Fisheries Management and Sustainability

Establishing and maintaining a sustainable fishery is a major goal in lake management. A diverse fish population is not only an excellent indicator of the overall health of a lake, but has many other benefits as well. A well-balanced fishery can assist the natural biological and chemical processes of an aquatic system, improving water quality and esthetics. Sustaining populations of grass carp and mosquito fish can help control infestations of undesirable aquatic weeds and mosquitoes. Fish species such as largemouth bass, bream and black crappie provide excellent sportfishing opportunities.

Fish population surveys provide information about species composition, sizes and population densities. They also provide information necessary to maintain and improve a waterway system. A lake is a living ecosystem in which all components are interrelated, and a lake changes as it ages. For a waterway to support a productive fishery, some of the variables need to be regularly evaluated and maintained in order to keep pace with the evolving aquatic community.

DIVERSITY AND POPULATION DENSITY

Diversity and density in a fishery refers to the mixture of different species and the number of each species existing in a particular ecosystem. A successful management program promotes species diversity in a lake and maintains a balance between predator and prey populations. This balance ensures that no particular species becomes too dominant and uses all of the resources available. Monitoring populations also includes an evaluation of levels of undesirable species, such as certain nonnative fishes. Some undesirable species can outcompete more desirable species and cause detrimental effects to the lake's ecosystem.

HABITAT AND COVER

Adequate habitat and cover is necessary for fish populations to become self-sustaining. Without protective cover, many fish populations become exceedingly susceptible to predators such as birds, otters and raccoons. Appropriate habitat includes areas that fish need to find food, and to spawn. Without these sanctuary areas, stocked populations will dwindle in a relatively short period of time. A sound habitat needs to include "nursery" areas to give newly hatched and fingerling fish sheltered areas to forage and grow, protected from predation by larger fish and animals.

Excessive levels of vegetation also create problems for a fishery in a lake. Since plants provide important habitat and cover for fish, many vegetation-associated species such as bluegill can be present in such high densities that limited food resources can limit their growth and ultimately their size. Excessive plant densities can also reduce prey-capture efficiency of predators such as largemouth bass, which can lead to reduced body condition and growth rates. The end result can be fewer quality-sized sportfish in the lake. Obviously, excessive plants also reduce recreational opportunities such as fishing, swimming and boating.

WATER CHEMISTRY

Water chemistry is usually the invisible factor that controls a fishery in a given waterway. Parameters such as dissolved oxygen and pH need to be monitored and maintained for an aquatic ecosystem to remain healthy. As the fish population in a lake evolves and grows, the oxygen demand it places on the lake can likewise grow. Failure to maintain good oxygen levels can result in fish kills or greater susceptibility to disease. The water's pH plays a role in the sustainability of fish populations. Adequate pH ranges are important for maintaining productive fish populations in a lake.

FOOD SUPPLY

As the higher predatory fish such as bass, bream and crappie grow to a larger, desirable size, they consume more food. It is possible, in partially closed systems, common to many of our South Florida lakes, for aggressively feeding gamefish to reduce the abundance of their available food supplies. Resulting declines in growth and survival of sportfish can reduce the quality of a fishery.

MANAGEMENT OPPORTUNITIES

There are many things that a fisheries biologist can do to improve and maintain conditions in an ecosystem.

1. Regular stocking of lakes can help bolster fish density. A detailed understanding of the existing populations helps to tailor stocking rates to achieve a balanced ratio of the different species present.
2. Aquatic revegetation and littoral shelf plantings can provide cover and appropriate nursery areas for newly hatched fry and fingerling fish.
3. The introduction of fish attractors provides safe foraging and congregation areas for larger fish. Stocking of appropriate prey fish and crustaceans can relieve pressure on food supplies and allow gamefish to reach larger trophy sizes.
4. The installation of aeration systems can help the lake to meet the oxygen needs of growing fish populations and oxygen demands.
5. Cooperation between lake and fisheries management experts is important to identify the needs and limits of each individual aquatic ecosystem. With proper supervision and maintenance, a viable fisheries management program can be developed. This will provide a necessary key to maintaining overall lake stability and health.

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