JOB COMPLETION REPORT

As required by

FEDERAL AID IN FISHERIES RESTORATION ACT

TEXAS

Federal Aid Project No. F-6-R-14

FISHERY INVESTIGATIONS - REGION 5-B

Job No. E-6 Experimental Stocking of Largemouth Bass and
Threadfin Shad in Ponds in South Texas

Assistant Project Leader: John M. Travis

J. R. Singleton
Executive Director
Parks and Wildlife Department

Marion Toole
D-J Coordinator

Eugene A. Walker
Director, Wildlife Services

March 8, 1967

ABSTRACT

Monthly collections of largemouth bass were continued at three of the four ponds stocked during a previous segment. Work at the fourth pond was terminated. As many specimens as possible were collected at each of the ponds during one day's sampling, with a minimum of ten intended. Lengths and weights were recorded for each specimen prior to its release.

Pelvic fins were removed from specimens prior to their release so that they might be identified. Right pelvic fins were removed from first generation bass and left fins were removed from second generation fish.

Schnabel's equation for population estimates was applied in a mark and recapture program in order that populations might be estimated. These estimates at the Hunter and Retzloff ponds varied from the known number of bass originally stocked. Possible explanations for these discrepancies are that the pond owner at Hunter's allowed friends to fish the pond prematurely thus reducing the number of stocked bass, and a suspected near toxic concentration of sulfates at the Retzloff pond prevented offspring from being produced. The Schnabel estimates are thought to be accurate.

Best growth, as indicated by monthly length and length-weight frequencies, occurred at the Hunter pond which had the heaviest stocking ratio. This was contrary to expectations. Growth rates at the Kunitz pond, which was lightly stocked, were probably influenced by the high concentration of undesirable fishes competing directly for food. Undesirable species also occurred at the Hunter pond, however.

Fishing success was measured as fish per man-hour. Overall, the ponds may be classified as very good, fair, and poor, with Hunter's pond yielding a catch of 1.82 fish/man-hour, Retzloff's 0.68 fish/man-hour, and Kunitz's 0.53 fish/man-hour. Although fishing success occurred in direct order with the stocking ratios, differences in fishing success among the ponds were not in correct proportion to the number of bass stocked per acre. Possible causes for fishing success not being in direct proportion to stocking are the very turbid water at the Kunitz pond and a lack of offspring of stocked bass at the Retzloff pond.

During the past three segments, a number of observations have been made concerning the success of such an experiment. Most important of these observations is that a number of uncontrollable variables affect experimental results. Some of those experienced during this segment are: pond quality, water quality, pond location, presence of undesirable fishes, and pond ownership.

Due to the inability to locate ponds of identical quality and thus limit these variables, it is felt that the experiment should be carried on for additional segments under more controllable conditions.

State of ___Texas___

Project No. ___F-6-R-14___   Name: Fishery Investigations - Region
                                          5-B

Job No. ___E-6___   Title: Experimental Stocking of Large-
                                           mouth Bass and Threadfin Shad
                                           in Ponds in South Texas

Period Covered: ___January 1, 1966 to December 31, 1966___

Objectives:

1. To determine the stocking ratio presenting the best growth rate for largemouth bass in ponds previously stocked with threadfin shad as forage.

2. To determine the stocking ratio providing the best fishing success in ponds previously stocked with threadfin shad as forage.

3. To determine the stocking rate which produces the best combination of growth and yield of largemouth bass in ponds previously stocked with threadfin shad for forage.

Procedures:

Growth Studies

Largemouth bass (Micropterus salmoides) and threadfin shad (Dorosoma petenense) samples were collected monthly at three of the four originally stocked ponds. Experimental use of one pond was terminated and will be discussed later.

Bass samples were ordinarily collected by angling with artificial and live baits. Shad and juvenile bass were taken with seines. It was intended that no less than ten bass would be collected during each month, but this figure was not attained at times.

Length and weight were recorded for most of the bass specimens. The weight of some young fish taken during hot weather was not measured for fear that this additional handling would impare their survival. Only casual observations on shad growth were made, since their survival was the basic concern.

Yield Studies

Beginning in September, pond owners were encouraged to fish the ponds. In order to approximate normal harvest conditions, bass weighing 400 grams

or more collected by project personnel were also removed from the ponds.

To estimate bass population densities, the mark and recapture program was continued. Specimens were recorded as either recaptures or non-recaptures at time of collection. Bass were marked by clipping a pelvic fin flush with the body - right pelvic for first generation (stocked bass) and left pelvic for second generation (progeny).

Pond owners were informed of this program and asked to help by recording the number of clipped bass which they removed.

The number of man-hours which project personnel spent angling and the number of bass caught were recorded. Pond owners were requested to do likewise, but none supplied any data.

Turbidity and water temperature were recorded each month and water analyses conducted bimonthly.

Results and Discussion:

Growth Studies

Several methods are available for determining the pond having the best growth. The choice depends on the type of growth being measured and the growth criteria.

The length-frequency distributions by month given in Figures 1-3 provide a measure of absolute growth in terms of length gain per time interval (slope) and allow separation of generations. These data probably give the best short-term presentation of growth.

Linear regression of mean standard length on month was computed for the data from the stocked bass. The regression slopes, b, were: Hunter pond, b = 9.2; Retzloff pond, b = 8.00; and Kunitz pond, b = 3.64. In this measurement, b = 0.00 indicates no growth.

This method is not entirely valid for measuring rate of growth, since the fingerling bass stocked at Kunitz pond were larger than those stocked at the other ponds and the growth slope is less for smaller (=younger) fishes and the growth slope is not exactly linear. Tentative interpretation of the growth rates indicates that the stocked bass of the Retzloff and Hunter ponds are growing at a similar rate, but the stocked bass of Kunitz pond are growing considerably slower. No tests of significance will be made until completion of the experiment.

Figures 4-6 give the scatter diagrams for length and weight. These include both the stocked bass and their progeny and are not useful for comparisons, since no young have been taken at the Retzloff pond.

