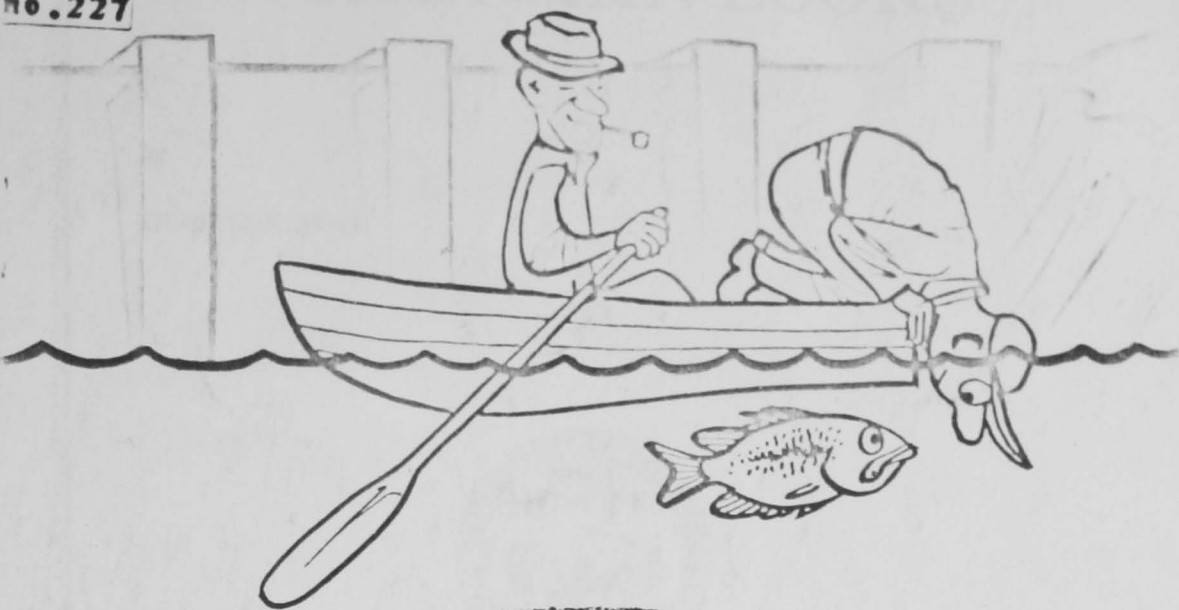


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A
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AT
RESERVOIRS



A FISHERMAN LOOKS

by

CHARLES E. MOST



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United States Department of the Interior
Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife

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AT RESERVOIRS

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The trees on the western bluffs had stretched fingerlike shadows almost to the other side of the lake when a fast-moving outboard rounded the point and abruptly slowed down to approach the floating dock. The lone man cut the motor and deftly guided the boat into the slip. After making fast to a cleat, he placed a large tackle box and his rod and reel on the dock. He then lifted a stringer of fish and stepped from the boat onto the wooden walkway.



Although slight, he gave an impression of solidness and competence. His weathered features showed he had spent many hours outdoors and his eyes had the look that comes from seeing things at a distance.

The young man on the dock ignored the boatman's features; he was looking at five big bass on the stringer. Forgetting his angling manners, he blurted, "Where and how did you catch fish like that?"

"You might say I caught them in the lake," the older man curtly replied.

John, the young man, caught the rebuff and explained, "I've been fishing here for a week and all I've caught were a few bluegills; why your smallest fish is almost four pounds and I couldn't guess what the big one weighs."

The fisherman, recalling similar experiences when he was younger, softened, "Yes, the smallest one will go around four and I think the big one may top seven pounds. Sorry to hear about your bad luck. What part of the lake were you fishing?"

John related his fishing activities of the past week, describing just where he had concentrated his efforts. As the two men continued to chat about various fishing experience, the rapport that always seems to exist among sport fishermen became more and more apparent.

Finally the older man said, "My name is Bert and if you would like to meet me here tomorrow morning about sunup, we'll see if we can stir up some action."

The morning sun had burned the last traces of mist from the surface of the lake when Bert shut off the motor and let the boat coast in

toward a snag standing in the water fifty feet out from a rocky bluff. "Tie the boat to that snag, John," he directed, rigging up John's rod with a small sinking lure. "Now cast right up against the rocks and retrieve very slowly." John made the cast and cranked the lure back to the boat. "That's not what I call slow," Bert said. "Try it again--only this time, I want you to feel that lure bounce from ledge to ledge as it sinks toward the bottom.

