

1974-1980

OAK LEAF TIER COMPLEX IN MASSACHUSETTS, ~~2074-2980~~

The complex is made up of the oak leaf tier, Argyrotoza semipurpurana sp. and three leaf rollers, Pseudexentera sp., Argyrotaenia sp., and Archips semiferanus. By far the most important of these species is Argyrotoza, the oak leaf tier, which feeds exclusively on the black oak group.

The tier overwinters as an oval, scale-like egg and is generally found on two year old wood on which the bark has begun to roughen. Hatching takes place from mid-April to early May. The early emerging larvae bore into the expanding buds and mine the young tissue. Later they feed more openly on buds and expanding leaves beneath silk webbing.

When mature the larvae are approximately  $\frac{1}{2}$  inch long, dirty white to light green with pale head capsule. They drop to the ground on silken threads from late May to early June. Pupation occurs in the litter.

Moths emerge in June to early July with egg laying occurring over this period. The eggs are laid individually upon the smaller branches of the trees.

The leaf tier has occurred in scattered locations in the state for many years and is a native insect. Until the mid to late 1970's it had not caused any great problems in Massachusetts. In the early 1960's an outbreak occurred in the town of Washington, continuing for two or three years, resulting in little, if any mortality of the red oak. Also in the 1960's it was reported in the Chester, Blandford, Russell Area of the state. Again, little mortality resulted. During this same period of time over 500,000 acres were being attacked in Pennsylvania with considerable mortality following the defoliation.

Our area of greatest concern has been mainly Franklin County and Several towns immediately abutting the County. Mortality is present and has increased steadily since 1977. This area stretches from Belchertown to Warwick and from New Salem to Deerfield.

While engaged in a gypsy moth research project in 1974, field crews reported scattered red oak trees being defoliated. The two main areas were Sears Road in Wendell and Flagg Road in Warwick. In 1975 the defoliation was identified as the oak leaf tier. Small groups of trees were now being affected. In 1976 an area of 25,846 acres was recorded by aerial survey as defoliated by this insect.

In 1977 a total of 72 sites were sampled to establish the boundaries of the infestation. Also in 1977 ten red oak plots were set out in this area with a check plot established in the Oakham State Forest 20 miles east of the infestation. The plots have been monitored since establishment for crown condition, defoliation class, egg deposition, growth or vigor loss and mortality or recovery. These plots were established on dry, medium or wet sites, hilltop, hillside and valley sites with as many different aspects as possible.

Although studies are continuing on these plots it is evident at the present time that deterioration has taken place. Of the ten plots within the tier infestation a total of 25% have been recorded as dead. None have died in the check plot. Growth measurements taken during the studies indicate severe growth loss.

In addition to the 25,846 acres recorded by the aerial survey in 1976 as defoliated a total of 101,545 acres of defoliation was recorded in 1977. In 1978 an abbreviated survey was flown due to lack of funds and 73,575 acres were recorded in June. In 1979 a total of 103,670 acres were recorded with 8,610 acres additional being in the Chester, Blandford, Russell area for a total of 112,280 acres. Gypsy moth build up in the infested area made further accurate determinations impossible. Oak leaf tier egg studies have shown a decline in tier population since 1979. There has been no heavy defoliation by this insect in the past two years. Branch samples have yet to be analyzed for defoliation predictions in 1984.

In retrospect it is clear that an outbreak of the oak leaf tier complex is much more devastating than is the gypsy moth. More severe mortality and growth loss has resulted from the tier outbreak than in similar forest situations attacked by the gypsy moth alone. It is expected that this will be borne out when data which has been collected from the continuous forest inventory plots (CFI) has been computerized sometime this winter.

One would expect greater losses when the same woodlands are attacked by the tier and the gypsy moth either together or consecutively. Unfortunately this was the case in parts of the area on question and to place the blame accurately on one pest or the other would be extremely difficult.

