

Innovative Technologies for the Future Recreational Fisheries

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Abstract

Recreational fishing is the principal form of exploitation of most inland and many coastal waters in most developed countries. It provides many social, economic and ecological benefit to society and harvests millions of fish on a global scale. However, technological innovations have positive and negative views, positively it provides anglers how to manage and conserve the resources in a better way. The technological innovation that can be implemented in recreational fisheries to achieve a sufficient catch are briefly explained here.

Introduction

Recreational fisheries is a practise of fishing for leisure. It generates several social benefits by providing an accessible leisure activity and a source of food for personal consumption, with related benefits to the participants, including exercise, reduced stress, and social bonding, contributing to improved physiological and psychological well-being of humans. It is a highly popular activity worldwide, with at least 220 million people participating and capturing billions of fish every year. Recreational fishing is today predominantly conducted by angling methods (hook and line fishing). Recreational angling methods include hand line fishing, pole fishing with rod, line and reels. Other capture methods include spear fishing, bow fishing, hand fishing, other forms of trapping fish etc. these capture methods are less common than angling and are only location specific fishing practise. Technological development and innovation is happening at an increasingly rapid pace, and anglers are using this to access new fishing opportunities, more effectively target fish, catch and record information

New innovations and technologies

The recreational fishing community has access to a diverse suite of technologies that help

anglers locate, catch, and handle fish. Some of the new innovations involves use of

- i. Underwater camera technology
- ii. Remotely operated vehicles and Drones
- iii. Boat based electronics
- iv. Hook, bait and line technology
- v. Fish attractants
- vi. Smartphones and Apps

Underwater camera technology

Underwater tools for observing fish have been used since ancient period. Single and dual frequency sonar technology are common tools for detecting fish (Horne 2000), but cameras that capture still images and video. These gather details about fish size, species, and location etc. Cameras allow anglers to monitor the effectiveness of various fishing techniques, informing the depth, target fishery, how to retrieve etc., to increase catch rates. Ice angling cameras and action cameras such as GoPro Hero cameras can be set up underwater to watch for fish. However, it is relatively expensive hence as an alternative water-proof cellular phones with camera can be used increasing the potential accessibility and utility of this technology.

Remotely operated vehicles and Drones

Remotely operated vehicles (ROVs) have been used in aquatic systems for decades, for several purposes like for basic exploration, oceanography, archeology, industrial application and for identifying fishing grounds. ROVs and drones when used provides several information like depth of the fish ground, targeted species and susceptibility of angling related injuries to the fish which can provide information on when to release the fish.

Boat-based electronics

Boat based electronics like chart plotters, GPS, radar technology are used which increases the capacity of recreational anglers to locate, navigate to, and capture fish, which increases the potential for overexploitation of fish populations. Chart-plotters with integrated underwater sonar provide GPS positioning on detailed system maps along with advanced underwater mapping, environmental measurement, and fish-finding capabilities digitized on large screens. GPS also delivers real time updated information such as lunar phase, atmospheric pressure, and tides, which anglers can use to inform their fishing tactics. Boat-mounted transducers utilize sonar to generate real time images of fish around the boat at ranges exceeding 100 m. Radar technology can also be used to inform the location of nearby boats.

Hook technology

Anglers have used hooks to capture fish. Hooks are designed to injure fish by piercing their flesh. Hence modifications in the hooks have been the goal in recent times to maximize capture rates and minimize fish loss, thereby imparting maximum benefits for anglers. Recent developments in the area of hooks have included the combination of hooks with weights to provide anglers a sleeker tackle profile that mimics like a live prey. Some other advancements in hook technology includes integration of hooks with swivels or rings to facilitate line attachment, changes to the location of the hook eye, the orientation of the hook eye, developed barbless hooks to reduce capture stress and development of hooks with multiple barbs to minimize the loss of hooked fish.

High-carbon steel were used in hook manufacture to increase strength, reduce brittleness, and prevent bending under the stress of a fish and hooks made from stainless steel or vanadium are intended to minimize corrosion, extending the life of a hook and preventing breakage after extended saltwater exposure

Fish attractants

Attempts has been made by recreational fishers to utilise scents to stimulate the olfactory (smell) and gustatory (taste) organs of fish to increase their catch rates. Since fish respond to various water-soluble substances including amino acids and their derivatives, small peptides, amines, nucleotides, inorganic salts, sugars, carboxylic, and bile acids etc. Hence use of appropriate attractants can result in high catch rate. Several fish attractants like grouper oil, glycine, menhaden oil, betaine, proline etc acts as attractants which is proved by several studies.

Smartphones and apps

Most recreational anglers have a smartphone with them while fishing. Smart phones play a major role in providing informations about fishing. There are several apps like FFMA, mKRISHI, fisher mobile, FishGIS etc provides scientific information to the fishermen. Further INCOIS provides information about potential fishing zones (PFZ) where the fish have been accumulated in the sea. Thus, it helps fishermen to reduce the time spent of search of fish and provides profit to the fishermen. Thus, smartphones play a major role in fishing.



Underwater Cameras



Remotely Operated Vehicles (ROVs)



Smartphone and apps



Lines and hook technology

Conclusion

Anglers have a tremendous amount of technology they can access for use in recreational fisheries. Achieving a sufficient catch is a major determinant of a satisfied angler trip across many angler populations. Therefore, implementing certain innovations in fishing gears, boat electronics, fishing crafts etc can help in achieving a sufficient fish catch. Technology related to recreational fisheries and natural resources can thus be both positive and negative for fisheries management. Technological innovation provides an opportunity to work with anglers to promote better management and conservation.

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