



## An Evaluation Comparing Survival of Fall Fingerling versus Spring Yearling Stocked Musky in Southern Wisconsin Lakes

DNR Fishery Management  
Poynette

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### **Abstract**

Fall fingerling true (11"), spring yearling true (14") and spring yearling hybrid (13") musky were stocked from 1998-2003 in four south-central Wisconsin lakes. DNR surveys and angler recaptures through 2005 found no difference in survival among the stocking groups during 3-12 months after stocking. Spring yearling trues survived 3 times better than fall fingerling trues and spring yearling hybrids based on fish recaptured more than 12 months after stocking. Though they cost more to rear, spring yearling trues cost 42% less than surviving fall fingerling trues and 57% less than spring yearling hybrids due to better survival past 12 months in the wild. Over-wintering costs were \$3.28/fish for spring yearling trues and \$4.74/fish for spring yearling hybrids because of better rearing survival of the true strain.

## Introduction

Until the early 1980s, musky were considered a “northern” Wisconsin fish, though a few southern waters had been stocked previously, such as Little Green Lake, Twin Valley Lake and Lake Wisconsin. The Portage Musky Club was formed in 1985 with the mission of rearing musky for local waters. The Club acquired permission to use the decommissioned Portage sewer plant and became successful at rearing 3” hybrid musky, provided by the Department of Natural Resources (DNR), to fall fingerlings. This new stock of fish needed a home with waters such as Swan, Silver and Park lakes in Columbia County, Lake Mason in Adams County, Big Green and Little Green lakes in Green Lake County and the Madison lakes becoming “musky waters”. Eventually the Club’s spring fingerling supply became limited as the DNR required the fish to become part of a lake’s stocking quota, and financial support from local clubs and lake organizations declined. This stimulated the Club to commit to a project to continue rearing fall fingerling hybrids along with funding the cost for over-wintering both trues and hybrids at the DNR Lake Mills hatchery. The goal of this project was to determine if one group of musky survived better than another in the wild to refocus the Club’s role in musky management in the south-central Wisconsin waters.

## Methods

### Stocking/Recapture

Four south-central Wisconsin lakes were selected to receive stocked musky including Park (312 acres), Silver (70 acres), and Swan (400 acres) Lakes in Columbia County, and Lake Redstone (612 acres) located in Sauk County. Stocked musky groups included fall fingerling true (FFT), spring yearling true (SYT) and spring yearling hybrid (SYH). Fall fingerling hybrid (FFH) stocking occurred during 2 years in Park Lake only. A year class was considered a fall stock along with the following year’s spring stock, as both plantings were hatched the same spring.

True musky were reared to fall fingerlings at the DNR Spooner hatchery and hybrids at the Portage Musky Club. The trues were transported to the DNR Lake Mills hatchery where fall planted fish were tagged, held overnight and stocked the next day. The hybrids were tagged at either the Portage facility or Lake Mills, kept overnight and stocked. A 1-3/8” Floy FF-94 tag was inserted at the base of the dorsal fin. Likewise, hybrids to be reared over winter were transported to Lake Mills. Both strains to be reared until spring were stocked in rearing ponds which contained fathead minnows (*Pimephales promelas*) as forage. Two or three additions of minnows occurred prior to harvest, with the amount determined by the number of fish in the rearing ponds. Minnow stocking ceased in late fall, prior to ice cover, with one additional plant added prior to spring harvest. Spring stocks were tagged in the same manner as the fall fingerlings.

At the time of stocking, fish were measured to the nearest 0.1” (TL) and released at one location on each lake. Fish that died during stocking or were found dead by a next day visit to the stocking site were deleted from the total number stocked.

Each year after the initial stocking event, DNR survey crews targeted musky during spring and fall evening electrofishing runs. Fish carrying tags were measured to

the nearest 0.1" (TL) and returned to the water. Spring netting surveys in 2002 on Silver Lake, Lake Redstone, and Swan Lake as well as angler tag returns also provided data for survival and growth assessment.

