



United States Department of the Interior

FISH AND WILDLIFE SERVICE
POST OFFICE BOX 1306
ALBUQUERQUE, N.M. 87103

JUN 21 1988

RECEIVED	
Organ Pipe Cactus, N.M.	
JUN 23 '88	
ACTION INTO	NOTED
☐	SUPERINTENDENT
☐	ADMIN. TECH.
☐	CH. MANAGER
☒	RESOURCE FRONT
☐	CH. MANAGER
☐	INTER. SPECIALIST
☐	PARK MANAGER
☐	PARK TECH.
☐	SUPV.
☐	CU
☐	FILE

Rox - copy

In Reply Refer To
Region 2: FWE/TS

Memorandum

TO: Harold J. Smith, Superintendent, Organ Pipe Cactus
National Monument, National Park Service, Ajo, AZ

FROM: Acting Regional Director, Region 2

SUBJECT: Endangered Species Permit PRT-676811

You, Bill Mikus, and Roy Irving are hereby authorized, through December 1988, to use the Regional Director's blanket permit PRT-676811 as subpermittees. The specific activities for which you are covered as subpermittees are given in this memorandum. You are authorized to capture, hold, and release unharmed desert pupfish (Cyprinodon macularius eremus) that reside in the Quitobaquito Pond at Organ Pipe Cactus National Monument for the purpose of conducting the annual census. If mortality occurs to 25 individuals because of handling of the fish, the operation should immediately cease and contact must be made with the Service (Phoenix [FTS 261-4720] or Albuquerque [FTS 474-3972]) within 24 hours. This authority is granted under U.S. Fish and Wildlife Service Permit PRT-676811.

Please note that this permit is limited to the above activities and species and is functional only when used in combination with a valid State permit. Be aware that you are constrained by the stipulations on the attached copy of the Regional Director's permit and that you must abide by them.

A report of the activities conducted under authority of this permit and a request for renewal, if appropriate, must be submitted to the Regional Director by December 1, 1988.

You or one of the designated subpermittees must have a copy of this memorandum and the permit in their possession while conducting the activities authorized.

Conrad A. Full

Attachment

cc: Director, Arizona Game & Fish Department
Field Supervisor, Ecological Services Field Office,
Phoenix, AZ
Chief, Office of Management Authority, Washington, D.C.
Regional Director, National Park Service, San Francisco, CA
Assistant Regional Director, Law Enforcement, Region 2

ROSE MOFFORD, Governor

Commissioners:

LARRY D. ADAMS, Bullhead City, Chairman
FRANCES W. WERNER, Tucson
THOMAS G. WOODS, JR., Phoenix
PHILLIP W. ASHCROFT, Eagar
GORDON K. WHITING, Klondyke

Director

TEMPLE A. REYNOLDS

Deputy Director

DUANE L. SHROUFE



ARIZONA GAME & FISH DEPARTMENT

2222 West Greenway Road Phoenix, Arizona 85023 942-3000

RECEIVED	
Organ Pipe Cactus, N. M.	
JUN 17 '88	
ACTION INFO	NOTED
☒ SUPERINTENDENT	☒
☒ ADMIN. TECH.	☒
☒ RECORDS MGMT.	☒
☒ CH. MGMT.	☒
☒ INTER. AFFS.	☒
☒ PARK MGMT.	☒
☒ PEST TECH.	☒
☒ SO. MGMT.	☒
☒ LG	☒
☒ FILE	☒

Mr. Harold J. Smith, Superintendent
Organ Pipe Cactus National Monument
Route 1, Box 100
Ajo, Arizona 85321

Dear Mr. Smith:

Pursuant to Arizona Game and Fish Rule R12-4-111 (copy attached) this letter authorizes you and other National Park Service employees to take, possess and release desert pupfish (Cyprinodon macularius eremus) under stipulations stated in the attached copy of your June 2, 1988 letter.

As with all State permits, the authorities conveyed expire on December 31 of the year of issuance. Within 30 days of that date, or as otherwise requested by the Department, you must file a report summarizing all activities carried out under your permit. A permit renewal notice and a report form will be sent to you in early December to remind you of these responsibilities.

Please contact me or any of our Nongame Branch staff if you have any questions on this matter.

Sincerely,

Terry B. Johnson
Nongame Branch Supervisor

TBJ:rp
Att.



United States Department of the Interior

NATIONAL PARK SERVICE ORGAN PIPE CACTUS NATIONAL MONUMENT

IN REPLY REFER TO:
N1423

ROUTE 1, BOX 100
AJO, ARIZONA 85321

June 2, 1988

Mr. Terry Johnson
Non Game Branch Supervisor
Arizona Game & Fish
2222 West Greenway Rd.
Phoenix, AZ 85023

Dear Mr Johnson:

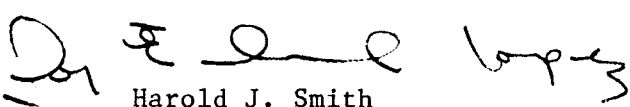
Through this letter I am requesting a permit to conduct our annual census of the desert pupfish (Cyprinodon macularius eremus) which resides in the Quitobaquito Pond at Organ Pipe Cactus National Monument. Sampling will be conducted for 4 days during the month of September, most likely between September 5 and September 16.

