(9) WATER QUALITY

Part 1 of a series

How much safe drinking water do we have?

In one-third of the communities in Massachusetts, the drinking water is contaminated by hazardous materials. Other communities have imposed watering bans and conservation measures because water supply is low. "Safe drinking water" is an issue that is more and more in the headlines.

The time is approaching—if not already here—when we must act to assure safe drinking water. But how? Shall we just move on to get clean water from another site as we have done in the past? Shall we or can we decontaminate existing supplies ? Shall we stetch out what clean water we have with conservation measures? Do we, in fact, have ample water and just need to allocate it more wisely? What role must the federal, state, and local governments play? And what is the role of the citizen?

Because safe drinking water cannot be assured without urgently needed attention to the problems, the League of Women Voters of Massachusetts has prepared a series of four articles that examine how our drinking water supply has gotten to its present crisis situation and some solutions which have been proposed.

Quantity

An estimated 1,300 billion gallons per day (BGD) of surface water is available in the continental United States. In addition, a potentially very large ground water resource is still undefined. The Water Resources Council (a federal agency) has estimated that 355 BGD is withdrawn each day, but only 111 BGD is **consumed.** The remainder is returned for reuse.

Considering the figures, one may ask, "If we have so much water, why the fuss about supply?" The principal answer to the nationwide problem is location. About 50 percent of the total supply is east of the Mississippi River, 20 percent is in the rather small area of the Pacific Northwest, and the rest of the country shares the remaining 30 percent.

Water use has increased markedly. Between 1900 and 1970 our population increased 2.5 times, but per capita water use increased 3.5 times. Add to these problems the increased use of chemicals, pesticides, hazardous materials of all kinds, and the pressure of development encroaching on watersheds, and you have not only a national picture but a microcosm of Massachusetts.

Water-rich state

Although Massachusetts receives an average of 43 inches of rainfall a year and by all yardsticks is a water-rich state, concern about water shortages has increased in the last decade. Because Massachusetts has been perceived to have an abundance of water, the water has been used excessively. It has been regarded as a "free good," and few if any efforts have been made to conserve except in times of draught.

Settlement patterns have developed without regard to water supply. The population is clustered in the eastern coastal area and the free-flowing streams are in the north central and western areas, especially in the Merrimack and Connecticut River Valleys.

Ground water sources in the East have been limited in quantity and now are limited severely by quality problems. In the West where acreage has been available for surface water impoundments (dam-formed lakes) and natural lakes and ponds abound, problems of road salt, viruses, bacteria, and turbidity are rendering these impoundments suspect. The topic of the League's second article on water quality.)

Recharge management

Recharge management is not readily understood or practiced in Massachusetts. The balance between the water withdrawn, water diverted out of the area (by sewage treatment plants, for example), and the amount of runoff from blacktop areas, paved roads, houses, etc., has not been a serious concern of water managers.

Consequently, water levels in wells drop, salt intrudes, reservoirs refill too slowly, and towns and cities find themselves with a "water problem." Because water supply has been primarily a local responsibility in Massachusetts, too frequently those in charge have not had the technical background to anticipate and deal with potential water problems. Nor have planning boards regularly considered the effect of development on the water supply.

Some very far sighted water managers called for the construction of Quabbin Reservoir early in this century, and it was developed in the 1940's. However, such a response to water demands is no longer possible because of lack of land area and, more importantly, because of an increased awareness of the rights of resident populations.

Flood skimming of the Connecticut River or diversion from the Millers River system and the Merrimack River have been suggested as ways to increase the water supply to eastern Massachusetts. These suggestions will be discussed in the League's third article. But such diversions will not aid Massachusetts cities and towns whose water supply has become contaminated.

After 22 years, Allen Morgan to leave Audubon Society

Allen H. Morgan of Wayland, who headed the Massachusetts Audubon Society for 22 years, will be replaced by Dr. Gerard Bertrand of Washington, D.C., chief of international affairs for the U.S. Fish and Wildlife Service.

Morgan has agreed to remain on duty at the society's headquarters in Lincoln at least until a transition of leadership has been completed. Morgan received national attention for his early campaigns against pesticides and his efforts to convince people that wetlands were worth saving.

Morgan, who has held the primary staff leadership post at the Society since 1957, has participated in the transition process to find a new president for the past two years.

"Twenty years for one person in this sensitive position is enough," said Morgan. "It is time for new, younger and more vigorous leadership to guide the society's efforts in the 1980's and beyond. While the basic issues remain the same, public mood and the details of how to achieve the environmental reform we need and have launched are far different from what we faced in the 1950's and 60's when my talents were of maximum effectiveness in leading the society," he said.

While my own plans are uncertain, I have always tried to stimulate close ties and effective communication with the business community. It is my strong conviction that the cooperation and participation of the business community is vital to the success of environmental reform and protection, and I hope that I may be able to find a useful continuing role in that effort." he said.

Dr. Bertrand has a Ph.D. in biological oceanography from Oregon State University, a J.D. in environmental law from the University of Wisconsin, an M.S. in biological sciences from Florida State University and a B.S. in zoology from the University of New Hampshire.