St. length
interval

St. length interval	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
340-349																	
330-339																	
320-329																	
310-319																	
300-309																	
290-299																	
280-289															1	1	
270-279																	
260-269															1		1
250-259											1	1	3			1	
240-249							1			3	3	3	3		2		
230-239			1		1	1	2	2	1	3	1	2					
220-229			2	3	6	2	2	4	3	4							
210-219		1	4	6	4	1	2	5	5	1	1						
200-209		1	3	1	1		1	1									
190-199		5	1														
180-189	2	5	1														
170-179	7														1		
160-169	1																
150-159															1		
140-149													1				
130-139																	
120-129																	
110-119													2				
100-109																	
90-99													1			1	1
80-89													3	2	1		2
70-79													2	1	1		
60-69													1	1			1
50-59													2	1	2		6
40-49																	
30-39															1		
20-29																	
10-19																	
0-9																	

Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
　　　　1965　　　　　　　　　　　　　　1966

Figure 1 - Length Frequency Distribution for Kunitz Pond

St. length
interval

St. length interval	Aug '65	Sep '65	Oct '65	Nov '65	Dec '65	Jan '66	Feb '66	Mar '66	Apr '66	May '66	Jun '66	Jul '66	Aug '66	Sep '66	Oct '66	Nov '66	Dec '66
340-349																	
330-339																	
320-329																	
310-319																	
300-309																	
290-299																	
280-289														2	1		
270-279														1	1	1	1
260-269														2	2	2	1
250-259												2		2	2	1	
240-249												2		3			
230-239										1	1	1					
220-229									2	3	3						
210-219							1		2	5	3						
200-209					1			1	2								
190-199							1	2	1	1							
180-189			3		4	3	1	1									
170-179		1			3			1									
160-169	4	4	3	4	2												
150-159		2	1	3													
140-149	5	8	9	1													
130-139		1															
120-129	1																
110-119																	
100-109																	
90-99																	
80-89																	
70-79																	
60-69																	
50-59																	
40-49																	
30-39																	
20-29																	
10-19																	
0-9																	

Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

1965   1966

Figure 2 - Length Frequency Distribution for Retzloff Pond

St. length
interval

St. length interval	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
340-349																	
330-339																	
320-329																	
310-319																	1
300-309																1	
290-299													1	1	1	1	
280-289													2	3		1	
270-279												2	5	3	1	1	
260-269											2	1	2	2	1	1	
250-259											3	4	3				
240-249								1	3	3	7	4					
230-239			1				2	3	6	7	5	2	1				
220-229					2		6	5	6								2
210-219				4	4		3	5	4	1						1	1
200-209		2	3	6	5		1	1							2		2
190-199		6	11	13							1					1	
180-189	1	10	10	10										2	2	4	1
170-179	3	7	2	3										1	1		
160-169	5	3	1														
150-159																	
140-149	1														3		
130-139																1	
120-129																	
110-119																	
100-109																	
90-99																	
80-89																	
70-79																	
60-69														2			
50-59														7			
40-49														3			
30-39																	
20-29																	
10-19																	
0-9																	

Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
    1965   1966
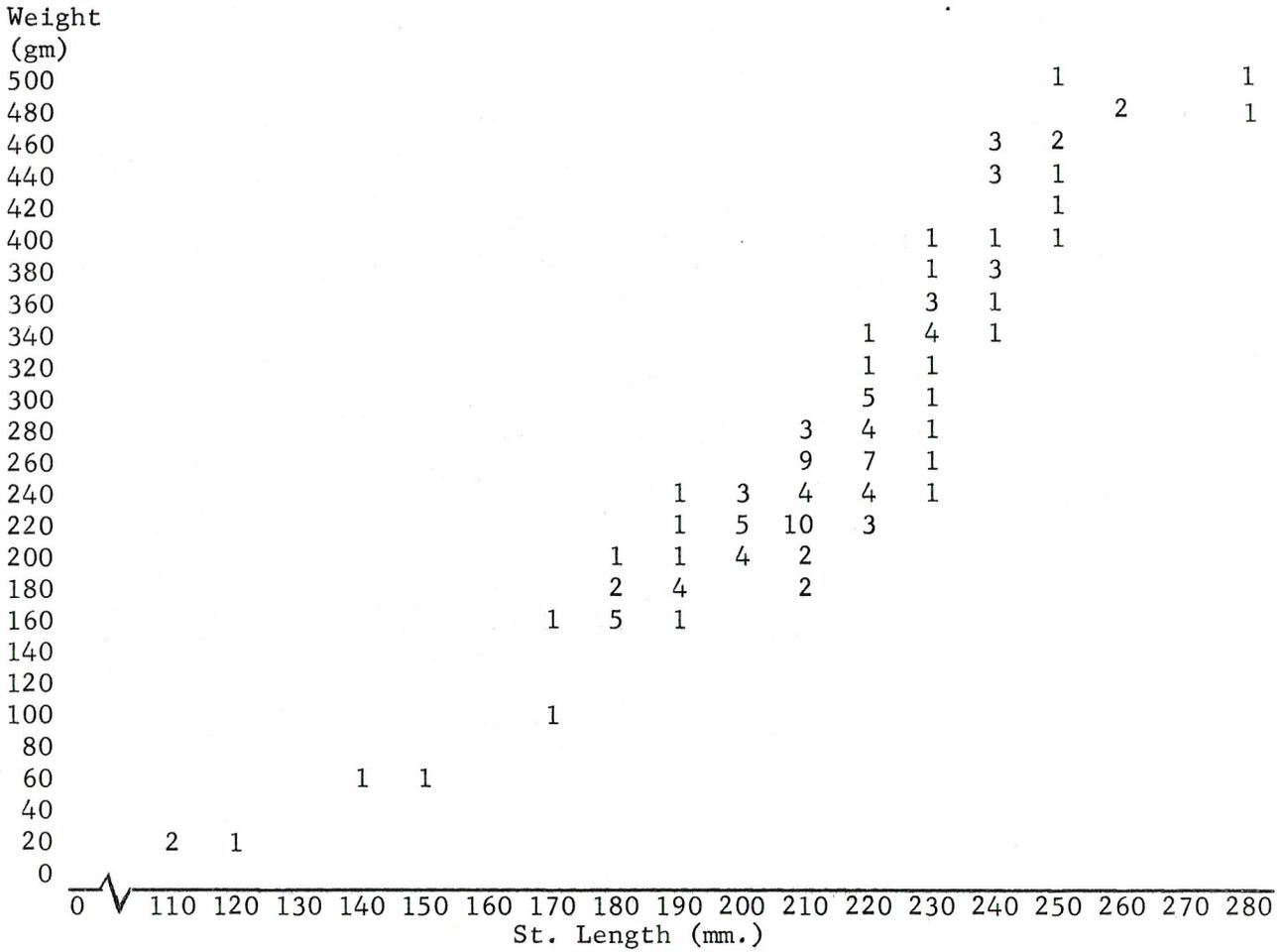
Figure 3 - Length Frequency Distribution for Hunter Pond

Weight (gm)

Weight (gm)	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280
500														1				1
480															2			1
460													3	2				
440													3	1				
420														1				
400												1		1	1			
380												1		3				
360													3	1				
340										1			4	1				
320													1	1				
300													5	1				
280										3			4	1				
260										9			7	1				
240								1		3	4		4	1				
220									1	5	10	3						
200							1	1	4		2							
180							2	4			2							
160						1	5	1										
140																		
120																		
100							1											
80																		
60				1	1													
40																		
20		2	1															
0																		

St. Length (mm.)

