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A study of the channel catfish, ictalurus punctatus (rafinesque), in Mud Lake, Utah

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A STUDY OF THE CHANNEL CATFISH, *ICTALURUS PUNCTATUS* (RAFINESQUE), IN MUD LAKE, UTAH

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INTRODUCTION

Several biological investigations of Mud Lake and Utah Lake (Utah County, Utah) have been made, some before they were joined by a canal in 1935 and others since their connection (White, 1963). Many species that inhabited Utah Lake before 1935 have since become established in Mud Lake, which is now considered to be a part of Utah Lake. The channel catfish, Ictalurus punctatus (Raf.), was one of these species. It was planted in Utah Lake during the summer of 1911 (Lawler, 1960), but was apparently not observed by Hatton (1932) since it was not mentioned in his discussion of the natural histories of the species of fishes found in Utah Lake. Little is known about the movements of channel catfish in Utah Lake, although some studies have been reported from other areas in North America (Houser (1959) in Oklahoma; McCammon and La Faunce (1961) in California; Stevens and Tiemeier (1961) in Kansas; and Welker (1967) in Iowa).

Channel catfish have become an important game fish in Utah Lake since 1932 and fluctuations in its population size have been noted by Arnold (1960), Lawler (1960), Lowder (1951), and Sigler and Miller (1963). A decline in the catch of channel catfish in Utah Lake has been reported recently by Loy (Personal interview) and Vincent (Personal interview). This study was made to evaluate this reported reduction and

Mud Lake was selected as the site for intensive study. The objectives of this study were: (1) to estimate if channel catfish are increasing or decreasing in Mud Lake, (2) to estimate the mean size of adult channel catfish in Mud Lake, (3) to determine which environmental factors effect the catches of channel catfish, and (4) to determine if the channel catfish in Mud Lake are residents year round.

