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USE OF MINI-MESH GILL NETS FOR FORAGE FISH EVALUATIONS

by Terry Margenau

The importance of forage fishes in our lakes has recently been given some long overdue attention. However, sampling these diverse populations to provide useful information to the manager is no easy task. The numerous species that constitute a lake's forage have different activity patterns and distributions, and thus are not all vulnerable to a single gear.

As part of a study on northern pike growth in northern Wisconsin, we used small (mini) mesh gill nets and four other gears to separately index forage fishes in six study lakes. The other gears were beach seine, small fyke nets (1-foot frame depth, 3-foot frame width), electroshocking with a framed net (50 inches wide x 16 inches deep) mounted to the boat bow, and drop nets (double-ended fyke nets set offshore in littoral areas). This article reports on results obtained with the mini-mesh gill nets. Effectiveness of the other gear types is also briefly discussed.

Setting the Gill Nets

The gill nets were 50-foot monofilament nets of 3/4-inch, 1-inch, and 1 1/2-inch stretch mesh, combined into a gang of 150 feet. Each net was 8 feet deep. This may seem like a small sample area, but to put things in perspective: 50 feet of 3/4-inch gill net fishes 409,600 meshes, 50 feet of 1-inch net fishes 230,400 meshes, and 50 feet of 1 1/2-inch net fishes 102,400 meshes. That's a total of 742,400 meshes waiting to capture fish!

Our monthly (May-August) index set was three gangs set randomly in littoral areas of the six study lakes. The nets were fished during daytime for a minimum of 4 hours and generally no longer than 6 hours. Limiting the set to 6 hours allowed for an adequate sample of fish and minimized mortalities of entangled fish during summer months. However, you should expect around 50% mortality of minnow and other forage fishes. This rate will vary depending on factors such as species and water temperatures.

Results

We found that mini-mesh gill nets were a good sampling gear for several forage fish (Table 1). Age yearling-plus yellow perch were caught most frequently. Mini-mesh gill nets were also effective for sampling offshore cyprinids (spottail shiner, golden shiner) during early summer when spawning occurs. Centrarchid panfish were generally captured in low numbers, presumably because of the panfish's flattened body shape.

TABLE 1. Fish sampled using mini-mesh gill nets in six lakes (sample size in parentheses). Effort was 150 feet of each mesh size (stretch measure) fished once per month (May-August) in each lake.

Fish Species	Mean Size of Fish Sampled by Mesh Size					
	3/4-Inch Mesh		1-Inch Mesh		1 1/2-Inch Mesh	
	Mean Size	S.D.*	Mean Size	S.D.	Mean Size	S.D.
Forage Fish						
Yellow perch	3.8(770)	0.86	4.4(654)	0.62	6.4(816)	0.59
Bluegill	3.4(118)	1.65	2.9(31)	0.24	4.3(93)	0.64
Pumpkinseed	3.6(36)	1.88	3.3(9)	1.17	4.0(29)	0.82
Black crappie	4.6(19)	2.30	6.2(8)	2.55	5.7(76)	1.06
Bullhead (all sp.)	9.6(11)	1.03	10.6(4)	1.39	8.2(53)	2.01
Spottail shiner	3.9(103)	0.41	4.7(172)	0.26	-	-
Golden shiner	3.6(146)	0.25	4.9(56)	0.48	6.2(148)	0.40
Common shiner	3.6(27)	0.18	4.6(7)	0.27	5.7(3)	0.21
Game Fish						
Walleye	4.1(2)	0.25	5.4(4)	0.58	7.9(5)	2.39
Largemouth bass	5.5(12)	4.35	4.7(7)	2.06	6.9(23)	2.96
Northern pike	14.0(43)	6.24	17.1(32)	3.79	16.3(95)	4.00

*Standard Deviation.

Compared with the other sampling gear we used, gill nets were more effective than drop nets in capturing yearling yellow perch but were less effective than drop nets in capturing centrarchid panfish.

More generally, gill nets provided an extra dimension of littoral zone (5-15 feet deep) sampling, allowing us to sample fish species that don't readily follow leads and species that are too small to be captured in drop nets. Beach seining and small fyke nets (1-foot frame depth) were effective for sampling shallow water (less than 3 feet deep). Electrofishing was effective in shallow water, in habitats that could not be seined (bulrush, rocks, trees, etc.), and for species that could not easily be netted. Drop nets and gill nets were suited best for the littoral areas of lakes where shallow-water gears are not effective. Drop nets were effective in sampling centrarchid panfish, bullheads, and other species that "lead" well. Thus, the five sampling gears we used each targeted on a specific aspect of the forage assemblage.