Figure 4 - Length-weight Frequency Distribution for Kunitz Pond

Weights are given in intervals of 20 grams. Standard lengths are given in intervals of 10 millimeters.
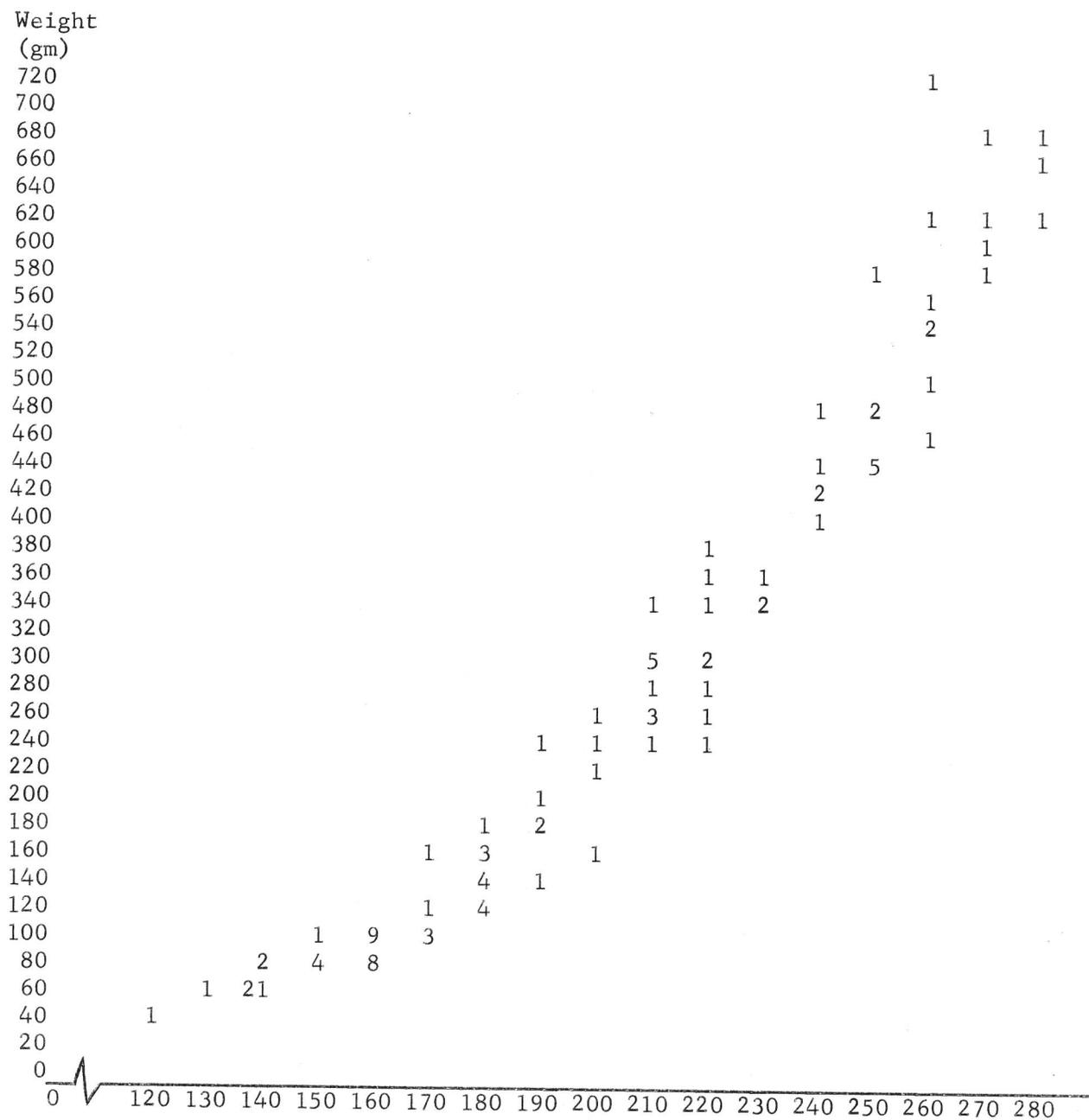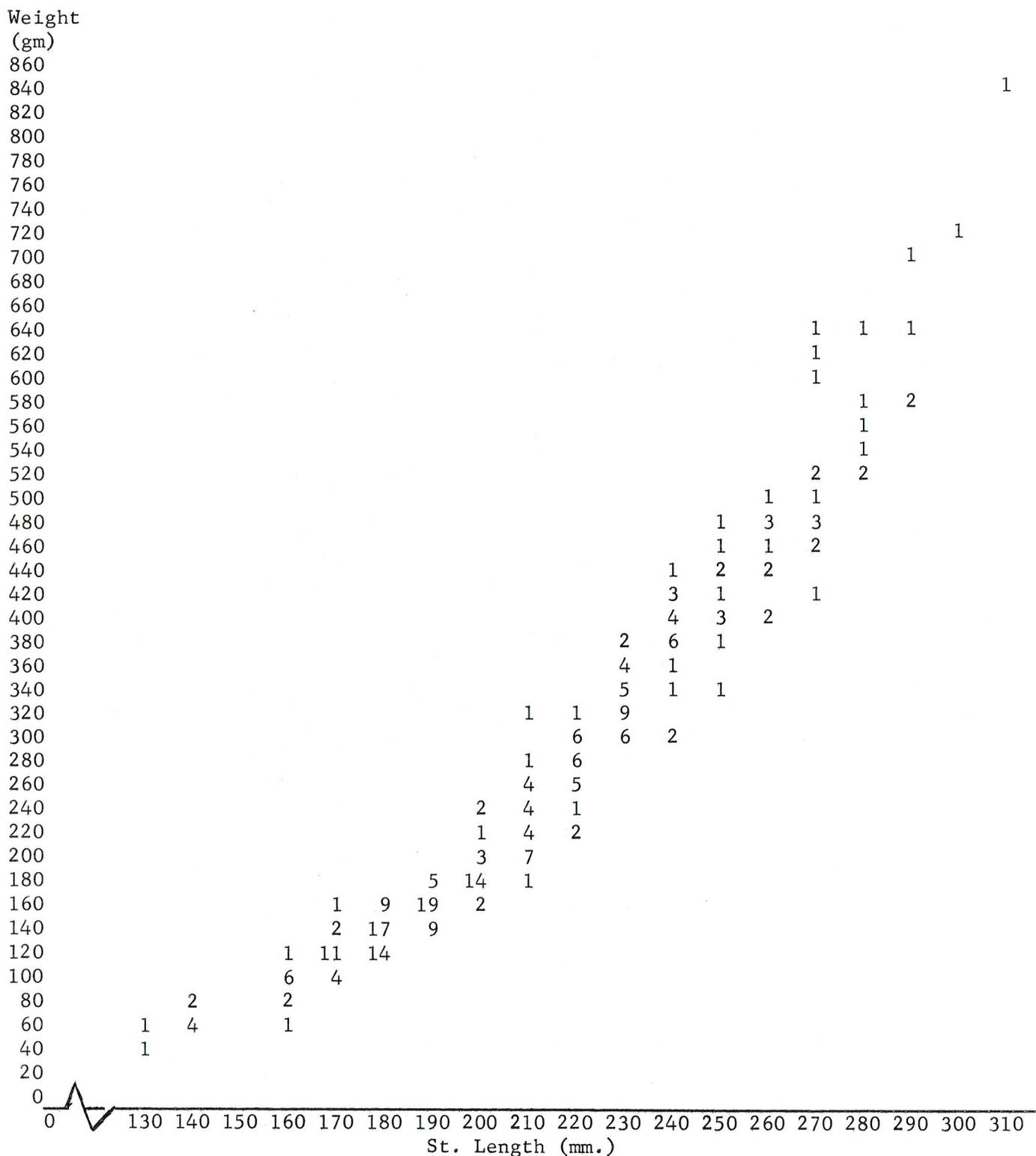
Weight (gm)