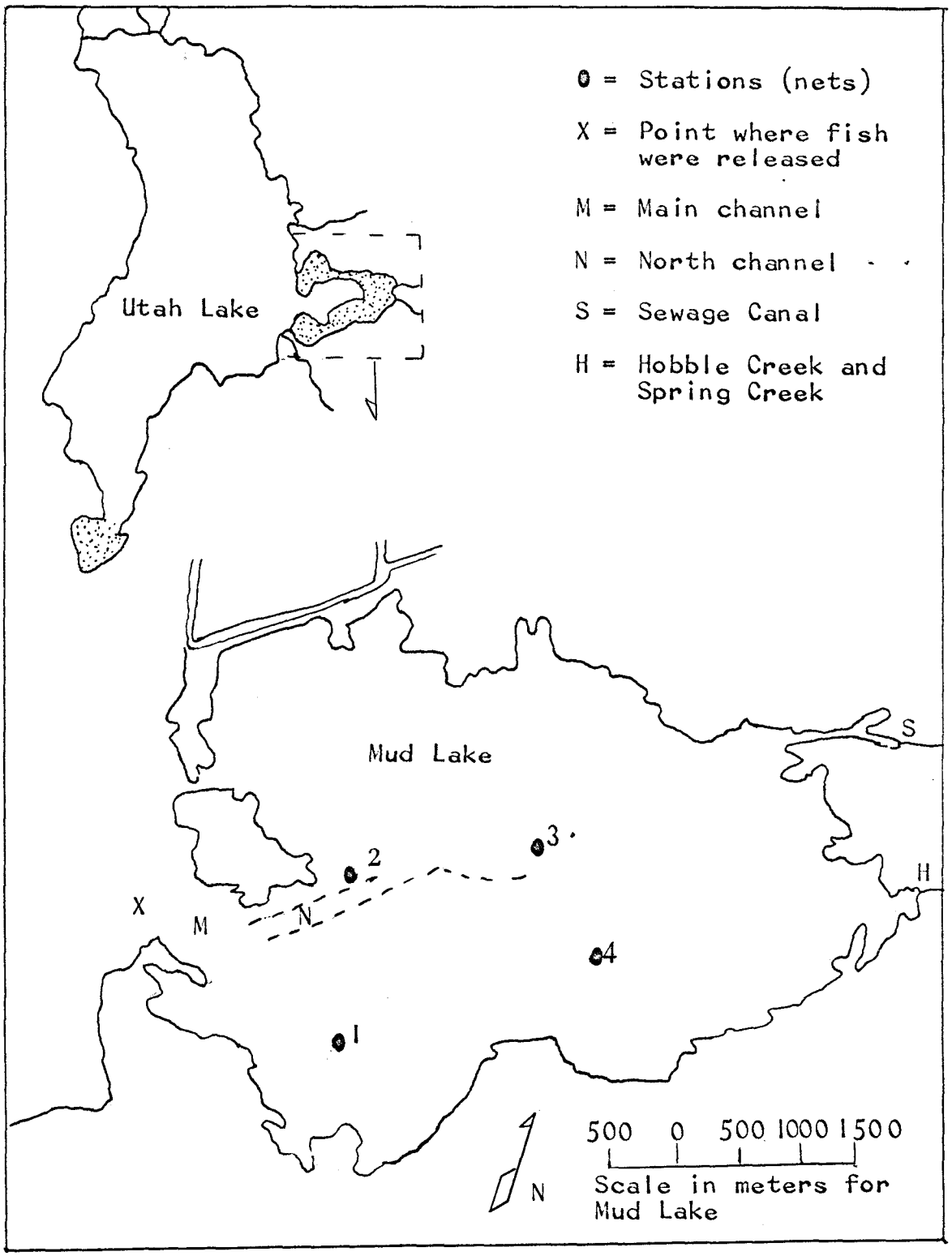

Figure 1. Map of Utah Lake and Mud Lake, redrawn from Map 66-418-2290, Bureau of Reclamation, 1963.

STUDY SITE DESCRIPTION AND METHODS

Study Site Description

Mud Lake is a marsh at the southeast side of Utah Lake, approximately 5.6 km wide; it is fed by Hobble Creek, Spring Creek, and a canal from the Provo City sewage treatment plant, and is connected with Utah Lake by a channel (Fig. 1). Bottom soil which is developed on alluvial deposits in Mud Lake is a Macbeth type ranging from 2.5 to 9.1 m deep. It is composed of particles from 0.05 mm to 0.002 mm in diameter mixed with organic matter (White, 1963). Dead tree trunks and shrubs in the northwest corner of the marsh and numerous muskrat holes along the dikes provide good over-head cover which could be an important spawning habitat for channel catfish (Lawler, 1960).

Mud Lake is characterized by the predominance of *Scripus validus* Vahl., *Scirpus americanus* Pers., *Tamarix pentandra* Pall., *Nasturtium spp.*, *Salix spp.*, *Typha latifolia* Linn., and various algae. The dominante species of fish during the study were: *Cyprinus carpio* Linn., *Roccus chrysops* (Raf.), and *Ictalurus punctatus* (Raf.) in decreasing order; and an occasional *Ictalurus melas* (Raf.), *Micropterus salmoides* (Lacep.), *Gambusia affinis* (Baird and Girard), *Stizostedion vitreum* (Mitch.), and *Perca flavescens* (Mitch.).

Methods

Environmental Measurements. To measure the water depths a calibrated pole at net No. 2 was used as a reference point. Water temperatures were taken near the surface in the shade of the boat and turbidity was similarly measured with a Seechi disk. During the latter part of the study the pH of the water was also measured. Barometric pressures were provided by the Physics Department of Brigham Young University.

Collections of Fish. Hoop nets, hook and line, seines, electro-fishing gear, and gill nets were used to capture fish. Most collections were made with four hoop nets; 6.1 m long, a mouth diameter of 1.5 m, 3.8 cm mesh, and containing nine hoops. Each net had two wings 3.1 m long and a 30.5 m small mesh lead net.

The first two nets were located in relatively small areas of open water. The first (No. 1) was placed 7.3 m from the nearest vegetation (Fig. 1), anchored in water 147 cm deep with the mouth facing south. This net was closed early in the study because of heavy damage by muskrats. The second (No. 2) net was placed in water 138 cm deep, at the north side of the north channel, the mouth faced south and was 12 m from the nearest vegetation.

