

Technical Bulletin #03:

# How Much Fish Can I Grow in My Pond?

## Carrying Capacity and Limiting Factors

In our world there are limits to almost everything. For example, a small truck can only carry so much cargo. If a small truck is overloaded, the load could spill, the car could break down, the tires could go flat, etc. preventing it from reaching its final destination.



A fish pond is similar. A pond can only hold so many fish until it reaches a point where the fish will no longer grow or will die from overcrowding. The maximum weight of fish that a pond can produce is called its **carrying capacity**. The carrying capacity of a pond depends on several things, such as; 1) the type and number of fish being raised, 2) the quantity and quality of the food they are given, and 3) the quality of the water in the pond.

*Carrying capacity* is calculated by raising fish in a pond until they stop growing for two months in a row. The fish are then harvested and weighed. Luckily once the *carrying capacity* is found for one pond that *carrying capacity* will be the same for other ponds growing the same fish using the same methods. This means that farmers do not need to waste time and money finding carrying capacities for their ponds, as fisheries technicians can tell farmers the *carrying capacity* to expect from a pond.

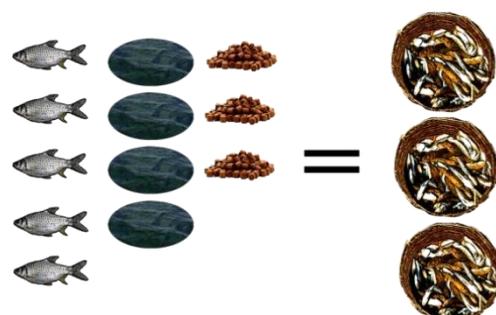
All the parts of a pond system must work together to produce fish for market.

For example, let us say that it takes a bag of fingerlings, good water quality, and a bag of feed to produce a basket of fish.



It is common for some parts of a system to be more available than others. If you are given five baskets of fingerlings, good enough water quality to support four baskets of fish, but only enough feed to support three baskets of fish, it is not hard to realize that only three complete baskets of fish can be grown.

The part of the system that is most responsible for limiting the number of baskets of fish in a system is called the **Limiting Factor**. So if there are five baskets of fingerlings, but only enough food to feed three baskets of fingerlings, no matter how many baskets of fingerlings are added the system can only





produce three baskets of fish.

In this example, the amount of food is the *limiting factor*, because there is only enough of it for three baskets of fish.

The only way to increase *carrying capacity* is to find a way to adjust the system and overcome the *limiting factor*. In the above example, adding more fingerlings will not increase the number of baskets of fish harvested from the pond. Only if the amount of feed given is increased can more fish be produced.

The ideas of *carrying capacity* and *limiting factors* are powerful tools that can be used to manage fish ponds. The first thing that can be predicted using these ideas is how big the fish will be at harvest. For example, if the *carrying capacity* of a small pond was one basket of fish that weighs 20 kilograms, the fish size at harvest will depend on how many fish are put in the pond to grow. If 40 fish are put in the pond; at harvest time there will be 40 fish each weighing 500 grams at harvest. However, if 80 fish are stocked in the pond the harvest is still the same basket of fish that weighs 20 kilograms, but this time there will be 80 fish and each will weigh only 250 grams.



*Carrying capacity* is: the maximum weight of fish that a pond can produce. Increasing the number of fingerlings stocked into the pond can only influence the final size of the fish, not the weight of the fish the pond can produce.

*Limiting factors* are the things that prevent the *carrying capacity* from increasing. The only way to increase *carrying capacity* is to find a way to manage the fish pond so that the *limiting factor* that is preventing fish growth is changed.

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