ditions present on the site. As conditions change, new organisms with tolerances that fall within the new ranges may become a part of the community; some of those originally present may be eliminated. The less rigorous the conditions of the site, the greater will be the variety of the inhabitants. Many affects these communities both through directly influencing the plants and animals and indirectly through influencing the characteristics of the environment. Weather modification, disposal of waste heat, and altered drainage patterns as in Everglades National Park are some of the many influences.

In order to decide how best to manage our biological resources, ecological studies in the Department are directed to understanding: (1) The characteristics and functioning of these living systems, (2) the role these systems play in the economy of man, and (3) the tolerances of these systems to change, including man-caused change.

A basic requirement is, therefore, studies that will provide "baselines" in a wide range of environmental types that will permit assessment of the degree and effect of future changes.

EUTROPHICATION

The process by which, against a geological time frame, a lake evolves from a clear, sparkling body of water into a gradually darkening one, then degenerates into a swamp and eventually dries up is known as eutrophication. The effect of man's waste discharges on the environment is to speed up this process to bring about the problem, which we know today as accelerated eutrophication, that brings, within the time frame of man, at least the first stages of this process by which a lake dies. Even this first stage of the problem is significant in that it takes a lake from the position of being a usable resource for recreation, a water supply, and a thing of scenic beauty to a body of water that serves none of these purposes well, if at all.

As with all of the subtle processes of nature, the first step in attempting to effectively control eutrophication is to learn to understand it. Current work is underway to establish what the triggering mechanism is that brings about the massive growths of algae and other organisms that are the beginnings of this dying process. Determining what keys this self-feeding, self-accelerating cycle of organism growth, and what can be done when this system is understood, to either slow or prevent its action is the object of the program.

The highest degree of scientific and technological skills is required to devise and implement studies that will measure the micronutrient contents of the lake and determine the effect of the minute quantities of material on the growth rates of the biota of the lakes. Engineering skills are utilized for the design and the development of treatment systems that permit the removal of these micronutrients from the environment in specially designed isolated ecosystems, which will permit the evaluation of the effect of these micronutrients on the overall ecology of lake systems. It is a project that requires the highest degree of competence in the earth, life, and physical sciences and in engineering.

The ultimate goal of this program is to permit us to control the environment of our lakes so that we can preserve these natural resources.

ANIMAL POPULATION CONTROL

Many hundreds of species of animals in North America share man's environment, compete with him and directly, or indirectly, affect his life. When the human population of an area increases, and changes the area's land usage, obviously something has to give. If, for instance, humans introduce sheep, there may be less forage for some animals but more food for animals that prey on sheep. The Bureau of Sport Fisheries and Wildlife has the job of searching out ways to cope with these conflicts, trying to do so while causing the least harm to life generally.

Stating it bluntly, some animals sometimes may have to be killed for the benefit of others if all other methods are ineffective. The control agents used must be selective, to protect other species which should not be killed, and they should have a temporary life limited to the time needed for the job at hand, and should not persist in the environment.

But control methods are not limited to lethal agents. Researchers working on control methods screen new chemicals with a wide range of biological activity, from birth control to "No Visitors Allowed." This research involves the identification of compounds useful as attractants, repellents, soporifics, antimetabolites, and chemosterilants. New products recently registered for use in fish and wild-