



Brook Trout Fishing Study Summary

Great Smoky Mountains National Park



Study Purpose: The purpose of the three-year experimental brook trout fishery was to determine if legal fishing and harvest would impose any detrimental population level impacts to brook trout populations. The results of this study will be combined with results from angler creel surveys collected during the study, law enforcement staff observations, and data from outside Great Smoky Mountains National Park in order to make a decision regarding fishing and harvest of brook trout Park wide for present and future generations.

Study Design: Eight streams (4 in TN, 4 in NC) were opened to fishing and harvest for 3 years under the current GRSM fishing regulations (i.e. 5 fish creel limit, 7-inch size limit, and single hook artificial lures only). Each stream that was open had a control stream which remained closed. Some streams were easily accessible and some were accessible by 5-7 mile hikes. We analyzed population abundance data from 2-3 sites within each stream (both open and closed) for three years prior to and three years after brook trout fishing was opened. An angler creel survey was also conducted during the study period in order to compare angler catch and harvest data to biological data. The following are the results of the study:

Objective #1: Has adult brook trout density (# fish/100m²) declined >30% over a 3-year period due to fishing (pre-fishing vs. post-fishing)?

Results: There were no significant differences (declines) in adult brook trout density in seven of eight streams opened to brook trout fishing during the study period (Figure 1a & 1b). A significant increase was observed in adult biomass in Hazel Creek (p=0.025). Variation which did occur was attributed to natural variation and was not related to open vs. closed *and/or* easy vs. difficult access.

Objective #2: Has young-of-year (YOY) or age-0 brook trout density declined >50% over a 3-year period due to fishing (pre-fishing vs. post-fishing)?

Results: There were no significant differences (declines) in YOY brook trout density or biomass in any stream opened to brook trout fishing during the study period (Figure 2a & 2b). Variation which did occur was attributed to natural variation and was not related to open vs. closed *and/or* easy vs. difficult access.

Objective #3: Has the number of legal brook trout (>7-inches) declined over a 3-year period due to fishing (pre-fishing vs. post-fishing)?

Results: There were no significant differences in the number of legal brook trout brook trout in any stream opened to brook trout fishing during the study period. In all cases, significant differences that were observed were increases (green) or in control stream. Variation which did occur was attributed to natural variation and was not related to open vs. closed *and/or* easy vs. difficult access.

Angler Creel Survey: There were 271 anglers interviewed during the three-year study period of which 95% (257) were male and 5% (14) female (Table 1). Of those anglers, 44% (120) were local and 56% (151) were non-local (those living >50 miles from the Park boundary). Local anglers have been fishing

and average of 19.8 (range 0-72) years and 63% of these anglers fish >20 days per year in the Park. Non-local anglers had fished an average of 5.8 (range 0-39) years however, 63% of these anglers only fish 1-5 days per year in the Park. Angler satisfaction was very high with 84% of locals and 88% of non-local anglers characterizing their experience as moderately enjoyable to excellent. Both local (27%) and non-local (25%) anglers cited “to catch a brook trout” as the number one reason they fished that particular stream when interviewed. Both local (50%) and non-local (46%) anglers cited acid rain as the number one future threat to GRSM wild trout populations. Between 77-80% of all anglers did *not* belong to a fishing club of any kind. Despite fairly high catch rates for local (3.5/hr) and non-local anglers (1.5/hr), harvest rates were extremely low (0.3 and 0.1 fish/hr). Only 32% of local and 26% of non-local anglers indicated they would harvest a legal brook trout if they caught one. Study results verify these results indicating that only 33% of local and 17% of non-local anglers who caught legal size brook trout actually harvested the fish. Most local anglers spent around \$30.66 per trip (range \$0-\$350) whereas non-local anglers averaged \$187.97 per trip (range \$0-\$1,500).