Weight (gm)	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280
720															1		
700																	
680																1	1
660																	1
640																	
620															1	1	1
600																1	
580														1		1	
560															1		
540															2		
520																	
500															1		
480													1	2			
460															1		
440													1	5			
420													2				
400													1				
380										1							
360										1	1						
340									1	1	2						
320																	
300									5	2							
280									1	1							
260								1	3	1							
240							1	1	1	1							
220								1									
200							1										
180						1	2										
160					1	3		1									
140						4	1										
120					1	4											
100			1	9	3												
80		2	4	8													
60	1	2	1														
40	1																
20																	
0																	

Figure 5 - Length-weight Frequency Distribution for Retzloff Pond

Weights are given in intervals of 20 grams. Standard lengths are given in intervals of 10 millimeters.

Weight (gm) vs. St. Length (mm.) — Length-weight frequency distribution:

Weight (gm)	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310
860																			
840																1			
820																			
800																			
780																			
760																			
740																			
720																		1	
700																	1		
680																			
660																			
640														1		1	1		
620														1					
600														1					
580																1	2		
560																1			
540																1			
520														2			2		
500													1	1					
480												1	3	3					
460												1	1	2					
440											1	2	2						
420											3	1		1					
400											4	3	2						
380										2	6	1							
360										4	1								
340										5	1	1							
320								1	1	9									
300								6	6	2									
280							1	6											
260							4	5											
240							2	4	1										
220							1	4	2										
200							3	7											
180						5	14	1											
160				1	9	19	2												
140				2	17	9													
120			1	11	14														
100				6	4														
80		2		2															
60	1	4		1															
40		1																	
20																			
0																			

St. Length (mm.)

Figure 6 - Length-weight Frequency Distribution for Hunter Pond

Weights are given in intervals of 20 grams. Standard lengths are given in intervals of 10 millimeters.

The stocking specifications of the ponds are given in Table 1. A most alarming observation is that the growth rate of the bass is directly proportional to the rate of stocking. This is diametrically opposite the theoretical model for fish growth which implies that the best growth would occur at the pond with the least competition.

Table 1
Stocking Specifications of the Experimental Ponds

	Kunitz	Retzloff	O'Brien	Hunter
Stocking rate per acre	50	100	150	200
Surface acres	1.1	3.0	2.6	3.4
Total bass stocked	55	300	390	680

It is hardly likely that the model has been reversed. If the experimental design of the job had been such that only the number of bass stocked per acre varied and all other environmental factors were equal (or near equal), the model would have been attained and the magnitude of deviation in growth between stocking rates measured for significance. These results indicate that far greater error (result deviation) was caused by uncontrollable factors than by the intended source of deviation (stocking rate per acre). This is often the case when private ponds are used for experimental purposes.

Some of the observed factors influencing growth over which there was no control were:

1. Hunter Pond

    a. Surface area - Since a two-foot variation in water level doubles or halves the area, a bass per acre rate is almost meaningless. Stocking was done in the summer when the level was down; subsequent filling nearly doubled the area and halves the stocking ratio. The principle water source was a well which would maintain the level, but the pond owner would not leave the pump running.

    b. Owner cooperation - The owner allowed friends to fish the pond and did not report the results to project personnel.

2. O'Brien Pond (terminated for experimental use in June)

    a. Construction - The lake was built by damming a small creek, and in times of heavy rains an entire turnover of water occurs.

    b. Undesirable fishes - These probably entered from below and above the lake. The lake was treated in November after termination and many smallmouth buffalo were found.

c. Owner cooperation - There was no cooperation. Gates to the pond were always locked, and project personnel were denied keys, causing much loss of time.

3. Retzloff Pond

a. Water quality - The pond is located in an area rich in sulfur deposits and is fed by an artesian well. Hydrogen sulfide gas is evident at the well and the water has a high concentration of sulfates. Most of the bass collected during the first six months of the job had external ulcers and were in poor condition. No young have been collected, indicating that no spawn occurred or that the young did not survive. No threadfin shad have been collected either, and this is also blamed on water quality.

b. Proximity to headquarters - The pond is approximately 100 miles from Corpus Christi and this introduces considerable trouble into sampling.

