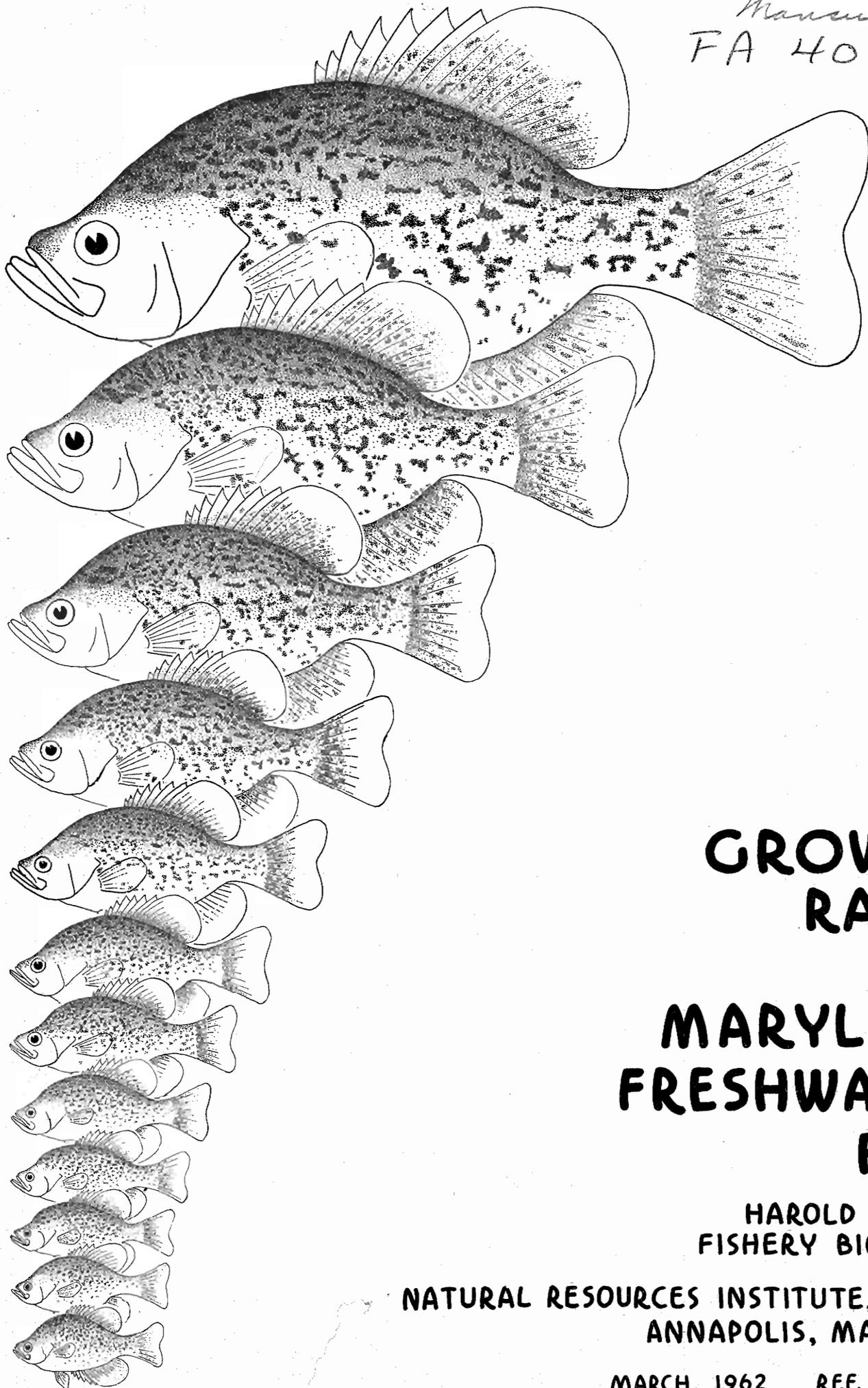


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GROWTH RATES OF MARYLAND FRESHWATER FISH

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Growth data obtained from a ten-year collection of scales from Maryland freshwater fish is presented, in this report, in graphs and tables especially designed to be useful for Maryland fishery management.

In 1948 we began taking scale samples from many of the fish encountered in the course of our freshwater work. A few years later the fishery management division of Maryland's Department of Game and Inland Fish also began collecting and interpreting scales. Data from both agencies were combined for this report.

The original purpose of the collections was to obtain a rough idea of the rates of growth of the various populations so they could be compared with those from other places and slow-growing or stunted populations could be detected. It was felt unnecessary to be extremely precise with the measurements because we recognized that the uncertainties of identifying and locating true annuli on fish scales made derived growth curves, at best, only crude approximations of the true pattern of growth. Consequently, we were satisfied to measure total length of all fish to the nearest tenth-inch trying to get, in the case of living fish, their relaxed length. We also recognized that differential growth rates have been found between the sexes of many species, but felt that this usually-slight difference, besides being masked by the errors of measurement, would be of little import to fishery management, so we made no attempt to measure it.

As collections piled up it became evident that sooner or later a rather useful compilation of growth curves could be made which would enable anyone to compare the curve of a specific population with that of the same species in Maryland as a whole or perhaps of some subdivision. This was felt to be a better standard than, say, a growth curve from a lake in Wisconsin.

So, without making any attempt to obtain our collections from a representative sample of lakes or streams or to try to weight our samples according to the relative number of fish in each place, we read hundred of scales, lumped their curves together as best we could into meaningful groups, and,

where enough data was available, have presented them in this report. The figures we have arrived at, therefore, are parameters for the data in the files rather than for the State or its subdivisions.

In order not to mislead the reader we have avoided the use of the word "average" and have substituted "normal" (still not the perfect word to use in this case, but the best we can come up with).

Very few fish, even of the same species, grow at identical rates, therefore, the lengths of any age group of the same species at any time form a frequency distribution in which there are a few slow growing fish and a few fast-growing fish, but the bulk of which are clustered near the middle of the range. This type of distribution is known to statisticians as a "normal curve". It is possible to divide any group of numbers into percentile groups, for instance, to pick out the ten percent lowest numbers, then the 10 percent next lowest, and so on until all the numbers are sorted into 10 equal piles (or they could be sorted by thirds, or fourths or sevenths or any other division). Now, if these numbers represent growth rates of individual fish, the lowest pile of numbers would represent the growth of the slowest growing fish and the pile of numbers at the top would represent the fastest growth. In this report we have selected the 20 percent lowest numbers and called them "slow growth". The 20 percent highest numbers we designated as "fast growth". The 60 percent in the middle we designated as "normal growth". We did this wherever we had at least 30 numbers to work with, because fewer than that might yield values rather wide of the mark. Inasmuch as the numbers equalled the calculated lengths of each fish at each birthday, we could plot on a graph the limits of the slow, fast and normal growths. When these limits were connected with lines, zones were formed which represented the three rates of growth.

Choosing the central 60 percent and calling it normal is purely arbitrary, we might have called the central 90 percent normal, but then almost any population of fish we might encounter would be called normal because the limits would be so very broad. At the other extreme, we might have selected the central ten percent as the normal group but if we did very few fish would be found to have growth rates which were normal. It seems that the 60 percent compromise is the best that could be made.*

*Had this mobilization of the data been intended for statisticians, two or three standard errors would have been used for the normal group, but it seems pointless to burden a non-statistician with such figures when the easier ones will serve our purpose.

The graphs which make up the bulk of this report are organized in this fashion:

A. Species

I. State wide

a. Geographical province

1. Individual lake or stream

(But graphs made only where data are numerous enough to be meaningful)

Each graph contains the following information:

- a. Species
- b. Area covered (State-wide, etc.)
- c. Source of specimens
- d. Limits of fast-growth zone
- e. " " normal " "
- f. " " slow " "
- g. Number of fish-birthdays (all fish are considered to be born on Jan 1) entering the calculations at each annulus. Inasmuch as the fish came in many ages, there were more first-birthdays than seconds, more seconds than thirds, etc.
- h. The length, in inches, of the fastest growers among the group being reported on.
- i. The upper limits of the "normal range", that is, the largest fish among the central sixty percent.
- j. The average of all the fish reported on. These are not shown as a line on the graph as are the others. This is to discourage thinking of "average" as being synonymous with "normal".
- k. The lower limits of the "normal range", that is, smallest fish at each birthday, of the central sixty percent.
- l. The length, in inches, of the slowest growers at each birthday, of the group being reported on.

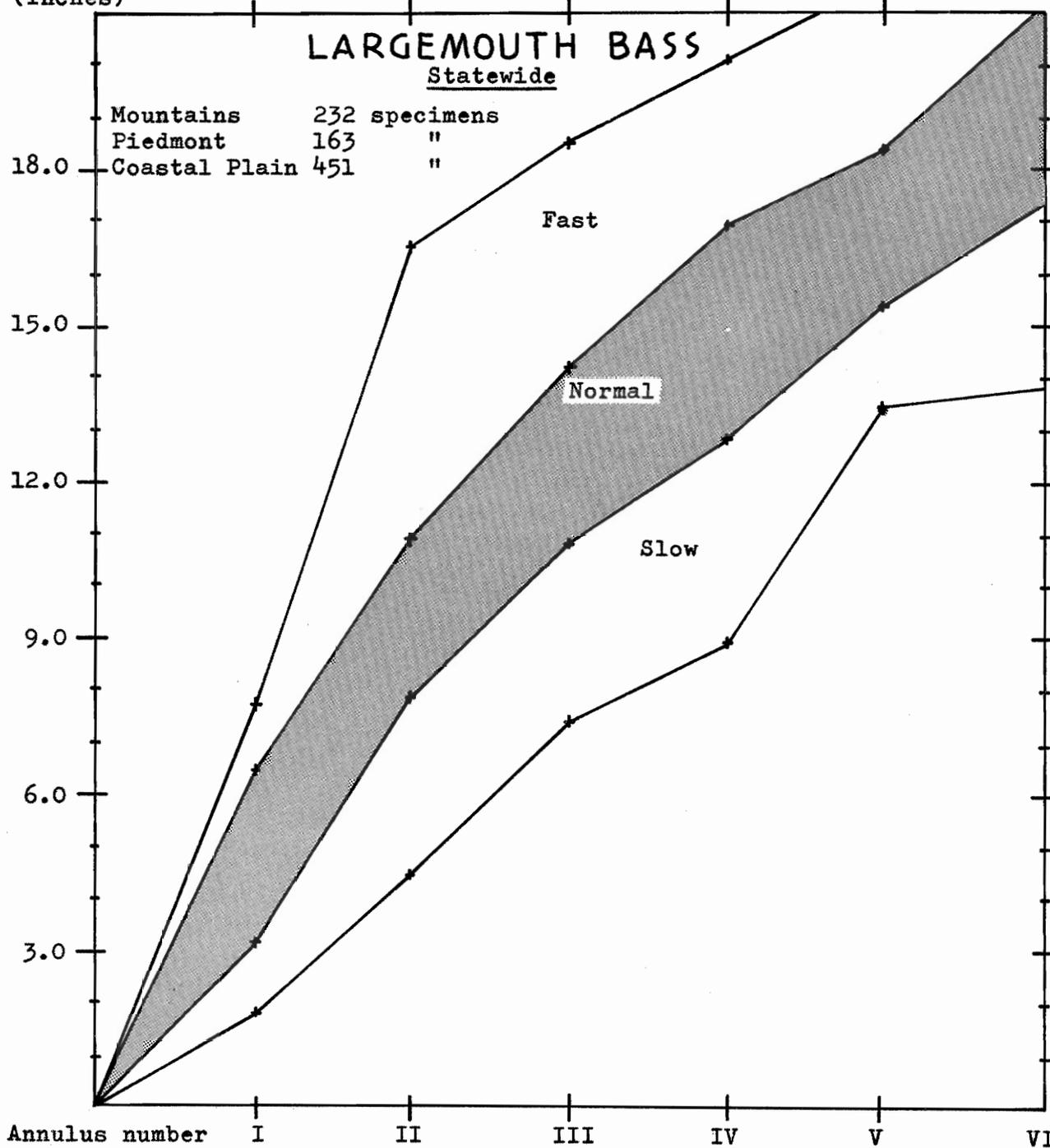
The graphs are arranged in alphabetical order according to common names. Scientific names are not given but they can be found by consulting the American Fisheries Society Special Publication No. 2 (1960) entitled "A list of Common and Scientific Names of Fishes From the United States and Canada, Second Edition".

The scales were read by perhaps twenty different people, but the variability among these readers is probably not as great as among a random sample of scale readers because all of these readers were trained by the author. This does not assure greater accuracy, but it does make for some degree of consistency.

GROWTH STUDIES OF MARYLAND FISH

1949-1959

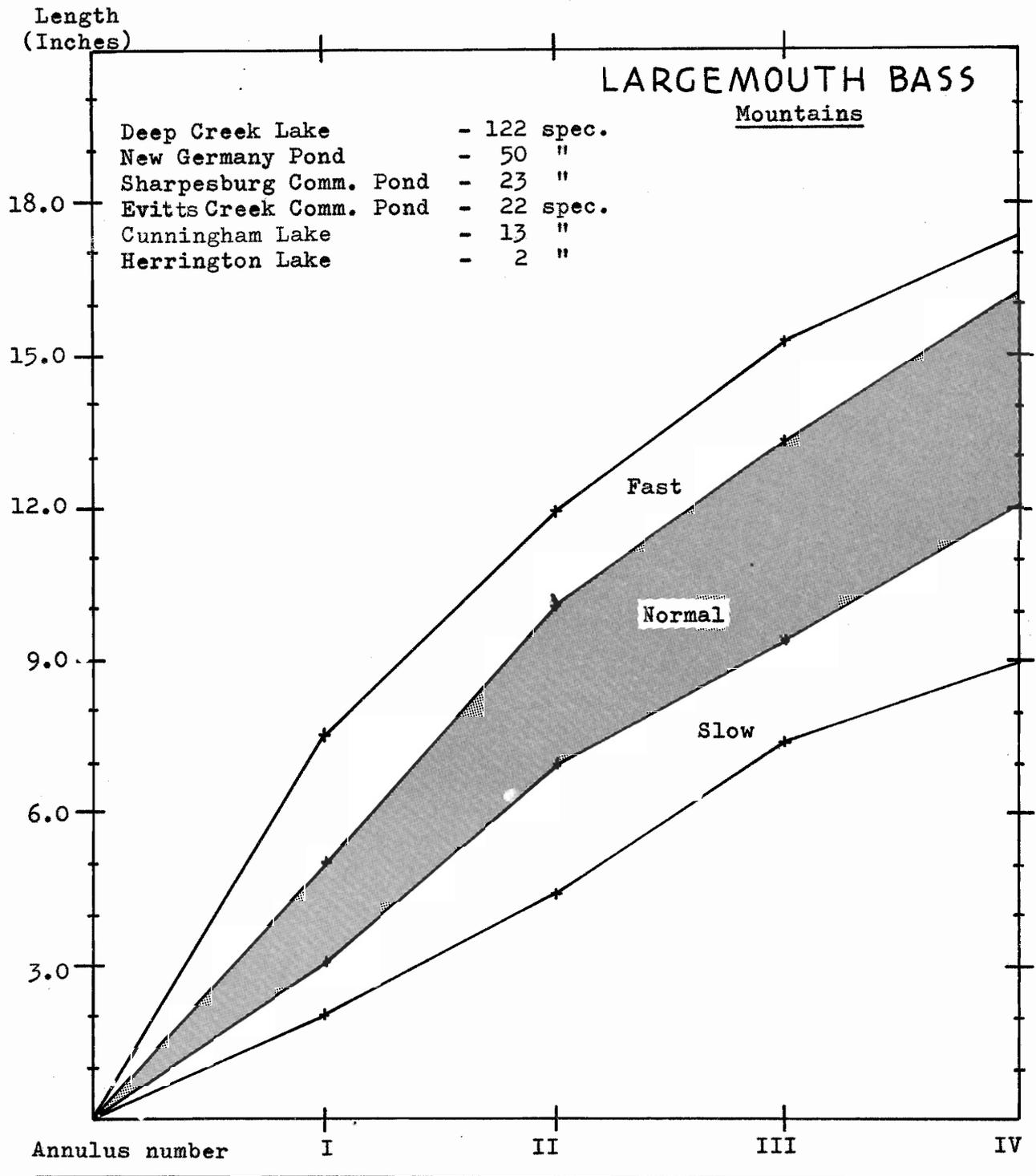
Length
(Inches)



	I	II	III	IV	V	VI
Number of fish	836	583	291	148	84	31
Largest fish	7.8	16.5	18.5	20.0	21.9	22.8
<u>Normal</u> {						
Upper	6.5	10.8	14.2	16.9	18.4	20.1
Average	4.7	9.6	12.4	15.0	17.0	18.6
Lower	3.1	7.8	10.8	12.9	15.4	17.4
<u>Range</u> {						
Smallest fish	1.8	4.5	7.5	9.0	13.6	13.8

GROWTH STUDIES OF MARYLAND FISH

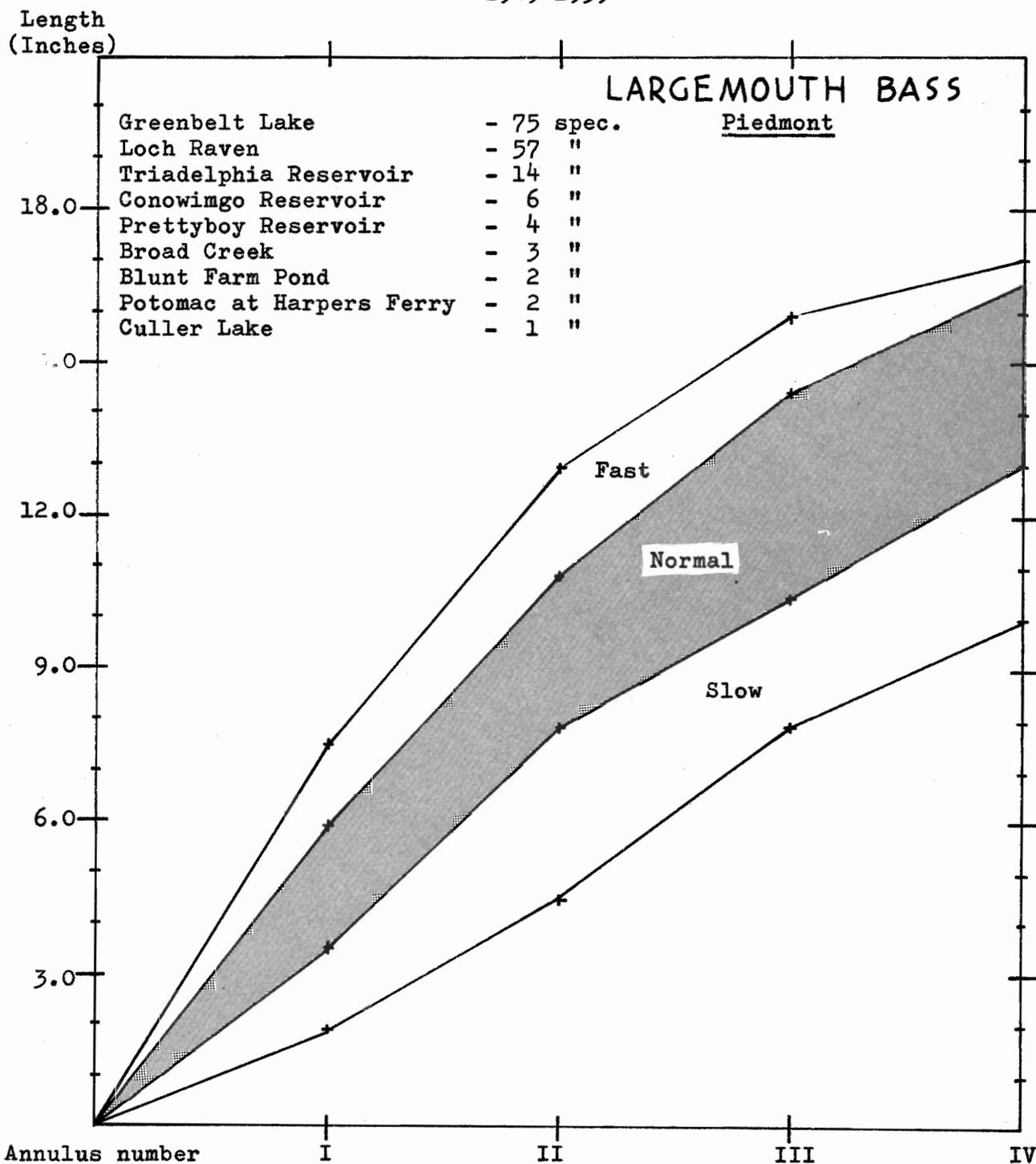
1949-1959



	I	II	III	IV	V
Number of fish	222	120	72	43	26
Largest fish	7.6	12.0	15.5	17.5	19.7
<u>Normal</u> <u>Range</u>	Upper	5.1	10.2	13.4	16.3
	Average	4.3	8.8	11.5	14.4
	Lower	3.1	7.0	9.5	12.1
Smallest fish	2.0	4.5	7.5	9.0	11.4