Summary: Given these biological and angler creel results, it is apparent that legal angling had no detrimental population level effects on brook trout populations in Great Smoky Mountains National Park. Both un-fished control streams and fished streams exhibited the same variability among years and no streams had significant differences between the fished and un-fished period. Angler creel results verified the biological results found during the study period (Table 1). Despite high catch rates (1.5-3.5 fish/hr), angler harvest rates were extremely low (<0.3 fish/hr). These results are similar to North Carolina where Borowa *et al.* (2001) found 11 of 17 streams that were closed to fishing or under catch and release regulations did not contain any larger percentage of trout >177mm than streams where harvest was allowed. Furthermore, Borowa *et al.* (1995) found that harvest rates of trout (>177mm) in streams open to single-hook artificial lures was <15%. Even in streams open to bait fishing, Borowa and Clemmons (1998) were unable to detect significant differences in trout densities (>177mm) or length frequencies between bait fishing, single-hook artificial, and closed streams. A recent wild brook trout creel study conducted by the Virginia Department of Game and Inland Fisheries (VDGIF) utilizing similar size limits (7 or 9-inch) found that no brook trout were harvested during the study despite the fact that many anglers caught legal sized fish (Steve Reeser, VDGIF personal communication). Stream access varied from easy to difficult, regulations varied from bait fishing to artificial single hook regulations, and streams received a variety of fishing pressure. When asked about harvesting wild brook trout, 87% (181) of the anglers interviewed (N=208) indicated they had no desire to harvest brook trout, just to fish for them.

References

- Borowa, J.C., C.J. Goudreau, and M.M. Clemmons. 1995. Responses of wild trout populations to supplemental feeding. North Carolina Wildlife Resources Commission, Division of Boating and Inland Fisheries, Raleigh.
- Borowa, J.C and M.M. Clemmons. 1998. Evaluation of a wild trout regulation with a natural bait allowance. North Carolina Wildlife Resources Commission, Division of Inland Fisheries, Raleigh.
- Borowa, J.C., J.H. Mickey, Jr., C.J. Goudreau, and M.M. Clemmons. 2001. Wild trout population monitoring summary, 1989-1996. Final Report, Mountain Fisheries Investigations. Federal Aid in Fish Restoration Project F-24. Raleigh, North Carolina.

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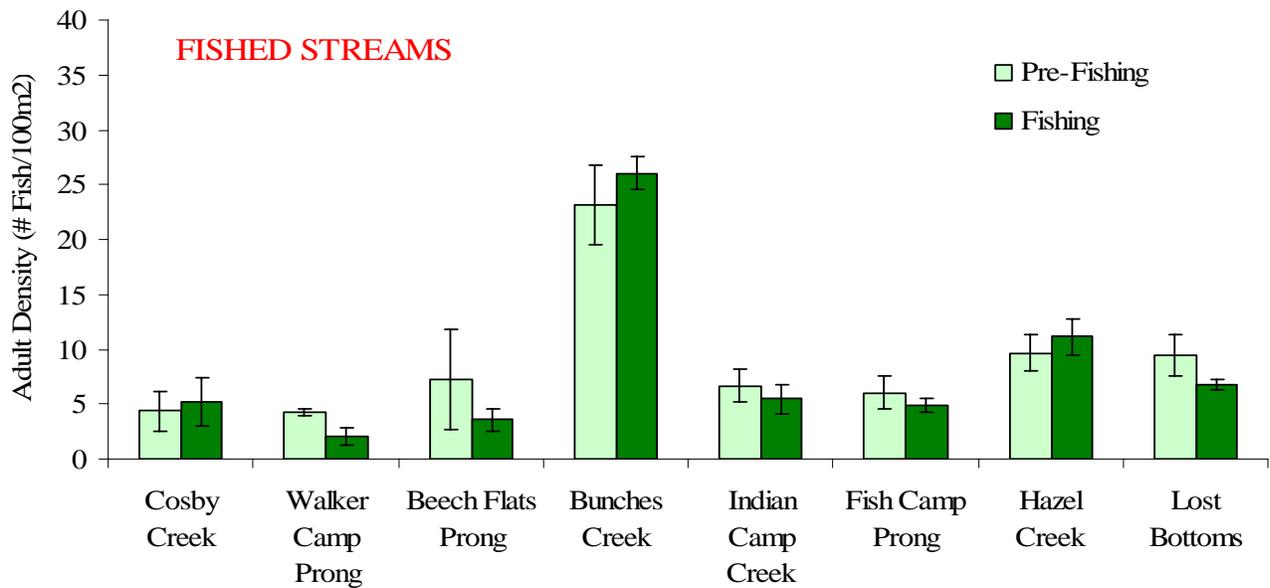


Figure 1.a. — Adult brook trout density in 8 streams *opened* to fishing in Great Smoky Mountains National Park. Streams were opened to fishing and harvest in June 2002. Densities are 3-year means for pre-fishing and fishing period with associated standard error (SE) bars.