### Data Analysis

Accurate growth data were collected because the study fish were of known age, but limited recaptures prohibited definite interpretation of the growth data, particularly among older fish.

Survival of each group, by lake, was assessed by percent of recaptured fish. Data for each group were compiled in two ways: percent recapture of fish surviving 3-12 months after stocking, and percent recapture 12+ months after stocking. Individuals captured more than once during a time frame were only counted once for that time period. The overall survival rate was calculated for each group by dividing the total number recaptured in all lakes by the total number of that group stocked. The minimal stocking of the FFH group provided limited data and precluded any meaningful analysis. One-way ANOVA was used to test for differences in the survival rates between groups for the two time intervals. Data were transformed prior to analysis with equation 13.8 in Zar (1999) to meet assumptions of normality. Tukey multiple comparisons for unequal sample sizes ( $n=4$  for SYT and FFT,  $n=3$  for SYH) were used when statistically significant differences occurred between groups. All statistical analyses were run at  $p = 0.05$ .

The cost of feed and labor to rear fall fingerlings (Tim Gallon, Gallon Fish Farm, Dan Schnering, Portage Musky Club, and Steve Fajfer, DNR Wild Rose Hatchery, personal communications) and the known value of forage added over winter for spring yearlings was used to determine the dollar amount required to raise each group of fish. Using the overall recapture rates observed in this study, the cost effectiveness of stocking the different sizes and groups of musky was assessed.

## **Results**

### Stocking

Strain and number stocked varied by year, depending on available funding and rearing mortality (Table 1). Silver and Swan Lakes received the most consistent yearly stockings, whereas Lake Redstone only received fish the first two years of the study and Park Lake was the only lake stocked with FFH musky.

Lake	Year class	FFT	FFH	SYT	SYH
Silver	98	100		70	101
Silver	99	82		80	
Silver	00	100		100	64
Silver	01	98		99	100
Silver	02	106		100	100
Swan	98	185		222	276
Swan	99	199		249	160
Swan	00	270		312	130
Swan	01	262		164	122
Swan	02	275		418	453
Redstone	98	260		299	
Redstone	99	301		340	
Redstone	00				
Redstone	01				
Redstone	02				
Park	98	130		147	253
Park	99	144		120	101
Park	00	226	301		
Park	01	302	310		
Park	02				

Table 1. Number and group of musky stocked within each study lake, 1998–2003.

#### Size of Stocked Fish

Average length at stocking ranged from 9.0–11.8” for FFT, 8.1–9.3” for FFH, 13.7–14.7” for SYT and 11.6–14.6” for SYH (Table 2). Growth over winter was 2.2-3.4” for true musky and 3.6-3.9” for hybrids (Appendix 1).

Year Class	FFH	FFT	SYT	SYH
1998	8.1	11.7	14.7	14.6
1999	9.3	11.8	14.1	11.6
2000		11.0	13.7	12.5
2001		9.0	13.9	13.0
2002		10.3	13.7	13.4
Average	8.7	10.8	14.0	13.0

Table 2. Average length (in.) of musky groups at time of stocking.

#### Growth

Lack of adequate sample sizes at the various ages of fish precluded any definite conclusions of the growth data, but some generalizations can be made (Table 3).

Silver Lake														
Strain	Age (years)													
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
FFT	11.1		18.1 (4)		25.2 (2)			32.3 (1)	34.3 (1)					
SYH		14.3	18.8 (3)	20.3 (1)	21.8 (3)		28.5 (2)						27.8 (1)	
SYT		14.1	18.7 (12)	19.8 (1)	23.2 (5)	27.5 (2)	29.6 (2)	29.4 (3)	31.5 (2)	32 (1)	37 (1)			

Redstone Lake														
Strain	Age (years)													
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
FFT	12.2	14.7 (5)	20.3 (6)					25.6 (1)						
SYT		14.5	20.8 (5)	22.1 (6)	26.9 (4)	26.2 (8)	32.7 (3)	33.3 (3)		33.1 (1)	35 (1)	37.5 (2)		