In the Pelham, Shutesbury, Leverett and Amherst area the host trees have been defoliated from 1971 through 1982 to some extent. Tier defoliation was light in 1975 and 1976. In 1971 through 1974 gypsy moth was present in this general area. It declined and a moth known as the half-winged geometer,

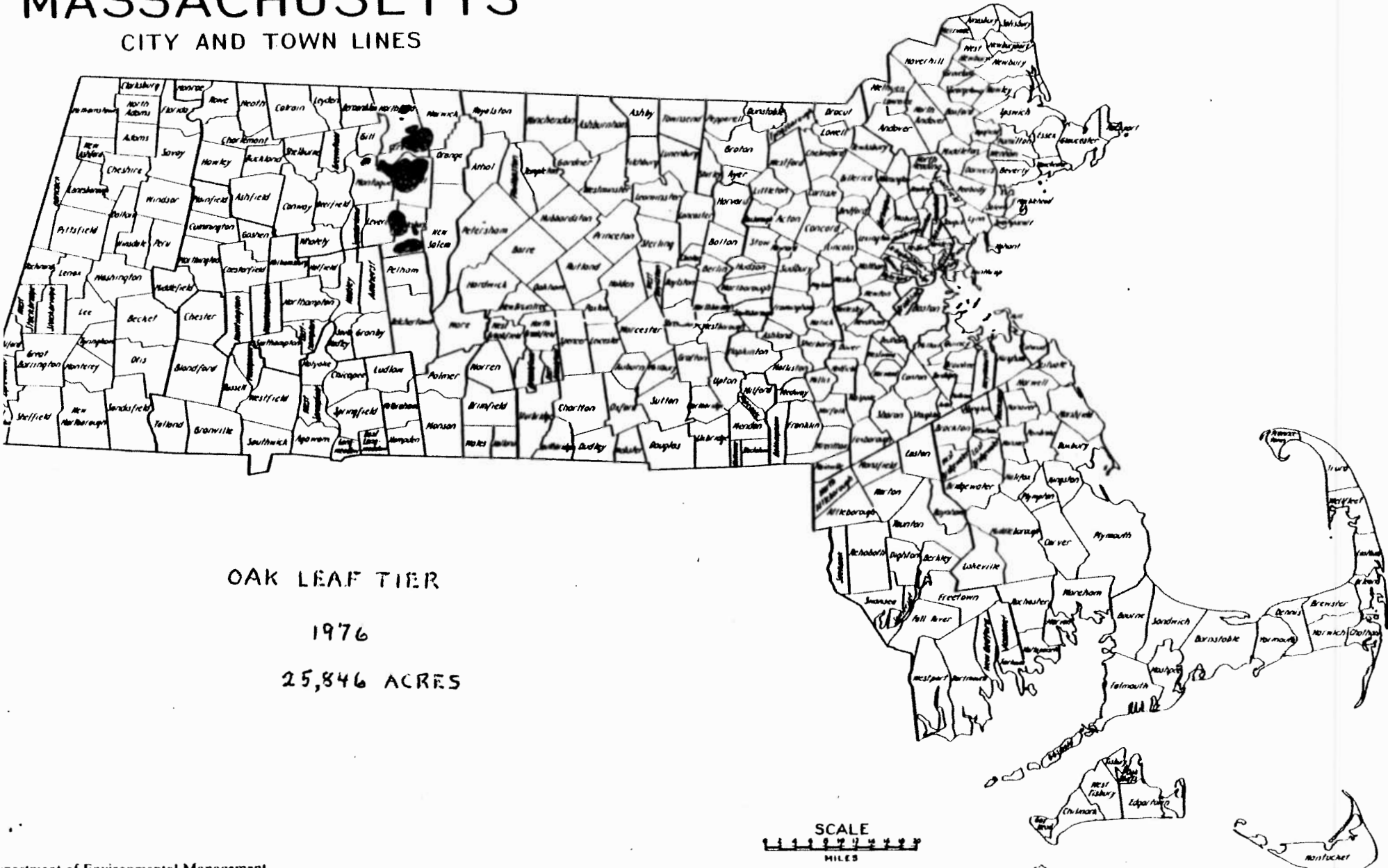
Philgilia titea, increased in 1977 and caused defoliation on the oaks. This insect, which became very numerous in 1979 and 1980, in combination with the gypsy moth that began to build again in this general area in 1977 and the oak leaf tier combined to caused heavy defoliation. The major cause of the defoliation here in 1981 and 1982 was the gypsy moth. Thus, the area in question has been attacked periodically by three different forest pests. The result has been considerable oak mortality. To place the blame on any one of the three would be a mistake.