4. Kunitz Pond

a. Water quality - The pond is quite turbid (see Table 2) which interferes with proper feeding.

b. Aquatic vegetation - Although turbid, there is a tendency for infestation by pond weeds and musk grass which also interferes with feeding.

c. Undesirable fishes - The pond contains large numbers of bluegill, white crappie, bullhead, and various sunfishes. Some of these species compete with young bass for food or feed on threadfin shad competing with the adult bass for forage.

Results and Discussion:

Yield Studies

One of the greatest sources of error in the experiment has been the inability to accurately measure the bass populations of the experimental ponds. Past methods of making counts at the termination of the experiment have proven unreliable.

In order to estimate the populations, Schnabel's methods have been applied to a mark and recapture program. The formular used was:

$$P = \sum \text{marked fish (unmarked fish + recaptured marked fish) } / \sum \text{recaptures}$$

A monthly record was kept of the bass caught and the number marked. The number of marked bass in the pond at the end of each month, together with those caught, and the number of returns was used to compute total population estimates. These computations are given in Tables 3, 4, and 5.

Table 2
Water Turbidity by Month for Kunitz, Retzloff, and Hunter Ponds
as Determined by Secchi Disc Readings in Inches

Month and Year	Kunitz	Retzloff	Hunter
August 1965	13	11	36
September	9	12.5	36
October	8	7	36
November	8.5	14.5	36
December	9.5	26	16
January 1966	8	12	15.5
February	12	18	19
March	12	19	20
April	12.5	15	30
May	9	15	
June		17	
July	10	29	30
August	11	34	30
September	5.5	19	25
October	5.5	20	12
November		20	15
December	7	17	6.5
January 1967	8	15	11
Mean visibility	9.28	17.8	23.40

Table 3

Monthly Population Estimates of Stocked Bass for Kunitz Pond
by Using Schnabel's Population Equation

Sample date	No. Caught A	No. Marked	No. Marked in Lake B	No. Removed	A·B	ΣA·B	No. Returns C	ΣC	Est. Pop. ΣA·B/ΣC
Sep 65	13	12	12		144	144	1	1	144
Oct	12	11	23		69	213	2	3	71
Nov*	3	1	24		168	381	3	6	64
Nov*	7	4	28		336	717	5	11	65
Dec	12	7	35		140	857	3	14	61
Jan 66	4	1	36		288	1145	3	17	67
Feb	8	5	41		492	1637	3	24	68
Mar	12	5	46		414	2051	7	31	66
Apr	9	2	48		288	2339	7	36	65
May*	6	1	49		245	2584	5	41	63
May*	5	0	49		294	2878	5	46	63
June	6	1	50		300	3178	5	51	62
July*	6	0	50	1 NM	100	3278	5	52	63
July*	2	1	51		153	3431	1	55	62
Aug*	3	0	51		102	3533	3	57	62
Aug*	0	0	51						
Sep	0	0	51						
Oct*	2	0	51		102	3635	2	59	62
Oct*	2	0	51		102	3737	2	61	61
Nov*	0	0	51	1 M					
Nov*	0	0	50						
Dec	1	0	50	1 M	50	3787	1	62	61

M – Indicates marked fish

NM – Indicates non-marked fish

* – Indicates two separate samples

Table 4

Monthly Population Estimates of Stocked Bass for Retzloff Pond
by Using Schnabel's Population Equation

Sample Date	No. Caught A	No. Marked	No. Marked in Lake B	No. Removed	A·B	ΣA·B	No. Returns C	ΣC	Est. Pop. ΣA·B/ΣC
Sep 65	16	15	0	1 NM			0	0	
Oct	16	16	15		240	240	0	0	
Nov	8	8	31		248	488	0	0	
Dec	10	9	39	1 NM	390	878	0	0	
Jan 66	0	0	48			878	0	0	
Feb	3	3	48		144	1022	0	0	
Mar*	1	1	51		51	1073	0	0	
Mar*	2	2	52		104	1177	0	0	
Apr	5	5	54		270	1447	0	0	
May	3	2	59	1 NM	177	1624	0	0	
June	5	3	61		305	1929	2	2	964
July	9	7	64		576	2505	2	4	626
Aug	11	9	71		781	3286	2	6	548
Sep	4	2	80		320	3606	2	8	451
Oct	10	1	82	1 NM	820	4426	0	10	442
Nov	6	0	83		498	4924	1	11	448
Dec	3	2	83		249	5173	1	12	431

M - Indicates marked fish

NM - Indicates non-marked fish

* - Indicates two separate samples

Table 5

Monthly Population Estimates of Stocked Bass for Hunter Pond
by Using Schnabel's Population Equation

Sample Date	No. Caught A	No. Marked	No. Marked in Lake B	No. Removed	A·B	ΣA·B	No. Returns C	ΣC	Est. Pop. ΣA·B/ΣC
Sep 65	28	28	0		0		0	0	
Oct	28	28	28		784	784	3	3	784
Nov	37	33	56		2072	2856	3	3	952
Dec	11	12	89		979	3835	0	3	1278
Jan 66	0	0	101		0	3835	0	3	1278
Feb	12	9	101		1212	5047	3	6	841
Mar	15	12	110		1650	6697	3	9	744
Apr	19	12	122		2318	9015	7	16	563
May	11	10	134		1474	10489	1	17	617
June	18	12	144		2592	13081	6	23	569
July	13	8	156		2028	15109	5	28	540
Aug	14	6	164		2296	17405	7	35	497
Sep	9	4	170		1530	18935	5	40	473
Oct	3	2	174		522	19457	1	41	475
Nov	5	0	176	3 M 2 NM	880	20337	3	44	462
Dec	1	0	173	1 NM	173	20510	0	44	466

M - Indicates marked fish

NM - Indicates non-marked fish

As these data indicate, a period of six to eight months of marking and re-capturing is required for the population estimates to stabilize and afford an accurate measurement. Since sufficient numbers of offspring have not been marked to allow a true indication of their numbers, only stocked bass have been used for these population estimates.

The population estimates obtained for the Retzloff and Hunter ponds varied widely from the number of bass originally stocked (Table 4).

The discrepancy indicated for the Retzloff pond is probably due to the short period for which sampling of the recaptures has been successful and may adjust during the next few months. The deficiency of the Hunter pond is probably near correct, since it is known that the pond owner allowed friends to fish the pond prematurely and heavy harvest is suspected.