Potential Problems

Problems with entanglement of large numbers of bullheads did not occur even though bullhead populations were present in all lakes we sampled and abundant in some. However, in one lake with abundant bullheads we found that other species entangled in the mesh were preyed upon by the opportunistic bullheads, often to the point where only the head remained when the nets were lifted. In these cases, bullheads were often found entangled in the net near the preyed-upon fish.

I recommend initial short-term sets in lakes where you suspect bullhead problems. I have spent one full day removing hundreds (maybe thousands) of those prickly things out of a gill net...and that was enough. That's another benefit of the 4-6 hour set; you're somewhat safe-guarded against a massive bullhead entanglement.

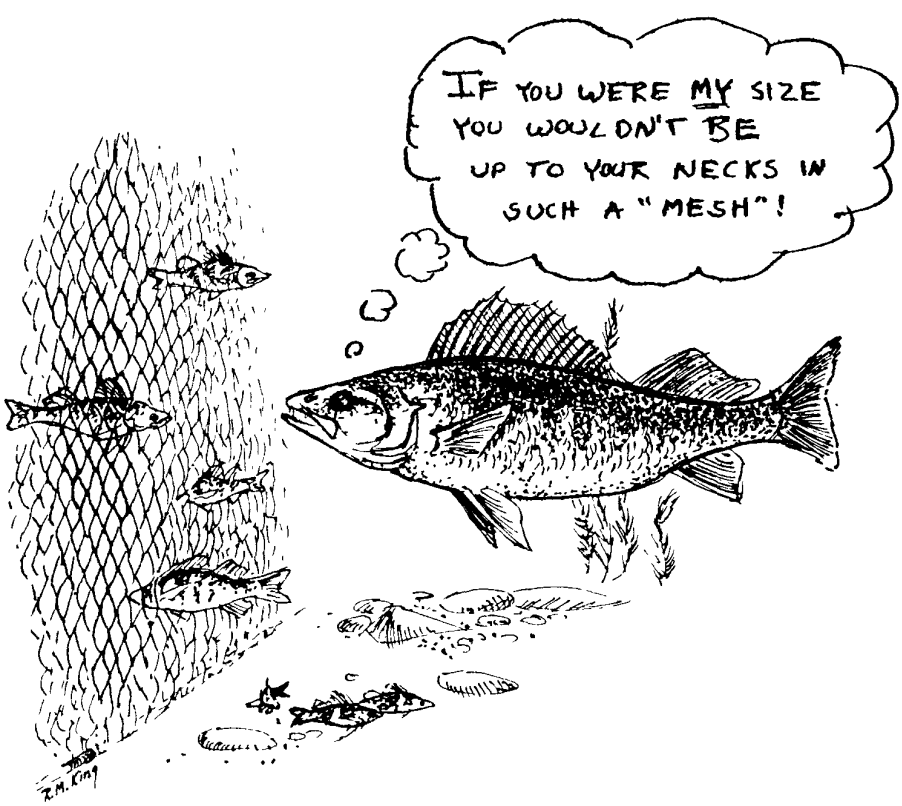
Probably the main fear with the use of gill nets is that game fish will be killed. The use of mini-mesh nets will prevent many larger game fish from being gilled, but will not prevent some from being entangled by teeth or the maxillary. Once again the short-term (4-6 hour) set becomes advantageous because most game fish captured can be returned to the lake alive.

Purchase Information

The gill nets we used were purchased through:

Biological Equipment
5605 Toronto Road
P.O. Box 46165, Station G
Vancouver B.C., Canada V6R 465
Telephone (604) 224-5345

The nets came ready to fish and were truly "impossible to tangle." Cost (current as of August 1987) for 3/4-inch, 1-inch, and 1 1/2-inch stretch measure (50 feet long, 8



feet deep) is $124.00, $79.00, and $66.00, respectively. For sampling smaller fish, 1/2-inch stretch mesh is also available for $138.00. I recommend checking with the supplier of your choice to obtain current prices and ordering information.

The Upshot

Mini-mesh gill nets provide fisheries personnel another effective method for sampling certain segments of the forage base. Yellow perch, various cyprinids, and other species vulnerable to gill nets are important food items for predatory fish in many of our lakes. Information gained from monitoring them may prove to be useful in making future management decisions.

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