The third and fourth nets were located in, or near, a large body of water. The third (No. 3) net was placed in water 145 cm deep, facing northeast at the end of the north channel where the nearest vegetation was 12.4 m from the end

of the lead. The fourth (No. 4) net was in water 145 cm deep and was more than 200 m from the nearest vegetation with the mouth of the net facing northwest (Fig. 1).

The hoop nets remained in place throughout the study, but were not open from Friday through Sunday. They were usually opened on Monday and the fish collected each 24 hours through the following Thursday. The nets were checked between 5 PM and 8 PM and the number of each fish species recorded. Attempts to collect channel catfish with gill nets, electric shockers, and seines were generally unsatisfactory.

A hook and line method was used for one day in September. An empty Clorox bottle was attached to a six pound test line tied to a No. 2 hook. Five of these rigs were baited with fresh carp meat and allowed to settle to the bottom. Fish caught by this method were immediately examined for the material contained in their stomachs.

Fish Measurements and Tagging. The total length was recorded for each channel catfish. Additional length measurements from fish taken in Mud Lake by the Utah Division of Fish and Game from April to May, 1967 were also included. The sex was determined with the method described by Doze (1925). The fish were then either fin-clipped or tagged before being released. Fin clips were made by removing a portion of the adipose fin and cutting an inverted V-shaped notch from the anal fin.

Yellow, numbered, spagetti tags (71 mm x 2 mm) were also used. The tags were inserted on the left side just

behind the dorsal fin. A floating tag method described by Hasler, et al. (1958) was used to determine local movements of fish.

RESULTS

Environmental Measurements

The water temperatures, depths, and turbidities are presented in Table 1. During June and July the surface temperatures averaged 28°C with little fluctuation. The next two months showed a steady decline with the November temperatures reaching 6°C. From June 12 to November 4 a steady decrease in the water level from 137 cm to 69 cm was recorded at Net No. 2. Sudden increases in water depth were due to seiches created by strong northwest winds. The pH of the water ranged from 6 to 7.2. Two algal blooms were observed in Mud Lake, one in June and July and the second in August. Some algae persisted for longer periods in areas protected from the winds.

Sampling Results

A total of 310 channel catfish and 920 carp (*C. carpio*) were captured during 4,918 net hours. These counts were used to establish ratios between carp and channel catfish. The other species of fish captured were not dealt with in my study.

The catch/per/net hour of channel catfish during this time is shown in Tables 1 and 2. Two fingerling channel catfish, 7.5 and 7.1 cm long, were collected on September 6.

Table 1. Environmental data and catch/net/hour of channel catfish in Mud Lake from June 12 to November 25, 1967.

Date	Catch/net/hr	Temp °C	Turb[a] cm	Bar Press[b] cm Hg	Water Level cm
June 12	.13	18		75.31	138
" 24	.10	20		75.82	137
July 11	.06	28		76.30	135
" 12	.11	28		76.35	134
" 13	.35	28		76.23	132
" 18	.23	28		76.15	128
" 19	.15	29		76.15	125
" 20	.14	30		76.07	123
" 25	.19	28		76.07	122
" 26	.04	29	39	75.92	120
Aug. 1	.22	28	34	76.07	118
" 2	.03	27	43	76.12	115
" 3	.06	29	45	76.12	112
" 5	.11	24	34	76.12	108
" 7	.09	27	41	75.95	106
" 8	.05	27	33	76.07	104
" 9	.10	29	39	76.28	103
" 10	.06	28	38	76.28	101
" 16	.08	28	34	76.25	99
" 17	.25	28	32	76.25	98
" 22	.19	28	32	76.02	99
" 23	.16	29	49	76.08	96
" 24	.10	30	40	76.12	95
" 26	.89	26	36	76.17	96
" 28	.08	27	35	76.17	94
" 29	.44	27	29	76.23	90
" 30	.43	27	35	76.38	91
Sept. 1	.24	25	46	76.15	86
" 4	.03	21	33	76.15	86
" 5	.00	22	35	76.17	86
" 6	.05	23	36	76.28	86
Oct. 17	.00	10	25	75.92	70
" 19	.00	16	31	76.25	75
" 26	.02	11	25	75.92	69
Nov. 4	.00	06	38	76.08	69
" 14	.00	08	30	75.92	74
" 25	.00	06	34	76.25	81

a Turbidity.
b Barometric Pressure

Table 2. Mean catch/net/hour of channel catfish from each station in Mud Lake from June 12 to September 6, 1967.[a]