John made a second cast and slowly dragged the lure off a ledge, stopping the retrieve to let it sink until he felt it bump the next ledge. When the lure was about ten feet down, a dark shape detached itself from the shadow of a huge boulder. With slowly moving fins, the fish followed the lure for a few feet and then struck savagely. John felt the strike, set the hook, and after a few hectic moments of keeping the fish away from the spectral-like submerged trees, boated a nice bass.

John was elated as he put the fish on the stringer. "How did you know the fish would be so deep, and in this particular spot," he asked?

"Well, we've had several weeks of hot weather and it's warmed up the water," Bert explained. "Fish are cold-blooded animals and their body takes on the temperature of their surroundings. The deeper water is cooler so the fish go deeper to get more comfortable. Also these sunken trees attract smaller fish allowing the bass to pick up a meal here without too much trouble. The jumbled boulders make this place even more attractive because they provide cover from any enemies the bass may have. What more could a fish want? Here he has a comfortable home, protection from enemies, and a supermarket just outside the front door. Fish aren't really so different from people when it comes to getting along in the world," Bert concluded.

The two fishermen managed to take three more bass from the base of the cliff before Bert announced that it was time to move on to another spot. He seemed to know the best places and John commented on this.



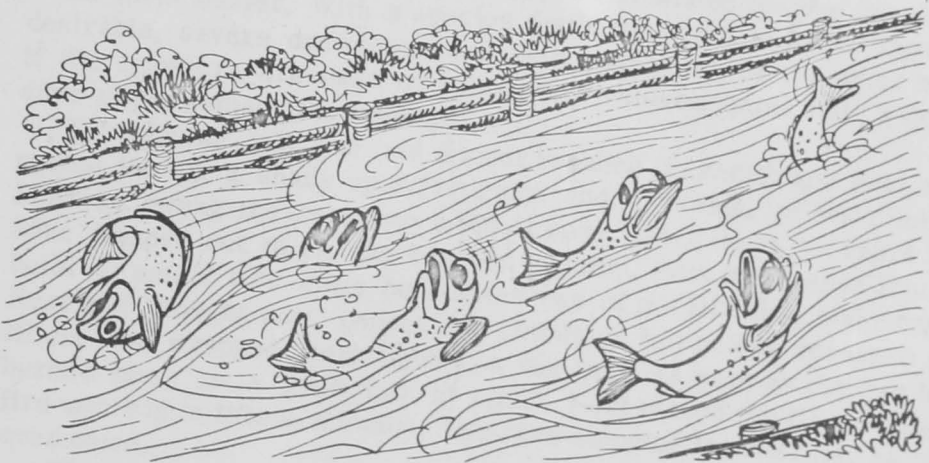
Bert shrugged, "Since I retired three years ago, I've been spending every summer here. It took me several weeks to find some of the most productive spots and I still locate new ones from time to time. A reservoir is a lot harder to read than a stream. Most fishermen can look at a stream and tell where the fish are likely to be, but a big lake is tougher. There's so much of it to learn."

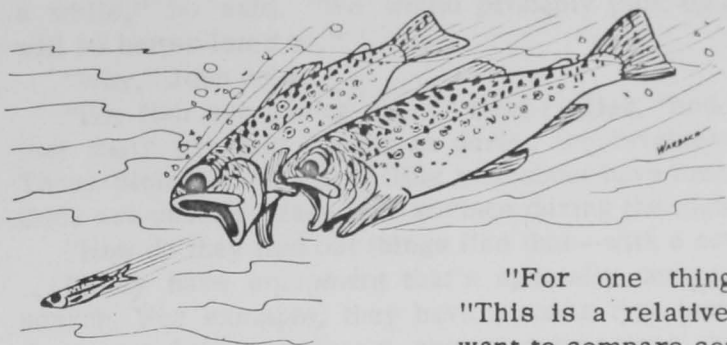
Then Bert grew more pensive, "There aren't as many good fishing streams now as there used to be and most of the ones that are left are overcrowded. I remember when the stream that fills this lake had good fishing but then mines were opened up in the valley. After most of the coal had been taken out, the mines were shut down but some of them had tapped underground water and the drainage carried mine acid into the stream. The pollution wiped out all the aquatic life--fish, insects, crayfish and all. The acid, of course, is diluted by all this reservoir water and has little effect now."

