000 acres In size. Every spring the canal banks, other wastelands and alfalfa fields in all of these sub-areas are visually inspected for meadow mouse signs. A transect line of 100 traps is exposed along a typical canal bank in each infested sub-area. The number of mice caught per 100 trap nights is used as an index or measurement of relative population levels. This operation, the surveillance part of the program, takes about 20 to 25 man days.

At present, we treat all sub-areas which show 10 or more Microtus, or 25 or more of all field mouse species, per 100 trap nights. Mixed populations of meadow mice, deermice and feral housemice are frequently encountered. Ten Microtus per 100 trap nights may seem a rather high economic threshold but it must be remembered that this represents a temporary concentration; that when these mice disburse from the canal banks into the much larger cropland area, they spread out so thinly that they can hardly be found. Furthermore, it will require several years more experience to perfect our population measuring technique and to determine with some certainty the highest permissible level or economic threshold below which the population should be maintained. Ultimate eradication does not appear feasible.

Treatment consists of broadcast application of poisoned squirrel-type oat groats, at the rate of from 5 to 8 pounds per acre, depending upon population density. We use a mixture of 20% poisoned and dyed groats with 80% unpoisoned and undyed groats. The poisoned portion is treated with 2 ounces of Compound 1080 per 100 lbs of groats, which makes a single average-sized groat lethal to the average meadow mouse of our particular species. We feel this mixture is much safer to associated wildlife than conventional formulas, and post-treatment trapping has indicated that it gives virtually complete elimination of Microtus. Needless to say, this mixture is useless against housemice.

So far, we have been able to protect 50 thousand acres of cropland from meadow mouse depredations at a cost of about $1,000 a year, and we are confident that this can be continued. Significant crop losses have been prevented even in potatoes, which are most vulnerable to meadow mouse damage.

We hope to eventually make this an integrated program, using ecological as well as chemical control methods. The most obvious step would be to eliminate the vegetative cover along the canal banks, but this does not appear feasible because of conflicting interests of the irrigation district and wildlife authorities. Nevertheless, some progress is being made in this direction. Heavy straw windrows left in harvested grain fields have been found to contribute significantly to the survival of over wintering mouse populations. With the assistance of last year's drought and feed shortage, we have been able to persuade local ranchers to bale up this straw and haul it away for cattle feeding. If trapping records this spring show a decrease in the population index, we will be in a good position to promote straw removal for meadow mouse control.

It may also be of interest to note that the Tulelake area supports one of the largest and the most stable population of raptorial birds in the county. Two systematic hawk counts,

taken over a 40 mile census route in January and February of 1958, showed averages of 3.0 to 3.15 hawks per mile, with 94% to 97% being Buteos. Some of these are resident, others migratory, but the population remains fairly constant for when the American rough legs fly north in March, the Swainson's and Marsh hawks arrive from the south. Since the meadow mouse population fluctuates so extremely, we believe these predators must depend upon the more stable populations of deermice and feral housemice for their sustenance when meadow mouse numbers are low. I have previously mentioned that mixed populations which include deermice and housemice are frequently encountered, and population densities of these two species often run up to 30 or 40 per 100 trap nights. In spite of this, it has never been demonstrated that they cause any significant economic damage; if we were to effectively control these seed-eating rodents, I am sure we would lose our raptorial bird population. In that event, our meadow mouse population might well become unmanageable. Fortunately, our 1080 bait formulation is ineffective against housemice, and does not decimate the deer mouse population so drastically as it does meadow mice.

I wi11 conclude my story with a moral: Vertebrate pest problems which defy solution should be recognized for what they actually are; complex and possibly unique ecological situations, which cannot be corrected by the use of conventional programs nor by traditional methods.