

Memorandum

To : Fisheries Management, Region 5

Date: October 5, 1979

From : Department of Fish and Game - Glenn Black, CFWB

Subject: Desert Pupfish Survey at the Salton Sea, August 12-16, 1979

Attached is a report on the results of a summer survey of desert pupfish populations within several habitats at the Salton Sea. The purpose of this survey was to monitor any changes that might have occurred in the distribution, relative abundance, and status of *Cyprinodon macularius* since the summer survey of 1978.



GLENN BLACK
Assistant Fishery Biologist

GB/saa

cc: Members & Advisors - Desert Pupfish Committee

**Desert Pupfish Survey at the Salton Sea,
August 12 - 16, 1979**

By

Glenn Black

**Inland Fisheries
Region 5**

INTRODUCTION

A desert pupfish survey was conducted at the Salton Sea on August 12-16, 1979 in order to determine differences in distribution, relative abundance and habitat preference as compared with the results of the summer survey of 1978.

MATERIALS AND METHODS

The materials and methods used during this survey were the same as described in the quarterly surveys of 1978-79 with the exception that no measurements of salinity, turbidity or dissolved oxygen were taken, nor was any seining conducted due to time constraints.

The numbers of sample areas and sites were the same as in the previous surveys with the exception that one irrigation drain was deleted on this survey because it had been included in only three of the prior surveys.

The Salton Sea Proper could not be sampled during this survey because of mechanical problems with several outboard boat motors.

RESULTS AND DISCUSSION

Irrigation Drains

Sixty-five minnow traps were set in 18 irrigation drains that flow directly into the Salton Sea (Appendix 1). Traps were set for approximately 24 hours at depths of 10-100 cm and checked for species composition (Appendix 1).

A total of 10 species were captured during this survey of the irrigation drains. As in the summer survey of 1978 the sailfin molly, *Poecilia latipinna*, was the most abundant species sampled. It contributed to 36% (245) of the 685 fish sampled (Table 1). This only represents approximately 1/6 of the number of sailfins sampled the same time last year. Not only were their numbers greatly reduced, but their relative abundance dropped from 90% in 1978 to 36% in 1979. Sailfins were sampled from 17 irrigation drains last summer and captured in only 11 of 18 this survey (Table 1). The reason for the marked decline in numbers of this species was the large winter die-off noted during the January of 1979 survey. The reasons for this mortality are not known.

TABLE 1. Numbers and Percent of Each Species Captured in 18 Irrigation Drains During Summer of 1979 Desert Pupfish Survey at the Salton Sea. Reference Also Made to the Number of Drains Each Species Captured.

Common Name	Scientific Name	No. Captured	Percent of Total	No. Drains Species Captured
Sailfin molly	<i>Poecilia latipinna</i>	245	36	11
Crayfish	<i>Procambarus clarkii</i>	139	20	7
African cichlids	<i>Tilapia/Sarotherodon</i> sp.	135	20	13
Desert pupfish	<i>Cyprinodon macularius</i>	54	8	8
Porthole fish	<i>Poeciliopsis gracilis</i>	39	5	1
Longjaw mudsucker	<i>Gillichthys mirabilis</i>	29	4	7
Red shiner	<i>Notropis lutrensis</i>	21	3	4
Shortfin molly	<i>Poecili mexicana</i>	15	2	1
Mosquitofish	<i>Gambusia affinis</i>	7	1	3
Green swordtail	<i>Xiphophorus helleri</i>	1	1	1

N = 685

The crayfish, *Procambarus clarkii*, and the African cichlids, *Tilapia/Sarotherodon* sp., ranked second and third, respectively, in abundance; 139 crayfish contributed to 20% of the catch as did the 135 cichlids (Table 1). Ninety-nine crayfish and 119 cichlids were captured in last summer's survey, thus the numbers changed little. Crayfish were sampled in seven irrigation drains this summer, compared to six a year ago (Appendix 1). Cichlids were trapped in 13 irrigation drains this summer, compared to 10 last summer (Appendix 1).