"Down south of here there used to be a good fishing stream but because of poor land use, it flooded in the spring with the water really piling up at every bend in the river. The stream has now been straightened and channeled so it no longer floods, but the water rushes through so fast that it's unsuitable for fish. Careless highway construction along streams and "Keep out" signs have also taken a lot of stream fishing away from fishermen.

"It's pretty obvious that with the population growth and the numbers of fishermen increasing, more people are going to turn to reservoirs for their sport. The other day, I was talking to one of the fishery biologists conducting research on this lake and he told me that because of reservoirs, there is now more fishing water in the United States than at any time in history. He also said that over one-third of America's anglers fish in reservoirs."

"Why are they doing research on this lake," John wanted to know? "My success wasn't too good until you showed me where to fish, but that was ignorance, not a shortage of good fish to catch."





"For one thing," Bert replied, "This is a relatively new lake. They want to compare conditions here with those in older lakes where the quality of fishing has started to decline. A lot of reservoirs provide great fishing during their early years but then it drops off. These biologists want to know why the fishing declines and how to delay or prevent it. The one I talked to pointed out several possibilities they are studying. Fish competition is one of the problems. Most fishermen have heard of lakes and ponds that have a stunted population of fish. The biologist said that fish grow in proportion to their food supply. When the food gets short, a fish stops growing. Increase the food supply and he starts growing again. With too many fish, the competition for food becomes serious. Fish also compete for spawning areas and living space. In most cases, the competition is between fish of the same species, but it can also be between different kinds of fish.

"Another thing these biologists are checking is the effect that fluctuating water levels have on fish. Most of these big reservoirs are for flood control, hydroelectric power, irrigation, or a combination of these. You can imagine the havoc caused when the water is drawn down just after a certain type of fish has finished spawning. Spawning areas would be left high and dry and any little fish would be either trapped or forced into deeper water where the big ones could catch them easier. With a species that's too plentiful or perhaps undesirable, severe drawdowns can be a good thing. On the other hand, if the spawners are bass or some other valuable game fish, a draw-down might damage the fishing."

The blazing July sun had almost reached its zenith and Bert suggested finding a shady spot for lunch and a "siesta." A few minutes later he swung the boat into a small cove, eased up to the shore and John jumped out to tie the boat to a stump. Bert then asked John to build a small fire while he filleted two of the fish they had caught. Bert had brought salt, pepper and aluminum foil and he seasoned the fillets and wrapped them tightly in the foil. As soon as the fire had burned down to a good bed of coals, Bert placed the fillets on the fire and within fifteen minutes, John was enjoying the best fish he had ever eaten.

When they had finished, Bert doused the fire, buried the foil, and then sat down with his back against a large rock. "Might as well relax.

a while," he said. "We would probably pick up a fish or two but it will be better later on."

"Why," John asked?

"Big fish are pretty wary," Bert replied, "and they seem to know that their greatest danger is during the brightest hours of the day. Those biologists I was telling you about have found that fish populations are usually nearer the surface during the night."

"How do they find out things like that--with a crystal ball?"

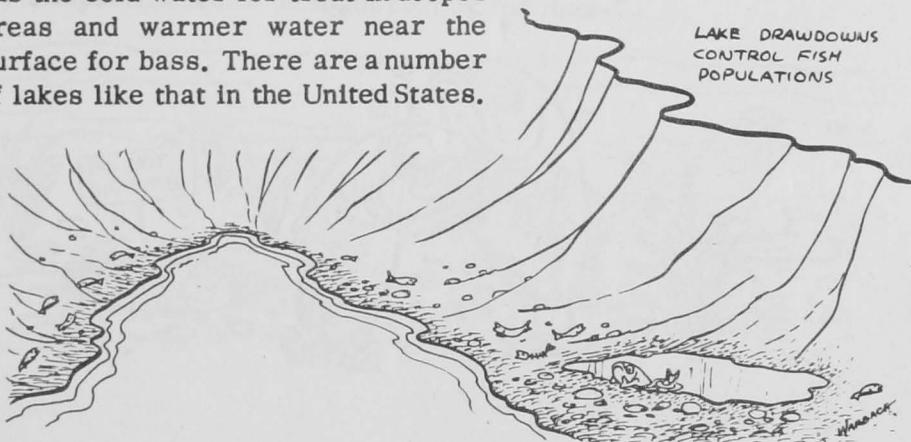
"They have equipment that's specially designed for fishery research. For example, they have a sonar-type instrument, similar to those developed to locate enemy submarines during the War. By bouncing sound waves off the bottom, this echo-sounder records bottom contours, trees on the bottom and even schools of fish. I saw one of the recordings this instrument makes and it looked like something out of a science fiction movie.