GROWTH STUDIES OF MARYLAND FISH

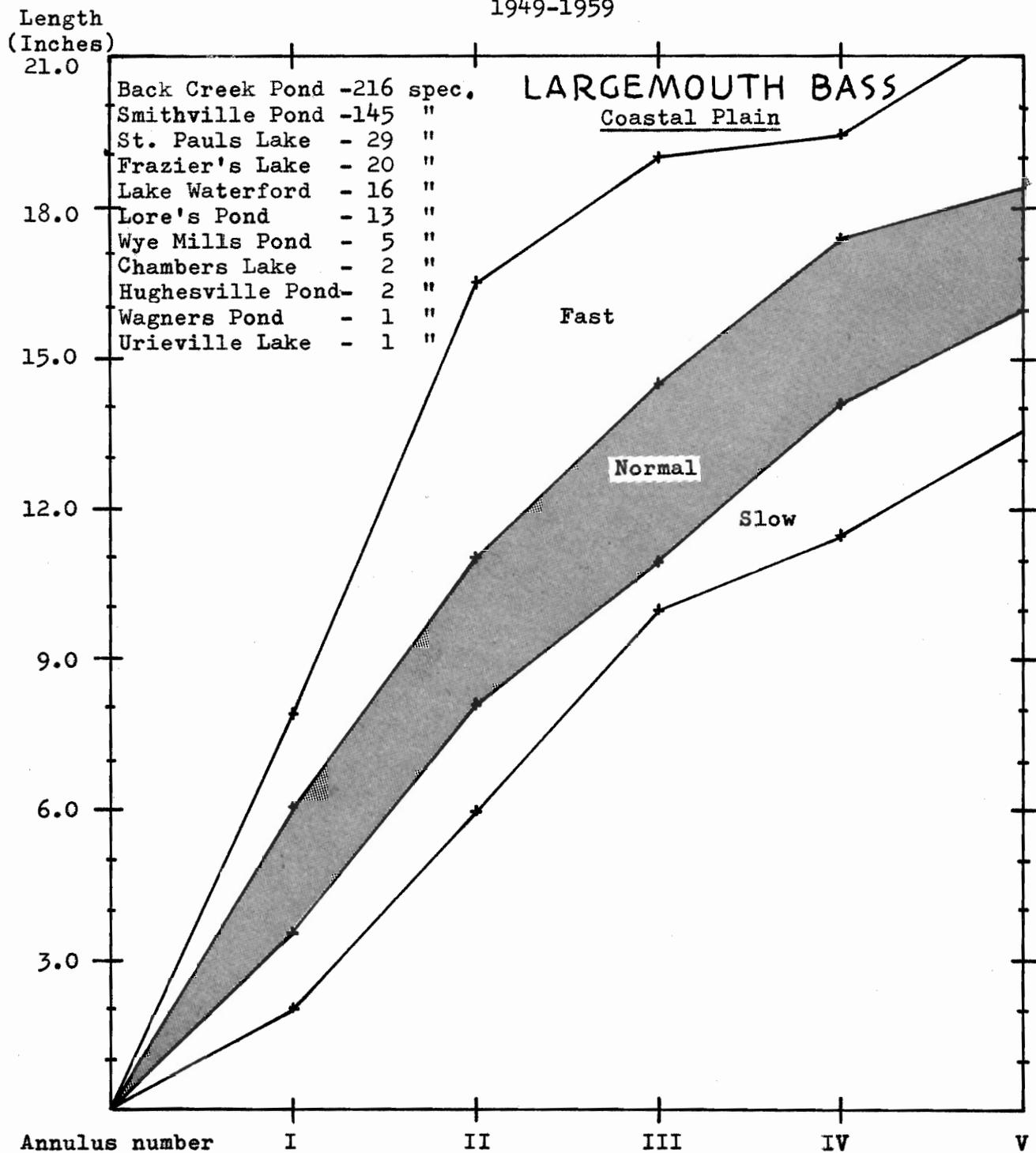
1949-1959



	I	II	III	IV	V
Number of fish	163	125	64	38	26
Largest fish	7.6	13.0	16.0	17.0	19.9
<u>Normal</u>	5.9	10.8	14.4	16.6	
{ Upper					
{ Average	4.8	9.4	12.6	15.5	
<u>Range</u>	3.5	7.9	10.4	13.1	
{ Lower					
Smallest fish	1.8	4.5	8.0	10.0	16.0

GROWTH STUDIES OF MARYLAND FISH

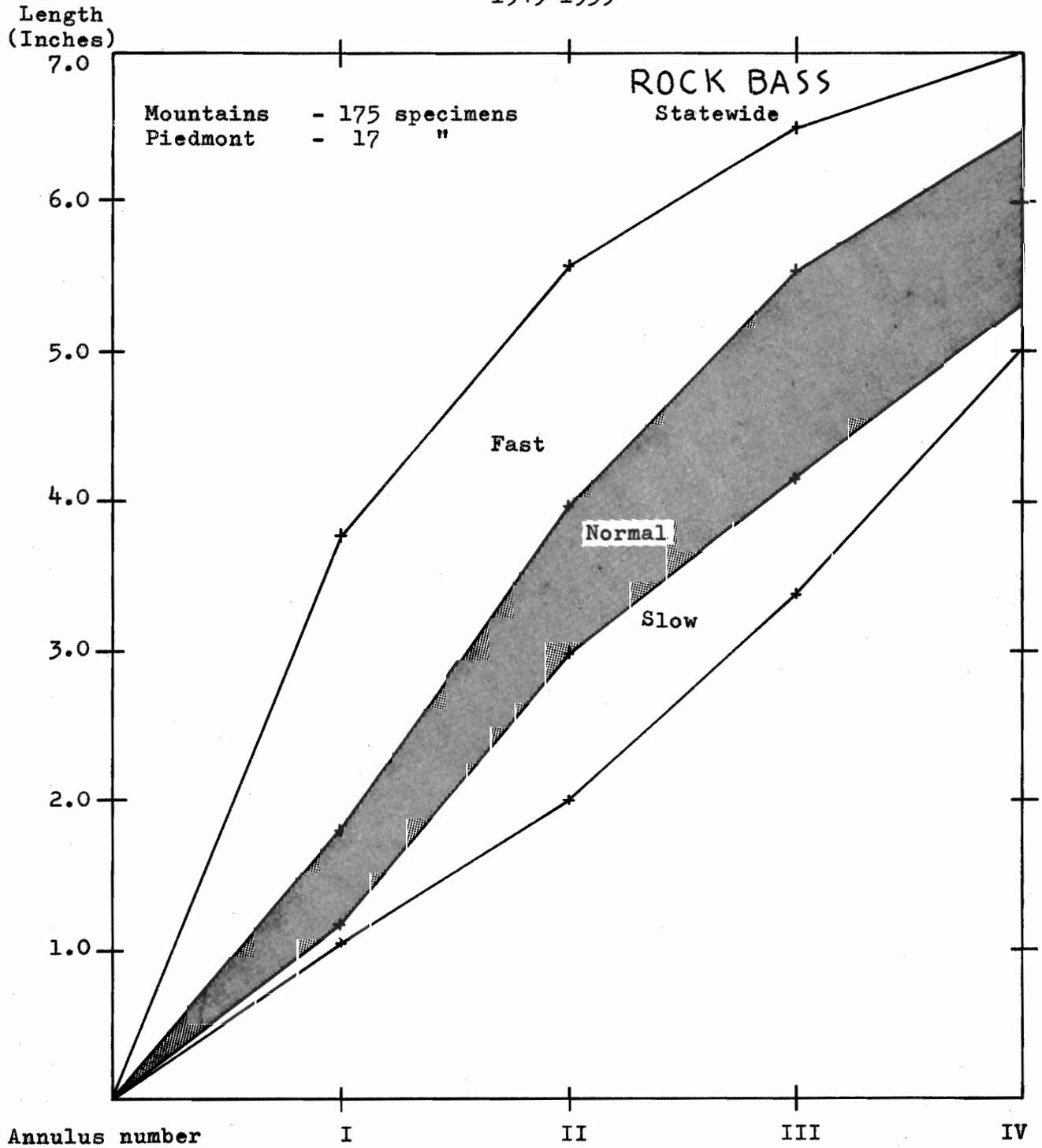
1949-1959



	I	II	III	IV	V	
Number of fish	451	338	155	67	32	
Largest fish	7.8	16.5	19.0	19.5	21.9	
<u>Normal Range</u>	Upper	6.1	11.0	14.6	17.4	18.4
	Average	4.9	9.7	13.0	15.3	16.9
	Lower	3.6	8.1	11.0	14.2	16.0
Smallest fish	2.0	6.0	10.0	11.5	13.6	

GROWTH STUDIES OF MARYLAND FISH

1949-1959

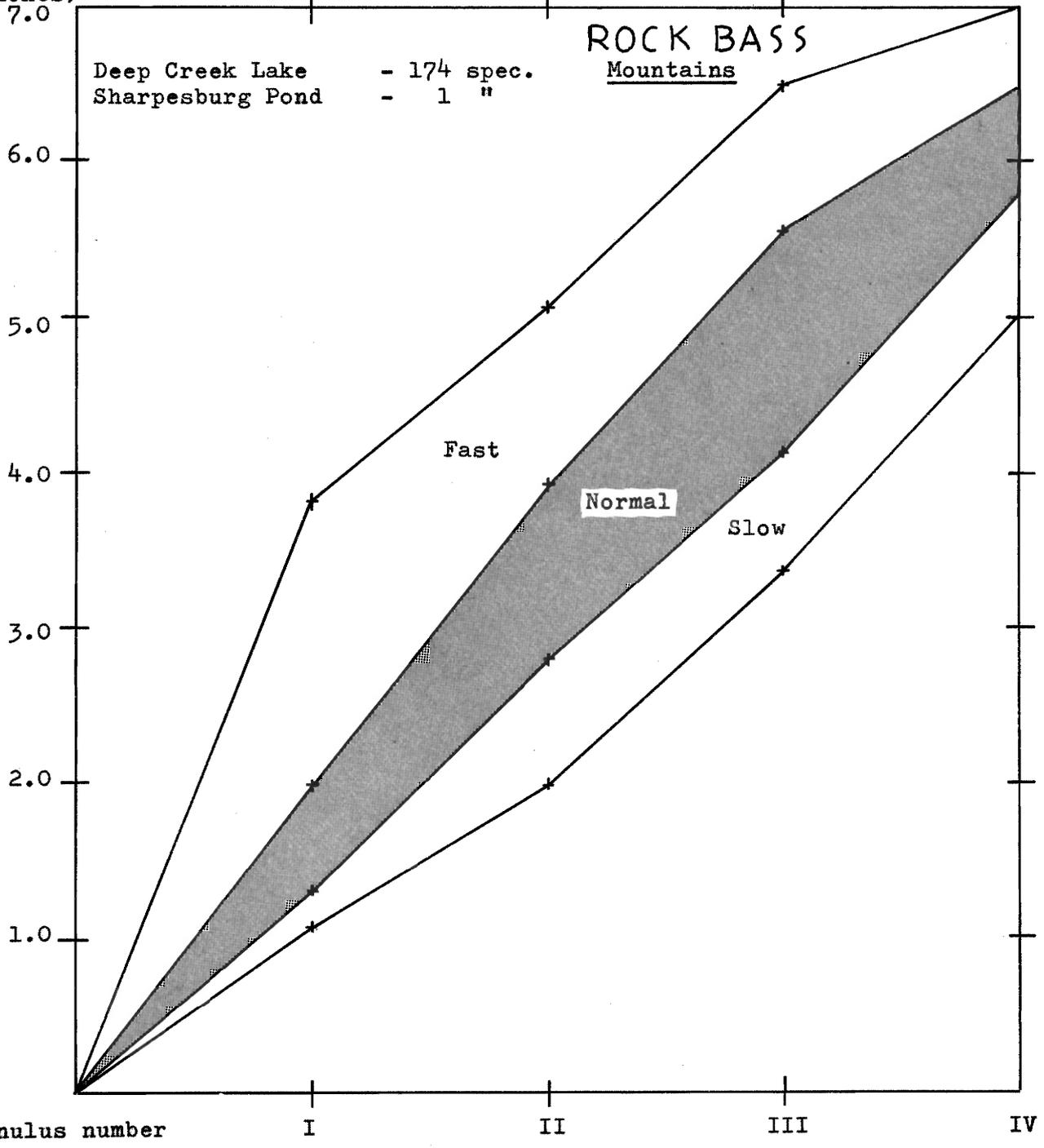


	I	II	III	IV	V	VI	VII
Number of fish	192	153	72	46	13	3	2
Largest fish	3.8	5.6	6.5	7.0	7.1	7.7	8.7
<u>Normal Range</u>							
{ Upper	1.8	4.0	5.6	6.5			
{ Average	1.6	3.5	4.9	5.8			
{ Lower	1.2	3.0	4.2	5.3			
Smallest fish	1.1	2.0	3.4	5.0	5.4	6.7	8.3

GROWTH STUDIES OF MARYLAND FISH

1949-1959

Length
(Inches)
7.0

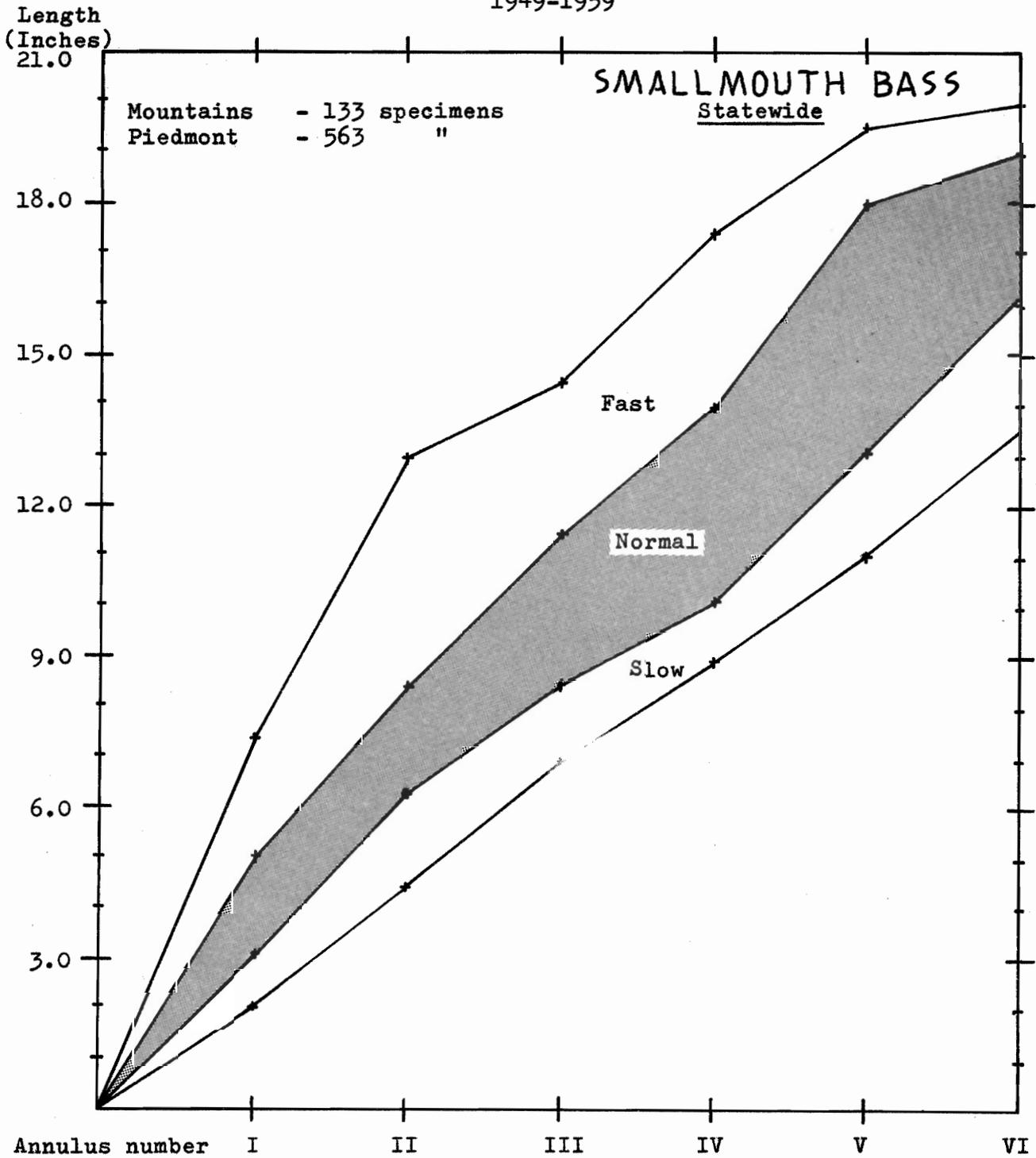


Annulus number I II III IV

	I	II	III	IV	V	VI	VII
Number of fish	175	136	72	46	13	3	2
Largest fish	3.8	5.1	6.5	7.0	7.1	7.7	8.7
<u>Normal</u> {							
Upper	2.0	3.9	5.6	6.5			
Average	1.6	3.3	4.9	5.8			
Lower	1.3	2.8	4.2	5.3			
<u>Range</u>							
Smallest fish	1.1	2.0	3.4	5.0	5.4	6.7	8.3