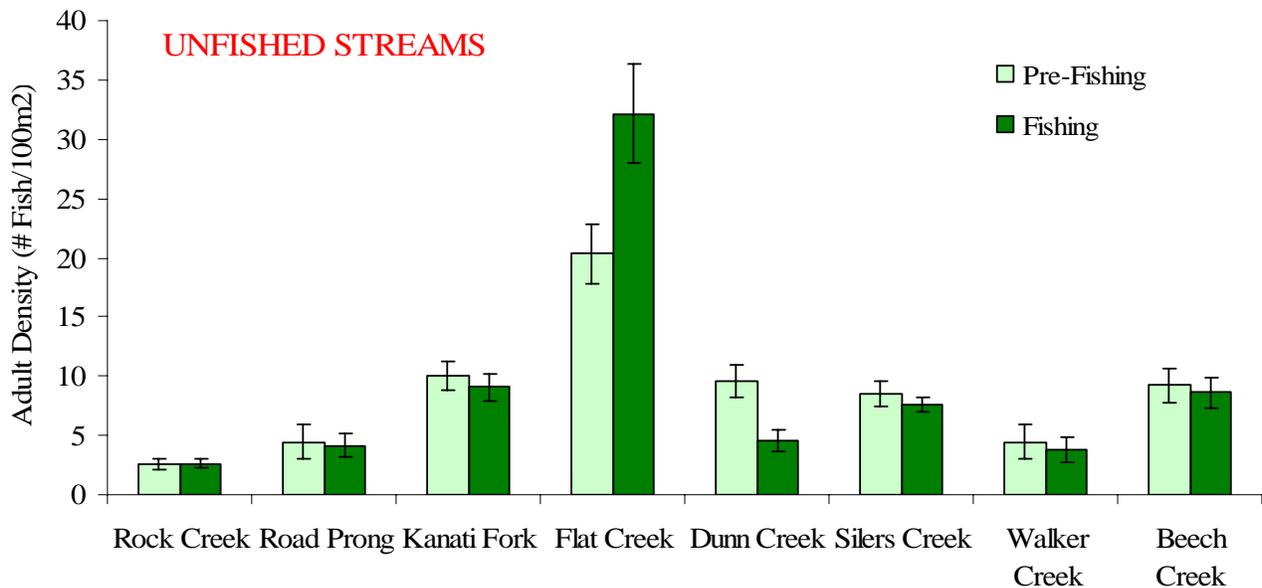


Figure 1.b. — Adult brook trout density in 8 streams *closed* to fishing in Great Smoky Mountains National Park. Streams were opened to fishing and harvest in June 2002. Densities are 3-year means for pre-fishing and fishing period with associated standard error (SE) bars.