Desert pupfish *Cyprinodon macularius* were the next most abundant species trapped in the irrigation drains; 54 pupfish accounted for 8% of the total catch (Table 1). This is approximately half the number of pupfish captured in last summer's survey. Pupfish were sampled from 8 irrigation drains both this year and a year ago (Appendix 1). Thirty-two males and 22 females were trapped that ranged in size from 2.7 to 5.1 cm SL (Appendix 1). They were captured in water ranging from 13 to 71 cm in depth (Appendix 1).

The ratios of predator and competitor species of fish to desert pupfish within individual traps showed variability between irrigation drains and even within the same drain; values ranged from 11 predator/competitor species to 1 pupfish in a single trap to 1 predator/competitor species to 6 pupfish in another trap at another drain (Table 2). Pupfish were sampled from 5 of the same drains as in the previous summer survey (Appendix 1).

TABLE 2. The Ratios of Predator and Competitor Species to Desert Pupfish as Sampled in Individual Traps Within Seven Irrigation Drains.

Drain	No. Predators/Competitors in Trap	No. Pupfish in Trap	Ratio of Predators/Competitors to Pupfish
Barth	5	1	5:1
" "	23	3	7.7:1
Johnson	11	1	11:1
Niland 5	1	1	1:1
"U"	1	6	1:6
" "	1	1	1:1
" "	23	3	7.7:1
Vail 3-A	6	1	6:1
" "	7	1	7:1
Wheeler	8	3	2.7:1
" "	5	1	5:1
" "	5	27	1:5.4
"Z"	1	1	1:1

Six species made up the remaining 16% of the fish captured which included: shortfin mollies, *Poecilia mexicana*; porthole fish, *Poeciliopsis gracilis*; red shiners, *Notropis lutrensis*; mosquitofish, *Gambusia affinis*; longjaw mudsuckers, *Gillichthys mirabilis*; and a green swordtail, *Xiphophorus helleri*. This is the first survey in which this last species has been captured; however, it has been reported from the irrigation drain in which we captured it by Mearns (1975).

Shoreline Pools

A total of ten minnow traps were set in three shoreline pools at the Salton Sea and four species of fish were captured (Appendix 2). Two hundred and thirty-six sailfin mollies comprised 56% of the total catch and were sampled from all three shoreline pools (Table 3). In last summer's survey 391 mollies were sampled and they made up 89% of the catch and were trapped in two of the three pools.

African cichlids were the second most numerous fish sampled; 91 were captured and they accounted for 22% of the catch (Table 3). This represents over 5X the number captured during the summer survey of 1978. Cichlids were trapped from two of the three pools sampled (Table 3).

TABLE 3. Numbers and Percent of Each Species Captured in Three Shoreline Pools During Summer of 1979 Desert Pupfish Survey at the Salton Sea. Reference Also Made to Number of Pools Each Species Captured.

Common Name	No. Captured	Percent of Total	No. Shoreline Pools Species Captured
Sailfin molly	236	56	3
African cichlids	91	22	2
Longjaw mudsucker	56	13	2
Desert pupfish	40	9	1

N = 423

Longjaw mudsuckers were the next most abundant species captured from the shoreline pools. They accounted for 13%, (56 of 423), of the total catch and were sampled from two of the shoreline pools (Table 3). This represents 2.5X as many mudsuckers as were trapped during the previous summers survey.

The least abundant species that was sampled from the shoreline pools was the desert pupfish. A total of 40 pupfish were captured and they represented 9% of the catch (Table 3). This is almost 4X the number of pupfish trapped during the summer survey of 1978. Desert pupfish were sampled only from the shoreline pool on the Salton Sea National Wildlife Refuge (Appendix 2). The 10 males and 30 females measured 2.9 to 5.2 cm SL and were trapped in water ranging from 30 to 60 cm deep (Appendix 2). Desert pupfish were outnumbered 1.5 and 2.0 to 1 by predator/competitor species within individual traps at the one shoreline pool where they were sampled (Table 4).