GROWTH STUDIES OF MARYLAND FISH

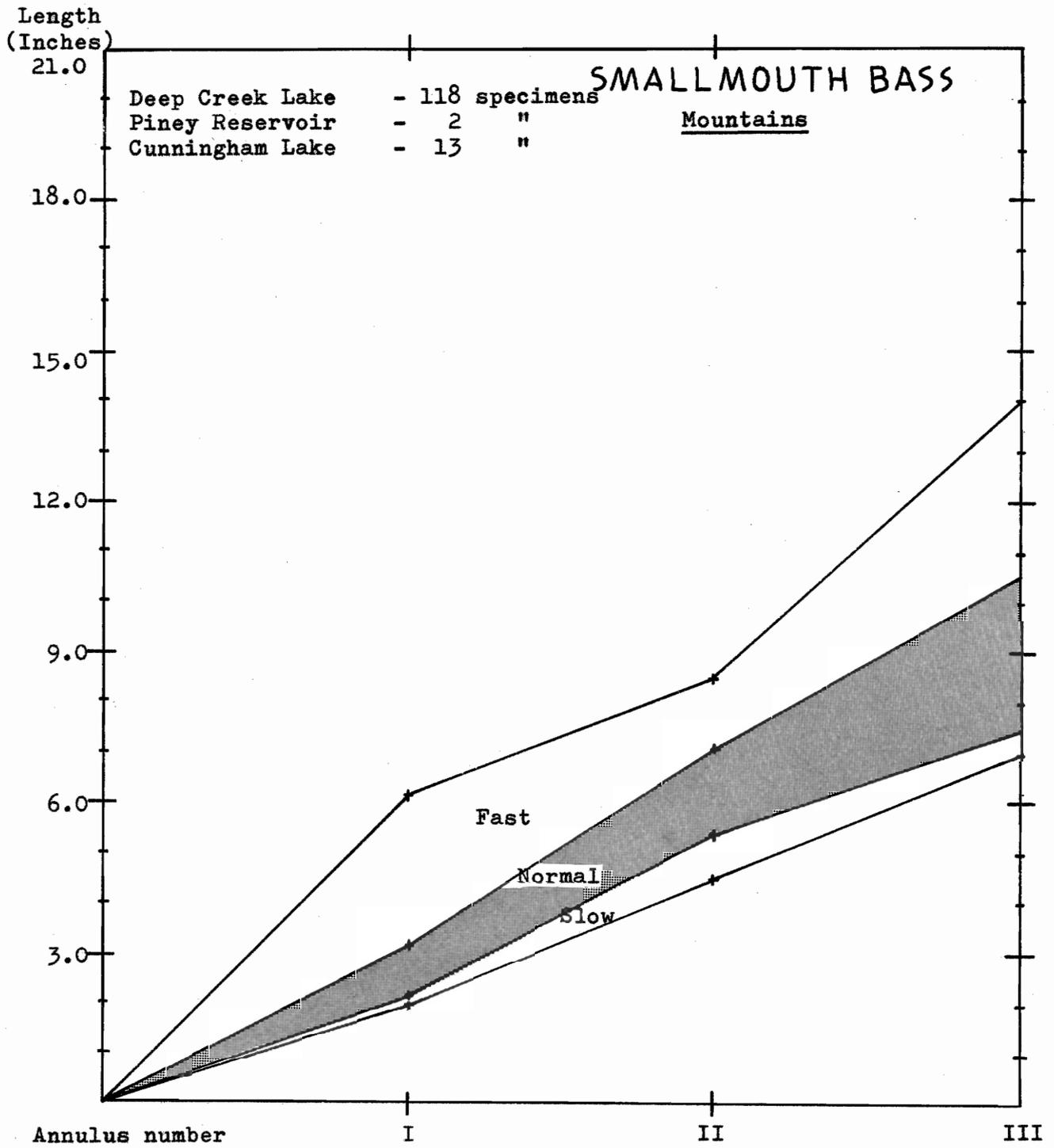
1949-1959



Number of fish	I	II	III	IV	V	VI	VII	VIII
	696	586	380	157	75	36	16	4
Largest fish	7.4	13.0	14.5	17.5	19.6	20.2	20.6	20.9
<u>Normal Range</u>	Upper	8.4	11.5	14.0	18.1	19.0		
	Average	4.0	7.4	10.3	12.6	15.5	17.8	
	Lower	3.1	6.3	8.5	10.2	13.2	16.2	
Smallest fish	2.0	4.5	7.0	9.0	11.1	13.5	14.6	20.4

GROWTH STUDIES OF MARYLAND FISH

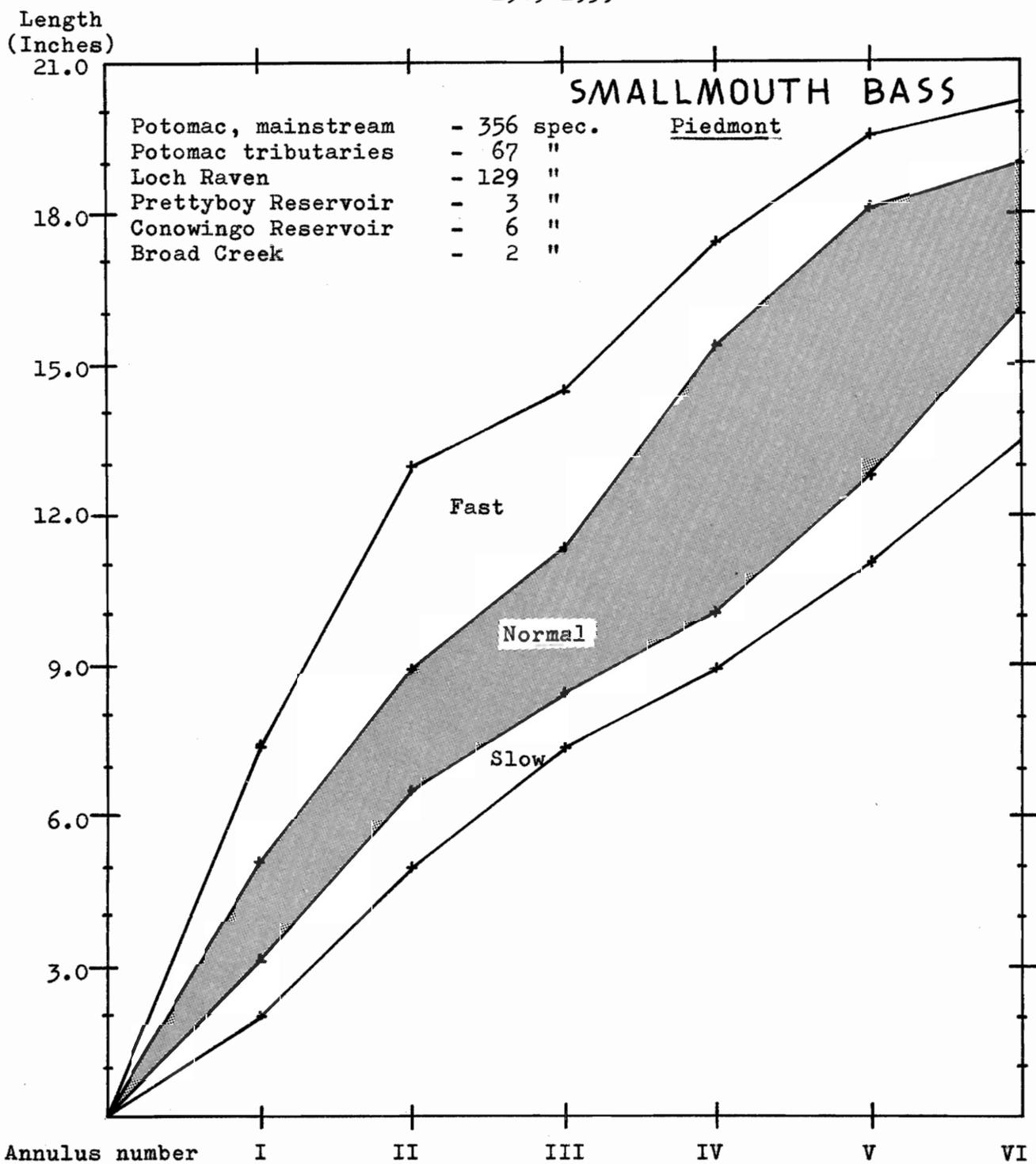
1949-1959



	I	II	III	IV	V	VI
Number of fish	133	92	54	23	19	3
Largest fish	6.2	8.6	14.0	15.9	18.9	18.5
<u>Normal</u>	Upper	3.2	7.2	10.5		
	Average	2.8	6.5	9.3		
	Lower	2.2	5.4	7.5		
<u>Range</u>						
Smallest fish	2.0	4.6	7.0	9.2	11.9	16.7

GROWTH STUDIES OF MARYLAND FISH

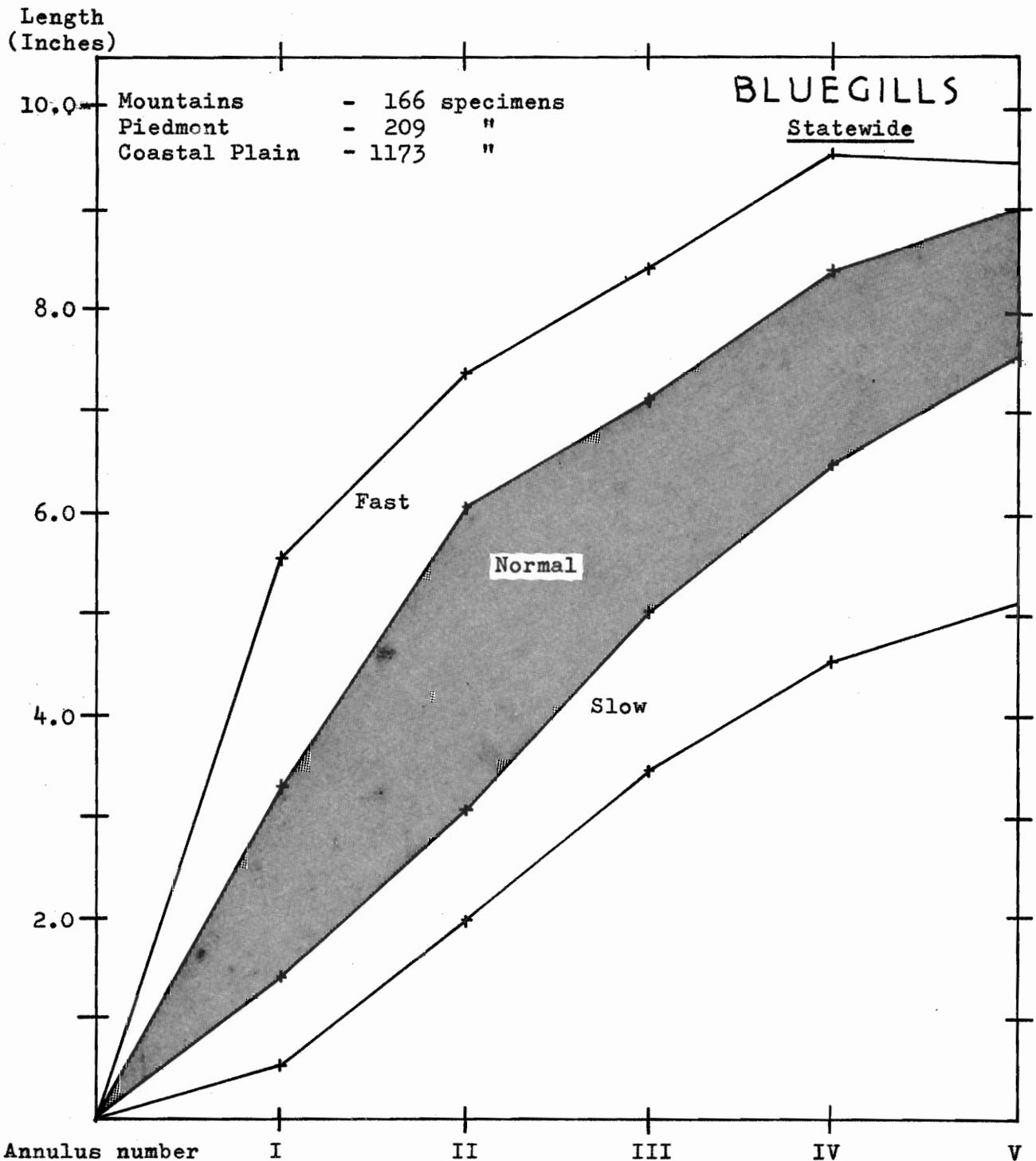
1949-1959



	I	II	III	IV	V	VI	VII	VIII
Number of fish	563	494	326	134	56	33	16	4
Largest fish	7.4	13.0	14.5	17.5	19.6	20.2	20.6	20.9
<u>Normal Range</u>	Upper	5.1	9.0	11.4	15.5	18.1	19.0	
	Average	4.3	7.9	10.4	12.9	15.6	17.8	
	Lower	3.2	6.6	8.6	10.2	12.8	16.2	
Smallest fish	2.0	5.0	7.5	9.0	11.1	13.5	14.6	20.4

GROWTH STUDIES OF MARYLAND FISH

1949-1959

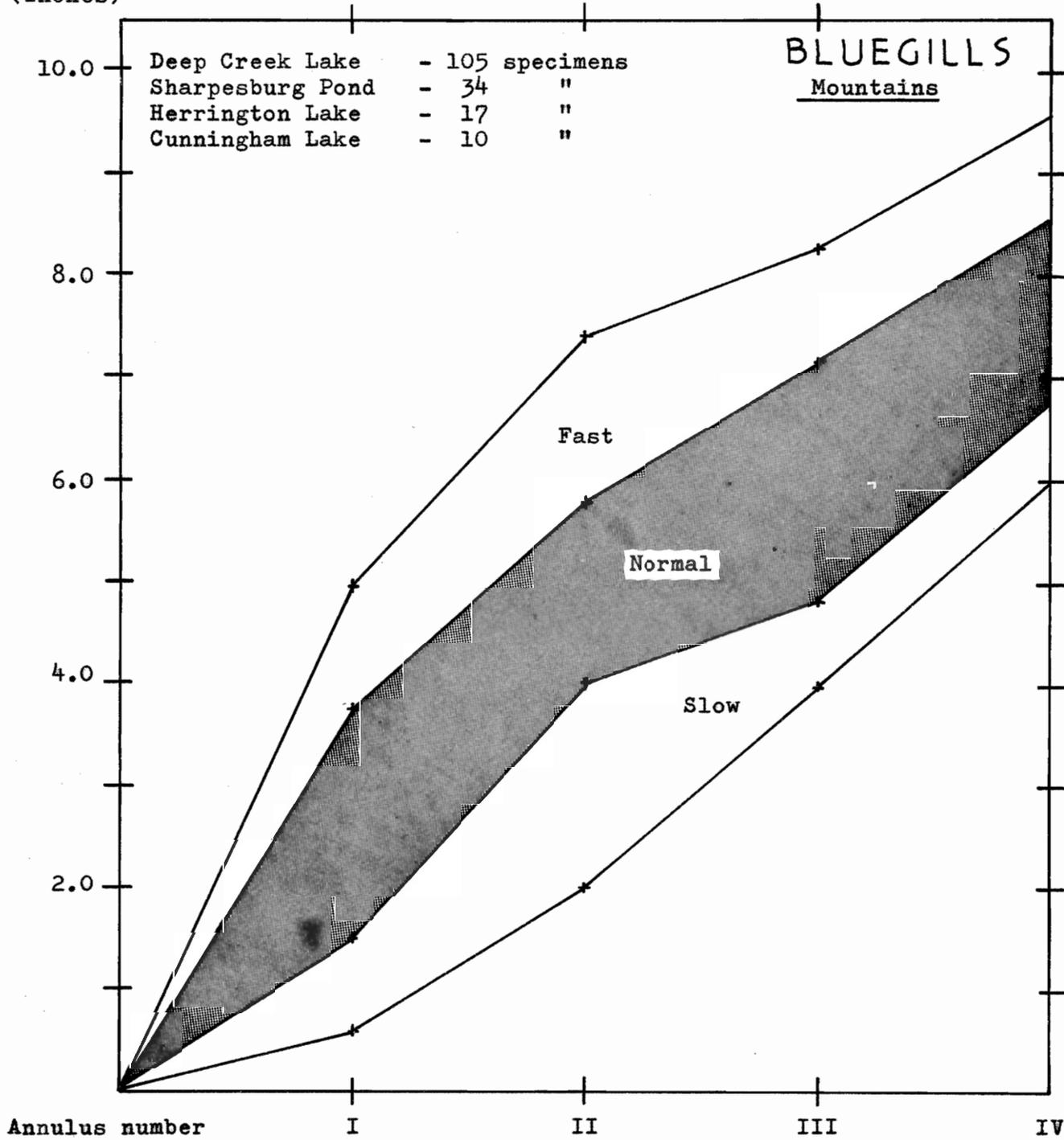


	I	II	III	IV	V	VI
Number of fish	1548	1281	461	94	33	6
Largest fish	5.6	7.4	8.4	9.6	9.4	9.4
<u>Normal Range</u>						
{ Upper	3.3	6.1	7.2	8.4	9.0	
{ Average	2.4	4.7	6.4	7.3	8.0	
{ Lower	1.4	3.1	5.1	6.6	7.6	
Smallest fish	0.6	2.0	3.6	4.6	5.2	6.0

GROWTH STUDIES OF MARYLAND FISH

1949-1959

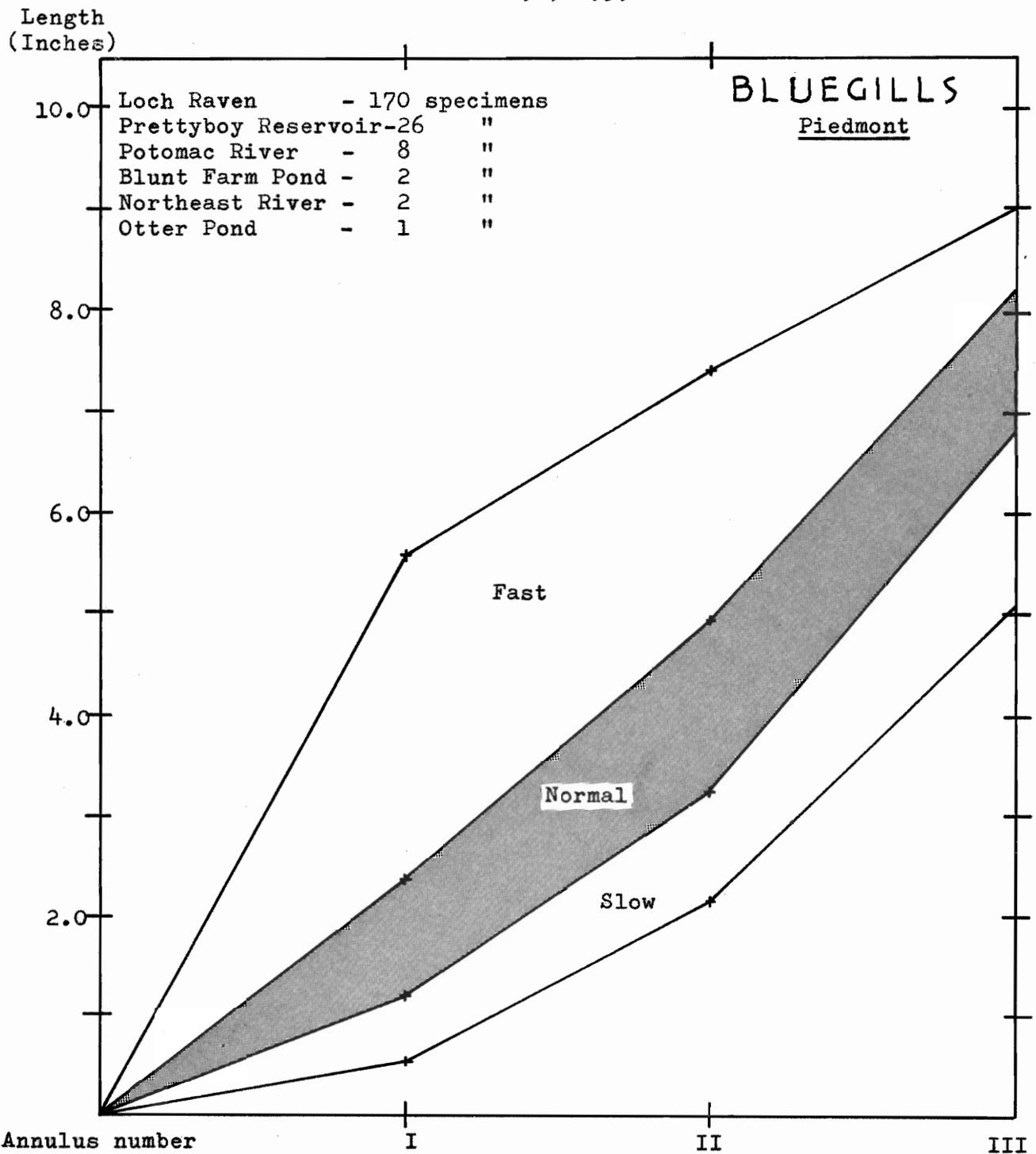
Length
(Inches)



	I	II	III	IV	V	VI
Number of fish	166	75	45	36	18	4
Largest fish	5.0	7.4	8.5	9.6	9.4	9.4
<u>Normal</u> Range {						
Upper	3.8	5.8	7.2	8.6		
Average	2.6	4.9	6.2	7.5		
Lower	1.5	4.0	4.8	6.8		
Smallest fish	0.6	2.0	4.0	6.0	7.0	7.9