(3) WATER QUALITY

How safe is your drinking water—and who cares

The following is the second in a series of four prepared by the League of Women Voters of Massachusetts. The series defines current water problems and actions, and discusses various proposed solutions.

Quality

By the late 1960's water specialists became very concerned about drinking water quality. In the United States between 1961 and 1970, 128 known outbreaks of disease and poisoning were traceable to drinking water, 20 persons died, and 46,374 became ill. It is safe to assume that many cases were unreported.

Surprisingly, few Americans question the quality of their drinking water. We had become used to turning over our water supply management to local governments and private entrepreneurs. We continued to assume that water from the tap was clean—although a few did turn to spring water, home distilled water, commercially provided bottled water, or even home-installed filtration devices.

Congress passed the Safe Drinking Water Act in 1974 but delayed full implementation of the Act until 1977 to enable the National Academy of Sciences to come up with primary drinking water standards. Every community water supply which serves 15 or more connections or 25 people must meet the safe drinking water standards. Even trailer parks, motels, etc., are covered.

Local testing

One of the provisions of the act calls for testing local drinking water supplies for 10 chemicals, six pesticides, bacteria, radioactivity, and turbidity (turbidity, or cloudiness, is caused by solid matter particles suspended throughout the water). It also requires that the public be informed when the quality violates the primary standards set as "maximum contamination levels."

These tests, when carried out in Massachusetts, revealed widespread contamination with salt, trichlorethylene, and many other substances. Fully **one-third** of Massachusetts communities' drinking water supplies are contaminated with hazardous materials. Some of these supplies must be closed permanently. Others will require expensive treatment and years of restoration effort. And this alarming development has appeared throughout New England and the nation.

Contamination has occurred in many wells because of lack of safeguards to the aquifer (underground area where water is retained). This has happened largely because there was inadequate understanding of the nature and characteristics of ground water.

Although the state has been engaged for many years in a cooperative program with the United States Geologic Survey to determine the flow and interaction of ground water, the entire state is not yet mapped. Additionally, many toxic and hazardous substances have been disposed of carelessly and often illegally. These wastes can then enter the ground water system.

Road salt problems

Widespread use of road salt has caused problems in some areas. Nitrate (a salt) is a real and immediate danger to infants and cannot be tolerated in the water supply. Coliform bacteria from fecal material also are a health hazard. These bacteria are often treated with heavy doses of chlorine, but chlorine can mix with debris in the pipes and create tribalomethones, which are cancer-causing agents. Turbidity tends to make chlorine treatment ineffective.

The solution to such problems for many communities is filtration at the source, which is expensive. Massachusetts recently adopted a regulation requiring filtration for some communities. Many large supp water already meet the standards an adequate treatment facilities.

Others will have to provide trea which will often be expensive. The law state primary responsibility (primac implementing the safe drinking wat when it can prove they have adequate of providing coverage. They are to l vided with technical and financial assi from Congress.

New laws

Massachusetts has primacy and is p ing to carry out its responsibilities. T portant bills were passed in the last se the legislature which will help comm finance their programs. The state wil percent of the costs of local filtrati tems. The state will also give financial leak detection and refining and repa distribution systems.

Water specialists expect that wh public is informed about its water problems, it will insist on corrective Whether this expectation is realistic r to be seen.

Next: More water from farther awa Northfield Diversion.

(4 WATER SUPPLY)

Third in the LWV series on water

With increasing need, cc

The following article is the third in a series which was prepared by the League of Women Voters of Massachusetts. The series has defined current water problems and actions and discusses various proposed solutions.

In presenting this information about the Northfield diversion, the League is aware that there are many other viewpoints and other issues, such as cost, to be considered. All the data are not in. But citizen discussion of water policy issues is urgently needed.

Northfield diversion

The 34 Boston area communities served by the Metropolitan District Commission's Quabbin Reservoir are fortunate to have extremely pure drinking water.

However, an increasing demand due to the rapidly growing southern New England population; and a spiraling rate of water consumption has caused the MDC to be concerned it will periodically exceed the safe yield of Quabbin by as much as twenty million gallons a day.

The only certainty is that the quality of all drinking water is going to be directly affected by the water policy decisions which will be made in the months to come.

One solution which the MDC has proposed is the controversial Northfield diversion. An aqueduct 9.8 miles long would be built to divert water from the Connecticut River in the Northfield-Erving area into the Northeast Utilities Company reservoir atop Northfield Mountain and then into Quabbin Reservoir.

This would be accomplished by drawing off water from the Connecticut River when the flow exceeded 17,000 cubic feet per second at the gauging station in Montague.

Some within the MDC view this as mere "spring flood skimming." (Less than one percent of the river's annual flow would be diverted, according to the Army Corps of Engineers.)

Yet others, including many environmental groups view the diversion with concern. To understand the controversy surrounding the Northfield diversion, some knowledge about Quabbin Reservoir and the Connecticut River is helpful.