"Water, to be most productive, is fertile just as the most productive farmland is fertile. The numbers of microscopic living things in the water is a good indication of its fertility. The biologists call these little plants and animals plankton. To find out how much of this plankton is in the water, an intake hose is lowered over the side of a boat and water is pumped through filters. These filters collect the plankton for later study on the lab.

"The amount of minerals available is also important to fish just as it is to crops on the land. One of the biologists showed me an electrical gadget they use to test this. He said the speed of an electrical current traveling through the water varies with the amount of dissolved minerals in the water. They lower two electrodes over the side, throw a switch, and a gauge shows the mineral content by the speed of the current moving between the electrodes."

"Water temperature would certainly affect fishing in a lake," John ventured. "You said earlier that fish go deeper to find a more comfortable temperature during hot weather. The average water temperature could determine the kind of fish in a reservoir because a cold water fish such as trout could not live in a warm water lake."

"That's true except where a lake has the cold water for trout in deeper areas and warmer water near the surface for bass. There are a number of lakes like that in the United States.





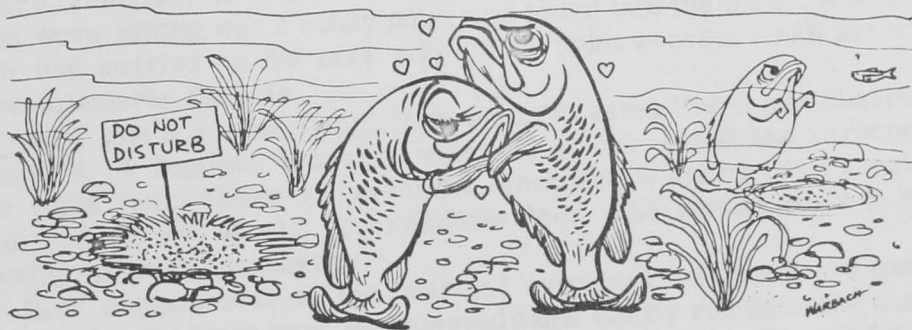
"The biologists aren't limiting their studies just to the kind of fish you and I like to catch. They're also studying what they call forage species--the little fish that big ones eat, and also non-game fish.

"Most of these studies are aimed at finding out more about the everyday life of different kinds of fish--what they eat, how the little one survive the juvenile stage which is supposed to be the most critical age for fish, and what kind of living conditions the different fish prefer. Much of this type of work is by direct observations of fish in their natural environment. The biologists use viewing boxes, scuba or skin diving gear to get right down with the fish, and they even have a submarine."

"A submarine?"

"That's right, a little two-man submarine. I suppose it's pretty difficult using diving gear to watch fish for long periods of time. With the submarine, two men can settle down to the bottom and observe fish under more suitable conditions. The submarine can also cover a much greater area than a diver could.

"Some of these studies take place at night and scuba diving is probably safer when it's dark. Not so much danger of running into rocks or other obstructions. My biologist friend said they found 'sleeping' fish on some of their night dives. These fish were resting on the bottom in water from 5 to 20 feet deep. He said they could locate the fish with an underwater light and almost touch them before the fish moved away. The fish seemed to have trouble swimming away just the way you would have trouble running immediately after waking from a sound sleep. They want to study this further because it may be an important factor in night fishing for bass."



"Judging from the fight the fish gave us this morning, I don't think I could land one at night unless it was asleep," John laughed.

"These fish are in fighting trim. They grow very fast in this lake."

"How does anyone know how fast a fish grows? There's no way to tell their age is there?"

"A biologist can tell. He takes a fish scale and puts it under a magnifying glass. Fish scales show 'rings' in much the same way a tree stump does and these rings tell a fish's age. Comparing the age and the weight gives the rate of growth.