We will be using a population depletion technique using 60 minnow traps placed around the perimeter of the pond at depths of 10 to 30 centimeters. The traps will be checked at 2 hour intervals and the number of fish per trap recorded. A random sample of fish from each 2 hour run will be measured for length to obtain the age class make up of the population and to construct a data base for future comparisons. This measurement is only momentary with all individuals being returned immediately to the water. The fish from each run will be held in 3 holding tanks which are kept floating in the pond in the vicinity of the water inlet.

Last year we used this technique for 2 days (3 trappings per day) and did not have enough effect on the population to plot an accurate depletion curve. We calculated a population of 6827 individuals, but this was probably low, due to the short sampling period and one day of cool, overcast weather. This year we plan to trap for 4 days to see if we can detect a population depletion and arrive at a more accurate population figure. Accordingly, our holding tanks this year will contain about twice the volume of the tanks we used last year. We will monitor the fish in the holding tanks closely and stop the census if mortalities reach the maximum number allowable under our permit. Every effort will be made to keep handling of the fish to a minimum. Last year; out of 1490 fish trapped, 5 mortalities were noted.

The individuals involved in this year's survey will be Mr. Bill Mikus and Mr. Roy Irving, with assistance from one or more other staff members.

We are also requesting the required collecting permit from the U.S. Fish & Wildlife Service to conduct this census. If you have questions concerning the plans for this work, please contact Bill Mikus or Roy Irving at (602)387-6849 or (602)256-2983.


Harold J. Smith
Superintendent

Amended 4/22/80

R12-4-111. Taking and Handling Wildlife for Management, Research and Law Enforcement Purposes

- A. The Director may authorize Department employees and employees of cooperating governmental agencies to take, possess, transport or otherwise handle wildlife in the performance of their lawful management, research and law enforcement activities.
- B. The Department may import, export, buy or sell wildlife as approved by the Commission for research, management and law enforcement purposes.
- C. The Department may export or approve exportation of wildlife seized in violation of A.R.S. Section 17-306 and Commission Rule R12-4-319.

Cyprinodon file - Corrao. 1988



United States Department of the Interior

FISH AND WILDLIFE SERVICE

POST OFFICE BOX 1306

ALBUQUERQUE, N.M. 87103

FEB 10 1988

In Reply Refer To
Region 2: SE

Dr. Mark R. Stromberg
National Audubon Society
Appleton Whittell Research
Ranch Sanctuary
Box 44
Elgin, Arizona 85611

RECEIVED	
Organ Pipe Cactus, N.M.	
FEB 16 '88	
ACTION	INTO
☒	ADMIN. SERV.
☒	ASST. DIR.
☒	CH. MGR.
☒	RESOURCE MGMT.
☒	CH. MGR. (N.M.)
☒	INTER. AFFAIRS
☒	PARK MGMT.
☒	PARK TECH.
☒	SPWA
☒	ED.
☒	FILE

Dear Dr. Stromberg:

You and Dr. Jeff Mitton are hereby authorized, through December 1988, to use the Regional Director's blanket permit PRT-676811 as a subpermittee. The specific activities for which you are covered as a subpermittee are given in this letter. You are authorized to collect up to 30 endangered desert pupfish (Cyprinodon macularius) from Quitobaquito Springs with proper State and National Park Service permits. These fish may then be sacrificed for electrophoretic analysis. The purpose of this study is to determine if Research Ranch pupfish are genetically similar to Quitobaquito pupfish, or may have hybridized with other subspecies. This authority is granted under U.S. Fish and Wildlife Service Permit PRT-676811.

Please note that this permit is limited to the above activities and species and is functional only when used in combination with a valid State permit. Be aware that you are constrained by the stipulations on the enclosed copy of the Regional Director's permit and that you must abide by them.

A report of the activities conducted under authority of this permit and a request for a renewal, if appropriate, must be submitted to the Regional Director by December 1, 1988.

You must have a copy of this letter and the permit in your possession while conducting the activities authorized.

Sincerely,

/s/ R. D. Earnest

Acting Regional Director

Enclosure

cc: Director, Arizona Game and Fish Department
Assistant Regional Director, Law Enforcement, Region 2
Chief, Office of Management Authority, Washington, D.C.
Superintendent, National Park Service, Organ Pipe Cactus
National Monument, Ajo, Arizona



FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

• REGIONAL DIRECTOR, REGION 2
U.S. FISH AND WILDLIFE SERVICE
P.O. BOX 1306
ALBUQUERQUE NM 87103

Subpermittees: Harold J. Smith;
Bill Mikus;
Roy Irving

"LIMITED"

2. AUTHORITY-STATUTES

16 USC 1539 (a)
16 USC 1533 (d)

REGULATIONS (Attached)

50 CFR 17.22
50 CFR 17.32

3. NUMBER

PRT-676811

4. RENEWABLE

☒ YES
☐ NO

5. MAY COPY

☒ YES
☐ NO

6. EFFECTIVE

12/23/87

7. EXPIRES

12/31/89

8. NAME AND TITLE OF PRINCIPAL OFFICER (If #1 is a business)

REGIONAL DIRECTOR
MICHAEL SPEAR

9. TYPE OF PERMIT

ENDANGERED/THREATENED SPECIES

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED

TAKE: WITHIN USFWS REGION 2 & IN ADJACENT STATES UPON CONCURRENCE
FROM APPROPRIATE STATE & FWS REGIONAL AUTHORITIES.
IMPORT & EXPORT: THROUGH ANY PORT LISTED IN 50 CFR 14.12 OR 14.16.

