THE MICROECONOMIC GEOGRAPHY OF SPORTFISHING: GREAT LAKES TRIBUTARIES, NEW YORK, 1984

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ABSTRACT: The Lake Ontario tributary fishery is one that has earned acclaim for its excellent fishing opportunities. The Department of Environmental Conservation conducts an Angler survey every four years and releases its findings to the public. Information contained in this survey includes hours fished on the tributaries, average expenditure on each trip, and the number of fish caught. The study area comprised ten survey routes along the shores of Lake Ontario, and one on Lake Erie. Sportfish were defined as Chinook and Coho Salmon, as well as Rainbow and Brown Trout. Linear regression modeling tests the relationship of: catch to time spent fishing, time expenditure to angler cash expenditures, and anglers' success versus relative cost of their fishing. In general, the factors associated with improved catch are the time and effort required to reach good fishing waters and anglers' related investment in superior equipment. The marked geographical variation in angler success observable in Western New York has implications for State-level policies concerning the tributaries it monitors and replenishes.

INTRODUCTION

Lake Ontario is well known for its excellent fishing opportunities. The purpose of my study of the Lake Ontario tributary fishery is to determine what variables influence the success of the sportfisherman. Sportfish are defined for my purposes as Chinook Salmon, Coho Salmon, Rainbow Trout and Brown Trout. Lake Trout and Atlantic Salmon are also popular sportfish, but due to insufficient data I excluded them from my analysis. I began by performing a statistical analysis of data obtained from the 1984 New York State Great Lakes Angler Survey, published by the Department of Environmental Conservation, Division of Fish and Wildlife (Table 1). I compared eleven variables to the total and individual species catch in the Lake Ontario tributaries. The tributaries were better suited for my analysis since they supplied more complete data than open water fishing. The Lakes' tributaries were divided into ten segments of the lakeshore, including one Lake Erie stretch of shoreline and tributaries (Figure 1). A database was assembled profiling anglers' reported fishing along each of the ten tributary segments (Table 1). Variables included in the database were as follows:

1. Angler hours
2. Angler trips
3. Average length of trip, hours
4. Coho Salmon caught
5. Chinook Salmon caught
6. Rainbow Trout caught
7. Brown Trout caught
8. Total catch, number of fish
9. Angler expenditure per fish caught, dollars

TABLE 1. FISHING PROFILE: TEN GREAT LAKE TRIBUTARY SEGMENTS, NEW YORK STATE, 1984.

VARIABLE	SEGMENT (WEST to EAST)										
	Erie	Niagara	Rochester West	Rochester East	Sterling	Ontario Southeast	Ontario Northeast	Upper Salmon River	Lower Salmon River	Salmon River Tributaries
1. Total Angler Hours spent fishing	135,188	287,851	240,462	194,811	48,509	27,988	72,807	358,837	516,085	33,079
2. Total Angler Trips	25,465	51,895	39,433	34,771	7,987	4,619	11,687	55,369	80,443	5,100
3. Average duration of trips (hrs.)	5.31	5.55	6.10	5.60	6.07	6.06	6.22	6.48	6.42	6.49
4. Coho Salmon Caught, no.	10,800	2,139	9,253	1,541	0	0	1,474	2,685	17,725	676
5. Chinook Salmon Caught, no.	2,247	18,842	20,544	10,902	949	91	6,103	19,231	120,806	3,405
6. Rainbow Trout Caught, no.	11,240	23,974	7,325	12,336	1,345	5,406	3,127	18,800	16,795	1,529
7. Brown Trout Caught, no.	636	15,888	8,750	4731	1,880	650	207	1,092	9,121	1,391
8. Total Trout and Salmon	25,022	60,813	45,872	29,510	4,154	6,149	10,911	41,818	158,449	7,001
9. Expenditure per day, dollars	20.29	29.32	34.43	28.10	34.67	42.68	36.92	39.89	44.96	57.23
10. Fish caught per hour	0.19	0.21	0.19	0.15	0.09	0.22	0.15	0.12	0.31	0.21
11. Expenditure per fish, dollars	3.36	5.68	3.65	2.88	0.33	0.39	0.81	2.87	9.65	0.34
12. Distance to nearest Large City (miles)	57	23	40	33	52	56	86	50	46	50
13. Percentage of fish released	30	34	16	16	11	41	23	21	45	24
14. Chinook salmon as percentage of total catch	8.9	31.0	44.8	36.9	22.8	1.5	55.9	46.0	76.2	48.6
15. Rainbow trout as percentage of total catch	44.9	39.4	16.0	41.8	32.4	87.9	28.7	45.0	10.6	21.8
16. Number of hours spent shagging	6,114	35,445	121,606	65,616	4,527	0	44,422	137,073	0	0

SOURCE: New York State Department of Environmental Conservation, Division of Fish and Wildlife, 1984 New York State Great Lakes Angler Survey, Volumes 1 and 2.

10. Fish caught per hour
11. Expenditure per fish caught, dollars
12. Distance to nearest large city, miles
13. Percentage of fish released
14. Chinooks as a percentage of the total catch
15. Rainbows as a percentage of the total catch
16. Number of snagging hours

ANALYSIS

As one would expect the total number of fish caught on each tributary segment reflects the number of hours anglers fish there (Figure 2). Further analysis of the data reveals more subtle associations.

Insofar as the average number of fish caught per hour of fishing can be regarded as a measure of angler efficiency, we would expect an angler's overall reported expenditure to decline on a per fish caught basis, as the total number of fish caught increases. This is not the case. Indeed, there is a strong positive linear relationship between these measures of efficiency and cost (Figure 3). Why does this counter-intuitive relationship hold? A probable explanation is that the more successful fishermen have higher quality and much more expensive tackle and equipment that help them catch more fish. An angler who has a greater range of lure color and size and bait selection is more apt to catch fish, given virtually any stream and weather conditions. But this success is bought at a very high price.