In order to show the estimated standing crops of stocked bass for each of the ponds, calculated weights were used together with population estimates to approximate pounds of bass per acre (Tables 6, 7, and 8).

Examination of the estimated standing crops for the ponds show Hunter's pond to be the heaviest producer, followed by Retzloff's and Kunitz's. Order of production of the ponds corresponds proportionally to the stocking rates thus far. It is felt that this will alter in the near future, however, since production is believed to be near its maximum at Hunter's now. If this as-sumption is correct, then the desirable stocking ratio, based on production alone, would be between 100 and 150 bass per surface acre. A lower stocking rate than 75 to 100 bass per acre would require approximately two years for maximum production, therefore, reducing both the time when catchable fish are available and the number of catchable fish.

Fishing success for the three ponds may be rated as very good at Hunter's, fair at Retzloff's, and poor at Kunitz's. These ratings are based on the presumption that one fish per man-hour fishing time is good. Table 9 gives the results of fishing success.

Although the best fishing occurred at the more heavily stocked ponds, these successes were not proportional to the number of bass stocked. While Kunitz's pond, which was stocked at the rate of 50 bass per acre, yielded an overall fishing success of 0.53 fish per man-hour, Retzloff's pond, stocked with 100 bass per acre, yielded only 0.68 fish per man-hour. Obviously, factors other than stocking rates are influencing fishing success. Two probable influences are: water turbidity, and the lack of offspring being produced.

The influence of water turbidity on fishing success is pointed out in Figures 7, 8, and 9. It is believed that the turbid condition of the water at Kunitz's pond is responsible for the low fishing success. Correlation analyses will later be used to determine if water turbidity or stocking rates have been the most important factor.

The second factor responsible for decreasing fishing success is a lack of offspring being produced by the stocked bass. A high concentration of sulfates in the Retzloff pond is believed to have prevented the production of offspring.

Table 6
Monthly Estimates of Standing Crop of Stocked Largemouth Bass
in Kunitz Pond in 1966

Month	Estimated weight (gm)*	Estimated population #	Estimated population weight (gm)	Estimated pounds per acre **
Jan	254	61	1.55×10^4	31.1
Feb	277	67	1.86×10^4	37.3
Mar	300	68	2.04×10^4	40.9
Apr	322	66	2.12×10^4	42.5
May	345	63	2.17×10^4	43.5
June	368	63	2.32×10^4	46.5
July	390	63	2.46×10^4	49.3
Aug	413	62	2.56×10^4	51.3
Sep				
Oct	459	61	2.84×10^4	56.9
Nov	481	61	2.93×10^4	58.7
Dec	504	61	3.07×10^4	61.5

* - Calculated from linear regression of mean sample weight on month
# - Calculated from Schnabel's mark and recapture method
** - Using 1.1 surface acres

Table 7
Monthly Estimates of Standing Crop of Stocked Largemouth Bass
in Retzloff Pond in 1966

Month	Estimated weight (gm)*	Estimated population #	Estimated population weight (gm)	Estimated pounds per acre **
Jan				
Feb	118			
Mar	165			
Apr	213			
May	261			
June	308	964	2.97×10^5	218
July	356	626	2.23×10^5	164
Aug	404	548	2.21×10^5	162
Sep	451	451	2.03×10^5	149
Oct	499	442	2.20×10^5	162
Nov	547	448	2.45×10^5	180
Dec	594	431	2.56×10^5	188

* - Calculated from linear regression of mean sample weight on month
\# - Calculated from Schnabel's mark and recapture method
** - Using 3.0 surface acres

Table 8
Monthly Estimates of Standing Crop of Stocked Largemouth Bass
in Hunter Pond in 1966

Month	Estimated weight (gm)*	Estimated population #	Estimated population weight (gm)	Estimated pounds per acre**
Jan				
Feb	216	841	1.82×10^5	118
Mar	265	744	1.97×10^5	128
Apr	314	563	1.77×10^5	115
May	360	617	2.22×10^5	144
June	412	569	2.34×10^5	152
July	461	540	2.49×10^5	161
Aug	510	497	2.53×10^5	164
Sep	560	473	2.65×10^5	172
Oct	609	475	2.89×10^5	187
Nov	658	462	3.04×10^5	197
Dec	707	466	3.29×10^5	213

* - Calculated from linear regression of mean sample weight on month
# - Calculated from Schnabel's mark and recapture method
** - Using 3.4 surface acres