Charles S. Hood

Douglas V. Trefry

# MASSACHUSETTS

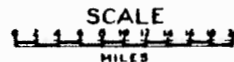
## CITY AND TOWN LINES



OAK LEAF TIER

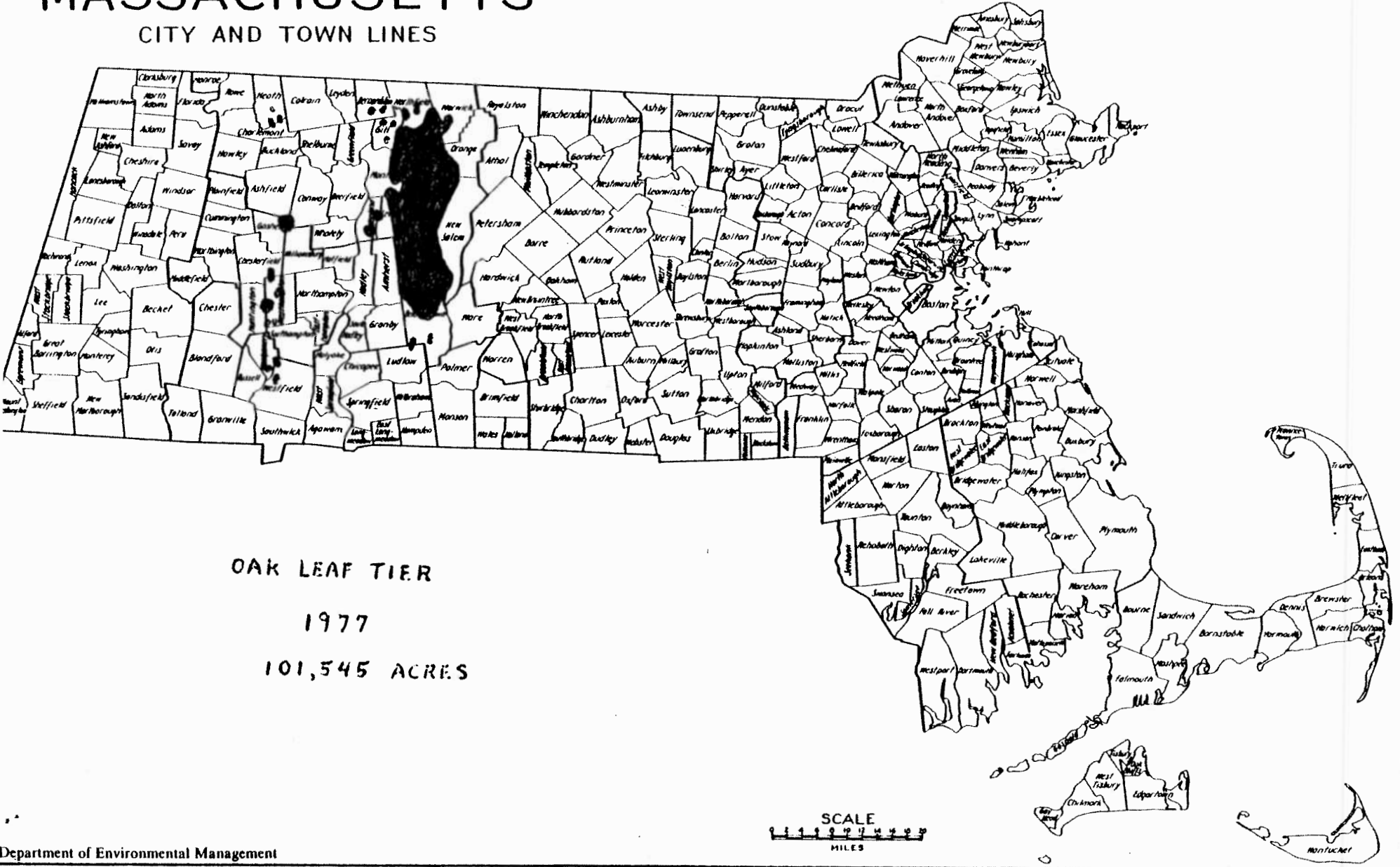