GROWTH STUDIES OF MARYLAND FISH

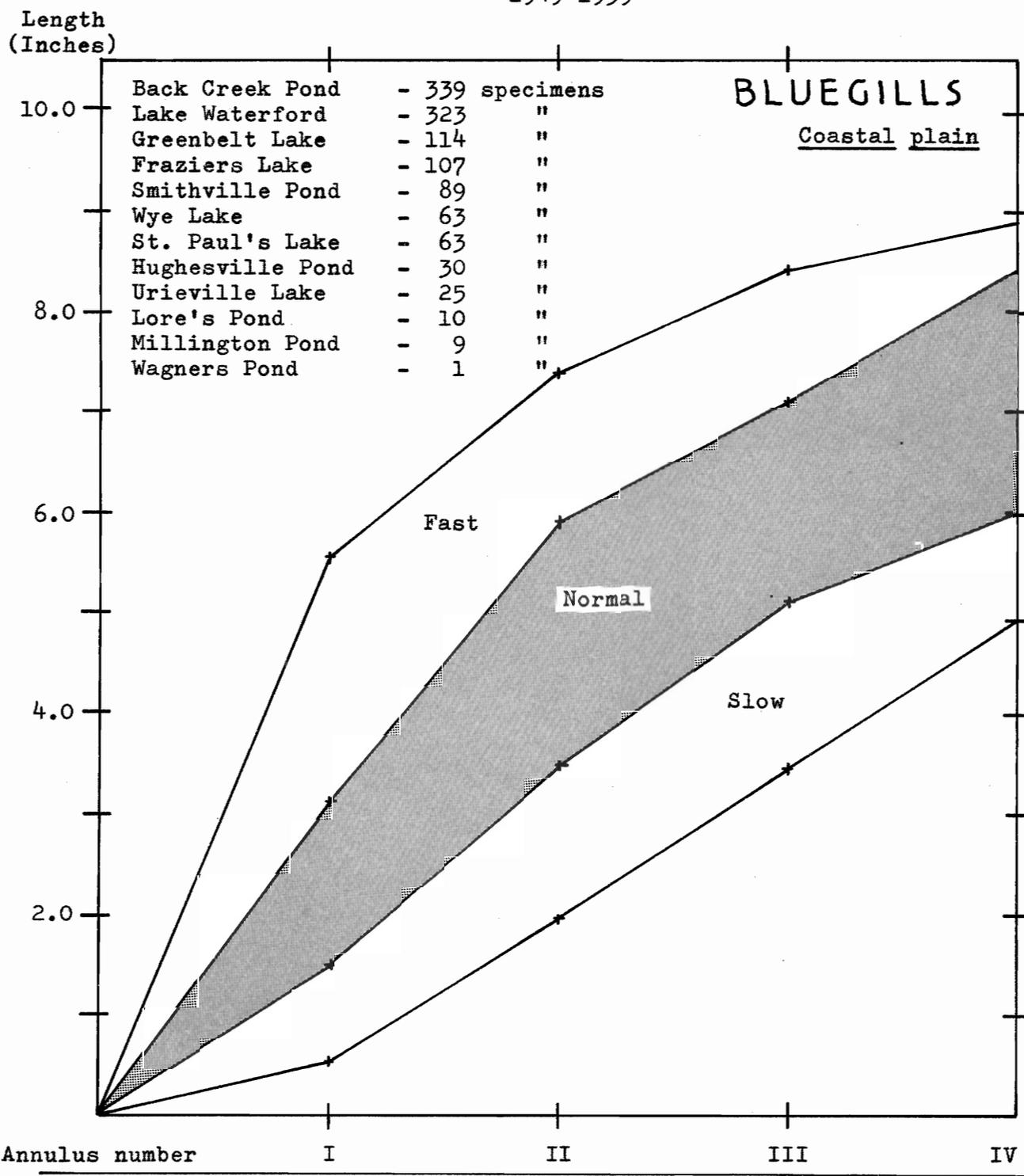
1949-1959



	I	II	III	IV	V
Number of fish	209	189	83	16	2
Largest fish	5.6	7.4	8.2	9.0	61
<u>Normal Range</u>					
{ Upper	2.3	4.9	6.8		
{ Average	1.7	4.2	6.1		
{ Lower	1.2	3.3	5.1		
Smallest fish	0.6	2.2	3.8	4.6	5.2

GROWTH STUDIES OF MARYLAND FISH

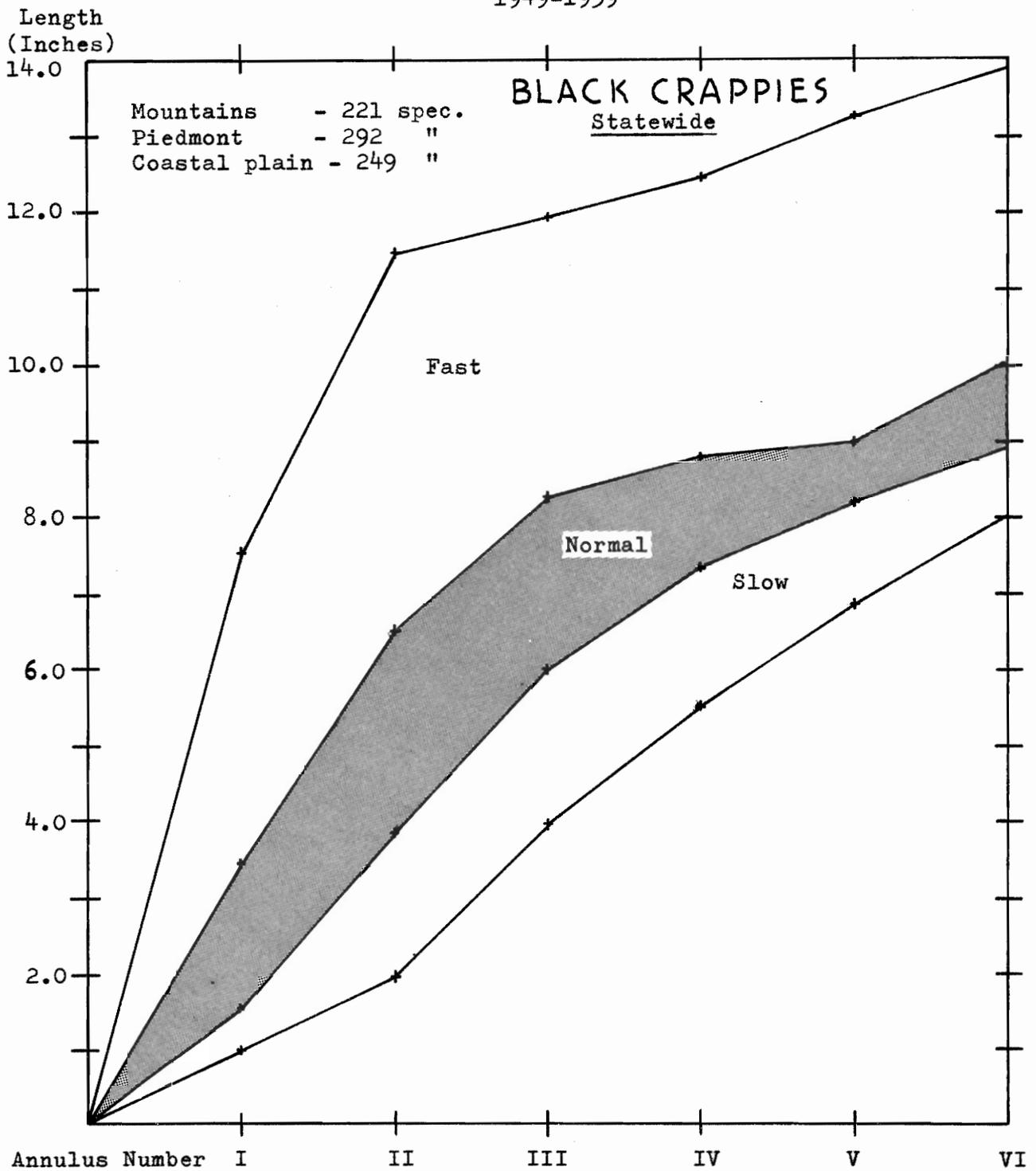
1949-1959



	I	II	III	IV	V
Number of fish	1173	1017	333	42	13
Largest fish	5.6	7.4	8.4	8.9	8.8
<u>Normal Range</u>					
{ Upper	3.2	5.9	7.2	8.4	
{ Average	2.3	4.7	6.4	7.2	
{ Lower	1.5	3.6	5.2	6.0	
Smallest fish	0.6	2.0	3.6	4.9	6.4

GROWTH STUDIES OF MARYLAND FISHES

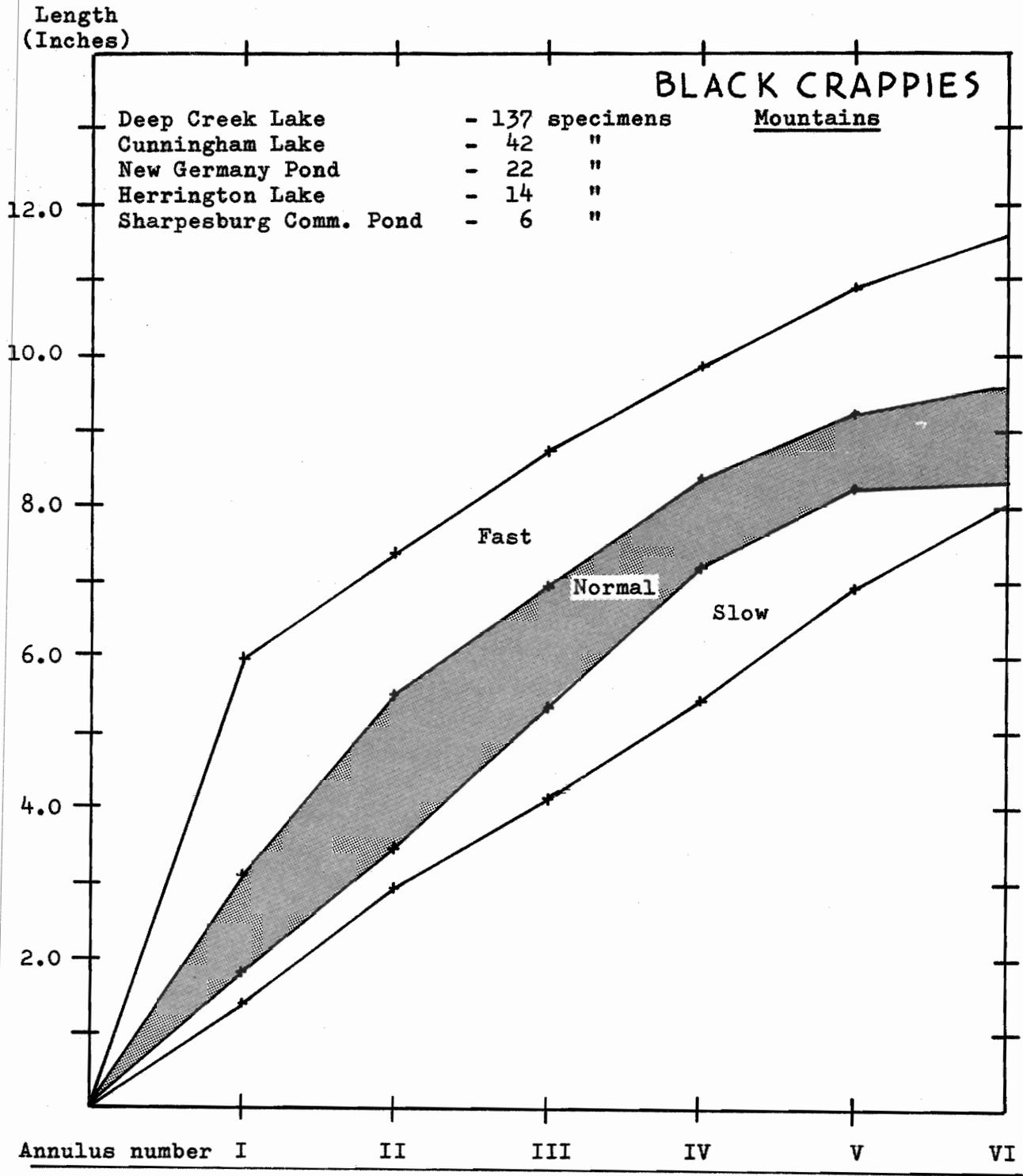
1949-1959



	I	II	III	IV	V	VI	VII
Number of fish	762	660	157	193	102	35	2
Largest fish	7.5	11.5	12.0	12.5	13.3	13.8	9.8
<u>Normal Range</u>							
{ Upper	3.4	6.6	8.3	8.8	9.1	10.2	
{ Average	3.0	5.7	7.2	8.1	8.9	9.4	
{ Lower	1.5	3.8	6.1	7.4	8.4	8.9	
Smallest fish	1.0	2.0	4.0	5.5	7.0	8.1	9.0

GROWTH STUDIES OF MARYLAND FISH

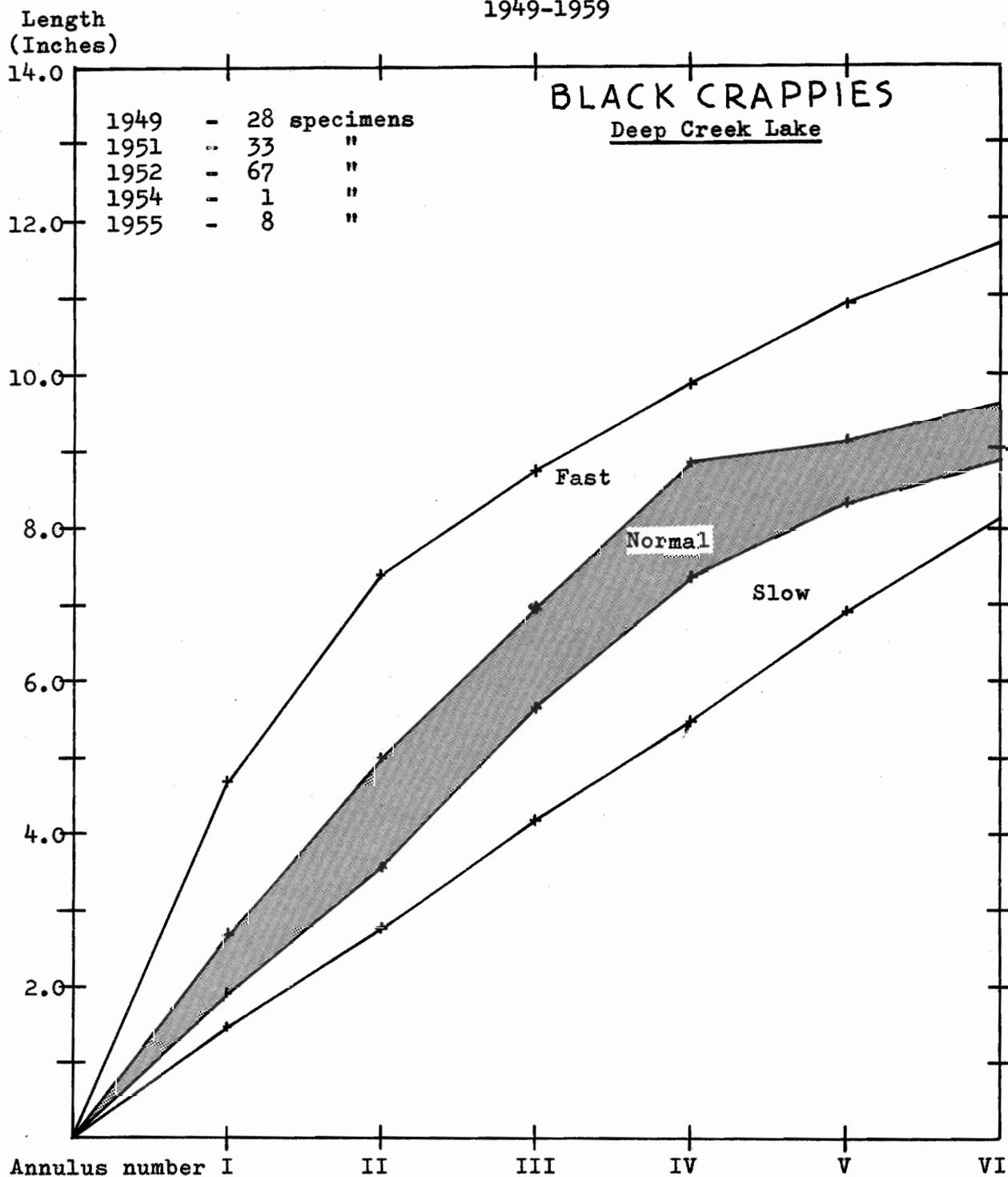
1949-1959



	I	II	III	IV	V	VI	
Number of fish	221	191	157	118	85	30	
Largest fish	6.0	7.4	8.8	9.9	11.0	11.7	
<u>Normal</u> <u>Range</u>	Upper	3.2	5.6	7.0	8.4	9.3	9.7
	Average	2.6	4.6	6.0	7.6	8.6	8.9
	Lower	1.8	3.5	5.4	7.3	8.3	8.4
Smallest fish	1.4	2.8	4.2	5.5	7.0	8.1	

GROWTH STUDIES OF MARYLAND FISH

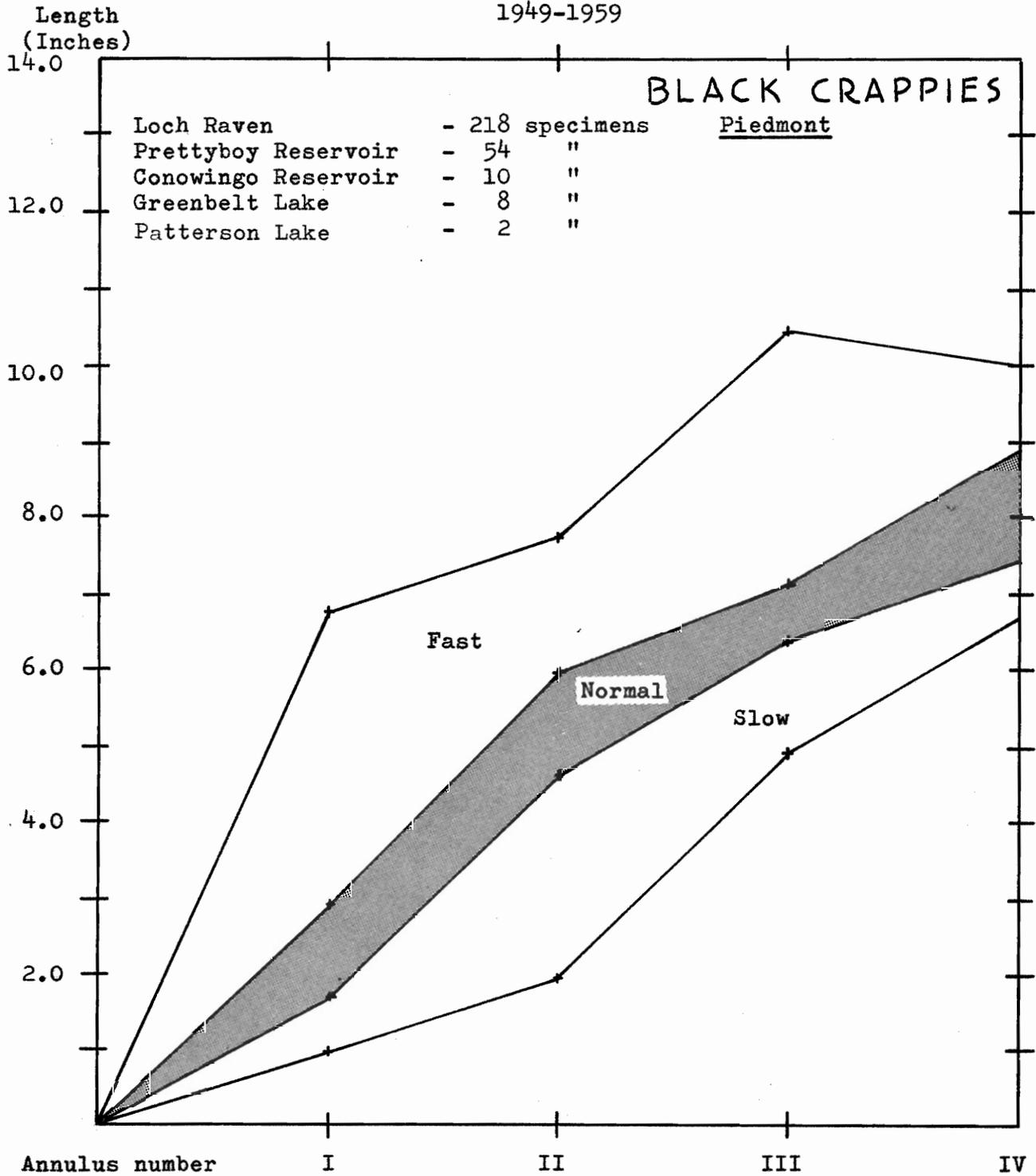
1949-1959



	I	II	III	IV	V	VI	VII
Number of fish	137	128	121	96	80	30	4
Largest fish	4.7	7.4	8.8	9.9	11.0	11.7	12.3
<u>Normal Range</u>	{ Upper Average Lower	2.7 2.3 1.9	5.0 4.2 3.6	7.0 6.3 5.7	8.9 7.7 7.4	9.2 8.6 8.4	9.6 9.2 8.8
Smallest fish	1.4	2.8	4.2	5.5	7.0	8.1	9.2