Net No.	Catch/net/hour
1	0.12
2	0.04
3	0.25
4	0.17

[a] After September 6 the catch decreased to near 0.

All other channel catfish ranged between 36.8 cm and 70.5 cm long with a mean length of 50.2 cm (Table 3). Statistically there are no significant differences among the mean lengths of the monthly samples (Table 4).

On September 4 seven fish were caught with baited hooks from 10:30 AM until 6:10 PM. The stomachs and small intestines of all these fish were empty.

During the first part of the study all females were gravid. Only one fish had spawned completely by June 24 and the others still contained eggs, but by July 27 most had completed spawning. Females collected during late summer and early fall contained immature eggs in the ovary that probably would have matured by June of the following year.

Movement Results

During the study period 244 channel catfish were tagged and the fins clipped on 39 more; 255 were released in Utah Lake and 28 in the main channel connecting Utah Lake and Mud Lake (Fig. 1). Six were recaptured (Table 5); four in the nets in Mud Lake, one by a fisherman in Provo River, and one by commercial fisherman along the southeast shore of Utah Lake. The latter was about 1.6 km from the point of release.

To study daily movements, 18 channel catfish with styrofoam floats attached were released on different days and observed. Thirteen moved toward the shore or vegetation where they either remained or broke the fishing line, and one swam out of the field of vision.

Table 3. Mean size of adult channel catfish in Mud Lake, captured in 4 hoop nets of 3.5 cm mesh, 1967.

Month	Sample Size	Mean Total Length (cm)	Range
Apr	50	50.1	43.0-60.0
May	9	48.2	46.0-51.0
June	28	51.4	40.5-67.0
July	43	52.1	42.1-65.2
Aug	72	52.1	42.4-70.5
Sept	25	47.0	36.8-64.0

Table 4. Summary of analysis of variance of the mean size of channel catfish in Mud Lake.

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F-Ratio	$F_{(5,26)(.01)}$
Mean	1	82702.445	82702.445		
Among Groups	5	78.601	15.72020	.75026	3.818
Within Group	26	544.774	20.95285		
Total	32	83325.820			

Table 5. Summary of recaptured channel catfish in Utah Lake and Mud Lake, 1967.

Date Tagged	Date Recaptured	Locality of Recaptures	Days since Release
July 11	Aug 1	Mud Lake	21
June 24	" 3	"	40
Aug 7	" 16	"	19
" 15	" 22	"	7
" 21	Sept 6	Provo River	16
" 10	Feb 15	Utah Lake	109

DISCUSSION AND CONCLUSIONS

Population

Several workers have recorded the catch of carp and channel catfish from Utah Lake during the last 17 years. Based on their figures and the ones obtained from this study, ratios have been established between the two species (Table 6). However, since different methods of capturing fish were used this interpretation must be used with caution. In 1950 and 1951 a higher ratio (about 30:1) of carp to channel catfish may have existed when compared with 1958, 1959, and 1967 (about 3:1). The narrowing of the ratio in later years could be due either to different fishing methods or to a shift in population sizes. The early data were obtained from seines and the latter mainly from gill nets and hoop nets. The small ratio could indicate the channel catfish population decreased. However, a commercial seiner, Loy (Personal interview), reported that the carp population has been increasing. If this were the case one could conclude that the channel catfish population had increased faster than the carp, provided the ratios of Table 6 were valid. It should also be noted that my data may indicate population trends of Mud Lake and not Utah Lake proper. Table 7 shows that the ratio of carp to channel catfish is approximately 3:1 until August 17; from August 20 to

Table 6. Numbers and ratios of carp to channel catfish in Utah Lake and Mud Lake from June through November.