Park Lake														
Strain	Age (years)													
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
FFH	9.5	14.1 (4)		24 (1)	28.5 (1)									
FFT	10.7	13.4 (3)	21.0 (5)	21.6 (3)		30.0 (2)	34.5 (1)	34.0 (2)	28.0 (1)	38.2 (1)	31.5 (1)			
SYH		13.8	22.1 (15)	23.7 (1)	31.4 (1)									
SYT		14.8	22.7 (4)	25.4 (2)	31.2 (2)	31.6 (2)		33.8 (2)	31.5 (2)					

Swan Lake														
Strain	Age (years)													
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
FFT	11.2	13.8 (4)	18.8 (3)	20.2 (2)	26.4 (4)	31.6 (5)	31.3 (1)	34.7 (1)						
SYH		13.7	20.1 (7)	23.6 (4)	28.6 (8)	29.1 (5)	33.4 (2)	30.0 (1)		29.0 (1)				33.6 (1)
SYT		14.1	19.5 (17)	22.9 (17)	27.0 (18)	28.9 (21)	31.7 (9)	32.4 (11)	36.0 (7)	34.3 (4)	34.9 (1)			32.5 (1)

Table 3. Average size (in.) of recaptured musky by group and age. Whole ages indicate fish sampled in the spring and half numbers indicate fall-sampled fish. Numbers in parentheses are the number sampled.

- 1) FFT musky grew over winter in the study lakes to the time when spring fish were stocked to be fairly similar in size at age-1 (~14"). At 2 years of age FFT fish were just over 20", reaching 30" by their 3<sup>rd</sup> year, and gaining several more inches by their 4<sup>th</sup> year.
- 2) SYT musky were typically stocked at 13.5-14.5", averaged in the low 20" range at age-2, upper 20s at age-3, and low 30s at ages 4 and 5. Two 6-year-old SYT musky were recaptured, both being 37.5" in length, and one 7-year-old fish from the 1998 year class (stocked spring of 1999) was recaptured by DNR shocking crews but only measured 32.5".
- 3) SYH fish also reached the low 20" range by age-2, and high 20s by age-3. Only 1 age-4 and age-5 SYH were recaptured, both from Swan Lake, and both were smaller than the average size of age-3 SYH from this lake. An age-7 SYH was also captured from Swan Lake, but was only 33.6".
- 4) Silver Lake fish were generally smaller at age than the other lakes. Silver Lake lacks white sucker and has bluegill as the primary forage species, and also has less species diversity than the other lakes, perhaps resulting in the slower growth rates observed.

### Survival

Survival 3-12 months:

Yearly survival rates varied for each group and lake (Appendix 2). When considering all lakes combined, overall survival was nearly identical for SYT and SYH (1.36% and 1.34%), which was about 3.5 times greater than FFT survival (0.39%)

(Figure 1, Table 4). However, survival was not significantly different among groups ( $0.25 < p < 0.10$ ).

3-12 months				
Lake	FFH	FFT	SYH	SYT
Park	0.65	0.37	4.24	1.50
Redstone		0.89		0.78
Silver		0.00	0.82	0.00
Swan		0.34	0.61	1.25
Total		0.39 (12)	1.34 (25)	1.36 (27)
12+ months				
Lake	FFH	FFT	SYH	SYT
Park	0.33	1.87	0.56	3.37
Redstone		1.07		3.91
Silver		1.44	1.37	2.90
Swan		1.18	1.84	5.35
Total		1.38 (42)	1.51 (28)	4.41 (120)

Table 4. Percent recapture by group and lake for 3-12 months and 12+ months in the wild. Number in parentheses equals the total number of fish recaptured for each group.