GROWTH STUDIES OF MARYLAND FISH

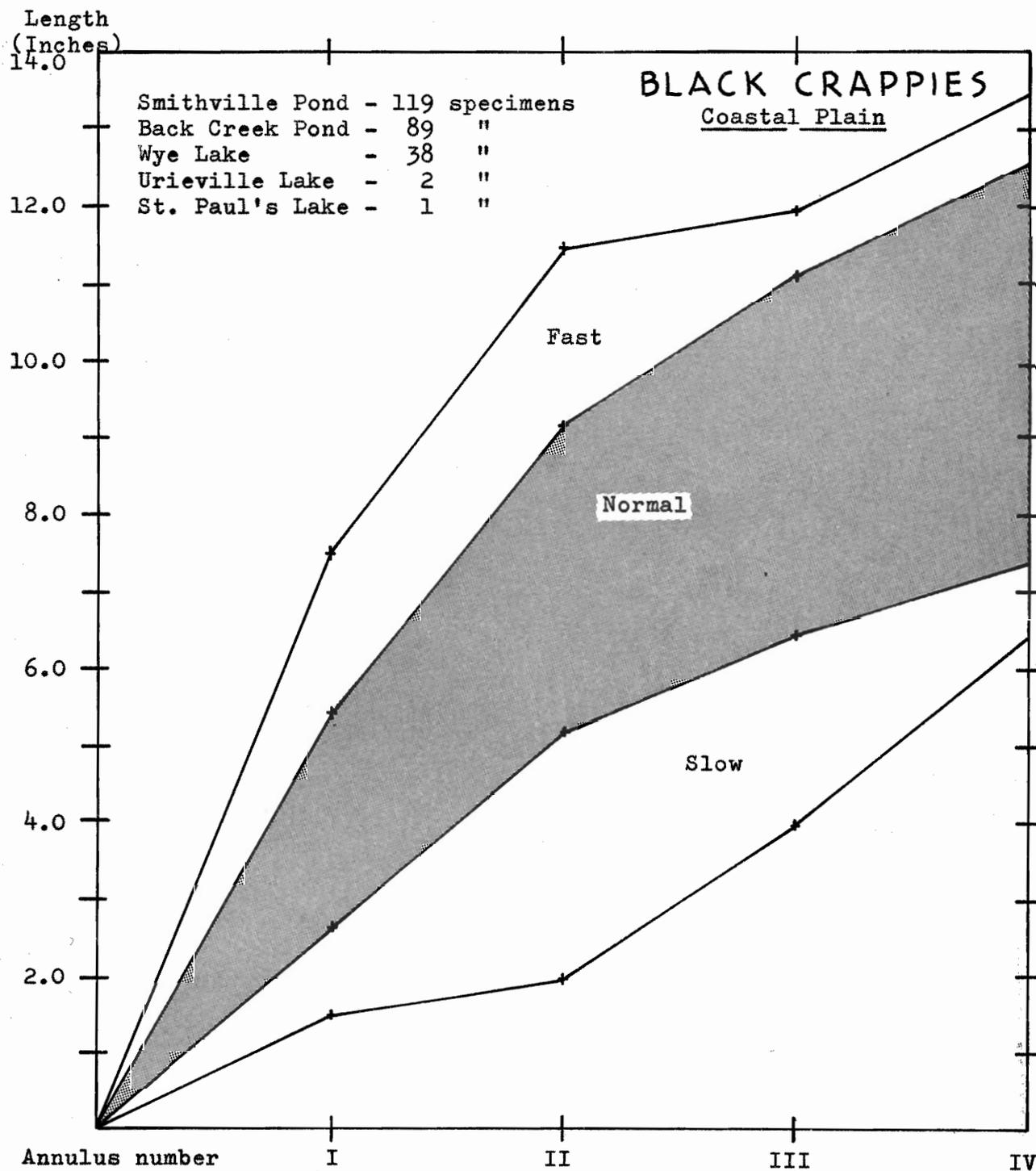
1949-1959



	I	II	III	IV	V	VI
Number of fish	292	249	147	45	8	2
Largest fish	5.8	7.8	10.6	10.0	12.0	13.8
<u>Normal Range</u>						
Upper	2.9	6.0	7.2	8.9		
Average	2.3	5.2	7.1	8.4		
Lower	1.7	4.7	6.5	7.4		
Smallest fish	1.0	2.0	5.0	6.6	9.0	10.2

GROWTH STUDIES OF MARYLAND FISH

1949-1959

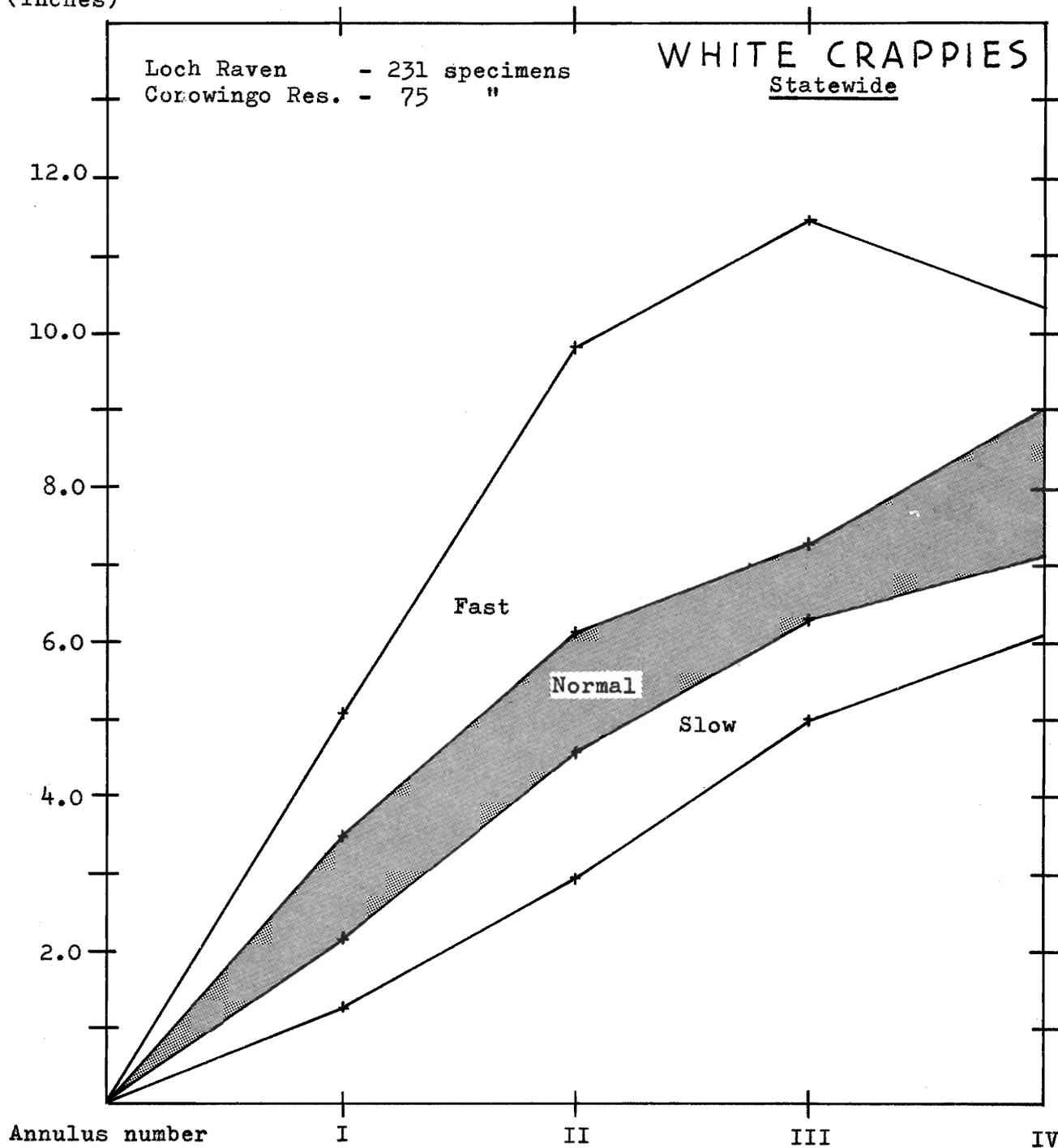


	I	II	III	IV	V	VI	VII																						
Number of fish	249	220	157	30	9	3	2																						
Largest fish	7.5	11.5	12.0	13.5	13.3	12.6	9.8																						
<u>Normal</u>	<table border="0"> <tr> <td rowspan="3" style="font-size: 2em; vertical-align: middle;">{</td> <td>Upper</td> <td>5.4</td> <td>9.2</td> <td>11.2</td> <td>12.6</td> <td></td> <td></td> </tr> <tr> <td>Average</td> <td>3.8</td> <td>7.1</td> <td>8.7</td> <td>9.8</td> <td></td> <td></td> </tr> <tr> <td>Lower</td> <td>2.7</td> <td>5.2</td> <td>6.5</td> <td>7.5</td> <td></td> <td></td> </tr> </table>							{	Upper	5.4	9.2	11.2	12.6			Average	3.8	7.1	8.7	9.8			Lower	2.7	5.2	6.5	7.5		
{	Upper	5.4	9.2	11.2	12.6																								
	Average	3.8	7.1	8.7	9.8																								
	Lower	2.7	5.2	6.5	7.5																								
<u>Range</u>																													
Smallest fish	1.5	2.0	4.0	6.4	7.5	8.4	9.0																						

GROWTH STUDIES OF MARYLAND FISH

1949-1959

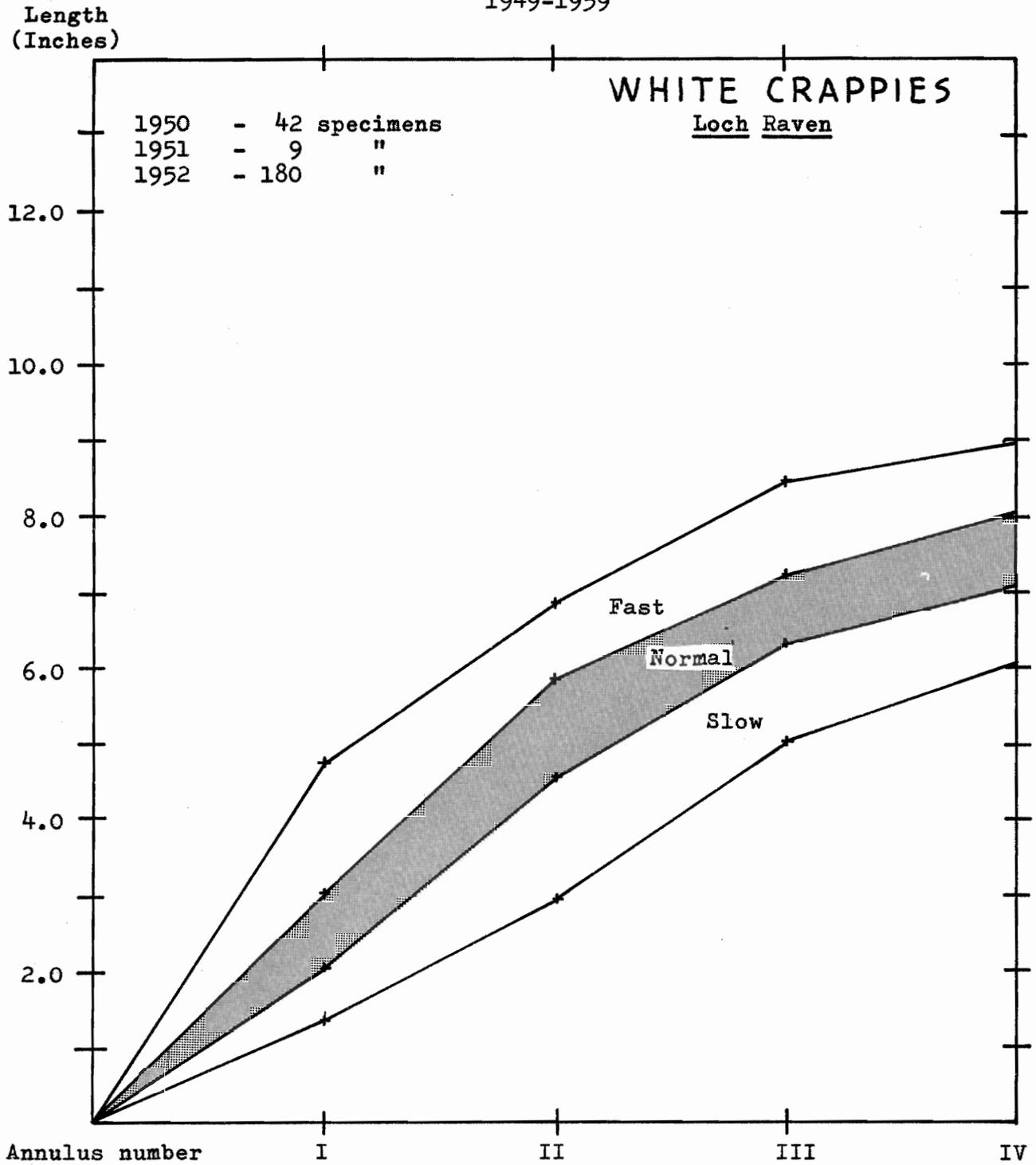
Length
(Inches)



	I	II	III	IV	V	VI	VII
Number of fish	306	242	176	52	14	3	3
Largest fish	5.1	9.8	11.6	10.4	13.8	15.9	16.7
<u>Normal</u> <u>Range</u>	Upper	3.5	6.2	7.3	9.1		
	Average	2.7	5.2	6.7	7.9		
	Lower	2.2	4.7	6.4	7.2		
Smallest fish	1.3	3.0	5.1	6.1	6.9	10.0	12.4

GROWTH STUDIES OF MARYLAND FISH

1949-1959

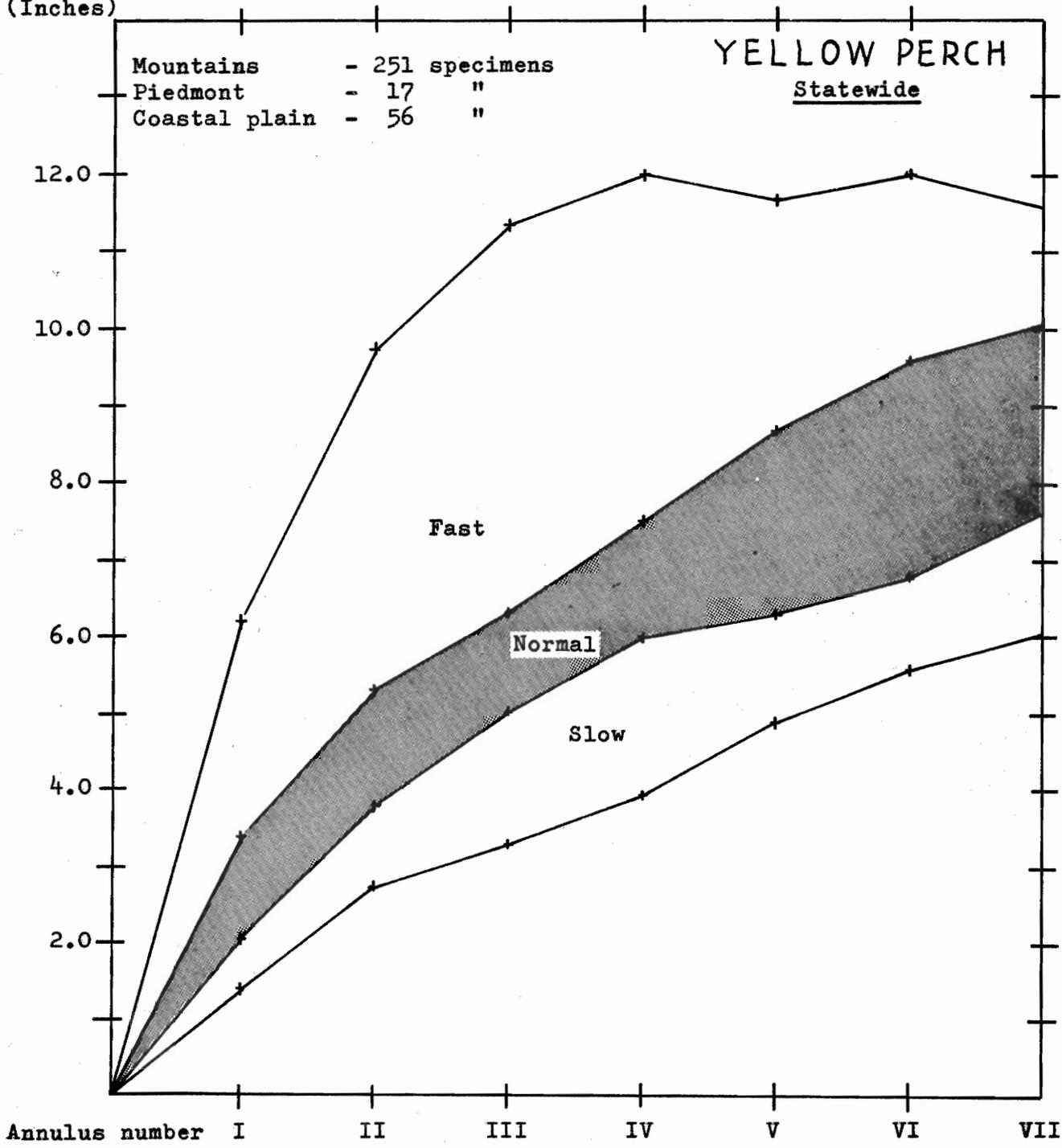


	I	II	III	IV	V	VI	VII
Number of fish	231	215	172	52	14	3	3
Largest fish	3.8	6.9	8.5	10.4	13.8	15.9	16.7
<u>Normal Range</u>	{ Upper 3.1 5.9 7.3 9.1 Average 2.3 5.0 6.7 7.9 Lower 2.1 4.6 6.4 7.2						
Smallest fish	1.3	3.0	5.1	6.1	6.9	10.0	12.4

GROWTH STUDIES OF MARYLAND FISH

1949-1959

Length
(Inches)