Table 9

Fishing Success in Fish per Man-hour for Kunitz, Retzloff and Hunter Ponds

Month	Kunitz			Retzloff			Hunter		
	No. fish	No. man-hrs.	Fish per man-hr.	No. fish	No. man-hrs.	Fish per man-hr.	No. fish	No. man-hrs.	Fish per man-hr.
Aug 65				10	3.00	3.33	10	1.00	10.00
Sep	6	4.75	1.26	16	6.75	2.37	28	7.50	3.73
Oct	12	6.25	1.92	16	12.50	1.28	28	3.00	9.33
Nov	10	14.50	0.69	7	8.50	0.82	36	9.00	4.00
Dec	8	12.00	0.67	10	7.50	1.33	11	15.00	0.73
Jan 66	4	14.00	0.28	0	3.00	0.00	0	6.00	0.00
Feb	8	16.25	0.49	3	11.42	0.26	12	4.50	2.67
Mar	12	13.00	0.92	3	13.50	0.22	15	4.75	3.16
Apr	9	7.30	1.23	5	15.50	0.32	19	3.50	5.43
May	11	14.83	0.74	3	13.00	0.23	11	3.50	3.14
June	6	4.50	1.33	5	13.33	0.38	18	7.00	2.57
July	9	23.00	0.39	9	7.50	1.20	13	9.00	1.44
Aug	1	30.83	0.03	11	17.42	0.63	18	17.42	1.03
Sep	0	13.50	0.00	4	3.75	1.07	12	10.58	1.13
Oct	5	9.00	0.56	10	9.00	1.11	11	7.33	1.50
Nov	2	2.00	1.00	6	16.00	0.38	12	9.50	1.26
Dec	1	9.75	0.10	3	10.50	0.28	8	10.50	0.76
Jan 67	2	5.00	0.40	3	11.00	0.27	5	17.50	0.28
Total	106	200.46		124	183.17		267	146.58	
Mean			0.53			0.68			1.82
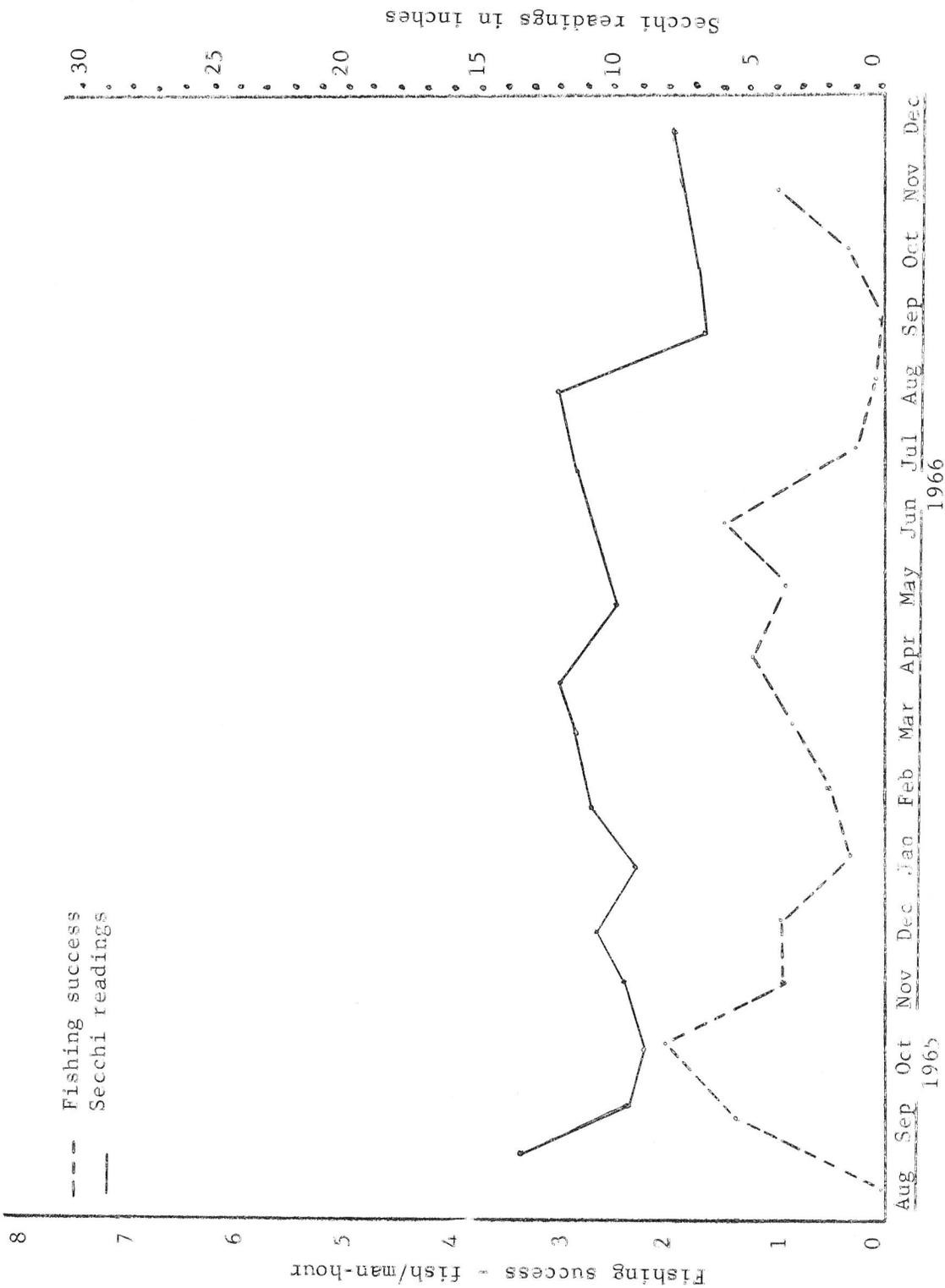
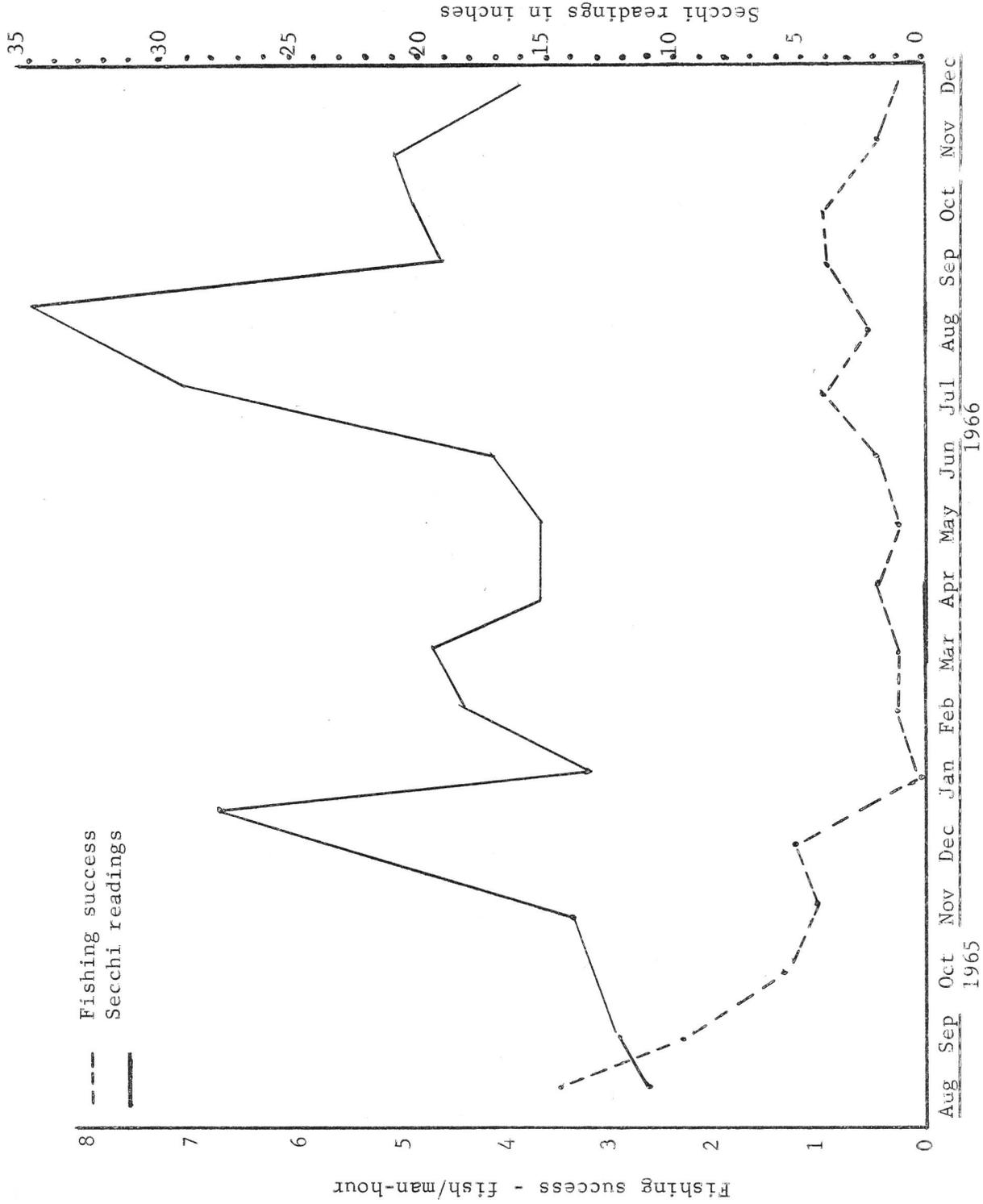Figure 7 - Comparison of Fishing Success with Secchi Readings at Kunitz Pond