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY OR RENEWAL OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

D. Acceptance of this permit serves as evidence that the permittee understands and agrees to abide by the "Special Conditions for Marine Mammals and Native Endangered and Threatened Species" (copy attached).

E. Authorized to conduct certain activities, as specified, with the species listed on the attached sheets for scientific research or enhancement of propagation or survival, including:

1. Actions necessary to recover specimens which will otherwise be lost because of natural processes or circumstances beyond the permittee's control;
2. Actions designated in the Service Program Advice; or
3. Actions outlined in any approved recovery plan.

(continued on page 2)

☒ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ON REVERSE ALSO APPLY

12. REPORTING REQUIREMENTS

FIRST ANNUAL REPORT DUE 12/31/88
REPORT OF ACTIVITIES MUST BE SENT TO U.S. Fish and Wildlife Service,
Endangered Species Office, P.O. Box 1306, Albuquerque, NM 87103

ISSUED BY

R. K. Robinson

TITLE

CHIEF, BRANCH OF PERMITS, OMA

DATE

12/23/87

ORIGINAL

F. Subpermittees may be designated in writing. Upon issuance of a subpermit to any person/organization authorized to act under this permit, a copy of the subpermit should be forwarded immediately to the Office of Management Authority (OMA), P.O. Box 27329, Central Station, Washington, D.C. 20038-7329.

G. Any importation into or exportation from the U.S. of species protected under the Convention on International Trade in Endangered Species (CITES) must be accompanied by appropriate documentation under that law.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
POST OFFICE BOX 1306
ALBUQUERQUE, N.M. 87103

NOV 19 1987

NOV 13 1987

In Reply Refer To
Region 2: SE

Memorandum

To : Superintendent, Organ Pipe Cactus National Monument,
National Park Service

From : Assistant Regional Director, Fisheries and Federal
Assistance, Region 2

Subject: Annual Report

Under your U.S. Fish and Wildlife Service permit PRT-676811, you are required to submit an annual report. This letter is to remind you that your report is due in this office by December 1, 1987. If you need a permit renewal for 1988, please provide the renewal request and supporting information when you submit your annual report. Your prompt attention to this matter will be appreciated.

Conrad at Fall

M1621
XN2621

November 24, 1987

To: Regional Director, U.S.F.W.S, Region 2

From: Superintendent, Organ Pipe Cactus National Monument

Subject: Annual Report of Desert Pupfish Census (Cyprinodon macularius
ereanus) conducted at Quitobaquito Pond, Organ Pipe Cactus National
Monument

The attached report fulfills the stipulations under USFWS blanket collection permit number PRT-676811 to collect, for annual population census only, the desert pupfish, Cyprinodon macularius ereanus.

The data from this year's census is provided for your records. If you have any questions concerning this report please contact Mr. Bill Mikus, Resource Management Specialist at (602)387-6849 or (602)256-2983.

Ed Lopez
Acting Superintendent

cc: Mr. Terry Johnson, Arizona Game & Fish Department

Bill's
copy

Report on the Annual Census

of

Cyprinodon macularius eremus

On September 9, 1987, Organ Pipe Cactus National Monument made a formal request to the Regional Director, USFWS, Region 2 to conduct a census of population of C. macularius eremus at Quitobaquito Pond. The following narrative provides a brief background and events of the 1987 Census. Collected data and calculations of the pond population are provided in the attached material (Attachment 2).

Pupfish census work began at Quitobaquito with research conducted by Dr. Boyd E. Kynard in 1975 and continued almost yearly through 1981. Population estimates ranged from a high of 7,294 individuals (1975) to a low of 1800 (1981) with intervening years showing a range of 3000 to 6700 individuals. The reliability of these figures has always been in question and resulted in contract research with the University of Arizona in 1965 to determine the most suitable method for sampling this species.

Census work up to 1985 used a mark-recapture technique which identified markable (22 mm length) and submarkable (22 mm length) fish. Left pectoral fins were chipped on markable-sized fish which involved much handling of each individual. In 1985, Dr. Bill Matter assisted the park in implementing a census technique which bases population estimates on depletion of the population from several successive trapping efforts. Fish from each trap effort are temporarily "held" in a nylon-screened holding tank which is maintained within the pond. Total catch per "trapping run" (Y axis) is plotted against the accumulated catch (X axis) to generate a graphic display of population size. Enclosed is a copy of the final report from Dr. Matter which estimated the 1985 population at 8907 individuals (Attachment 2). As Dr. Matter indicates each subsequent trap run did not show a good depletion correlation and may indicate that the population is considerable larger than the estimate reflects.

The census was conducted in 1987 on September 16 and 17. A total of 59 traps were placed in the best known habitat locations on the parameter of the nearly 1/2 acre pond. Each trap was read at a 2 hour interval a total of 6 times over the two day period. The fish contents of each run were tallied and then held in one of three holding tanks placed in the vicinity of the pond inlet (each tank has nearly 9 cu. ft. capacity). Approximately 75 fish from each run were measured for total body length to develop a data base for the age/size structure of the population. The fish from the first day's trap efforts were held for one overnight period in the tanks. The fish from the first two runs of the second day were likewise held for the remainder of the second trapping day. All fish were returned to the habitat areas from which they were removed at the end of the second trap day. In the process of trapping, measuring and "holding" a total of 1490 fish, 5 mortalities were noted from the sample.

