Cage Culture: Advantages and Challenges

One of a series of aquaculture information documents produced by AACI Central Canada

Introduction

Fish can be cultured in one of four culture systems: ponds, raceways, recirculating systems, cages or in-water closed containment. A cage or net pen is a system that confines the fish in a mesh enclosure. The terms “cage” and “net pen” are often used interchangeably. This fact sheet will use the term “cage” to minimize any confusion. Cage culture uses existing surface water resources (ponds, rivers, estuaries, open ocean, etc.), but confines the fish inside some type of mesh enclosure. The mesh retains the fish, making it easier to feed, observe and harvest them. The mesh also allows the water to pass freely between the fish and surrounding water resource, thus maintaining good water quality

Advantages of Cage Culture

Resource use flexibility: Cage culture can be established in a variety of waterbodies, including lakes, ponds, mining pits, streams or rivers with proper water quality, provided the potential operator has access and legal authority. This makes cage culture one of the most flexible form of aquaculture.

Comparably low capital cost: Compared to the cost of construction for other large-scale aquaculture methodology cage culture in can be relatively inexpensive.

Simplified husbandry (fish care) practices: Cage culture is a relatively ‘hands-on themselves to direct observation of the fish. The observation of fish behavior, especially feeding behavior, is essential for good husbandry.

Simplified harvesting: Traditionally, cages have been harvested by temporarily crowding the fish into a restricted area, and dipping the fish out of the cage. Fish pumps and other mechanized methods have recently become popular. One of the advantages of cage culture is that it is possible to partially harvest fish from cages as needed.

Multi-use of water resources: The husbandry of fish in cages should not hinder other users of the water resource, including those pursuing fishing, boating, and swimming.

Potential Challenges in Cage Culture

Feed is critical: Feed must be nutritionally complete and kept fresh. Caged fish will get no natural food and so depend on the manufactured diet for all essential nutrition. Feed must provide all necessary proteins (down to specific amino acids), carbohydrates, fats (including essential fatty acids), vitamins and minerals for maximum growth. Nutrients start to deteriorate quickly when exposed to heat and moisture. Therefore, food must be stored properly and fed quickly. Fortunately, there are a number of fish feed suppliers in Canada with high quality feed resulting from years of collaborative research between farmers, feed suppliers, and academic researchers.

Water quality problems: Localized water quality problems, particularly low dissolved oxygen, are a possible outcome of cage culture, *if* cage systems are not properly sited. Much has been learned about siting cages such that water quality issues are minimized or non-existent.

Vandalism and poaching: Caged fish are can be an easy target people bent on theft or vandalism. Cages must be placed where access can be controlled and poaching risks reduced. Increasingly, operators are employing electronic security methods as additional protection.

Predation: Predation can be a problem if cages are not constructed or managed properly. Turtles, snakes, otters, raccoons and fish-eating birds will take fish or damage cages unless precautions are taken. In general, however, predation is less of a problem in freshwater versus the marine environment.

The challenges of cage culture should be considered carefully before production begins. Many of these challenges can be addressed through proper siting, construction, and management.

Species selection

In Canada, rainbow trout are by far the most commonly cultured freshwater species. However many other species have been and are currently cultured, including Arctic charr, walleye, yellow perch, smallmouth bass, sturgeon, and various species of baitfish. With the exception of sturgeon most of these species have been cultured in cages. At this time, there are no species of freshwater shellfish cultured in Canada.

For a species to be practical for cage culture, we must know its specific culture requirements including water quality tolerance. The potential producer must also have access to quality commercial fish feed. Before attempting to raise fish in cages, the producer should also carefully analyze many factors including potential markets, the production site, water quality, construction and production costs, and legal requirements. Of these, it is often market research that is not done or done poorly. Research the markets in your area before deciding whether or not to culture fish.

Revised Sept 2015: ATBE