TABLE 4. The Ratios of Predator and Competitor Species to Desert Pupfish As Sampled in Individual Traps Within the Shoreline Pool at the Salton Sea National Wildlife Refuge.

No. Predators/Competitors	No. Pupfish in Trap	Ratio of Predators/Competitors To Pupfish
42	28	1.5:1
25	12	~ 2:1

Natural Tributaries

A total of 14 traps were set in three natural tributaries to the Salton Sea: the Whitewater River; Whitefield Creek; and Salt Creek (Appendix 3). Traps were set at depths ranging from 15 to 47 cm (Appendix 3).

Six species were captured of which the most abundant was the sailfin molly; it made up 43%, 102 of 240, of the total catch and was sampled from two tributaries (Table 5). During the summer survey of 1978 it accounted for 69% of the catch from the tributaries in which 8X as many mollies were caught as in this survey.

Sixty-nine longjaw mudsuckers were trapped from three tributaries and made up 29% of the total catch (Table 5). In last summer's survey 49 mudsuckers were captured that contributed to 4% of the catch.

The catch of African cichlids during this survey was only about 40% of what it was during the summer survey of 1978; 54 fish were captured this year as compared to 137 last year at this time (Table 5).

TABLE 5. Numbers and Percent of Each Species Captured in Three Natural Tributaries to the Salton Sea During Summer of 1979 Desert Pupfish Survey. Reference Also Made to the Number of Tributaries Each Species Captured.

<u>Common Name</u>	<u>No. Captured</u>	<u>Percent of Total</u>	<u>No. Tributaries Species Captured</u>
Sailfin molly	102	43	2
Longjaw mudsucker	69	29	3
African cichlids	54	23	3
Shortfin molly	13	5	1
Red shiner	1	1	1
Crayfish	1	1	1

N = 240

Shortfin mollies, red shiners, and crayfish made up the remaining 5% of the total catch from the tributaries (Table 5). Each of these species was captured in only one tributary to the Salton Sea (Appendix 3). It is of interest to note that the catch of red shiners went from 175 during last summer's survey to 1 this summer.

No desert pupfish were sampled from the tributaries during this survey, whereas, in the summer survey of 1978, there were 3 captured from Salt Creek. Desert pupfish were captured in only one other survey of the tributaries; that was in the fall survey of Whitefield Creek when two were sampled.

CONCLUSIONS

The numbers of desert pupfish sampled this summer within the irrigation drains was down to approximately half of last summer's catch. It is not known whether this represents a downward trend in the population size or is just an artifact of our sampling since the numbers of pupfish trapped within the one shoreline pool were 4X what it was last summer. However, three things are apparent from this year's summer survey: 1) for whatever reasons, the sailfin molly population is much reduced in numbers from last year; 2) the sailfin molly is still the most abundant species found in our traps and; 3) the desert pupfish population at the Salton Sea still appears to be endangered by the presence of large numbers of competitor and predator species.

REFERENCE

Mearns, Alan J. 1975. *Poeciliopsis gracilis* (Heckel), newly introduced poeciliid fish in California. Calif. Fish & Game 61(4):251-253.

APPENDIX 1. Numbers of Each Species Captured in Traps at Specific Irrigation Drains. Reference is Also Made to Depth of Capture and Length and Sex Composition of Desert Pupfish Sampled.

Drain	No. Traps	Species Captured*	No. Captured	Depth of Capture-cm	Standard Length Range of Pupfish-cm	Sex of Pupfish
—Arthur	4	AFC LJM	36 2	75-100 " "	- -	- -
—Ave. 73	5	AFC SLF CRF RS	11 7 31 3	16-25 15-25 " " 25	- - - -	- - - -
—Ave. 76	3	CRF	48	10-25	-	-
Barth (IIP)	3	SLF AFC CRF LJM [DSP]	23 2 5 9 4	14-27 26 26-27 26 14-26	- - - - 2.7 - 3.3	- - - - 2 males, 2 females
—Garfield Half	2	SLF AFC LJM	29 11 8	43-70 43 " "	- -	- -
—Grant	4	SLF AFC LJM	49 10 4	31-42 22-42 " "	- -	- -
—Hayes	2	No Fish Captured				