1976

25,846 ACRES



# MASSACHUSETTS

## CITY AND TOWN LINES



OAK LEAF TIER

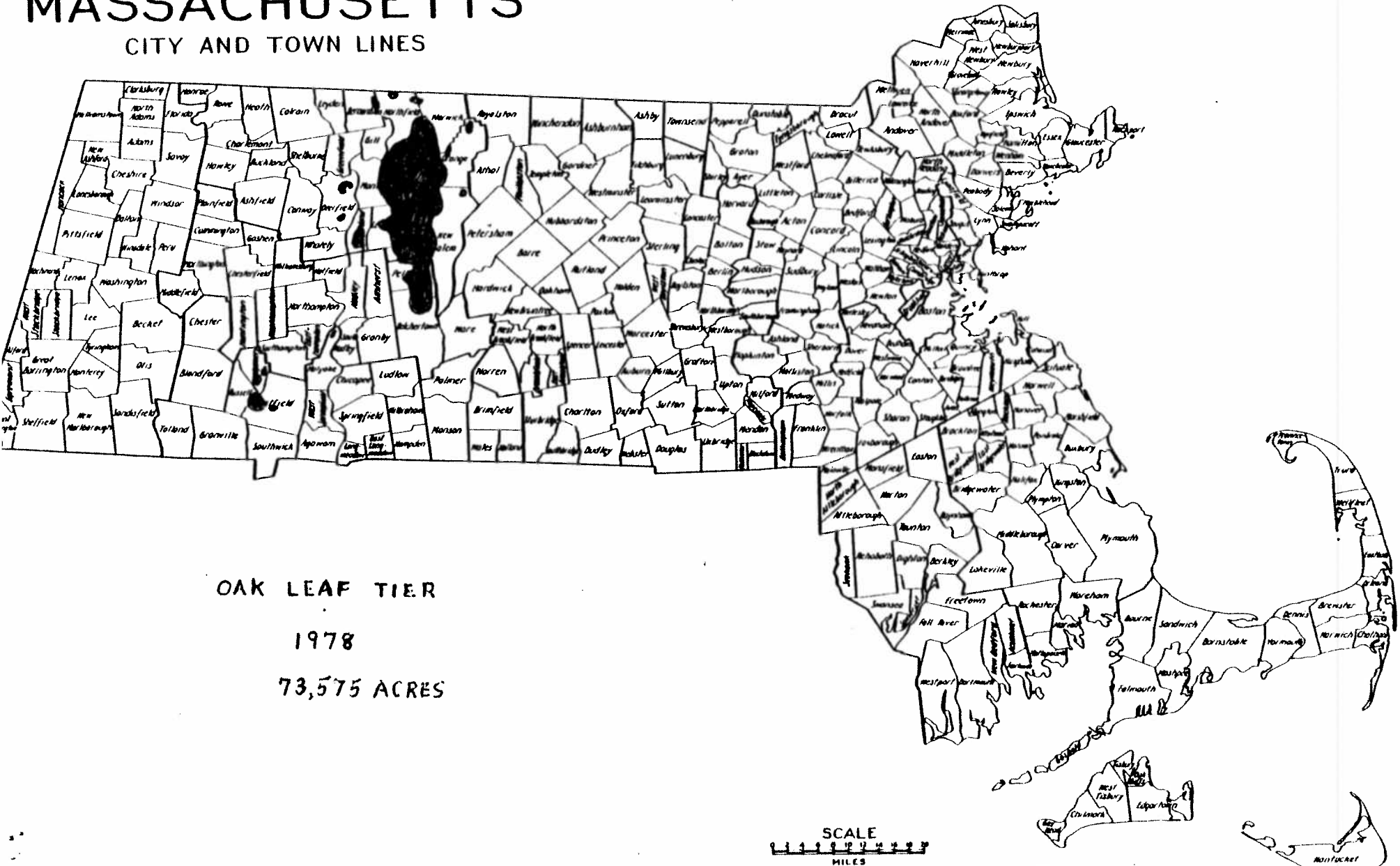
1977

101,545 ACRES



# MASSACHUSETTS

## CITY AND TOWN LINES



OAK LEAF TIER