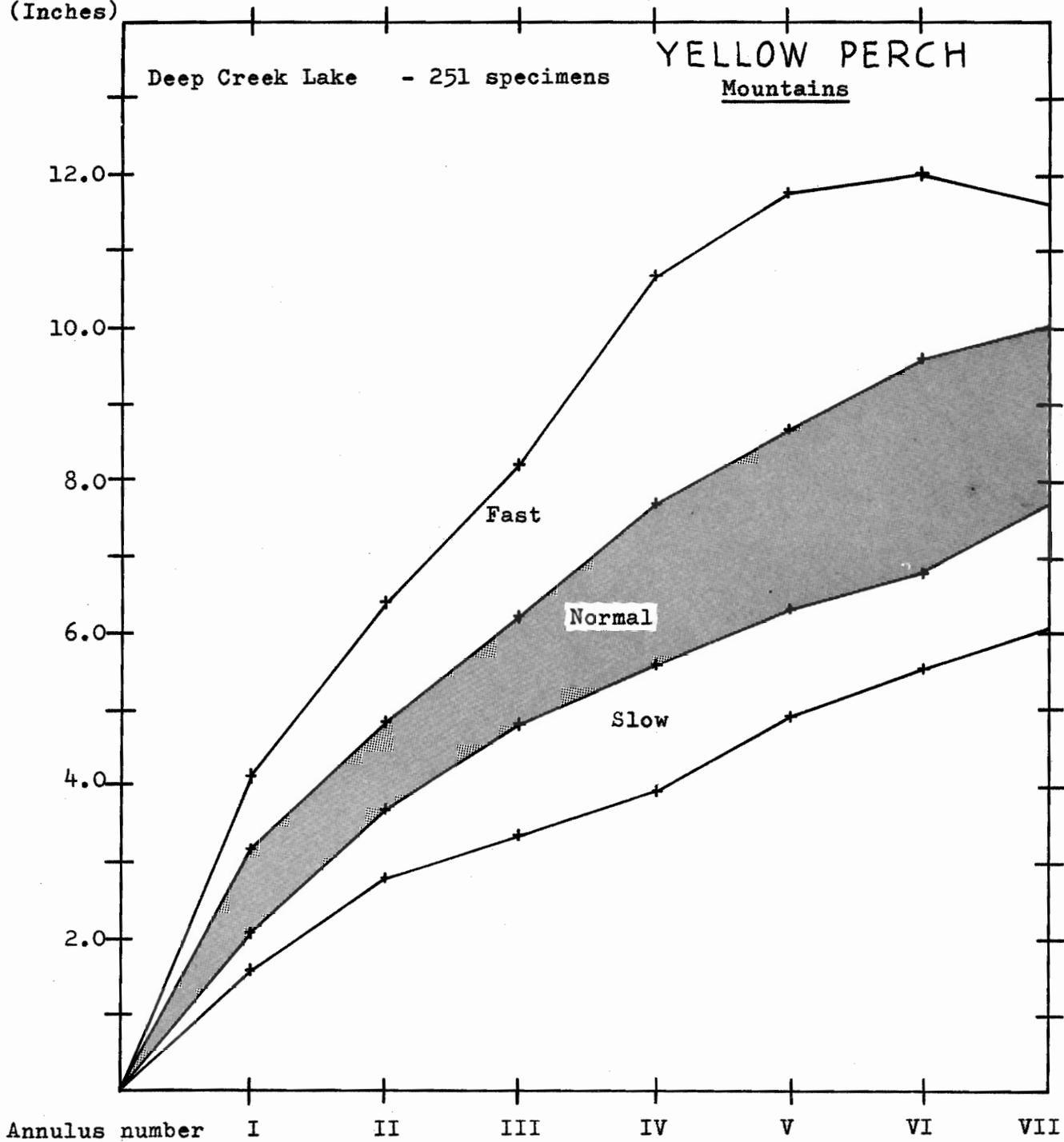


	I	II	III	IV	V	VI	VII	VIII	IX	
Number of fish	324	271	194	102	88	62	41	25	12	
Largest fish	6.2	9.8	11.3	12.0	11.7	12.0	11.6	12.0	12.3	
<u>Normal Range</u>	{ Upper Average Lower	{ 3.4 2.8 2.1	{ 5.3 4.7 3.8	{ 6.3 5.8 5.1	{ 7.5 6.9 6.0	{ 8.7 7.4 6.3	{ 9.6 8.2 6.8	{ 10.1 8.8 7.7		
Smallest fish	1.4	2.8	3.3	3.9	4.9	5.6	6.1	7.5	9.1	

GROWTH STUDIES OF MARYLAND FISH

1949-1959

Length
(Inches)

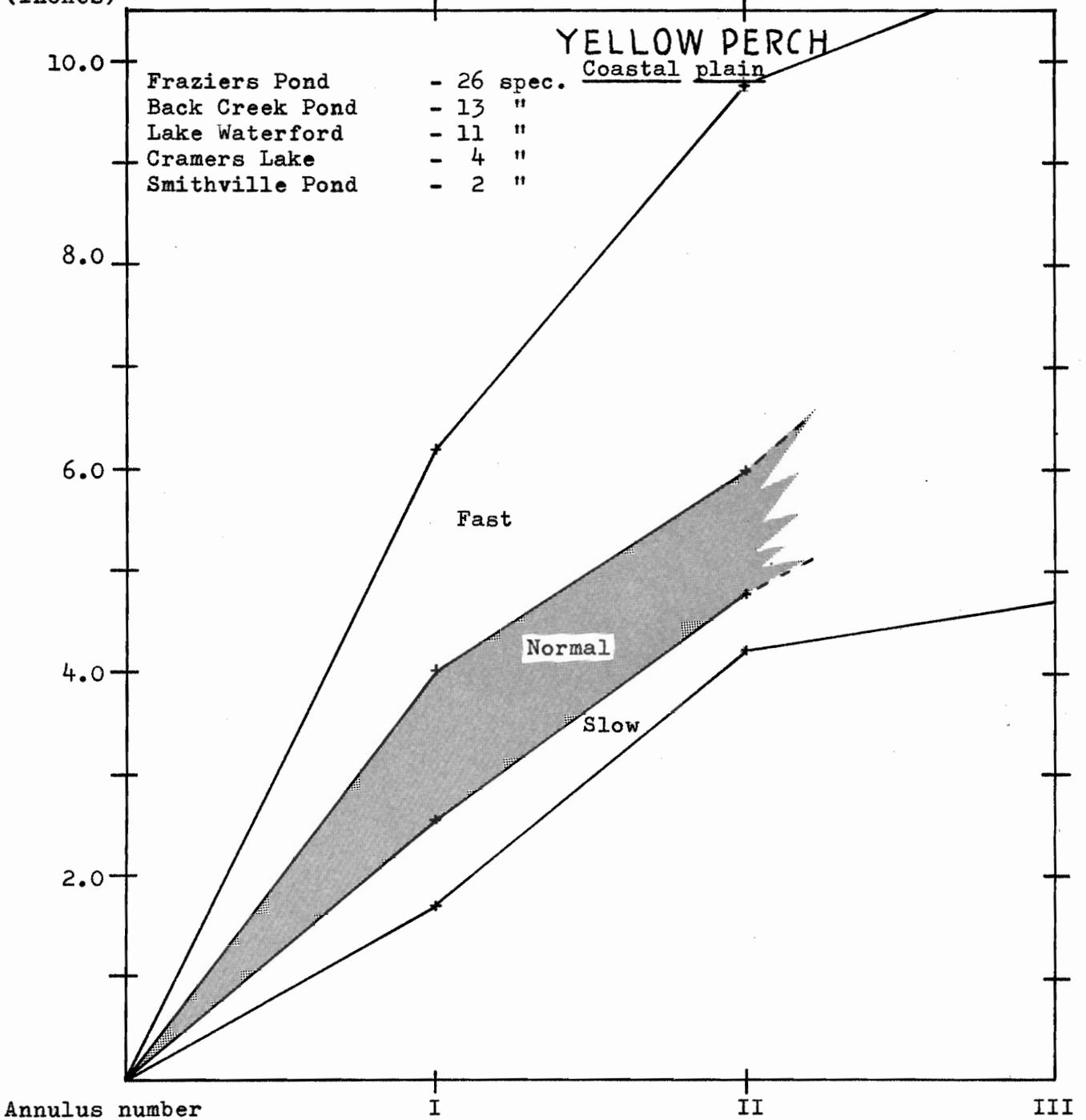


	I	II	III	IV	V	VI	VII	VIII	IX
Number of fish	251	206	175	132	88	62	41	25	12
Largest fish	4.2	6.4	8.2	10.7	11.7	12.0	11.6	12.0	12.3
<u>Normal</u> <u>Range</u>	Upper	3.2	4.8	6.2	7.7	8.7	9.6	10.1	
	Average	2.6	4.4	5.6	6.6	7.4	8.2	8.8	
	Lower	2.1	3.7	4.8	5.6	6.3	6.8	7.7	
Smallest fish	1.6	2.8	3.3	3.9	4.9	5.6	6.1	7.5	9.1

GROWTH STUDIES OF MARYLAND FISH

1949-1959

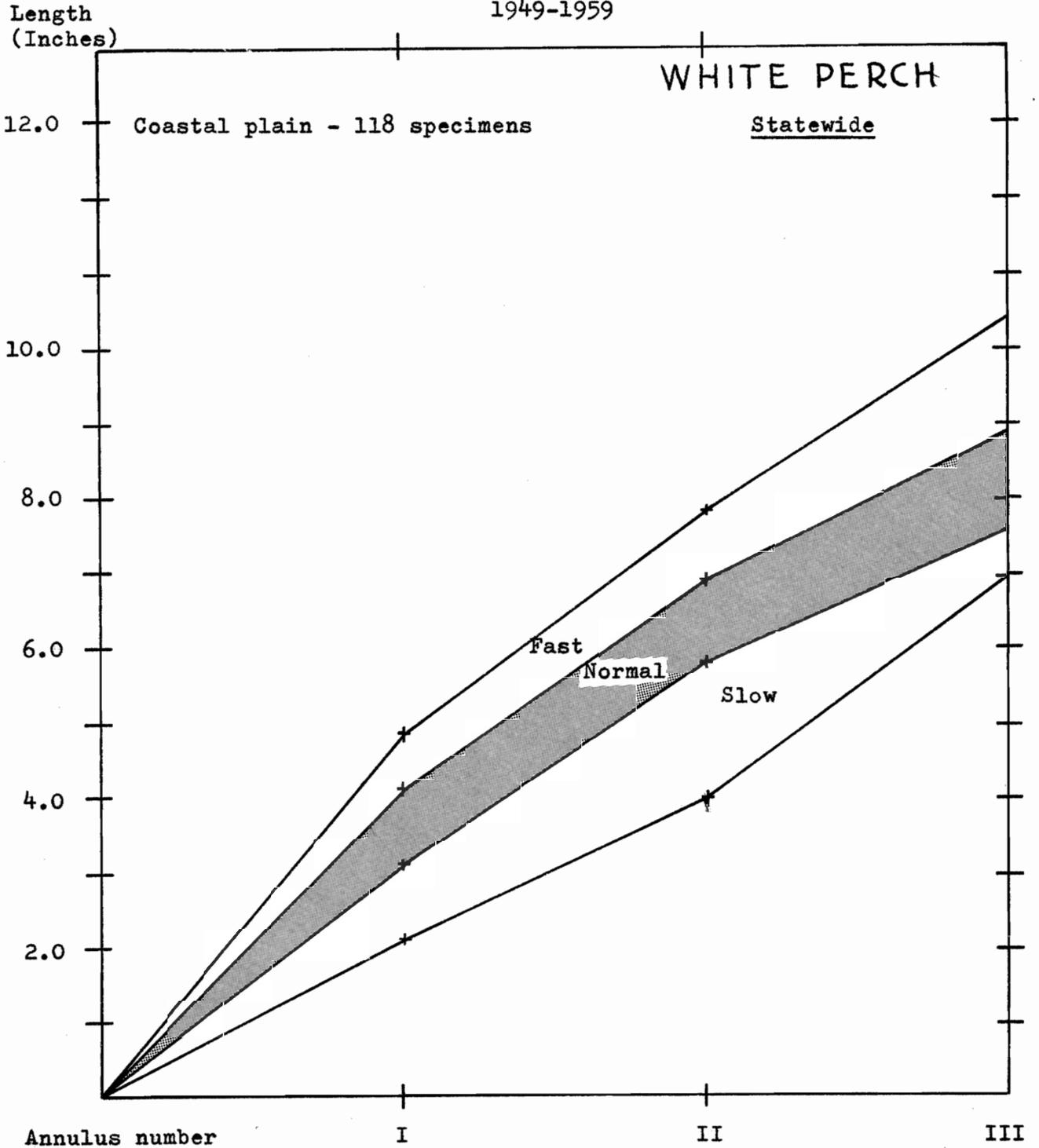
Length
(Inches)



	I	II	III	IV
Number of fish	56	50	13	3
Largest fish	6.2	9.8	11.3	12.0
<u>Normal Range</u> {				
Upper	4.1	6.0		
Average	3.6	5.6		
Lower	2.6	4.8		
Smallest fish	1.8	4.3	5.7	7.1

GROWTH STUDIES OF MARYLAND FISH

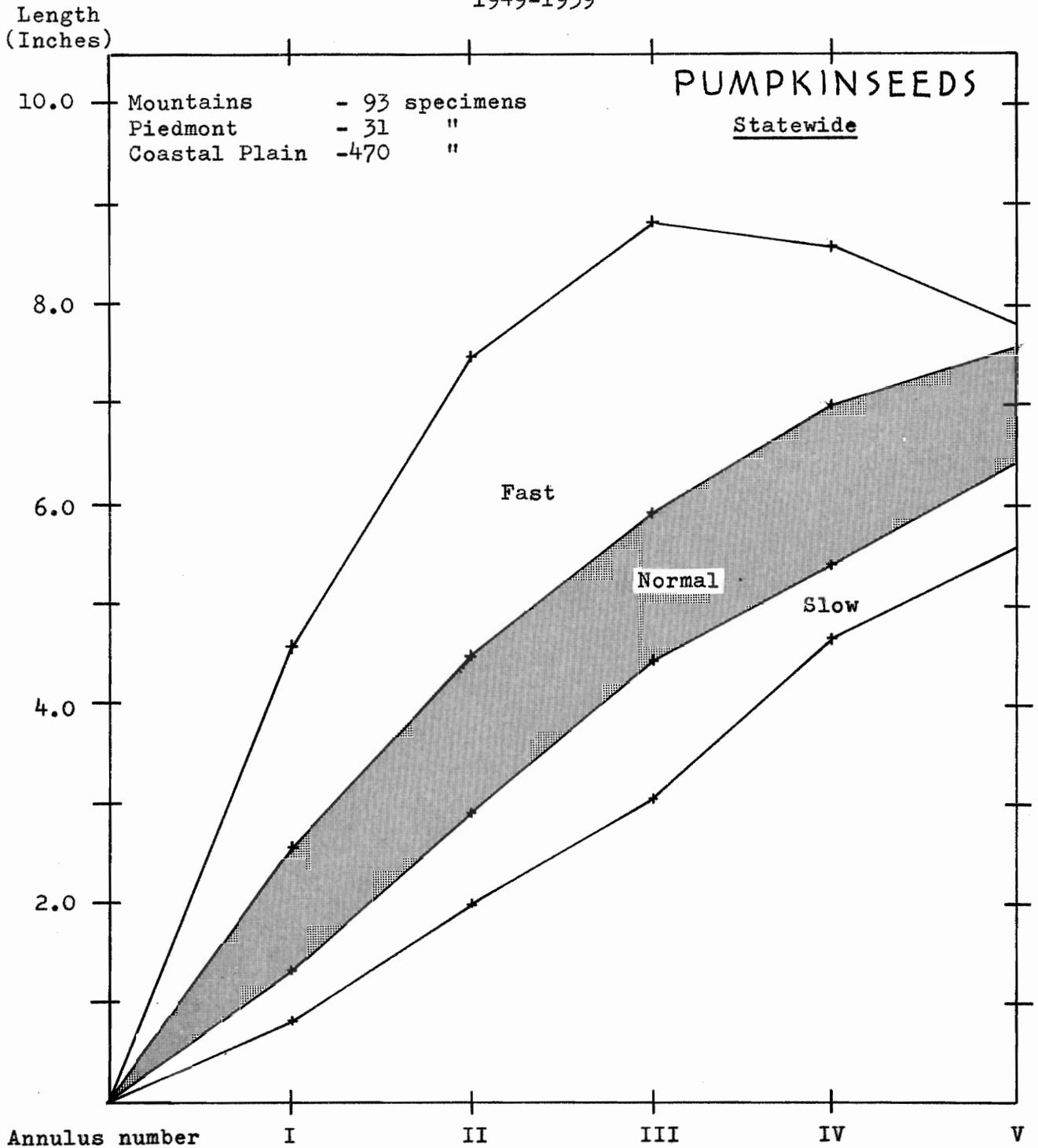
1949-1959



	I	II	III	IV
Number of fish	118	97	31	7
Largest fish	4.8	7.8	10.4	9.8
<u>Normal Range</u>	Upper	6.9	8.9	
	Average	3.8	6.5	8.3
	Lower	3.2	5.8	7.6
Smallest fish	2.2	4.0	7.0	8.0

GROWTH STUDIES OF MARYLAND FISH

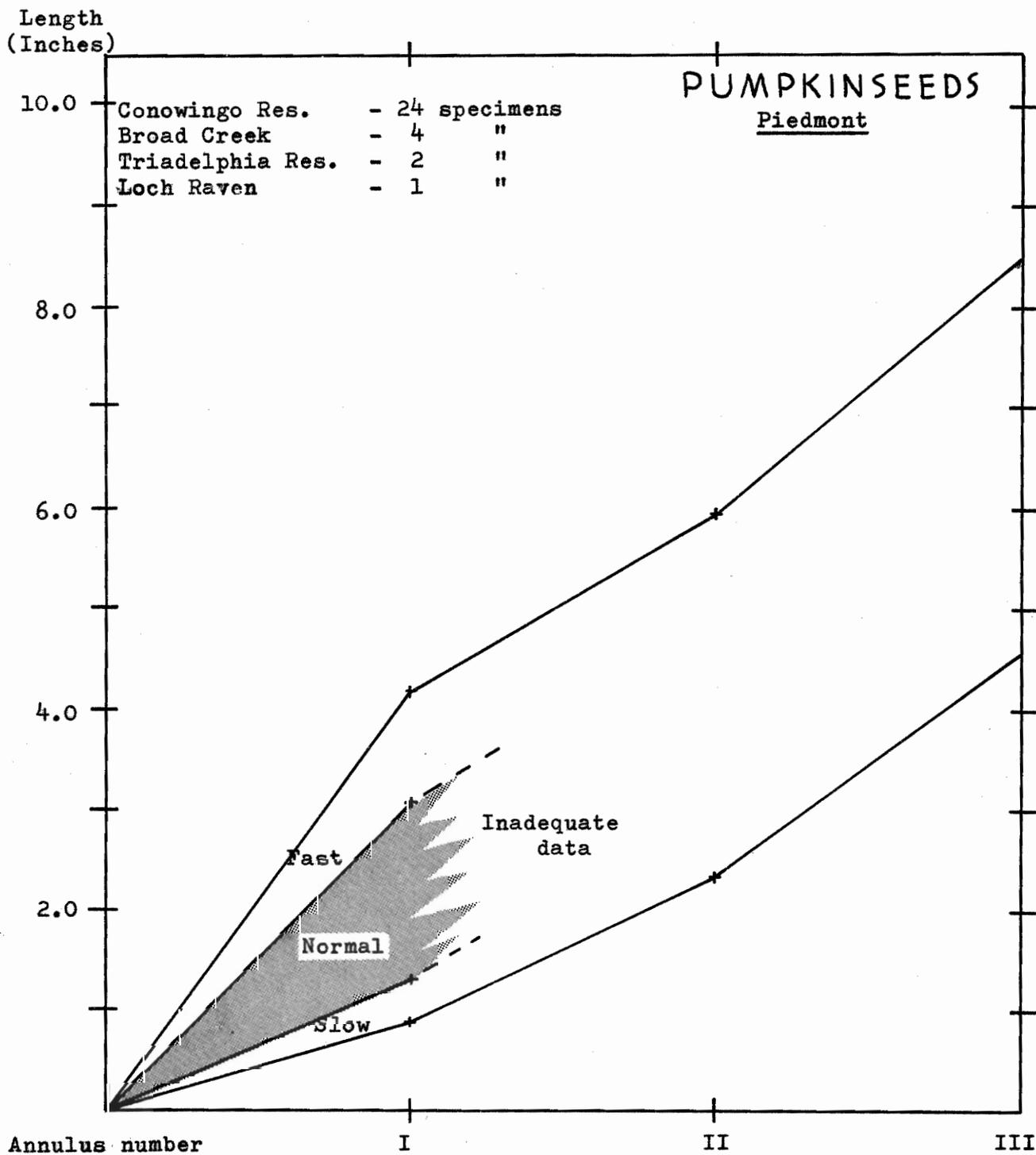
1949-1959



	I	II	III	IV	V	VI	VII	VIII
Number of fish	594	443	270	141	59	22	3	3
Largest fish	4.6	7.5	8.8	8.6	7.8	7.9	7.2	7.8
<u>Normal Range</u>	Upper	4.5	5.9	7.0	7.6			
	Average	2.0	3.7	5.5	5.9	6.7		
	Lower	1.3	2.9	4.4	5.4	6.4		
Smallest fish	0.8	2.0	3.1	4.7	5.6	6.8	7.0	7.5