"Sample fish are taken with nets stretched out in shallower water or pulled behind a boat. One of the most effective ways to collect study fish is with an electrical shocker mounted on a boat.

"They used the shocker in the little cove just south of the boat landing one night last week and I walked over to watch them. They had lights mounted under the front of the boat so they would shine down into the water. The electrodes were hanging from poles sticking out in front of the boat. A portable generator supplied power for the shocker and the lights. The fish were temporarily stunned by the shock and then scooped up in long handled nets."

"Sounds to me like a fishery biologist has a lot of fun with his job."

"Yes, it does look like interesting work but not all of his time is spent out on a lake. Much of the work is in the laboratory. For example, stomachs are removed from a lot of the sample fish and analyzed in the lab to see what the fish have been eating."

"That doesn't seem like much fun to me and then I suppose there's the usual amount of paperwork to do."

"Scientific research isn't of much value unless it's recorded for future use. An important part of this work is collecting reports of previous research findings on all major reservoirs in the country. Comparing the characteristics of different reservoirs may give some clues that will lead to better reservoir fishing. This also prevents costly duplication because anything that helps fishing in one reservoir may work in similar reservoirs. I believe-----."

A splashing sound broke the afternoon stillness, interrupting Bert's remarks. A short distance up the shore from where the two men were sitting was a rocky point that jutted into the water. A large fish had swirled on the near side of the point where a small feeder stream entered the lake.

"Say, that's a good fish," Bert said. "It acted like it was chasing minnows. I suppose the cool water from the brook has attracted the little fish. There he is again. That fish is asking to be caught and I think we should accommodate him. The fishing ought to be picking up about now anyway."

Bert stepped over to the boat and extracted a battered rod case from under the front seat. He removed a fine old fly rod from the case and quickly joined the sections together. Next he took a fly reel from



the depths of the big tackle box, mounted it on the rod, stripped off about 20 feet of line and threaded it through the guides.

"That's the first fly rod I've seen since I came here," John remarked.

"I prefer to fish with a fly rod," Bert replied, "But it's not as versatile on reservoirs as some other methods. For one thing, you can't fish deeply with it as easily as with other types of tackle. I keep this rod in the boat just in case I run into a lucky situation like this. That fish is after minnows in shallow water and this streamer fly should imitate a minnow enough to do the trick."

Bert asked John to use the paddle to position the boat for the cast. "Don't bump the side of the boat," he cautioned, "fish are easily frightened when they're in shallow water."

When the boat was about 40 feet from where they had seen the fish, Bert tossed the line into the air, false cast once and dropped the fly right at the mouth of the little stream. The minnows scattered wildly as the fly landed. Bert was just starting the retrieve when a large bass surged into the shallows, grabbed the fly, leaped once and then turned for deeper water. The reel screeched in protest as the fish bored for the shelter of some rocks along the point. Bert felt the leader grate against the sharp rocks and then the line went slack. The fish was gone but Bert had a happy grin on his face. "If I won all the battles, I'd give up fishing," he said, summing up his philosophy that sport fishing is for fun and not just for food.

The two men changed places in the boat and Bert started the motor, heading the boat back up the lake. They passed several spots that looked good to John but when he pointed them out, Bert only shook his head.

Finally after cruising for several miles, Bert turned the boat into a broad cove and cut the motor.

"This is a good place to be late in the day," he said. "This cove is pretty shallow. You can tell that by looking at the banks. They are

low and the gentle slope continues right on under the water. A steep bank usually indicates deep water near shore. Big bass will move into a shallow area like this in the evening and at night because there are usually plenty of small fish, frogs and other things they can eat. Last year this cove was dry by the end of summer due to the demand for more water farther downstream."

"Does that sort of thing happen often?"