Year	Carp	Channel Catfish	Ratio of Carp to Channel Catfish	Source of Data
1950[a]	78900	2427	32.51:1	Lowder, (1951)
1951[a]	22400	758	29.60:1	"
1958[abc]	1815	540	3.36:1	Arnold, (1960)
1959[b]	1227	212	5.79:1	"
1967[b]	920	310	2.97:1	Author, (1968)

[a]Seining by commercial fisherman.
[b]Hoopnet.
[c]Gill net.

Table 7. The ratios of the mean catch/net/hour of channel catfish to carp in Mud Lake, 1967.

Net No.	Carp	Channel Catfish	Ratio
1	.41	.12[a]	3.4:1
2	.17	.06[a]	2.8:1
	.04	.04[b]	1.0:1
3	.94	.26[a]	3.6:1
	.43	.25[b]	1.7:1
4	.22	.07[a]	3.0:1
	.23	.27[b]	0.9:1

[a]From June 12 - August 17.
[b]From August 20 - September 6.

September 6 the ratio approaches 1:1 in each net because there were fewer carp captured as compared to catfish. It appears that carp and channel catfish were proportionately dispersed throughout the area and that they could be found anywhere in Mud Lake. However, the largest numbers were captured in the two nets in the area of open water (Table 8). This is in agreement with Trautman (1957) who stated that channel catfish seldom live in dense aquatic vegetation.

Lawler (1960) captured channel catfish of all age classes in his nets in Utah Lake. In determining the age of maturity he observed that no channel catfish in Utah Lake in the first four years of life were regarded as matured. In my study only fingerlings and adult channel catfish, five years or older, were observed in Mud Lake. From these observations it appears that mature channel catfish move into Mud Lake for spawning and summer feeding while the fingerlings inhabit the area in their early life.

Environmental Influences on the Population

Lawler (1960) observed three types of movements in channel catfish: (1) movements to the spawning sites, (2) movements to shallow water during early spring and to deeper water after mid-August, and (3) daily movements in search for food.

Mud Lake is believed to be a spawning site (Lawler, 1960). It is possible that when this study began the channel catfish had already moved into the area to spawn. In California

spawning takes place from May 11 to July 14 (Geibel and Murray, 1961) and in Texas from April 15 to August (Toole, 1951). Lawler (1960) observed spawning catfish from mid-June through August in Utah Lake. However, gravid channel catfish were collected only from June 12 until July 27 in 1967. During this time many channel catfish were caught which may have been due partially to spawning movements. A general migration of channel catfish into shallow water may also have contributed to the catch. Of the channel catfish marked, 1.5 per cent of those released in the deeper water of Provo Bay returned to Mud Lake, but there may have been a higher per cent return owing to the small area which the nets sampled. When floats were attached to channel catfish and released in Provo Bay most of the fish swam toward shallow water.

A slight decrease in catches was recorded in early August which may have been due to a stabilizing of the population. Stevens and Tiemeier (1961) noticed that channel catfish spent most of their time in less than .2 ha of water, but moved noticeably farther at certain periods of the day, which would contribute to the catch.

Most of the channel catfish were captured from August 20 to September 1. Extensive searching for food, as well as the migration into deeper water may have contributed greatly to the catch. I concluded that by November almost all channel catfish had left the area, since the catch in the nets decreased to zero (Table 1). Only one channel catfish was captured after

October 16, although the nets remained open for 35 days. During the autumn when the water cleared and the bottom became visible, a few carp were observed, but no channel catfish were sighted.

The egress from Mud Lake was probably due to decreasing water temperature. The F ratios of the multiple regression analysis at the .10 level indicated that temperature changes could have had a significant influence on the catch (Table 7). This species prefers warm water (Doze, 1925) which is usually found in shallow depths during the summer. Scott (1950) trapped and poisoned channel catfish from July 7 through August 27 and observed that these fish were more abundant in shallow water than in deep water. When the surface temperatures of Mud Lake averaged 28° C and the bottom temperatures averaged 23° C the catch was the highest. In September when the water of Mud Lake cooled the catches rapidly decreased. Water fluctuations in Mud Lake showed no correlation to the catch. Moreover a steady decrease in water level showed no significant correlation to the catch (Table 7).