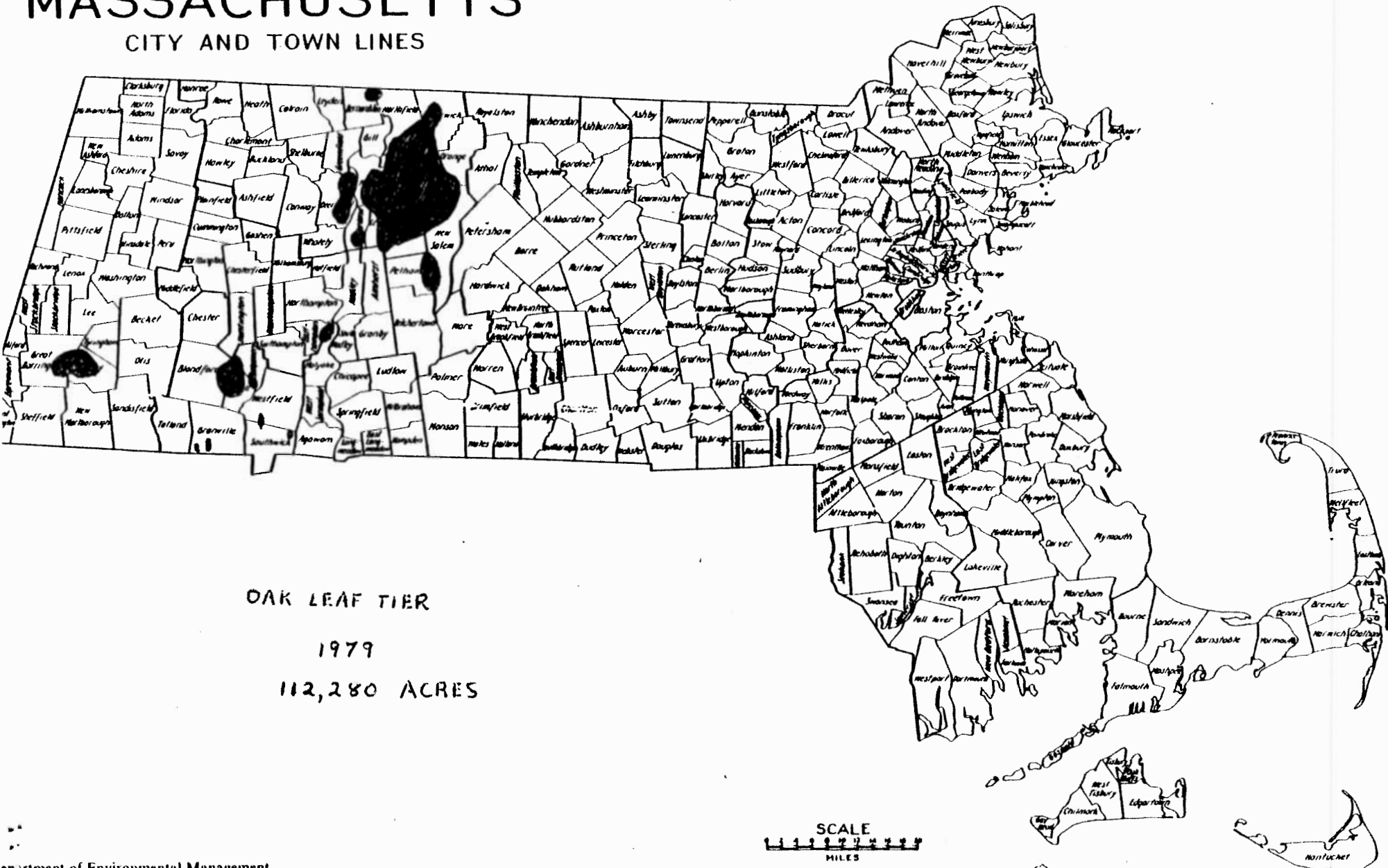
1978

73,575 ACRES

SCALE  
MILES

# MASSACHUSETTS

## CITY AND TOWN LINES



OAK LEAF TIER

1979

112,280 ACRES