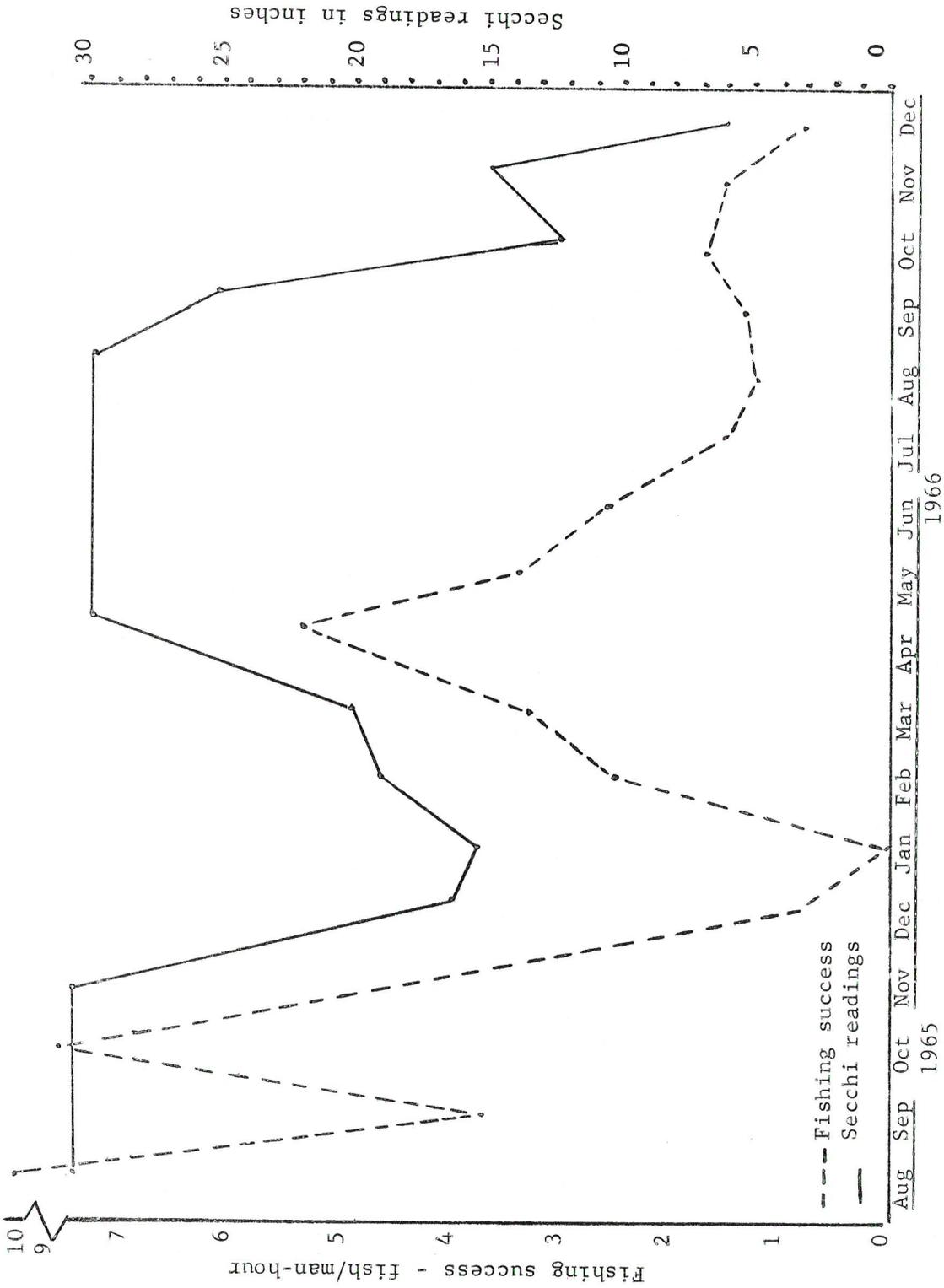Figure 8 ~ Comparison of Fishing Success with Secchi Readings at Retzloff Pond

Figure 9 - Comparison of Fishing Success with Secchi Readings at Hunter Pond

If this is true, then the number of bass per acre is less than it should be, thus accounting for the low fishing success.

Discussion and Recommendations:

Upon reviewing the work completed during the first three segments, several observations have been made concerning the success of the experiment. The most important observation is that many uncontrollable variables were encountered. Such variables as pond quality, water supply, water quality, pond location, and pond ownership have proven detrimental to the experiment. It is felt that these uncontrollable factors have influenced results as much or more than the experimental design, thus reducing faith in any conclusions which might have been reached.

Due to the presence of these variables, it is felt that the experiment should be carried on for at least two additional segments under more controlled conditions.

Acknowledgement:

Special recognition is made of Project Leader John C. Barron. His advice and help with the analysis and presentation of data have been very valuable in contributing to the experiment.

Prepared by John M. Travis
Asst. Project Leader

Approved by *Marion Toole*
Coordinator

Date March 8, 1967

Ernest G. Simmons
Regional Supervisor