Literature on sport fishing claims that barometric pressure differences influence fish movements. When the pressure increases, fish are reported to move into shallow water, and when the pressure decreases, they move into deeper water (Bueno, 1952). Some pressure differences occured during the sampling period, so there was some chance to determine if such a correlation existed. The possible maximum barometric pressure difference of 5.08 cm of mercury when a low pressure

Table 8. Analysis of variance associated with the multiple regression of environmental factors and catch/net/hour of channel catfish from Mud Lake, 1967.

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	F-Ratio
Water Temperature	1	.12598	.12598	3.7662*
Barometric Pressure	1	.03300	.03300	.9865
Water Level	1	.02137	.02137	.6389
Turbidity	1	.02001	.02001	.5982
Experimental Error	23	.76932	.03345	
Total	27	.96969	.03591	

*Significant at the 90 per cent level.

area is replaced by a high pressure area, did not occur. However, the greatest change observed during the sampling period was 1.04 cm which was equivilent to 13.6 cm of water (Table 1). This change did not seem to be related to any observable variation in the catch/net/hour (Table 1).

I first thought that reduced light due to turbidity would encourage channel catfish to range further during the day and thus, increase the catch when the turbidity was high. In this study fluctuations in catches and turbidity showed no correlation according to the multiple regression analysis (Table 5). Factors other than light may be responsible for fluctuations in the catch.

Buck (1956) in quoting Claffey (1955) stated that when using a spectrophotometer, he found only 24.9 per cent of the red wave length was visible at a depth of 10 cm in water having a turbidity of 25 ppm; at 150 ppm, no detectable light of any visible wave length penetrated through a depth of 7.5 cm. Since the turbidity of Mud Lake was approximately 45 ppm, little light would penetrate to the depth at which channel catfish were usually found and would probably not affect the fish, since they usually feed near the bottom (Bailey and Harrison, 1948).

SUMMARY

During the period of June to November, 1967, a study was undertaken (1) to estimate if channel catfish are increasing or decreasing in Mud Lake, Utah Co., Utah, (2) to estimate the mean size of adult channel catfish in Mud Lake, (3) to determine which environmental factors effect the catch of channel catfish, and (4) to determine if the channel catfish in Mud Lake are residents year round.

A total of 310 mature channel catfish averaging 50.2 cm long, two fingerlings, and 920 carp were collected. Ratios between carp and channel catfish which had been established over a period of 17 years were developed in this study. These ratios indicate no decrease in the channel catfish population. Attempted correlations between environmental factors (water temperature, turbidity, water level, and barometric pressure) and the catch shows that only water temperature changes have a statistically significant influence. Large catches during June, July, August, and September were recorded. In later months the numbers of channel catfish captured decreased. It appears that channel catfish utilize Mud Lake only during the summer.

LITERATURE CITED

Arnold, B. 1960. Life history notes on the walleye, Stizedion vitreum vitreum (Mitchill), in a turbid water, Utah Lake, Utah. Utah Fish and Game Dept. Federal Aid Project F-4-R-5 Job T, 107 pp.

Bailey, Reeve M., and Harry M. Harrison, Jr. 1948. Food habits of the southern channel catfish (Ictaluras lacustris punctatus) in the Des Moines River, Iowa. Trans. Am. Fish Soc. 80:119-139.

Buck, H. S. 1956. Effects of turbidity on fish and fishing. Trans. 21st N.A. Wildl. Conf., March: 249-261.

Bueno, B. 1952. The American fisherman's guide. Prentice-Hall Inc. Englewood Cliffs, N. J., 549 pp.

Claffey, F. J. 1955. The productivity of Oklahoma water with special reference to relationships between turbidity from soil, light penetration, and the populations of plankton. Masters thesis, Oklahoma A and M College, Goodwell, Oklahoma. 102 pp.