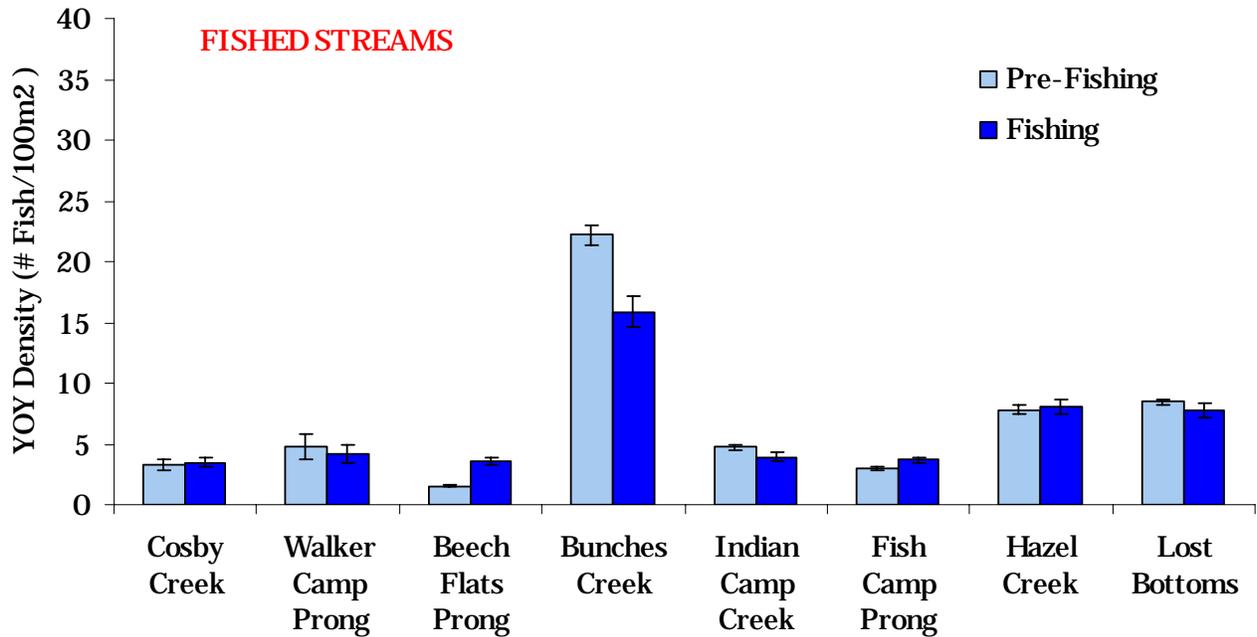


Figure 2.a. — Young-of-year (YOY) brook trout density in 8 streams *open* to fishing in Great Smoky Mountains National Park. Streams were opened to fishing and harvest in June 2002. Densities are 3-year means for pre-fishing and fishing period with associated standard error (SE) bars.

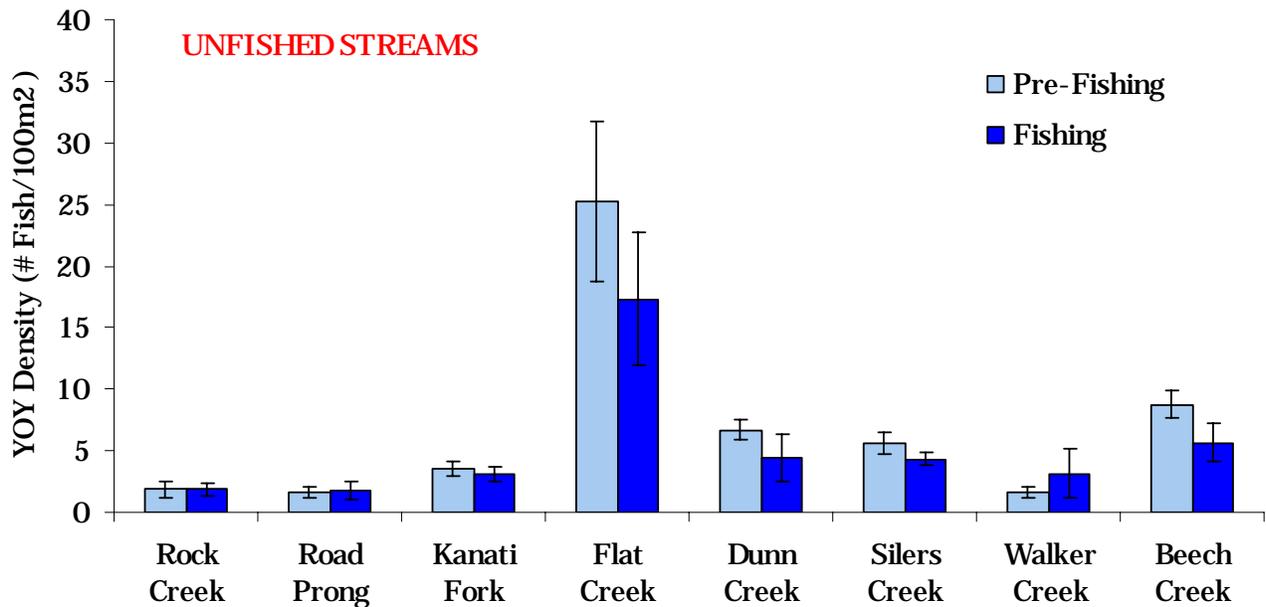


Figure 2.b. — Young-of-year (YOY) brook trout density in 8 streams *closed* to fishing in Great Smoky Mountains National Park. Streams were opened to fishing and harvest in June 2002. Densities are 3-year means for pre-fishing and fishing period with associated standard error (SE) bars.