GROWTH STUDIES OF MARYLAND FISH

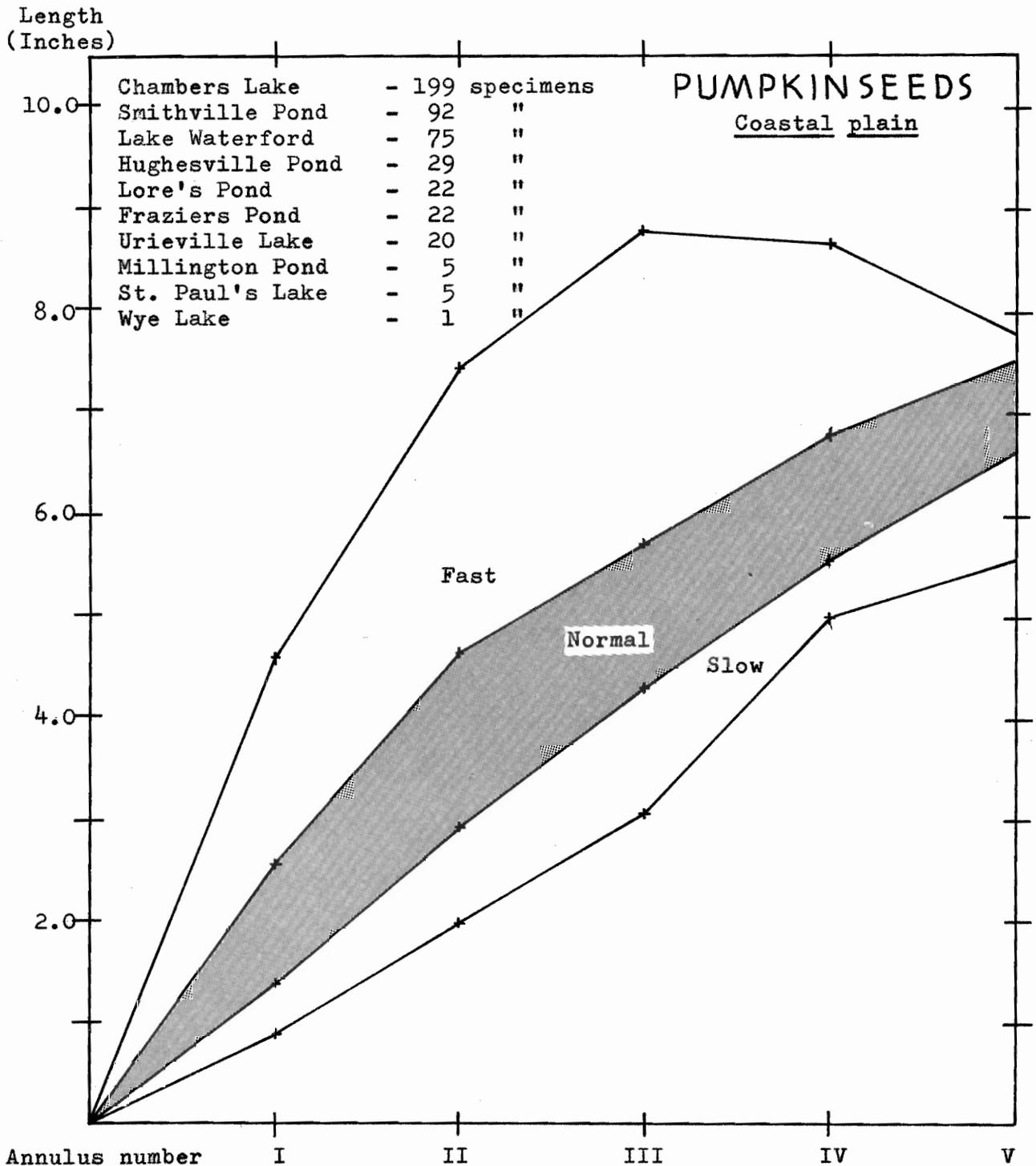
1949-1959



	I	II	III	IV
Number of fish	31	23	14	4
Largest fish	4.2	5.9	7.2	8.5
<u>Normal Range</u>	{ Upper 3.1 Average 1.6 Lower 1.3			
Smallest fish	0.8	2.3	4.6	5.1

GROWTH STUDIES OF MARYLAND FISH

1949-1959

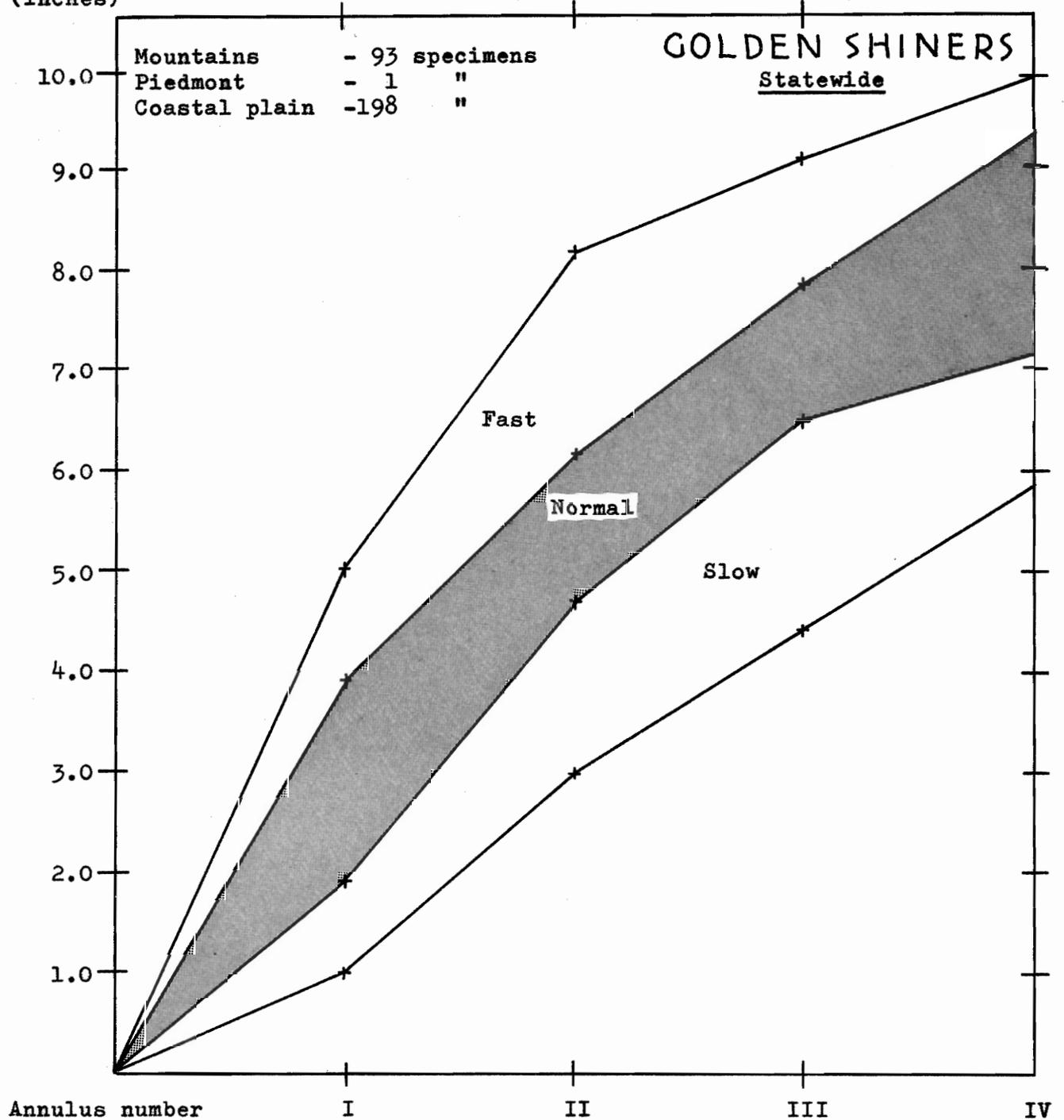


	I	II	III	IV	V	VI
Number of fish	470	357	214	119	53	17
Largest fish	4.6	7.5	8.8	8.7	7.8	8.1
<u>Normal Range</u>	Upper	4.7	5.7	6.8	7.5	
	Average	2.1	3.8	5.5	6.3	7.0
	Lower	1.4	2.9	4.3	5.6	6.7
Smallest fish	0.8	2.0	3.1	5.0	5.6	6.8

GROWTH STUDIES OF MARYLAND FISH

1949-1959

Length
(Inches)

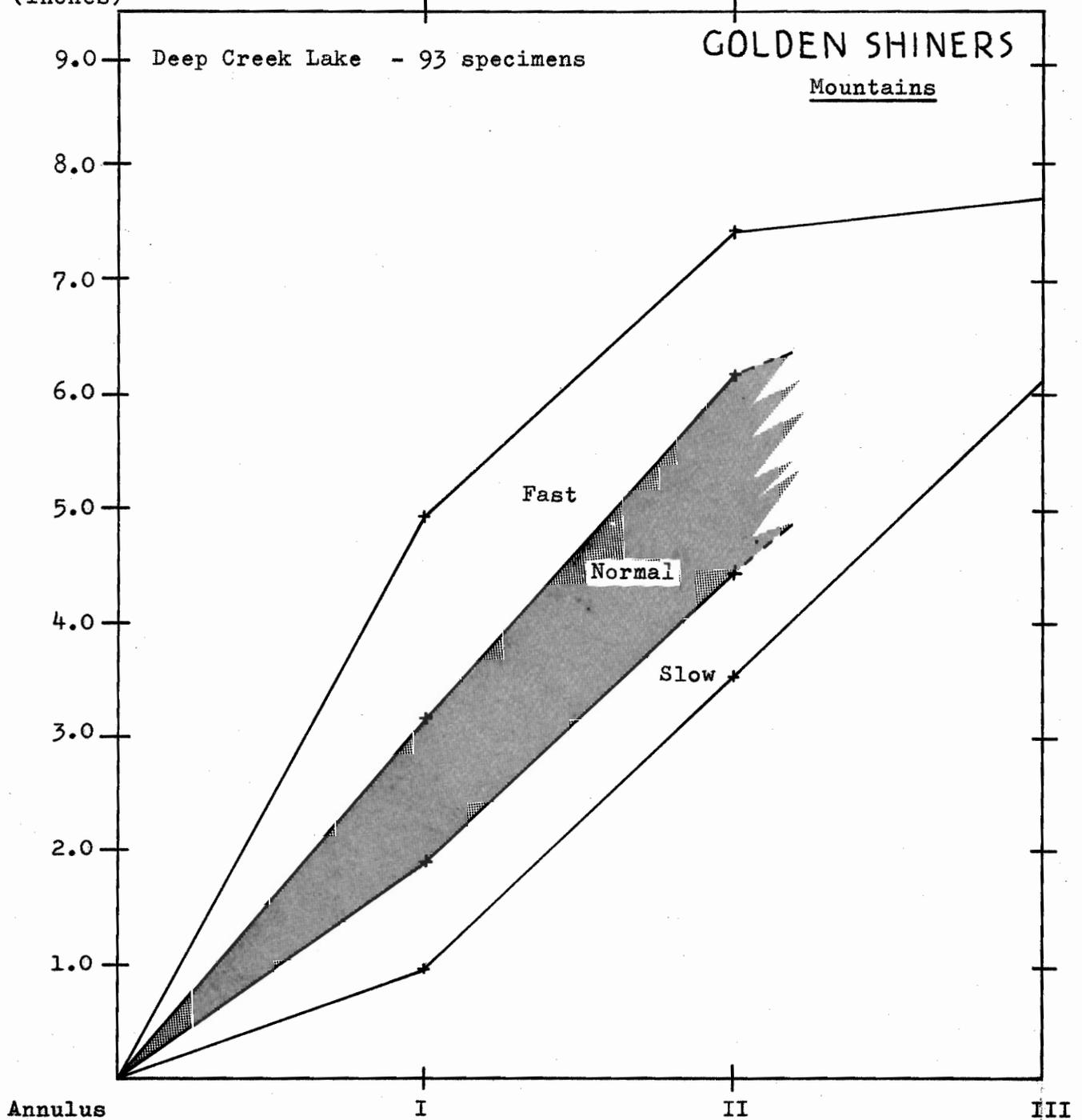


	I	II	III	IV	V	VI
Number of fish	292	251	117	39	6	2
Largest fish	5.0	8.2	9.1	9.9	10.1	9.9
<u>Normal Range</u>						
{ Upper	3.9	6.2	7.7	9.3		
{ Average	2.9	5.6	7.0	8.4		
{ Lower	1.9	4.7	6.5	7.2		
Smallest fish	1.0	3.0	4.4	5.8	9.3	9.5

GROWTH STUDIES OF MARYLAND FISH

1949-1959

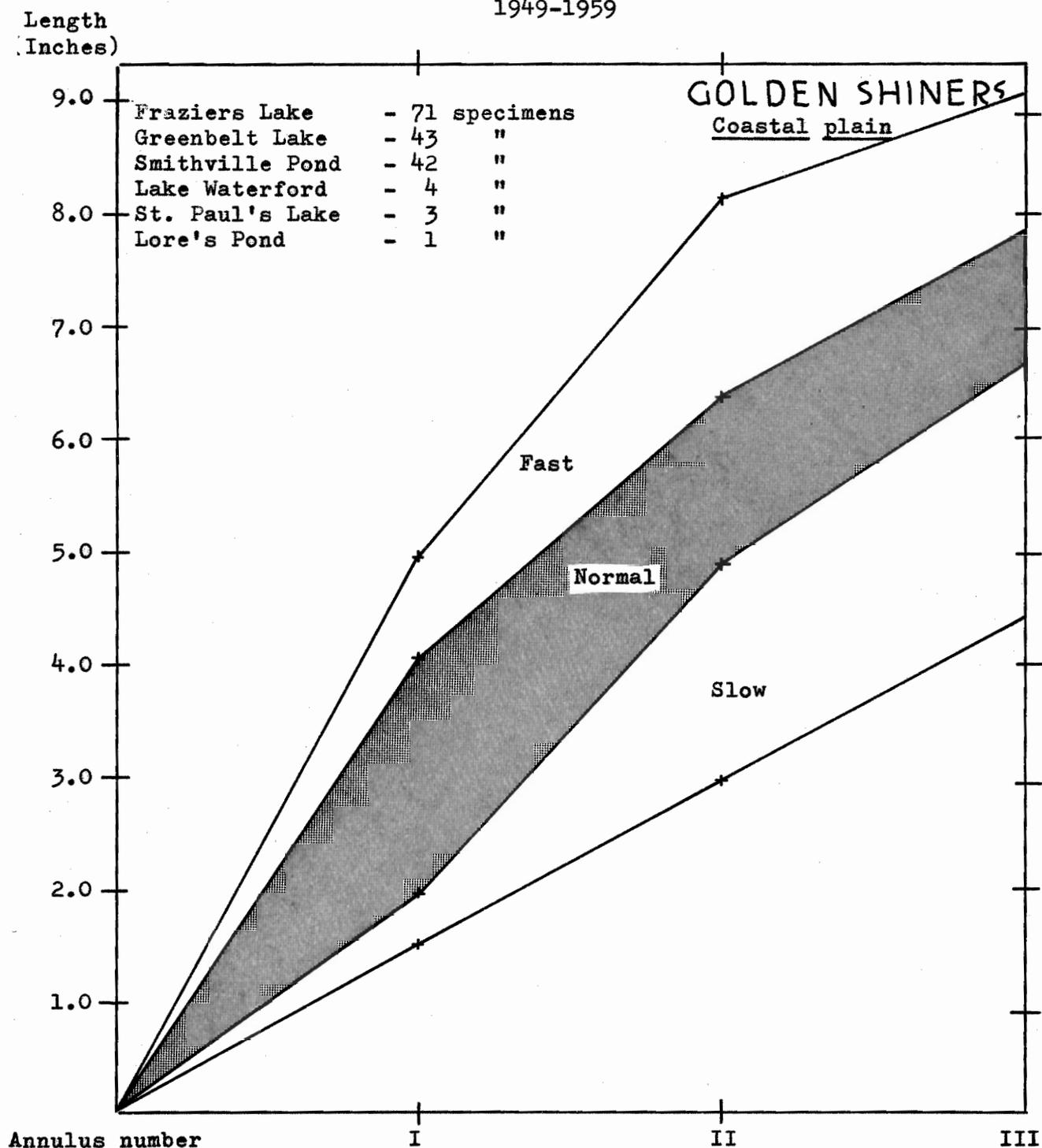
Length
(Inches)



	I	II	III	IV
Number of fish	93	73	25	19
Largest fish	5.0	7.4	7.7	8.5
<u>Normal Range</u>				
{ Upper	3.2	6.2		
{ Average	2.6	5.5		
{ Lower	1.9	4.4		
Smallest fish	1.0	3.6	6.2	7.0