Doze, J. B. 1925. The barbed trout of Kansas. Trans. Am. Fish Soc. 55:167-183.

Geibel, G. W. and Murray G. E. 1961. Channel catfish culture in California. Prog. Fish-Cult. 23:99-105.

Hasler, A. D., R. M. Horral, W. J. Wisby, and W. Braemer. 1958. Sun-orientation and homing of fishes. Limnol.

and Oceanog. 3(4): 353-361.

Hatton, S. R. 1932. Fish fauna of Utah Lake. Unpubl. Master's thesis, Dept. of Zool. and Entomol., Brigham Young Univ. Provo, Utah. 58 pp.

Houser, A. 1959. The effect of homing on channel catfish population estimates in large reservoirs. Proc. Okla. Acad. Sci. 40:121-135.

Lawler, R. E. 1960. Observation on the life history of channel catfish, Ictalurus punctatus (Rafinesque), in Utah Lake, Utah. Utah Fish and Game Dept. Fed. Aid Project F-4-R-5 Job T, 67 pp.

Lowder, L. J. 1951. Taxonomic study of Catostomidae of Utah Lake with notes on the fish population. Unpubl. Master's thesis, Dept. of Zool. and Entomol., Brigham Young Univ. Provo, Utah. 45 pp.

Loy, W. Commercial Fisherman. Personal interview. Orem, Utah. Nov. 1967.

McCammon, G. W. and D. A. La Faunce, 1961. Mortality rate and movement in the channel catfish population of Sacramento Valley, California. Calif. Fish and Game Dept. 47:5-23.

Stevens, E. D. and O. W. Tiemeier, 1961. Daily movement of channel catfish, Ictalurus punctatus (Rafinesque), in a farm pond. Trans. Kan. Acad. Sci. 64:218-224.

Scott, D. C. 1950. Sampling fish population in the Coosa River, Alabama. Trans. Am. Fish Soc. 80:28.

Sigler, W. F. and R. R. Miller, 1963. Fishes of Utah. Utah State Dept. of Fish and Game, Salt Lake City,

Utah. 203 pp.

Toole, M. 1951. Channel catfish culture in Texas. Prog. Fish-Cult. 13:3-10.

Trautman, M. B. 1957. The fishes of Ohio. Ohio St. Univ. Press, Columbus, Ohio. 683 pp.

Vincent, F. Jr. Regional Director of Utah State Dept. of Fish and Game. Personal interview. Provo, Utah, Feb., 1967.

Welker, B. 1967. Movements of marked channel catfish in the Little Sioux River, Iowa. Trans. Am. Fish. Soc. 96: 351-353.

White, D. A. 1963. Ecology of summer aquatic invertebrates population in a marsh area of Utah Lake. Unpubl. Master's thesis. Dept. of Zool. and Entomol., Brigham Young Univ. Provo, Utah. 35 pp.

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ABSTRACT

From June to November 1967, a study on channel catfish, Ictalurus punctatus (Rafinesque), in Mud Lake, Utah Co., Utah was undertaken. The objectives were (1) to estimate if channel catfish are increasing or decreasing in Mud Lake, (2) to estimate the mean size of adult channel catfish in Mud Lake, (3) to determine which environmental factors effect the catch of channel catfish, and (4) to determine if the channel catfish in Mud Lake are residents year round. A total of 310 mature channel catfish and 920 carp were collected with four hoop nets. Two fingerling were captured by seining. Ratios between carp and channel catfish over a 17 year period had been established which indicated a possible increase in the channel catfish population. With the exception of the fingerlings all channel catfish captured were at least 36.8 cm long with an average of 50.2 cm. A comparison between environmental factors (water temperature, turbidity, water level, and barometric pressure) and the catch showed that only water temperature changes had a statistically significant influence. Large catches during June, July, August, and September were recorded. In later months the numbers of fish captured decreased and no channel catfish could be seen when the water cleared. It appears that channel catfish utilize Mud Lake only during the summer.