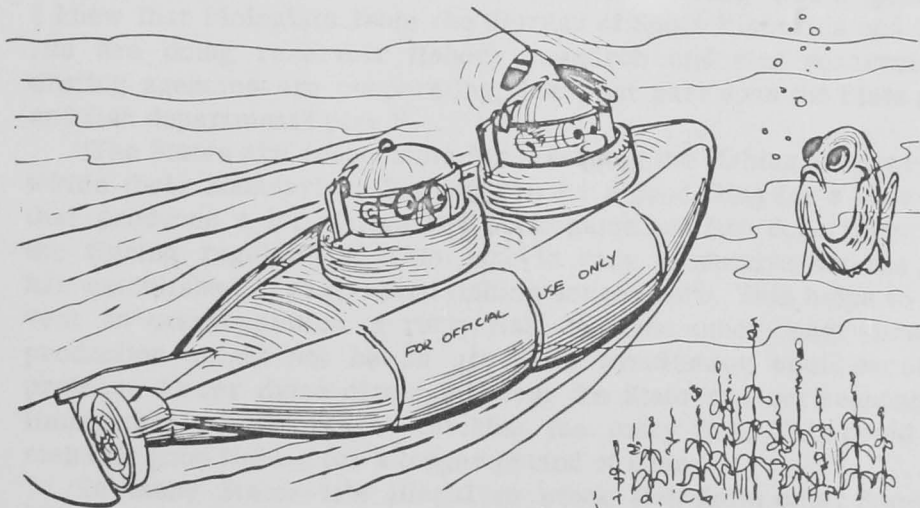
"No, it doesn't. There was little rain last year to help maintain water levels, but the people controlling the dams have been very cooperative. Federal agencies like the Bureau of Reclamation, Tennessee Valley Authority, and the Army's Corps of Engineers, as well as private power companies, want to provide the best possible fishing in reservoirs under their jurisdiction.

"You see, those fishery biologists I mentioned earlier are from the Interior Department's Bureau of Sport Fisheries and Wildlife and they are conducting what is called basic research--testing water quality, finding out what kind of fish are here, what they eat, and many other things that get right to the roots of the problem. It's a sure bet that these studies will result in recommendations for improving the fishing in reservoirs. That's when the second step of the research program begins--putting the recommendations into practice and seeing how they work out. This is called applied research.

"State game and fish departments and the reservoir construction agencies will play the major role during this phase.

"According to the needs of a particular lake, reservoir agencies might be able to coordinate drawdowns with fish spawning seasons. This could control non-game fish such as carp or help maintain good conditions when game fish are spawning. Drawdowns can also be used to control unwanted water plants and to help clear up muddy lakes."

"The work that's done on a reservoir site before the lake is filled can also have considerable influence on future fishing. It wasn't many



years ago that construction agencies cut every tree in a reservoir area, right up to the high water mark. Cleared areas in deeper water are important for boating, water skiing, swimming, and commercial fishing, but leaving trees in shallow areas is also important.

"These trees hold down wave action and this helps to prevent shore erosion and roiling of the water. Timbered areas also provide good cover for many kinds of fish. White bass, for example, prefer open water areas but most fresh water fish like trees, rocks and other kinds of cover.

"The biologist told me two other ways that flooded timber can help fishing in reservoirs. These submerged trees go through a slow rotting process that releases carbon dioxide into the water. Apparently sediment is held in suspension by an electrical charge. The carbon dioxide helps to neutralize the electricity and the tiny particles settle to the bottom. This helps keep the water clear. Also, standing timber, and the twigs, bark and other forest litter in the water promotes the growth of microscopic organisms. These tiny plants and animals are eaten by larger creatures, which are in turn eaten by aquatic insects and small fish which then feed larger fish and so on. This is called a food chain and all of it is affected when one link is weak.

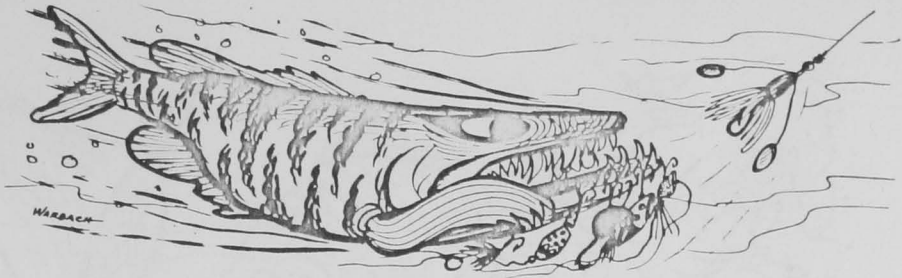
"The reservoir construction agencies are generally in favor of leaving trees in many parts of a reservoir because it's good management and it reduces construction costs."

A bass swirled farther back into the cove and Bert changed lures. "Looks like there is going to be some surface activity. It doesn't happen often in this lake but when the fish do feed on the surface, it produces some wonderful sport," he said.