The 1987, 2 day effort with 59 traps resulted in a very slight and irregular drop in the catch-per-unit-effort. The population estimate for this years census is 6,827, which is some 2000 individuals less than recorded in 1985 with Dr. Matter. Because of this very irregular drop, the 6,827 figure is probably not very precise. The positive consequence of irregular depletion is the large number of fish available for capture. It is our feeling that to get a more accurate estimate, a much longer period of trapping (and subsequent holding) would be needed. For the purposes of the National Park Service, the September census was beneficial. There appears to be a healthy grouping of age/size class, no non-native fish species or other exotic competitors were observed and population size, while perhaps underestimated, is certainly within the range of past estimates. All indications are that the present population of C. macularius oregonus is in good condition.

Yellow Sea fish

7-26-55

[illegible]

21

12

r

- S CE

3. length data from a subsample of captured pupfish (at least 250-300) continue to be taken in order to follow the age-class make up of the population and to construct a data base for future comparison,
4. at least two floating holding cages be acquired for retention of fish during depletion sampling, and
5. a computer program for estimation of population size and confidence intervals for that estimate be developed, possibly according to the outline given by White, G. C., D. R. Anderson, K. P. Burnham, and D. L. Otis. 1982. Capture-recapture and removal methods for sampling closed populations. Report No. LA-8787-NERP. Los Alamos National Laboratory, Los Alamos, New Mexico.

or

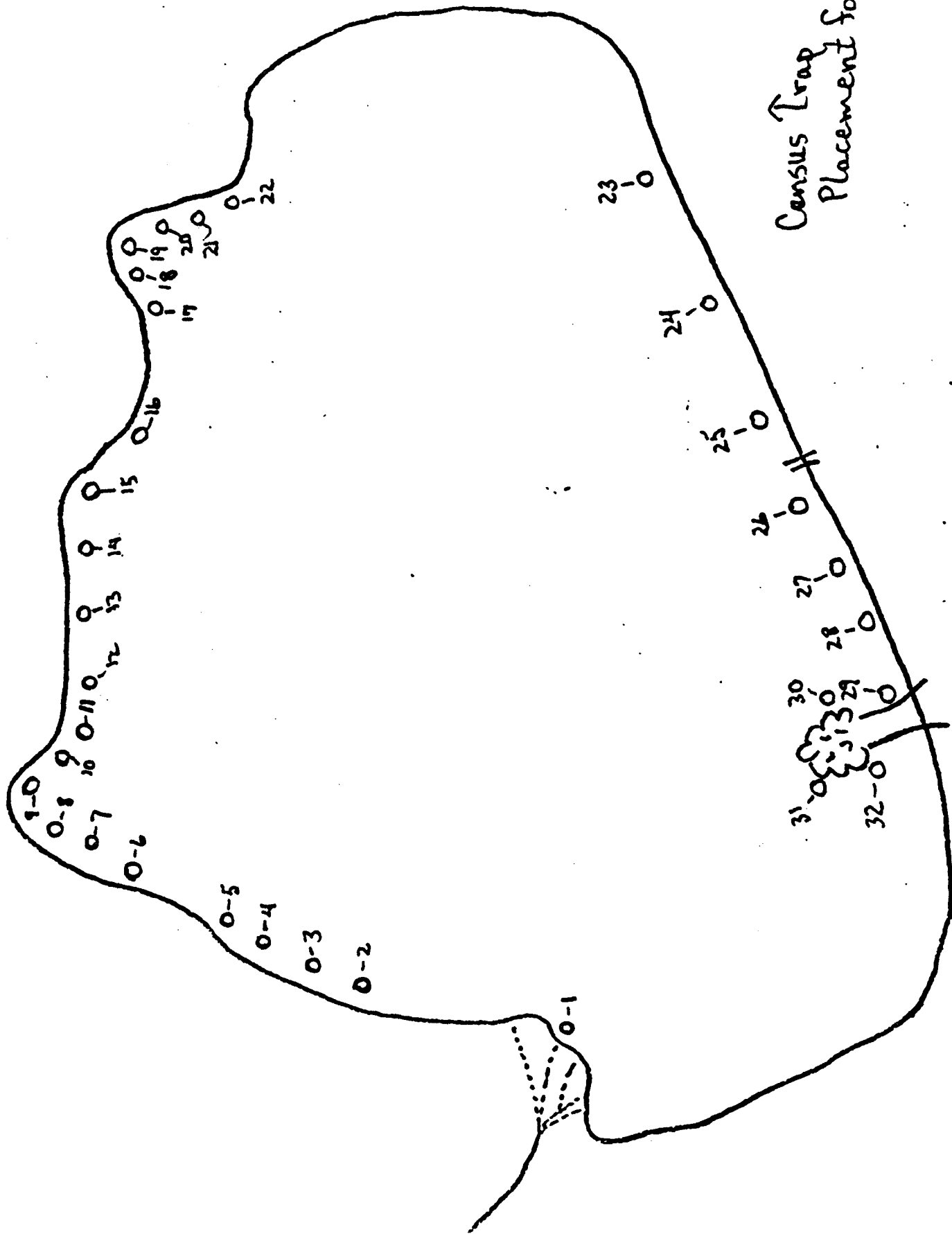
Otis et al. 1978. Statistical inference from capture data on closed populations. Wildlife Monographs 62: 1-135.