Another linear relationship I identified was probably the most interesting. The variables of fish caught per hour and percentage of caught fish that are released showed a strong positive relationship (Figure 4). The interesting aspect of this relationship is that it is a direct result of informed fish conservation education, based on exposure to sources such as wildlife magazines, television programs, and peer practice. Also, regulations such as a three fish limit on maximum daily catch encourages angler self-discipline. Moreover, reluctance to eat contaminated Lake Ontario origin fish such as carp and other larger species, like salmon and trout, promote fish release habits. Catch and release practices are producing larger fish populations; hence, more fish will be caught in the future. Along the tributary segments with high release percentages fishermen don't mind putting a few fish back, since they are catching a lot of them anyway. The striking linear relationship highlights the interdependence of success and moderation in fishing.

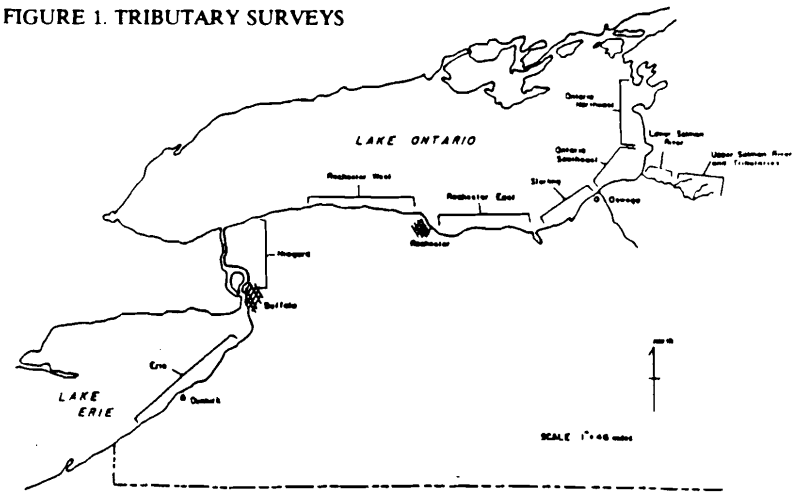
Time permits mention of one more noteworthy association. The number of Brown Trout caught per hour on individual tributary segments decreases with increasing distance from the nearest major city (Buffalo, Rochester, Syracuse) (Figure 5). This may be explained by angler species preference. Fishermen are not as willing to travel as far to catch Brown Trout because the species is smaller and less popular than the Chinook Salmon, the most sought after fish in the Lake Ontario tributary system.

CONCLUSION

The preliminary research findings outlined here suggest that angler census information compiled by New York or other state environmental agencies provide a broad perspective on angler behavior and fishing strategy. This behavior has been shown to apparently vary with

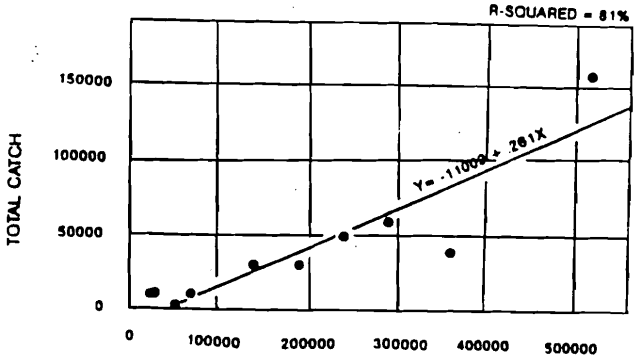
distance from principal angler origins, with the environmental context of tributary streams, and with the skill and capitalization of individual anglers. Thus, effective promotion, conservation and education programs might profitably re-examine angler census data as a guide to program development.

FIGURE 1. TRIBUTARY SURVEYS



Areas consumed by nine tributary survey routes along New York's Great Lakes waters. January-May, September-December, 1984.

FIGURE 2



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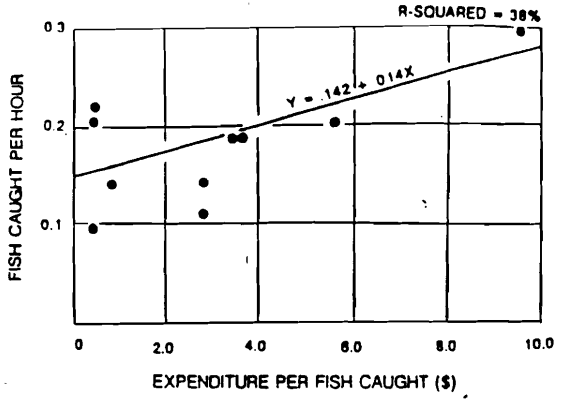

FIGURE 4

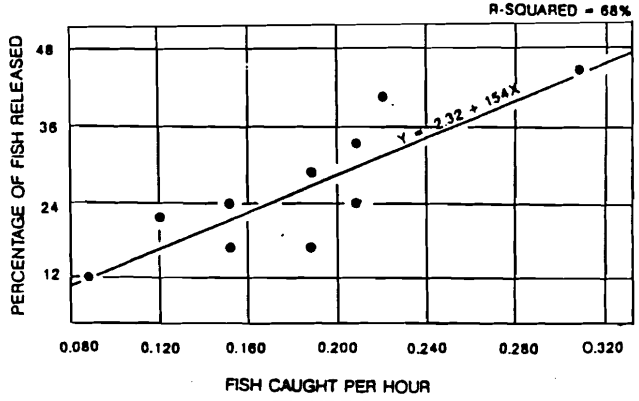

FIGURE 5