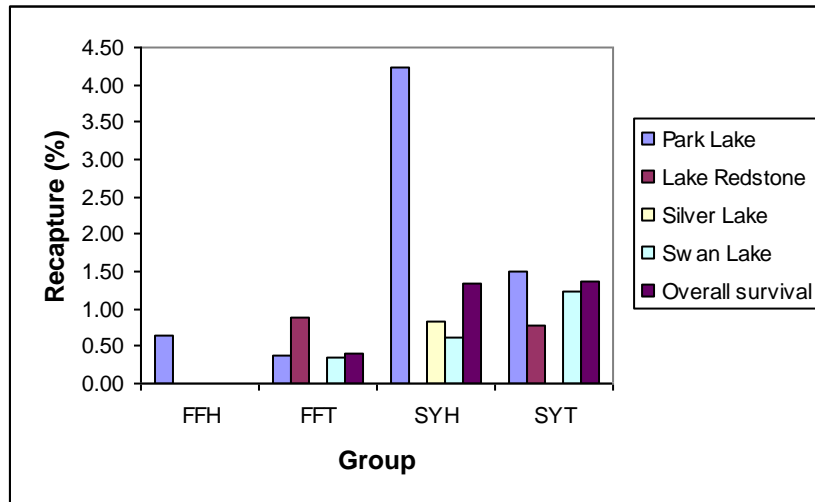


Figure 1. Percent recapture by group for 3-12 months in the wild. No FFT or SYT were recaptured in Silver Lake, and SYH were not stocked in Lake Redstone.

#### Survival 12+ months:

As with the 3-12 month period, yearly survival of each group within an individual lake varied (Appendix 2). At 12+ months in the wild, percent survival was significantly different among groups ( $0.0025 < p < 0.001$ ). SYT survived significantly greater compared to SYH and FFT, but no difference between SYH and FFT survival was detected. Overall survival was highest for SYT (4.41%), followed by SYH (1.51%) and FFT (1.38%) (Figure 2, Table 4).

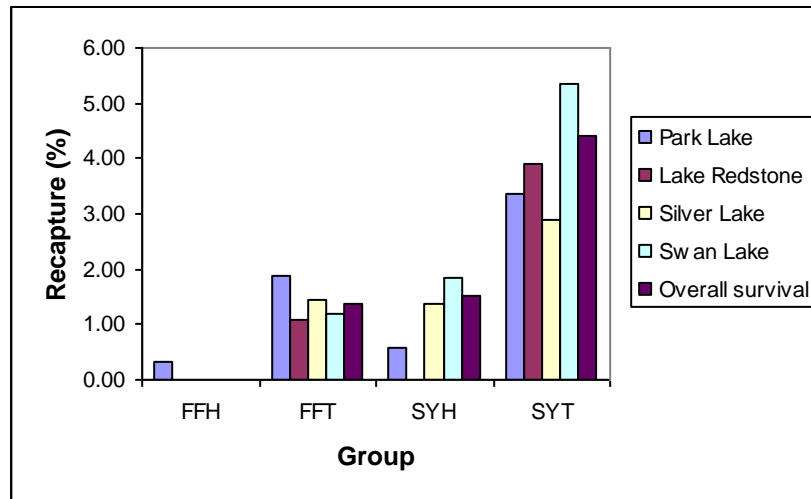


Figure 2. Percent recapture by group for 12+ months in the wild. SYH were not stocked in Lake Redstone.

### Cost-benefit analysis

The average cost (forage plus labor) to raise a musky to FFT stocking size was approximately \$4.00 (Tim Gollon, Gollon’s Fish Farm, personal communication). The additional cost of rearing fish over winter ranged from \$2.16 to \$4.70 for true strain musky with an average additional cost of \$3.28, making the total cost \$7.28 per fish (Appendix 1). Hybrid musky were more expensive to rear over winter because a greater portion of forage was allocated to this strain and over-winter survival was lower. Average additional cost ranged from \$2.68 to \$7.67 with an average of \$4.74. However, when raised on dry feed, the cost to rear a FFH is about \$1.00, making average cost of a SYH \$5.74 (Don Schnering, Portage Musky Club, and Steve Fajfer, DNR Wild Rose Hatchery, personal communications).

Cost effectiveness of stocked musky was evaluated as the total rearing cost per surviving fish, based on a hypothetical number stocked (Table 5).