I want to assure you that I will be available to meet with you or Park personnel in order to fill in any detail which may be required to implement those recommendations you feel have merit or to generate additional recommendations.

Sincerely,

Bill 9-26-85

William J. Matter
Associate Professor
Wildlife and Fisheries Science



Census Trap
Placement for 5/23-24/85

5-23-85
5-24-85

Run 1 set: 10:45 am out: 12:45 pm	R-2 set: 12:45 out: 2:40 pm	R-3 set: 2:40 out: 4:45	R-4 set: 9:55 am out: 11:55	R-5 12:00 2:00 pm	R-6 2:05 4:05
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TRAP No.

1	5	2	6	2	47	14
2	8	2	29	2	60	42
3	4	8	1	11	4	18
4	8	3	4	12	9	14
5	26	10	0	5	2	1
6	8	22	12	54	22	20
7	2	5	4	11	0	1
8	10	14	6	9	23	4
9	14	1	1	9	11	9
10	4	26	3	3	7	2
11	5	2	22	7	0	2
12	4	8	9	4	10	4
13	34	5	3	24	3	8
14	30	4	16	15	22	16
15	4	7	1	8	26	11
16	12	79	0	39	0	9
17	13	0	7	0	1	3
18	3	1	0	1	19	18
19	1	22	33	2	5	13
20	4	4	16	4	0	1
21	1	7	0	14	28	3
22	7	18	0	1	12	0
23	22	32	5	9	17	12
24	21	5	1	8	7	10
25	49	15	2	10	4	3
26	15	1	5	9	16	0
27	8	4	12	4	17	5
28	4	10	1	0	15	1
29	13	1	0	6	0	2
30	4	23	1	2	1	2
31	19	9	4	0	0	1
32	3	5	1	5	9	2

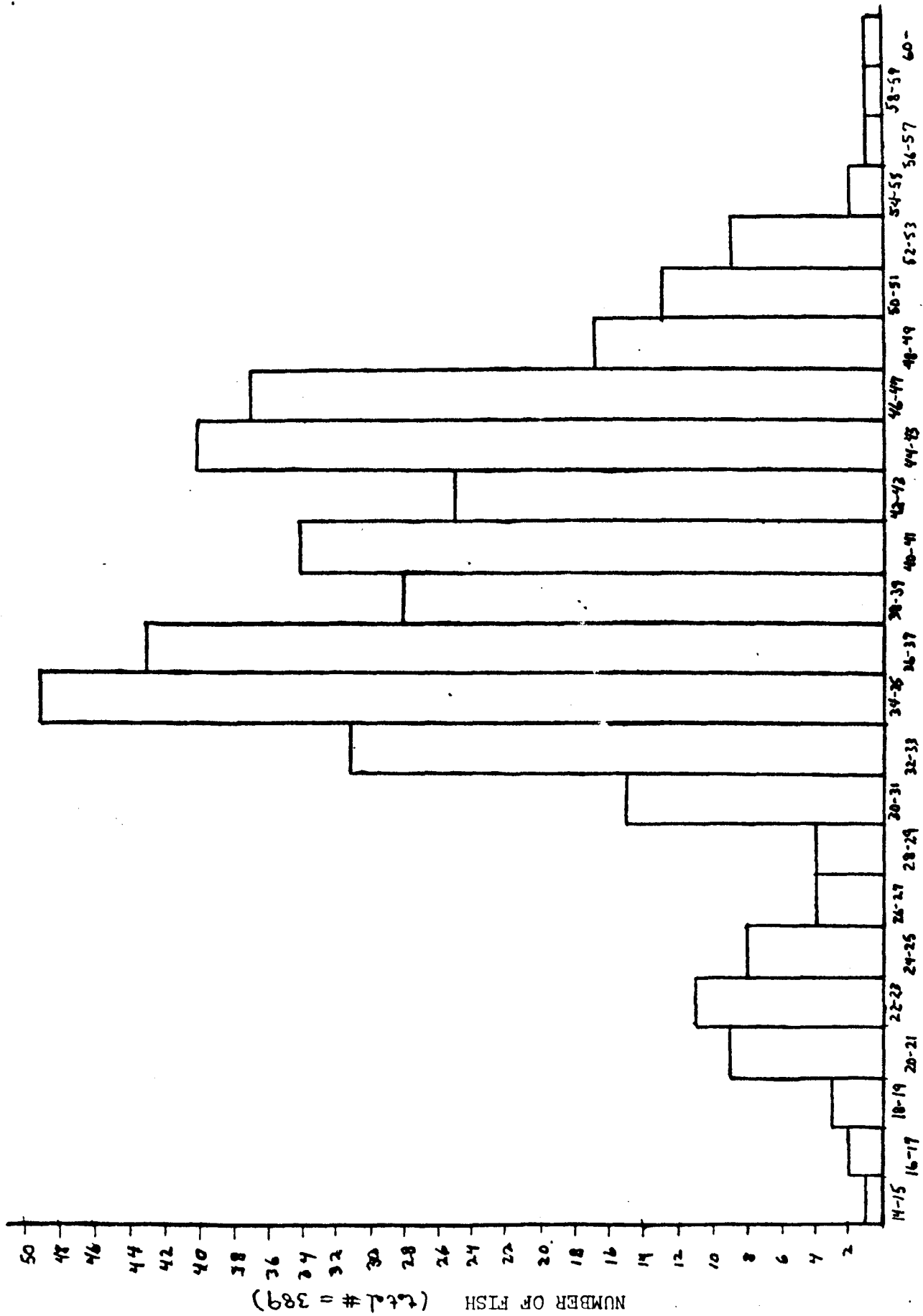
TOTAL	265	375	202	290	397	251	1000
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Puffin Census 881
5/23-24/85