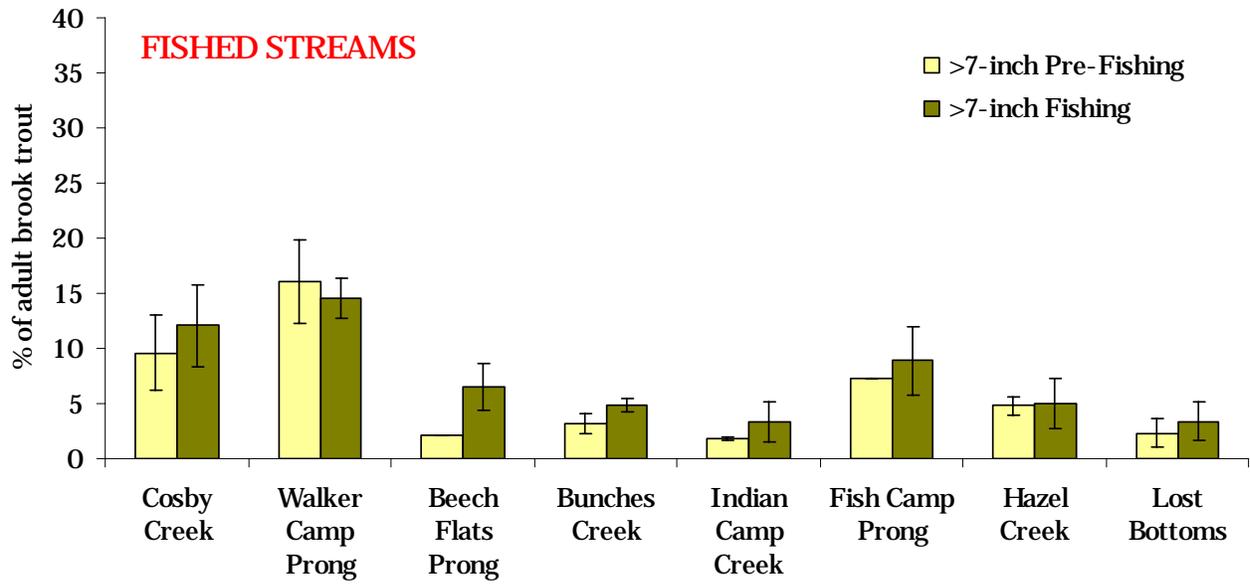


Figure 3.a. — Percent of legal size (>7-inches) brook trout in 8 streams *open* to fishing in Great Smoky Mountains National Park. Streams were opened to fishing and harvest in June 2002. Note 2-20% of the adult brook trout in the study streams were available for angler harvest during the study period. Percents are 3-year means for pre-fishing and fishing period with associated standard error (SE) bars.