Serving 34 communities

Quabbin is one of the largest bodies of untreated drinking water in the country and has a capacity of 412 bilion gallons. Located 75 miles west of Boston, it is a true wilderness area, serving as a wildlife refuge as well as the source of Boston's water supply.

The MDC, a state agency, supplies water to 34 metropolitan Boston and 10 central Massachusetts communities. Some western Massachusestts towns (Amherst, Belchertown, Chicopee) experiencing a water crisis due to inadequate supply or contamination, are resentful that Quabbin's water, in their own "back yard," travels to Boston.

The traditional approach

Communities traditionally have solved the problem of inadequate or contaminated water supply by locating new sources of supply rather than decreasing demand.

In the 19th century, when the Charles River became unfit to drink, the Cochituate Dam in Natick and the Sudbury Aqueduct were sought as reservoirs. When demand exceeded this supply, the Nashua River was dammed and the Wachusett Reservoir was created.

In 1938, the Swift River in Enfield was dammed and Quabbin Reservoir was born. With demand again exceeding supply, the Connecticut River is being considered as a source of water supply.

The Connecticut River, largest of New England rivers, flows 410 miles from the Canadian border to Long Island Sound. Fall trees, a panorama of autumn color, beautiful wild flowers, and the call of the loon have inspired people recently to recognize its potential for recreation and enjoyment.

Gradually, with the construction of sewage treatment plants and a decrease in the discharge of industrial effluents, water quality in the Connecticut River is reaching the goal of grade B (suitable for boating and recreation, not drinking or swimming).

Contaminating Quabbin

Certainly one controversial aspect of the diversion is putting questionable grade B water in Quabbin's pristine grade A water. The Army Corps of Engineers has advised that the diversion would cause contamina-

nservation is a necessity

tion of Quabbin's water with coliform bacteria, thereby creating a need for added chlorination to make it safe for drinking.

What would the impact of the diversion be on the Connecticut River? The amount of water collecting in the flood plains would be less.

Excessive pollution in sections of the river quickly dissipates in high water times and accumulates in low water times.

In addition, a great deal of time and money have been spent on restocking the river with shad and salmon. The diversion would adversely affect the trails these fish use to find their way from the ocean to their fresh water spawning grounds.

A river is a complex ecosystem with delicate balances to be maintained. The effect of lowering the water levels on wildlife habitats, wetland plants, soil hydrology and flood control may at this time present more questions than answers.

Are there other options besides diversions? Information gathered from the special Legislative Commission on Water Supply affirms there are. These alternatives will be the topic of the League's next column.

Conservation

Will conservation of water help us out of our present serious problem of water contamination? Can we save enough water so that a search for additional sources will not be necessary?

These questions are being asked by citizens and public officials across the state. As in any question so broadly stated, there is not a yes or no answer. However, a study which is nearing completion for the New England Interstate Water Pollution Control Commission reveals some significant facts about the effectiveness of water conservation.

It is generally conceded that people use up to 65 gallons of water each day in their schools, workplaces, and homes. Showers use about 23 gallons and toilets, 26 gallons. People can save both water and water heating costs by installing a very simple device in their shower heads or using water saver shower heads and by limiting the time spent showering. A family of four can save $100 per year.

In addition, installation of toilet dams (plastic containers in tanks) or water saving toilets can reduce water usage significantly.

These savings, along with similar shower and toilet modifications in commercial and industrial facilities, can reduce present and future water demand by 20 percent.

Recycling water

The savings in commercial and industrial use of water can amount to 90 percent if recycling and more effective application and use is made of process water. In addition, communities can reduce water requirements by a systematic program of pipe leak detection and repair and pipe rehabilitation. State Senator Carol Amick maintains that between 18 and 20 million gallons a day are lost from the MDC system. Arlington found that a leak repair program saved over 600 million gallons of water a year.

It appears that a strong conservation program can provide additional water for some communities which have lost a part of their water supplies to contamination. Communities will be able to further ensure adequate water in times of shortages by making plans now for future problems.

Conservation measures

Conservation can be assured if local governmental units have the authority to impose conservation measures through ordinances, penalties for violations, and enforcemment. Implementation of a watershed management program can enhance the yield of a watershed and can ensure that future contamination does not occur.

A systematic program of leak detection and repair and replacement of old pipes will save water. Installation of water meters where none are now used and systematic testing to ensure that meters are accurate will save water. And a realistic rate structure that does not reward the big user will encourage conservation.

Since it is evident that some contaminated supplies will not be rehabilitated for years (about 10 years to clear a salt-contaminated well, for instance) and additional sources will be hard to tap (the Northfield diversion controversy is an example), conservation is an important part of the future water picture in Massachusetts.

But conservation can be effctive only if a large percent of the citizens in the community not only demand that "something be done," but actually participate in the doing. Safe drinking water supplies can no longer be taken for granted. Like the energy shortage, the safe drinking water shortage requires industrious management. Federal and state agencies have helped define the problems and will provide assistance with the solutions, but ultimately local municipalites and individual water users will determine whether water from the tap will be safe to drink in the not-so-distant future.