	Morning (Runs 1 & 4)	Noon (Runs 2 & 5)	Afternoon (Runs 3 & 6)	TOTAL
<u>Total Length (mm)</u>				
14	0	1	0	1
17	0	2	0	2
18	0	0	2	2
19	0	1	0	1
20	0	2	3	5
21	0	3	1	4
22	1	3	3	7
23	1	1	2	4
24	0	0	2	2
25	0	3	3	6
26	0	2	1	3
27	1	0	0	1
28	0	1	2	3
29	0	0	1	1
30	1	2	4	7
31	3	2	3	8
32	6	4	7	17
33	2	9	3	14
34	6	10	10	26
35	2	10	11	23
36	7	4	10	21
37	6	7	9	22
38	1	6	7	14
39	2	7	5	14
40	4	8	15	27
41	6	4	7	17
42	5	6	2	13
43	4	1	7	12
44	4	7	5	16
45	6	8	10	24
46	4	4	7	15
47	6	8	8	22
48	4	7	4	10

Puffin Census
892

				TOTAL
49	3	1	3	7
50	3	3	3	9
51	2	1	1	4
52	2	2	2	6
53	0	1	2	3
54	0	0	0	0
55	1	1	1	3
56	0	1	0	1
57	0	0	0	0
58	0	0	0	0
59	1	0	0	1
60	0	0	1	1



TOTAL LENGTH (MM)

Population Estimate - Leslie's Method from Ricker (1975)
pgs. 150-153.

1) $\frac{C_t}{f} = q N_0 - q K_t$

where:

$Y = C_t/f$

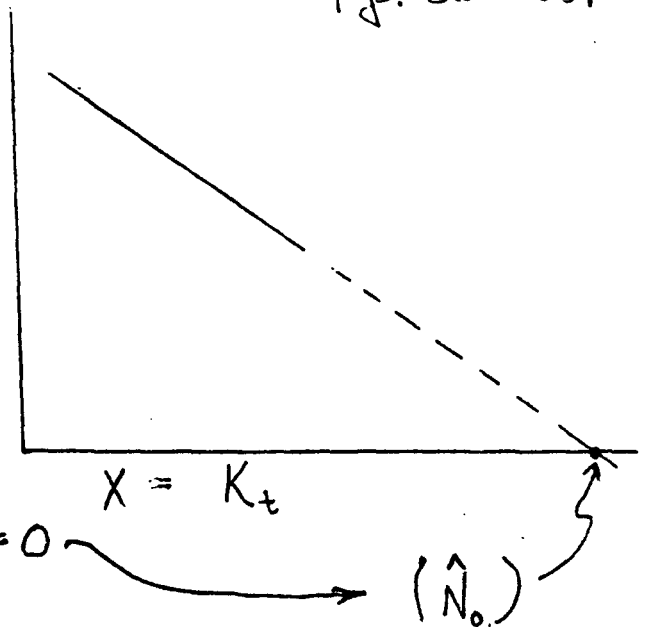
2) $\frac{C_t}{f} = \text{Catch per unit effort}$

3) $q = \text{catchability} = \text{slope of } C_t/f \text{ on } K_t = b$

4) $N_0 = \text{Original Population}$
= the $X = K_t$ when $Y = C_t/f = 0$

= (Y-axis intercept) / slope

= a/b } from $Y = bX + a$, where
 $Y = C_t/f$ & $X = K_t$



K_t = the sum of the catch to the start of time = t , plus one-half of the catch during interval = t .

For the Quitovaquito Pupfish data - 5/23-24/85:

Effort $N_0 =$	1	2	3	4	5	6
$C_t/f = Y =$	365	375	202	290	397	251
$K_t = X =$	132.5	552.5	841	1097	1430	1754

Calculations:

$$(1) \sum X = 5847$$

$$(2) \sum X^2 = 7348828.5$$

$$(3) \sum x^2 = \frac{\sum (X^2) - (\sum X)^2}{n} \\ = 1,650,927$$

$$(4) \sum Y = 1880$$

$$(5) \sum Y^2 = 619,364$$

$$(6) \sum y^2 = \frac{\sum (Y^2) - (\sum Y)^2}{n} \\ = 30,297.3$$

$$(7) \sum (XY) = 1,766,876$$

$$(8) \sum xy = \frac{\sum (XY) - (\sum X)(\sum Y)}{n} \\ = -65184$$

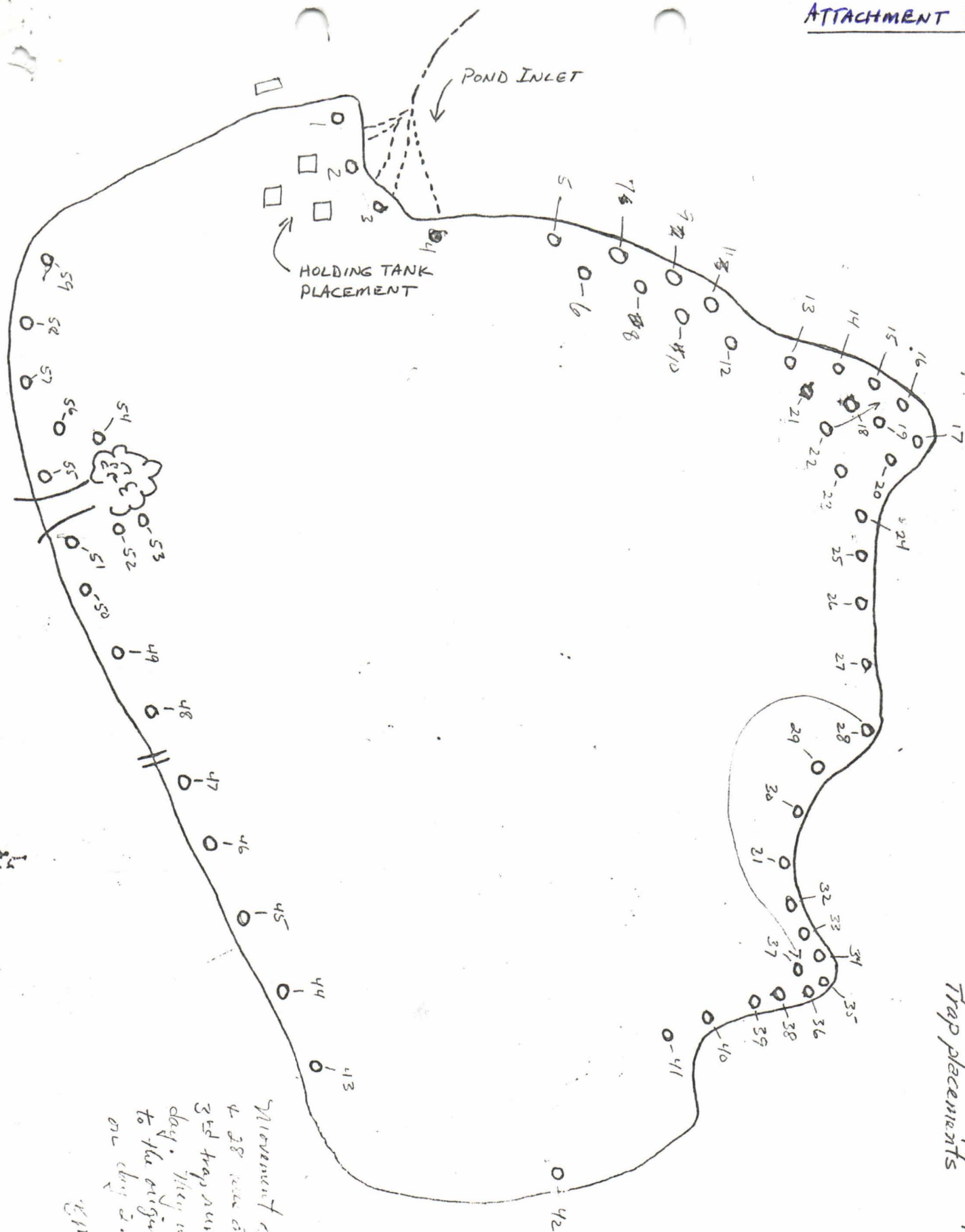
$$(9) \text{ slope } = b = \frac{\sum xy}{\sum x^2} \\ = -0.0395$$

$$(10) \text{ variance of points from the regression line} = S_{y \cdot x}^2 \\ = 6930.6$$

$$(11) \text{ variance of } b = S_b^2 \\ = 0.0042$$

$$(12) Y\text{-axis intercept} = a \\ = \frac{\sum Y - b \sum X}{n} \\ = 351.8$$

$$(13) \hat{N}_0 = \frac{a}{b} = \frac{351.8}{-0.0395} = \underline{\underline{-8907}}$$



QUIROGAUTO I BND
Pop. Census 9/16-17/87
Trap placements

Movement of traps 31
4, 38 were only for the
3rd trap run on the first
day. They were replaced
to the original position
on day 2.

4/8/88

Run 1,2,3 September 16, 1987
DATE! Run 4,5,6 September 17, 1987

TRAP #

heavy
overcast

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6
	Start: 9:15 am Finish: 11:15 am H ₂ O Temp: 24° C	Start: 11:15 pm Finish: 1:15 pm H ₂ O Temp: 27° C	Start: 1:15 pm Finish: 3:15 pm H ₂ O Temp: 29° C	Start: 8:55am Finish: 10:55am H ₂ O Temp: 23° C	Start: 10:55 am Finish: 12:55 pm H ₂ O Temp: 24° C	Start: 12:55 pm Finish: 2:55 pm H ₂ O Temp: 25° C
1.	1	0	0	3	2	2
2.	4	16	34	0	2	11
3.	9	5	2	2	5	4
4.	6	1	1	9	0	4
5.	5	1	1	18	12	5
6.	11	8	3	1	20	7
7.	3	18	1	9	13	7
8.	13	3	1	19	4	1
9.	4	2	4	1	8	5
10.	3	14	3	14	2	9
11.	16	5	2	7	5	3
12.	11	18	3	1	6	4
13.	4	10	4	3	0	2
14.	7	13	7	9	15	6
15.	5	7	15	7	10	12
16.	16	3	7	38	12	3
17.	12	8	2	12	9	4
18.	4	3	8	1	4	12
19.	3	10	2	12	21	3
20.	1	12	19	4	3	2
21.	3	1	1	4	4	6
22.	2	4	0	2	11	11
23.	1	5	1	0	4	4
24.	0	15	9	11	8	17
25.	1	9	1	2	10	4