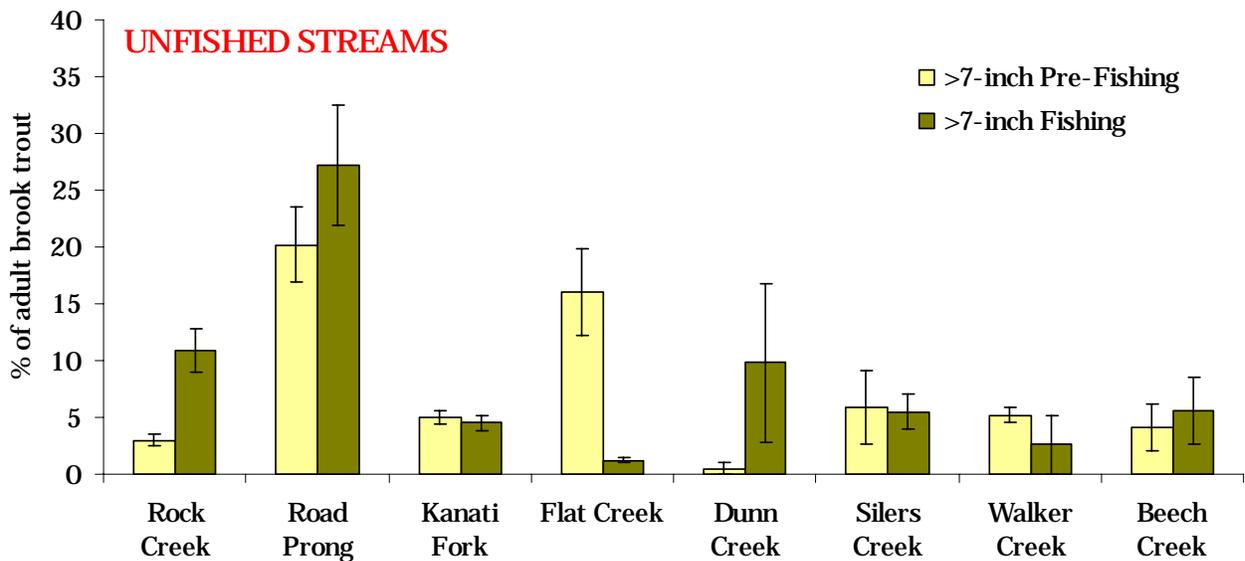


Figure 3.b. — Percent of legal size (>7-inches) brook trout in 8 streams *closed* to fishing in Great Smoky Mountains National Park. Streams were opened to fishing and harvest in June 2002. Percents are 3-year means for pre-fishing and fishing period with associated standard error (SE) bars.

Table 1. — Wild brook trout angler creel survey results from eight streams opened to fishing in Great Smoky Mountains National Park from 2002 to 2005.

Total Number of Angler Interviews = 271	Local	120 (44%)		Male	257 (95%)	
	Non-Local	151 (56%)		Female	14 (5%)	
How many years have you been fishing in GRSM?		Mean	Range			
	Local	19.8	0-72			
	Non-Local	5.8	0-39			
How many days per year do you fish in GRSM?	# of Days	1-5	6-10	11-20	>20	
	Local	8%	13%	16%	63%	
	Non-Local	63%	18%	9%	10%	
How would you rate your angling experience today? <i>1-Poor to 5-Excellent</i>		1	2	3	4	5
	Local	7%	9%	25%	27%	32%
	Non-Local	3%	9%	32%	28%	28%
Why did you choose to fish this particular stream today?				Local	Non-Local	
	To Catch A Brook Trout			27%	25%	
	Easy Access to Brook Trout Water			12%	20%	
	Close To Home			11%	0%	
	Recommend. of Friend or Guide			10%	23%	
	Past Experience			9%	9%	
	Favorite Stream			8%	3%	
	All Others			8%	12%	
	Seek Better Fishing			7%	0%	
	No People			5%	3%	
Camping Nearby			3%	5%		
What do you perceive to be the greatest future threat to wild trout populations in GRSM?				Local	Non-Local	
	Acid Rain/Air Pollution			50%	46%	
	No Answer			16%	10%	
	Over-Harvest			10%	18%	
	All Others			7%	14%	
	Poaching			4%	5%	
	Uneducated Fishermen			3%	1%	
	Otters			3%	1%	
	Habitat Degredation			3%	3%	
	Federal Government			2%	0%	
Non-Native Trout			2%	2%		

Do you belong to a fishing club?	Local	Yes (20%)	No (80%)
	Non-Local	Yes (23%)	No (77%)
If you caught a legal-size trout (>7-inches), would you release or harvest it?	Local	Release (68%)	Harvest (32%)
	Non-Local	Release (74%)	Harvest (26%)
What percent of anglers who caught fish actually harvested their fish?	Local 33%	Non-Local 17%	
What type of fishing gear do you use?	Flyrod 83%	Spinning Rod 17%	
Total number of fish caught per angler per trip.		Mean	Range
	Local	10.8	0-49
	Non-Local	5.1	0-50
What is the average number of fish anglers <i>catch</i> and <i>harvest</i> per hour?		Catch/hr	Harvest/hr
	Local	3.5	0.3
	Non-Local	1.5	0.1
What is the average size of harvested trout (inches)?		Mean	Range
	Brook Trout	8.2	7.5-9.0
	Brown Trout	8.2	8.0-9.0
	Rainbow Trout	8.3	7.0-14.0
What is the average amount of money anglers spend per trip?		Mean	Range
	Local	\$30.66	0-\$350
	Non-Local	\$187.97	0 - \$1,500.00
What is the average amount of money spent on the following:		Local	Non-Local
	Gas	\$5.27	\$20.65
	Food	\$2.40	\$23.07
	Lodging	\$0.81	\$61.47
	Equipment	\$5.56	\$34.11
	License	\$10.75	\$16.01
Additional	\$3.00	\$13.31	