Group	Time period	Overall survival rate	Survival compared to SYT	Rearing cost per 100 fish	Hypothetical number surviving adjusted for group survival rates	Hypothetical cost per surviving fish	Cost compared to SYT	Cost difference of SYT to others
SYT	3-12 months	1.36%	1.00	\$728	50	\$14.56		
SYH	3-12 months	1.34%	0.98	\$574	49	\$11.71	0.80X	24% more
FFT	3-12 months	0.39%	0.29	\$400	14	\$28.57	1.96X	49% less
FFH	3-12 months	0.65%	0.48	\$100	24	\$4.17	0.29X	250% more
SYT	12+ months	4.41%	1.00	\$728	50	\$14.56		
SYH	12+ months	1.51%	0.34	\$574	17	\$33.76	2.32X	57% less
FFT	12+ months	1.38%	0.31	\$400	16	\$25.00	1.72X	42% less
FFH	12+ months	0.33%	0.07	\$100	7	\$14.28	0.98X	2% more

Table 5. Cost comparison per surviving fish of the musky groups.

Based on the observed difference in total survival and average rearing costs, when compared to FFT, SYT cost approximately ½ as much when evaluated either 3-12 months (49% less) or 12+ months (42% less) after stocking. The SYT cost more (24%) per fish during the 3-12 month period compared to SYH, but the cost was 57% less for 12+ months post-stocking. Despite poorer survival but a much lower rearing cost, FFH were more cost effective than SYT fish during the 3-12 month period, but nearly identical after 12 months. However, this comparison was based on minimal FFH data.

## Discussion

This study found that SYT survival past 12 months in the wild was significantly greater (3X) compared to FFT or SYH, thus a surviving fish cost ½ as much as a FFT, the traditional DNR hatchery musky product. At 3-12 months post-stocking no group displayed a significant survival advantage however. Based on paired stockings and measured survival in three northern Wisconsin lakes, Margenau (1992) found that SYT survived 4.8 times better and were 1-4 times more cost effective as well.

Overall recapture for SYT and FFT was more than 3 times less during the 3-12 month period than the 12+ month time frame, whereas SYH were recaptured at about the same rate during both time periods. An explanation for more of the older SYT and FFT fish being recaptured is greater vulnerability to the sampling gear and/or simply that the 12+ month period was a longer time to recapture fish. Furthermore, this trend suggests that mortality may occur primarily within the first year of survival, and poor short term survival, at least for fall fingerlings, has been documented in other studies (Hanson et al. 1986 and Margenau 1992).

The most probable explanation for the greater survival of SYT musky is that their larger size at stocking (14") enhanced survival, perhaps by reducing losses from predation. Margenau (1992) found that musky stocked as spring yearling fish were 1.4 inches larger by early summer than fall fingerlings, an advantage maintained to 18 months of age. The growth data from this study is too sparse to determine if SYT fish maintained a size advantage through time. Environmental factors may favor spring yearlings too, such as food availability or a lack of migratory predators during spring stocking. For example, one fall a Swan Lake resident reported finding 7 floy tags from recently stocked FFT musky that were defecated on his boat lift canopy by a Great Blue Heron, and other lifts were noted as having "resident" herons. Behavioral traits may play a role in survival as well. If size was the only factor in determining survival of musky and if SYT were indeed at an advantage due to greater size, then one would expect the recapture rates of SYH (13" at stocking) to be similar to the rates for SYT, but such was not the case. Brege (1986) noted slightly higher catch (14.6%) and exploitation (33.3%) rates for hybrid musky versus true musky (11.6% and 26.6%) on stockings in Little Green Lake, Wisconsin. He also found 55% of hybrids were caught on live bait versus 87% of true musky being caught on artificial baits, and suggested hybrid musky may be more vulnerable to angling.