John was gazing out across the lake at the distant shore. The wind had dropped and the water was still and calm. It was the magic hour for a sports fisherman. "You've told me a lot of interesting things about reservoirs and the research work that's going on. I know that biologists from the Bureau of Sport Fisheries and Wildlife are doing reservoir fishery research and that reservoir operating agencies are cooperating, but what part does the State game and fish departments play."

"The States are responsible for managing the fishing in reservoirs within their boundaries. Fishing can be a good thing for a reservoir that produces a lot of fish and State game and fish departments set the fishing regulations. This lake is very productive and the State has established a year-round fishing season here. This helps to prevent an overpopulation of runty fish. In some other reservoirs, the production might not be as good and overfishing could become a problem. Under these circumstances, the State can set seasons and limits that would prevent catching too many fish. This could help maintain good fishing for a longer period of time.

"In many States it's illegal to stock fish from other States or countries, but in some cases, fish introductions from other areas can



be good. Suppose someone should discover in some distant country a fish that would be perfect for American fishermen. Something that would strike at every lure that came in sight, fight like a demon, be good to eat and grow to a large size on a very limited food supply. You can bet that States would be standing in line to get some fish like this to release in their own waters."

"Isn't this sort of thing pretty risky? Look at the damage carp do and they were brought here from Europe."

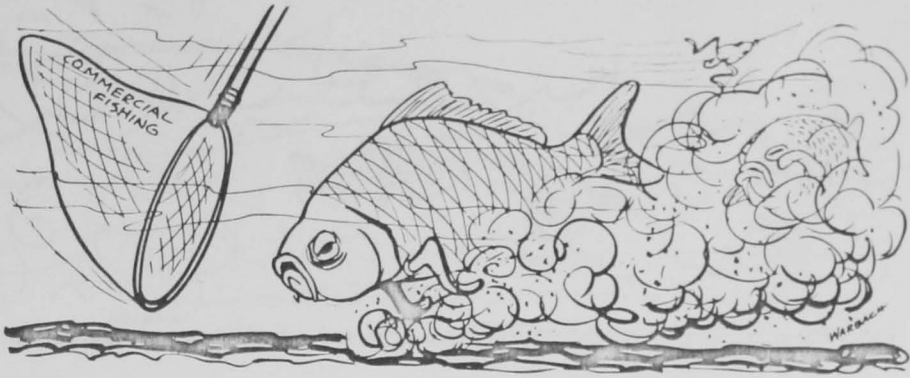
"No State could go into a stocking program without thoroughly checking it out. The brown trout is a foreigner and few fishermen want to get rid of them.

"Most transplants of fish, however, have been from one part of the United States to another. Rainbow trout were once native only to the western part of the country but now they are found in many other trout streams across the United States and in other countries as well. Largemouth bass have also been shifted around until few people realize their original home was in the south and east. States have even introduced striped bass, a salt-water fish, into reservoirs. They're doing pretty well in a number of fresh-water lakes now.

"Sometimes it's the little things that make one fish more suitable than another for a particular reservoir. There's a second team of biologists working on some lakes north of here. These biologists believe that in those lakes, a fish known as the sauger will do better than its close relative, the walleye. Each of these fish lay eggs in moving water at the upper end of the reservoirs. Because sauger eggs are more adhesive and stick to the bottom better than those of walleyes, they hold better in the current, particularly during power releases from upstream dams.

"Finding the right fish for reservoirs goes considerably farther than studies of game fish, too. In some cases, a food or forage fish may be needed for the other fish to eat. Threadfin shad have been introduced into this lake by the State to provide more food for bass.

"Those northern lakes I mentioned are also the scene of other fishery studies that have a different purpose. Biologists from the Interior Department's Bureau of Commercial Fisheries are looking for better methods of harvesting non-game fish for commercial use and the effect this has on the reservoir. Under the right conditions, commercial fishing can help sport fishing. Many of the rough fish



actually compete with game fish in the juvenile stage and they make conditions unfavorable for adult game fish by roiling the water. Commercial fishing regulations of course, are established by the States.

"Have you driven down for a look at the dam since you came here," Bert asked.

"Yes. It sure took plenty of cement to build one that big."

"Notice anything of particular interest to fishermen?"