GROWTH STUDIES OF MARYLAND FISH

1949-1959

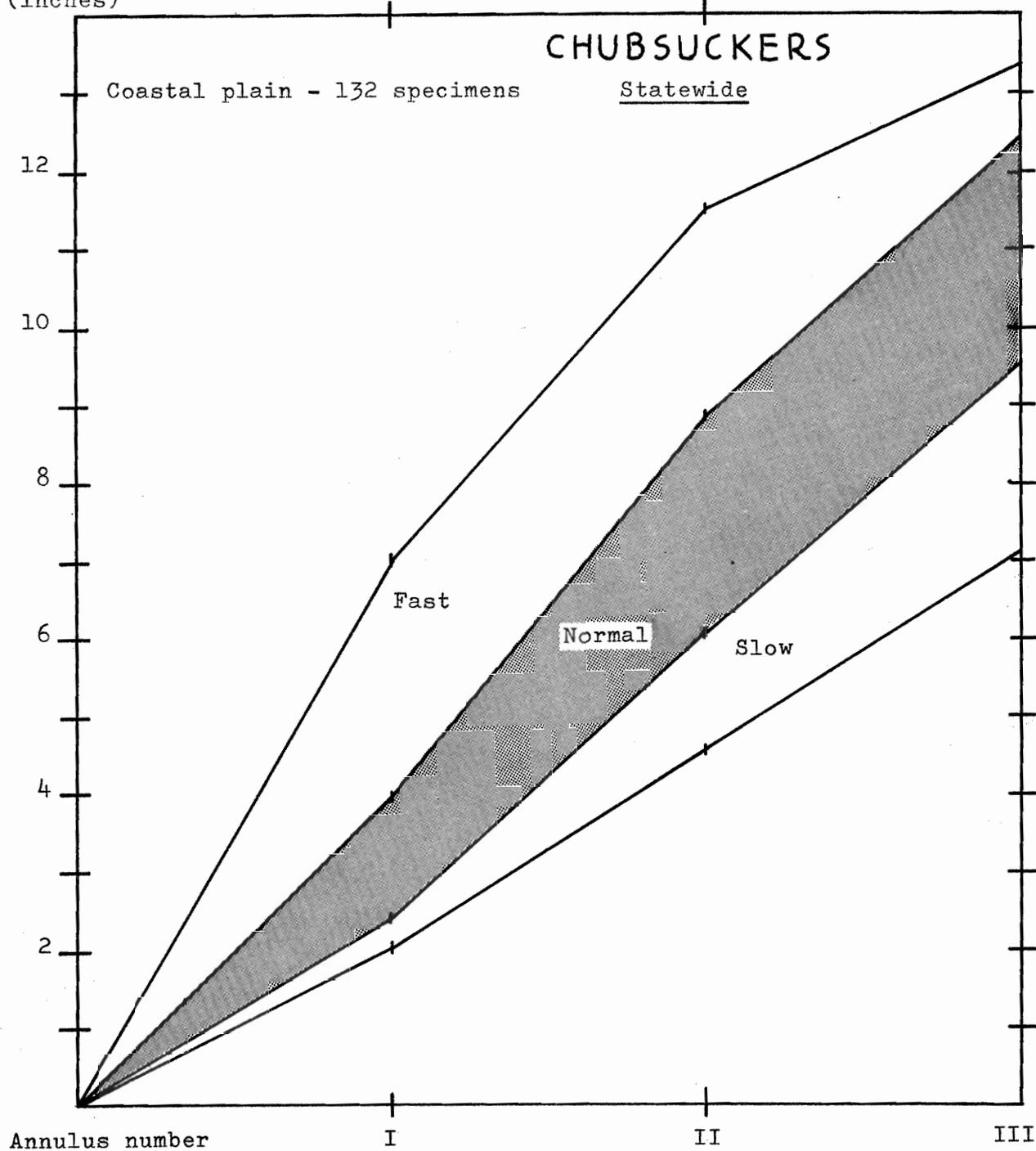


	I	II	III	IV	V	VI
Number of fish	198	177	92	20	6	2
Largest fish	5.0	8.2	9.1	9.9	10.1	9.9
<u>Normal Range</u>	Upper	4.1	6.4	7.8		
	Average	3.0	5.5	7.0		
	Lower	2.0	4.9	6.7		
Smallest fish	1.5	3.0	4.4	5.8	9.3	9.5

GROWTH STUDIES OF MARYLAND FISH

1949-1959

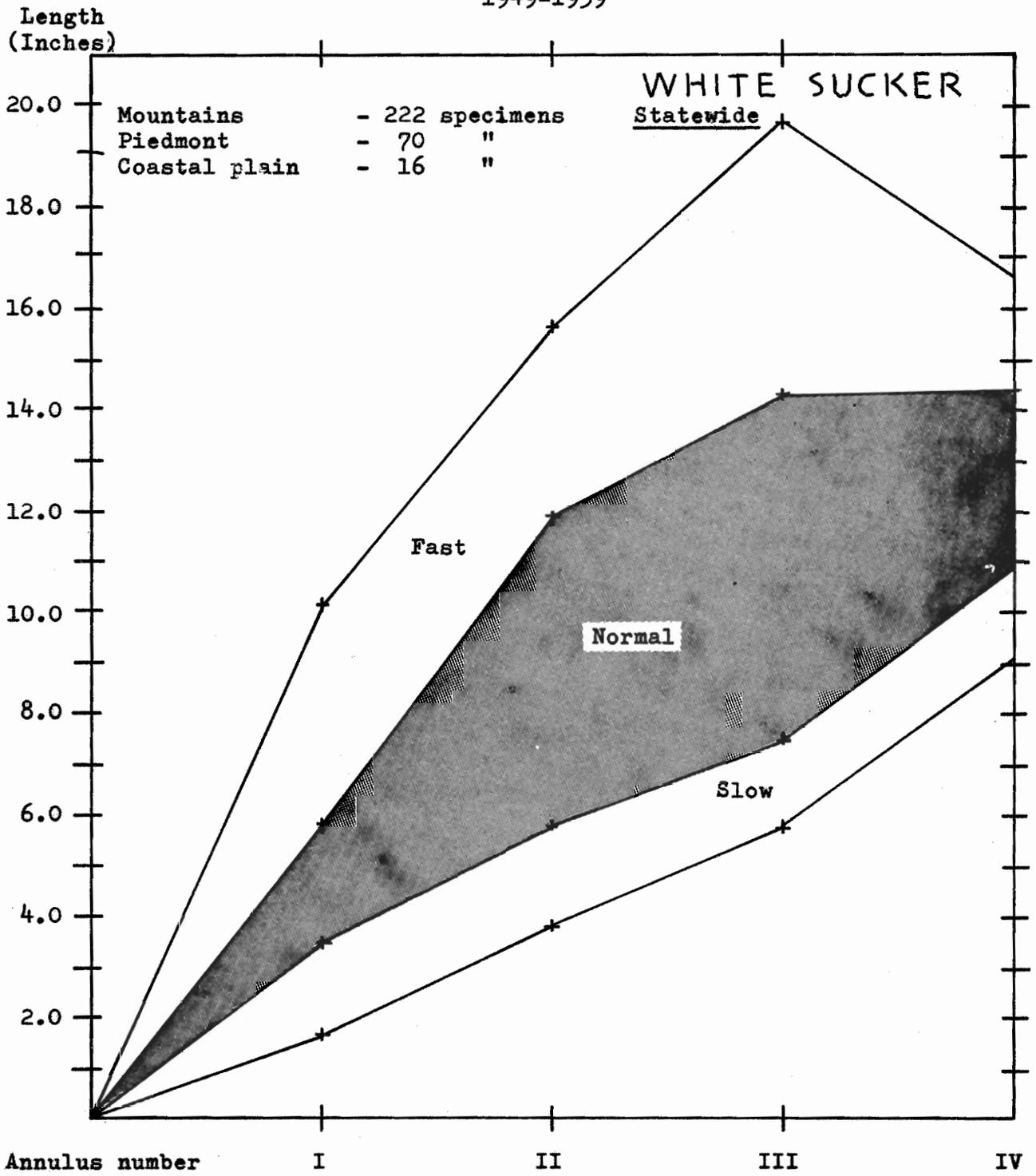
Length
(inches)



	I	II	III	IV
Number of fish	132	70	52	15
Largest fish	7.1	11.6	13.4	14.4
<u>Normal Range</u>	Upper	8.9	12.6	
	Average	3.4	7.7	11.3
	Lower	2.5	6.1	9.6
Smallest fish	2.1	4.7	7.2	11.5

GROWTH STUDIES OF MARYLAND FISH

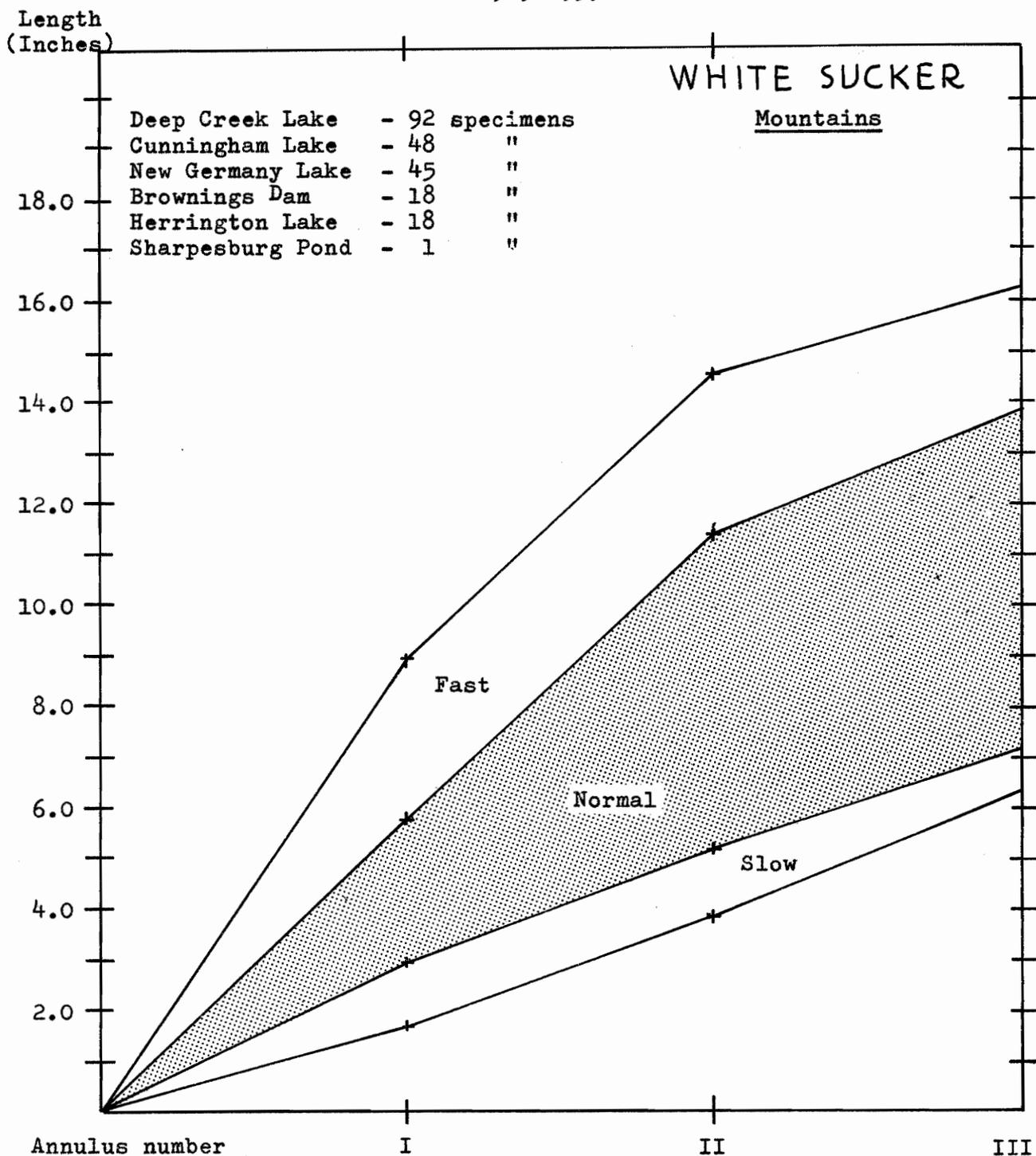
1949-1959



	I	II	III	IV	V	VI	VII
Number of fish	308	254	128	32	15	5	2
Largest fish	10.1	15.7	19.6	16.6	16.4	15.8	15.3
<u>Normal Range</u>	Upper	5.8	11.9	14.2	14.3		
	Average	4.9	8.7	11.8	12.4		
	Lower	3.5	5.8	7.5	10.8		
Smallest fish	1.7	3.8	5.8	9.1	10.2	11.9	14.0

GROWTH STUDIES OF MARYLAND FISH

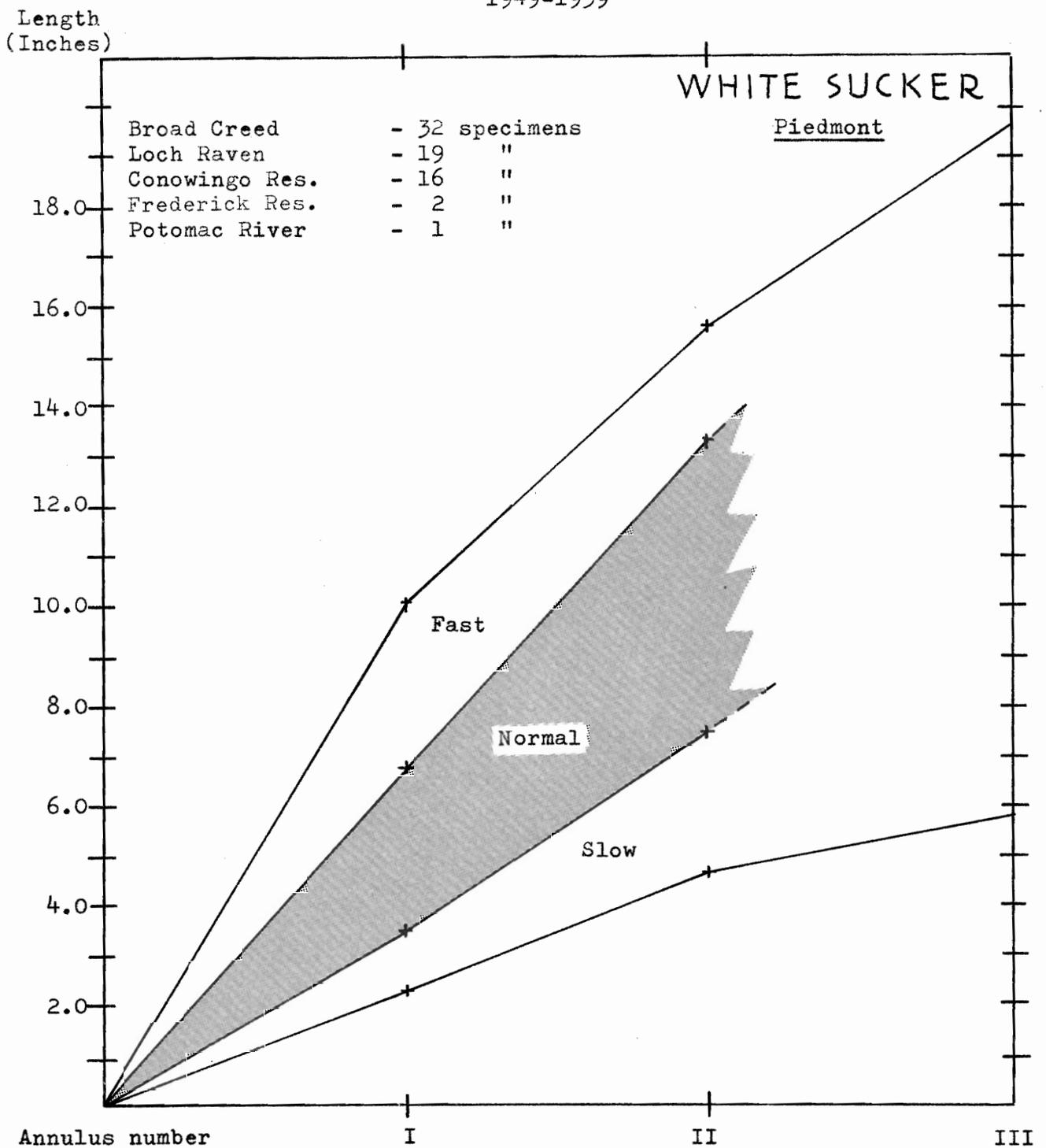
1949-1959



	I	II	III	IV	V	VI	VII													
Number of fish	222	186	93	28	15	5	2													
Largest fish	9.0	14.6	16.2	16.2	16.4	15.8	15.3													
<u>Normal Range</u>	<table border="0"> <tr> <td rowspan="3" style="font-size: 2em; vertical-align: middle;">{</td> <td>Upper</td> <td>5.8</td> <td>11.4</td> <td>13.8</td> </tr> <tr> <td>Average</td> <td>4.9</td> <td>8.3</td> <td>10.0</td> </tr> <tr> <td>Lower</td> <td>3.0</td> <td>5.2</td> <td>7.2</td> </tr> </table>							{	Upper	5.8	11.4	13.8	Average	4.9	8.3	10.0	Lower	3.0	5.2	7.2
{	Upper	5.8	11.4	13.8																
	Average	4.9	8.3	10.0																
	Lower	3.0	5.2	7.2																
Smallest fish	1.7	3.8	6.3	9.1	10.2	11.9	14.0													

GROWTH STUDIES OF MARYLAND FISH

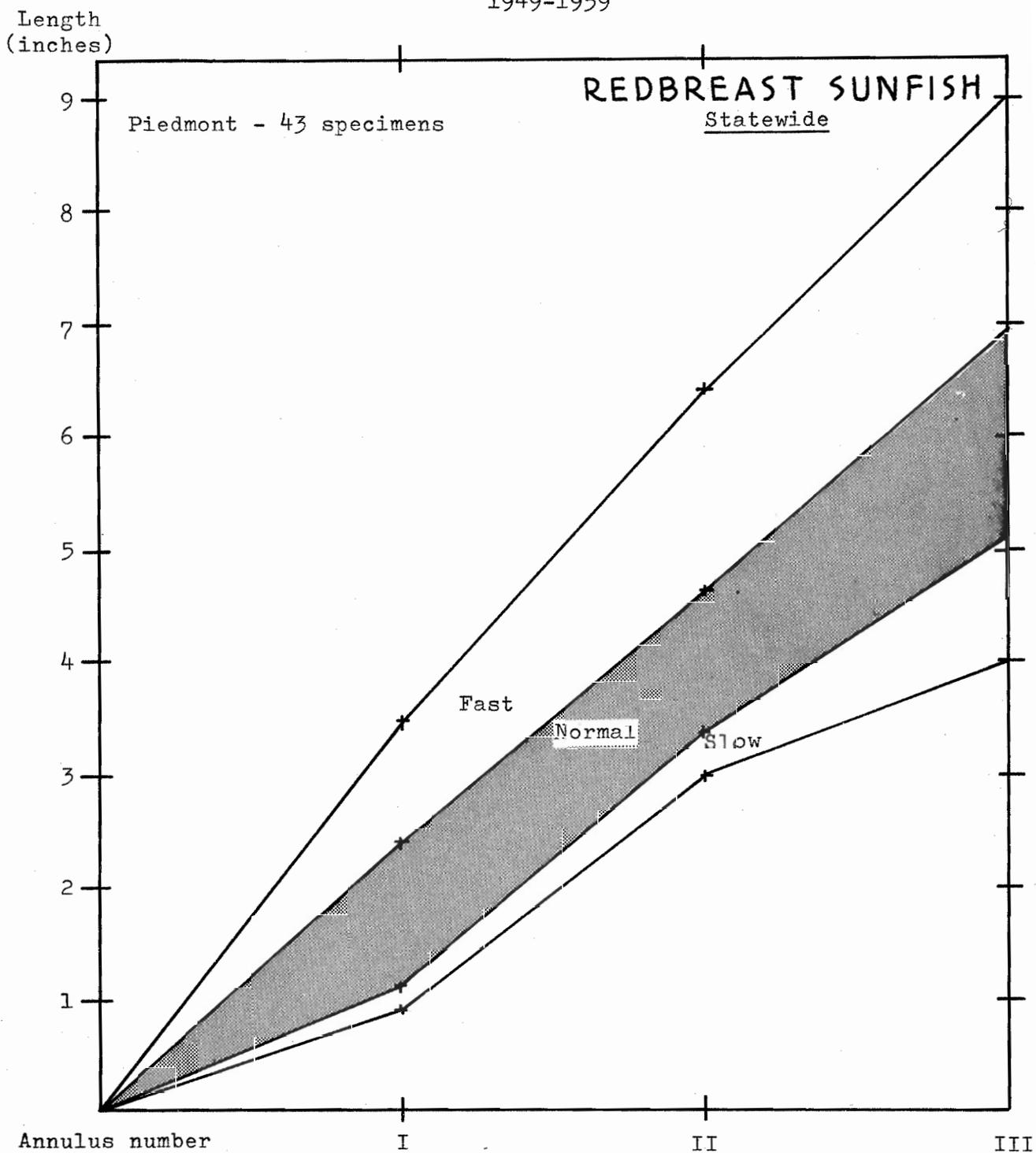
1949-1959



	I	II	III	IV
Number of fish	70	52	26	5
Largest fish	10.1	15.7	19.6	16.6
<u>Normal</u> <u>Range</u>	Upper	13.4		
	Average	10.3		
	Lower	7.5		
Smallest fish	2.3	4.7	5.8	10.6

GROWTH STUDIES OF MARYLAND FISH

1949-1959



	I	II	III	IV	V
Number of fish	43	43	30	6	2
Largest fish	3.5	6.4	9.0	6.8	7.0
<u>Normal</u> <u>Range</u>	Upper	4.7	6.9		
	Average	1.8	4.2	6.1	
	Lower	1.2	3.4	5.2	
Smallest Fish	0.9	3.0	4.0	6.2	6.8