The Portage Musky Club has historically had very good success rearing 3" spring hybrids on dry feed to 9" fall fingerlings. When 3" fingerlings were received, rearing success to the fall was typically 90% (Don Schnering, Portage Musky Club, personal

communication). The summertime rearing is embraced by Club members, culminating in a high profile harvest at season's end. While the SYH showed an overall survival rate equivalent to SYT for the 3-12 month period, it dropped to 1/3 that of the SYT for greater than 12 months. Cost to over-winter hybrids averaged 1.5 times greater than for trues, due to less over-winter survival in all five years, but particularly 1999 and 2000 when fish only survived about half as well. In 1998 and 2000 survival was only slightly better for trues versus hybrids. However, cost was also higher because more minnows were added to the hybrid ponds based on rationing the forage per number of trues versus hybrids initially fall stocked in the rearing ponds. Given the fact that SYH only survived 1/3 as well as SYT after 12 months in the wild, the minimal data showing lower survival of FFH, and higher over-wintering cost, the SYH demonstrated that it is a less desirable hatchery product.

### **Management Recommendations**

The group exhibiting the best longer term survival in the study lakes was the SYT. Analyzed as a lower cost per surviving fish beyond 12 months post-stocking, the SYT is the best option for stocking. The role of the Portage Musky Club should be reevaluated based on these findings. The DNR hatchery system should also evaluate rearing of SYT versus the current FFT rearing program.

### **Acknowledgements**

Appreciation is extended to the Portage Musky Club for funding the cost of over-wintering musky for Silver, Swan, and Park Lakes and to the Reedsburg Outdoor Club for funding the Lake Redstone spring yearlings. The efforts of Bob Fahey and the DNR Lake Mills hatchery crew are recognized as over-winter rearing was an extra workload for them, which they took on with their usual enthusiasm and ingenuity.

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Appendix 1. Number, survival, growth, and cost to over-winter true and hybrid musky. Two ponds were used for true strain musky for the 1999 year class.

<b>1998 Year Class</b>								
Strain	# stocked	# harvested	Survival (%)	Fall length	Spring length	Growth	Forage	Cost/fish (\$)
	in ponds	from ponds		(inches)	(inches)	(inches)	(\$/gal.)	
True	847	742	88	11.7	14.7	3.0	12.50	3.83
Hybrid	730	630	86	10.7	14.6	3.9	12.50	4.51
<b>1999 Year Class</b>								
Strain	# stocked	# harvested	Survival (%)	Fall length	Spring length	Growth	Forage	Cost/fish (\$)
	in ponds	from ponds		(inches)	(inches)	(inches)	(\$/gal.)	
True	900*	817	91	11.8	14.0	2.2	7.50	2.75
Hybrid	480	261	54	8.0	11.6	3.6	7.50	4.31
<b>2000 Year Class</b>								
Strain	# stocked	# harvested	Survival (%)	Fall length	Spring length	Growth	Forage	Cost/fish (\$)
	in ponds	from ponds		(inches)	(inches)	(inches)	(\$/gal.)	
True	462	414	90	11.0	13.6	2.6	8.50	3.60
Hybrid	500	194	39	8.6	12.5	3.9	8.50	7.67
<b>2001 Year Class</b>								
Strain	# stocked	# harvested	Survival (%)	Fall length	Spring length	Growth	Forage	Cost/fish (\$)
	in ponds	from ponds		(inches)	(inches)	(inches)	(\$/gal.)	
True	462	264	57		13.8		8.25	4.70
Hybrid	500	222	44	9.2	13.0	3.8	8.25	7.41
<b>2002 Year Class</b>								
Strain	# stocked	# harvested	Survival (%)	Fall length	Spring length	Growth	Forage	Cost/fish (\$)
	in ponds	from ponds		(inches)	(inches)	(inches)	(\$/gal.)	
True	502	518	100	10.3	13.7	3.4	7.45	2.16
Hybrid	603	554	92	9.6	13.3	3.7	7.45	2.68
<b>Average Cost/Fish (Based on weighted average)</b>								
True Musky: \$3.28								
Hybrid Musky: \$4.74								

\* 2 ponds were used for rearing

Appendix 2. Yearly survival by year class, lake, and group.