"Well, the river below the dam certainly looks nice. The water is really clear. Any fish in it?"

"That river is one of the top trout fishing places in the country."

"How could that be? This is a warm-water lake."

Bert laughed. "Remember earlier when we were talking about the deeper water being colder? The water that runs the turbines in the powerhouse at the dam comes from deep down in the lake. The temperature hardly changes between winter and summer and it's just right for trout. I hear it's still cold enough for them thirty miles downstream.

"Streams just below dams are called tailwaters and they usually fluctuate quite a bit because of power plant operation, irrigation needs downstream and for other operating reasons. Because of these fluctuating water levels, trout normally don't spawn in such areas. The Federal Government has built National Fish Hatcheries at a number of these dams and they've really paid off. Tailwaters are rich in food and trout stocked in them usually grow very fast. Because of the fast water, tailwater trout are well conditioned fish and they really give you a fight. Trout weighing more than 15 pounds have been caught in the river below here."

"Fifteen pounds," John exclaimed. "I didn't know trout grew that large in civilized waters. I'd like to fish that stream."

"If you do, I'd suggest you use a boat. The water can come up pretty fast when power releases are made from the dam and there is some risk when wading."

The two fishermen had been casting and retrieving various lures through the shallow cove, but neither had had a strike. Suddenly, John saw a fish take something from the surface near an old decaying



stump. He pointed it out to Bert who told him to try and bounce the floating lure off the stump so it would appear that some small animal had jumped or fallen into the water. John made a near perfect cast, bouncing the lure into the water about three feet from where they had seen the fish. "Let it lay there for as long as you can stand it and then give the lure a light twitch," Bert instructed. John watched the motionless lure for about thirty seconds; then his nerves got the best of him and he gave the rod a slight jerk.

Although both anglers had anticipated the strike, they were both startled when it came. A big bass hit the lure so hard that John almost lost his grip on the rod. "Don't let him get into that brush," Bert yelled, frantically backing the boat toward deeper water. The big fish tore across the shallow cove, alternating long runs with crashing leaps. John hung on grimly as the bass threw his weight and power against the drag of the reel. "Don't horse him now," Bert cautioned as the fish began to show signs of tiring. "Try to keep him away from the boat until he's thoroughly played out."

The big fish stubbornly circled the boat, but his strength was just about gone. Finally the fight was over and John eased the fish in toward Bert who had picked up the landing net. Bert held the net under the water until the fish was over it and then lifted him into the boat.

John started moving toward the rear of the boat and Bert had to tell him to sit down before the boat capsized. Bert then reached into the net and got a grip on the fish's lower lip, a hold that keeps bass from wiggling too much. He handed the fish to John and the awe-stricken look on the young man's face was ample reward for the old anglers' advice. "I think he'll weigh around eight pounds, John," he said quietly, trying not to break the spell.

As John began to recover from the thrill of catching the largest fish of the day, he started talking about the battle. Bert interjected comments of his own for a few minutes and then cranked up the outboard for the long run back to the boat dock. While on the way, Bert kept chuckling to himself because John continued to wave his arms and talk about the big fish, not realizing that Bert couldn't hear a word above the roar of the motor.

Just as twilight was settling over the big lake, Bert turned the boat into the home cove and eased it into its berth.

John took the large bass over to the boat dock operator's weighing station while Bert unloaded the boat. When he had finished placing tackle and other equipment on the landing, Bert walked to the end of the dock, filled and lit his pipe, and then stood looking out across the lake. The slap of waves created by the boat's wake had died down and the first stars were just starting to appear.

He mused over the day's fishing and the thoughts and ideas he had passed on to the young fisherman. Somewhere on the bottom of the lake, perhaps right under his feet, fish were motionless as though asleep. In other parts of the lake, large predator fish were on the prowl for food. He thought about the complex of chemical, physical and biological relationships that make up a reservoir and how these interact to produce good fishing or perhaps fishing that is not so good. The shortage of fine fishing streams was to be regretted and Bert was sure the growing human population would create even more demands on America's fishing waters.

With reservoirs expected to absorb a large part of this increased fishing pressure, Bert knew that the keys to proper reservoir fishery management, geared to individual reservoirs or regions, would have to be found. He was glad the search was already underway.

With a last look at the lake, Bert turned to join John at the weighing station. He hoped the big bass was heavier than eight pounds.