APPENDIX 1 (cont'd)

Drain	No. Traps	Species Captured*	No. Captured	Depth of Capture-cm	Standard Length Range of Pupfish-cm	Sex of Pupfish
<u>Johnson</u>	10	SLF	21	13-70		
		SHF	15	21-35		
		AFC	13	13-66		
		PH	39	21-33		
		MSQF	2	21		
		RS	7	33-40		
		GST	1	33		
		(DSP)	1	13	3.1	1 female
		MSQF	1	22		
		MSQF	1	40	3.2	1 female
N1land 1	2	MSQF	1	22		
		SLF	42	16-30		
		AFC	21	18-45		
		RS	1	30		
		(DSP)	1	18	4.8	1 male
"S"	3	(DSP)	1	40		
		AFC	2	29		
		CRF	49	14-29		
Trifolium 7-A	4	MSQF	4	14-24		
		RS	3	24		
		SLF	24	23-24		
"U"	3	LJM	3	" "		
		(DSP)	13	20-24	3.4-5.1	11 males, 2 females
		AFC	1	20		
Unnamed	4	SLF	27	75-84		
		AFC	16	75-81		
		CRF	1	84		
		LJM	1	" "		

APPENDIX 1 (cont'd)

Drain	No. Traps	Species Captured*	No. Captured	Depth of Capture-cm	Standard Length Range of Pupfish-cm	Sex of Pupfish
Vail 3-A	2	SLF AFC (DSP)	10 3 2	44-56 44 44-56	3.2-4.0	2 females
Vail 4-A	2	AFC CRF	1 4	50 "		
Wheeler	4	SLF AFC (DSP)	9 9 31	29-40 29-71 " "	2.6-4.4	18 males, 13 females
"Z"	4	SLF LJM CRF (DSP)	4 1 1 1	23-25 23 " " 25	4.5	1 female

*SLF - Sailfin molly
 SHF - Shortfin molly
 DSP - Desert pupfish
 AFC - African cichlids
 LJM - Longjaw mudsucker
 MSQF - Mosquitofish
 PH - Porthole Fish
 RS - Red shiner
 GST - Green swordtail
 CRF - Crayfish

APPENDIX 2. Numbers of Each Species Captured Within Three Shoreline Pools. Reference is Also Made to Depth of Capture and the Length and Sex Composition of Desert Pupfish Sampled.

Shoreline Pool	No. Traps	Species Captured*	No. Captured	Depth of Capture cm	Standard Length Range of Pupfish - cm	Sex of Pupfish
North Shore Airport	2	SLF	126	19-25		
		AFC	60	" "		
		LJM	2	25		
Salt Creek	6	SLF	43	20-65		
		AFC	31	" "		
		LJM	54	" "		
Salton Sea National Wildlife Refuge	2	SLF	67	30-60	2.9-5.2	10 males, 30 females
		DSP	40	" "		

*SLF - Sailfin molly
 AFC - African cichlid
 LJM - Longjaw mudsucker
 DSP - Desert pupfish

APPENDIX 3. Numbers of Each Species Captured Within Three Tributaries.
Reference is Also Made to Depth of Capture.

<u>Tributary</u>	<u>No. Traps</u>	<u>Species Captured*</u>	<u>No. Captured</u>	<u>Depth of Capture-cm</u>
Whitewater River	7	SLF	52	25-41
		AFC	20	23-39
		LJM	1	39
Whitefield Creek	3	SLF	50	15-47
		AFC	3	47
		LJM	1	" ""
		SHF	13	15-25
		RS	1	25
Salt Creek	4	AFC	31	24-36
		LJM	67	" "
		CRF	1	24

*SLF = Sailfin molly
SHF = Shortfin molly
AFC = African cichlid

CRF = Crayfish
LJM = Longjaw mudsucker
RS = Red shiners