### Silver Lake

			Months at large	
			3 to 12	12 or greater
Strain	Year class	# stocked	# recaptured	# recaptured
FFT	98	100	0	2
FFT	99	82	0	0
FFT	00	100	0	4
FFT	01	98	0	0
FFT	02	106	0	1
Total		486	0	7
Survival (# recaptured/# stocked)			0.00000	0.01440
			Months at large	
			3 to 12	12 or greater
Strain	Year class	# stocked	# recaptured	# recaptured
SYT	98	70	3	4
SYT	99	80	2	2
SYT	00	100	3	5
SYT	01	99	3	2
SYT	02	100	0	0
Total		449	11	13
Survival (# recaptured/# stocked)			0.02450	0.02895
			Months at large	
			3 to 12	12 or greater
Strain	Year class	# stocked	# recaptured	# recaptured
SYH	98	101	2	1
SYH	99	0		
SYH	00	64	1	0
SYH	01	100	0	2
SYH	02	100	0	2
Total		365	3	5
Survival (# recaptured/# stocked)			0.00822	0.01370

Appendix 2 continued

### Park Lake

			Months at Large	
			3 to 12	12 or greater
Strain	Year class	# stocked	# recaptured	# recaptured
FFT	98	130	0	3
FFT	99	144	1	2
FFT	0	226	2	6
FFT	1	302	0	4
FFT	2	0		
Total		802	3	15
Survival (# recaptured/# stocked)			0.00374	0.01870
			Months at Large	
			3 to 12	12 or greater
Strain	Year class	# stocked	# recaptured	# recaptured
FFH	98	0		
FFH	99	0		
FFH	00	301	0	0
FFH	01	310	4	2
FFH	02	0		
Total		611	4	2
Survival (# recaptured/# stocked)			0.00655	0.00327
			Months at Large	
			3 to 12	12 or greater
Strain	Year class	# stocked	# recaptured	# recaptured
SYT	98	147	1	5
SYT	99	120	3	4
SYT	00	0		
SYT	01	0		
SYT	02	0		
Total		267	4	9
Survival (# recaptured/# stocked)			0.01498	0.03371
			Months at Large	
			3 to 12	12 or greater
Strain	Year class	# stocked	# recaptured	# recaptured
SYH	98	253	12	1
SYH	99	101	3	1
SYH	00	0		
SYH	01	0		
SYH	02	0		
Total		354	15	2
Survival (# recaptured/# stocked)			0.04237	0.00565

Appendix 2 continued

### Swan Lake

			Months at Large	
			3 to 12	12 or greater
Strain	Year class	# stocked	# recaptured	# recaptured
FFT	98	185	1	2
FFT	99	199	2	1
FFT	00	270	1	10
FFT	01	262	0	1
FFT	02	275	0	0
Total		1191	4	14
Survival (# recaptured/# stocked)			0.00336	0.01175
			Months at Large	
			3 to 12	12 or greater
Strain	Year class	# stocked	# recaptured	# recaptured
SYT	98	222	5	15
SYT	99	249	1	15
SYT	00	312	4	18
SYT	01	164	3	11
SYT	02	418	4	14
Total		1365	17	73
Survival (# recaptured/# stocked)			0.01245	0.05348
			Months at Large	
			3 to 12	12 or greater
Strain	Year class	# stocked	# recaptured	# recaptured
SYH	98	276	3	6
SYH	99	160	0	2
SYH	00	130	1	1
SYH	01	122	2	6
SYH	02	452	1	6
Total		1140	7	21
Survival (# recaptured/# stocked)			0.00614	0.01842

Appendix 2 continued

**Lake Redstone**

			<b>Months at Large</b>	
			<b>3 to 12</b>	<b>12 or greater</b>
Strain	Year class	# stocked	# recaptured	# recaptured
FFT	98	260	4	5
FFT	99	301	1	1
Total		561	5	6
Survival (# recaptures/# stocked)			0.00891	0.01070
			<b>Months at Large</b>	
			<b>3 to 12</b>	<b>12 or greater</b>
Strain	Year class	# stocked	# recaptured	# recaptured
SYT	98	299	5	12
SYT	99	340	0	13
Total		639	5	25
Survival (# recaptures/# stocked)			0.00782	0.03912