Run 1,2,3 September 16, 1987

Run 4,5,6 September 17, 1987

DATE: _____

heavy
overcast

TRAP #

RUN 1

RUN 2

RUN 3

RUN 4

RUN 5

RUN 6

26.	11	11	4	7	4	5
27.	1	14	2	2	1	3
28.	6	1	1	5	7	8
29.	0	11	0	0	7	3
30.	0	15	0	0	2	1
31.	2	0	1	0	0	0
32.	0	3	1	1	1	1
33.	1	10	1	0	1	0
34.	13	0	0	1	0	1
35.	2	1	3	3	4	4
36.	3	0	2	0	1	3
37.	1	4	4	1	1	0
38.	7	1	3	0	3	15
39.	3	4	4	0	2	0
40.	1	7	1	0	7	1
41.	30	6	0	1	0	1
42.	0	6	2	1	0	0
43.	2	1	1	0	0	0
44.	0	1	4	1	0	0
45.	1	7	0	1	2	10
46.	0	7	21	0	0	0
47.	1	3	0	0	1	2
48.	3	0	1	6	8	0
49.	0	11	0	0	1	1
50.	0	4	0	0	2	0

Run 1,2,3, September 16, 1987
 DATE! Run 4,5,6, September 17, 1987

TRAP #

heavy
overcase



RUN 1

RUN 2

RUN 3

RUN 4

RUN 5

RUN 6

3

0

2

1

0

1

0

0

1

0

1

0

0

3

0

1

1

0

0

1

1

0

0

1

0

1

0

0

0

2

0

22

2

0

0

0

3

1

0

2

2

0

2

1

10

1

11

4

--

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1

0

0

8

3

5

TOTAL

242

348

204

213

263

220

POPULATION ESTIMATIONS
CYPRINODON MACULARIUS EREMUS

SEPTEMBER 16-17, 1987

Effort No. =	1	2	3	4	5	6
$C_{t/f} = Y =$	242	348	204	213	263	220
$K_t = X =$	121	416	692	900.5	1138.5	1380

Calculations:

1) $\sum X = 4648$

2) $(\sum X)^2 = 21,603,904$

3) $\sum X^2 = \sum (x^2) - (\sum X)^2/n$
 $= 1,077,392.8$

4) $\sum Y = 1490$

5) $\sum Y^2 = 384,222$

6) $\sum Y^2 = \sum (Y^2) - (\sum Y)^2/n$
 $= 14,205.33$

7) $\sum (XY) = 1,110,050$

8) $\sum_{xy} = \frac{\sum (XY) - (\sum X)(\sum Y)}{n}$
 $= -44,203.3$

9) slope = $b = \frac{\sum xy}{\sum x^2}$

$= -0.041028$

10) variance of points from the regression line = $S^2_{y \cdot x}$
 $S^2_{y \cdot x} = \frac{\sum Y^2 - b \sum (XY)}{n-2}$

$= 13751.94$

11) variance of $b = S^2_b$
 $= \frac{S^2_{y \cdot x}}{\sum (x^2)}$
 $= 0.012764$

12) Y axis intercept = a

$$a = \frac{\sum Y - b \sum X}{n}$$

$$= 280.116$$

13) Population estimate = $\hat{N}_0 = a/b$

$$= \underline{\underline{6827}}$$

PUPFISH CENSUS

Summary of
raw data
(length measurements).
SEPT. 16-17, 1987

TOTAL LENGTH (mm)	MORNING (RUNS 1+4)	NOON (RUNS 2+5)	AFTERNOON (RUNS 3+6)	TOTAL
13	2	1	0	3
14	0	0	0	0
15	1	2	3	6
16	1	4	0	5
17	2	2	2	6
18	0	2	1	3
19	2	2	3	7
20	7	11	7	25
21	10	5	11	26
22	9	5	4	18
23	6	3	6	15
24	10	4	7	21
25	8	8	5	21
26	6	7	1	14
27	5	6	7	18
28	2	3	1	6
29	1	6	2	9
30	3	5	1	9
31	5	3	6	14
32	5	12	10	27
33	5	4	8	17
34	6	6	6	18
35	14	9	9	32
36	8	6	8	22
37	10	8	4	22
38	7	4	5	16
39	5	3	3	11
40	0	8	9	17

PUFFISH CENSUS

SEPT. 16-17, 1987

TOTAL LENGTH (mm)	MORNING (RUNS 1+4)	NOON (RUNS 2+5)	AFTERNOON (RUNS 3+6)		TOTAL
41	4	3	5		12
42	0	2	2		4
43	3	6	4		13
44	2	0	2		4
45	0	2	2		4
46	1	0	2		3
47	0	1	0		1
48	0	0	0		0
49	0	0	1		1
50	1	0	0		1
51	0	1	0		1
52	0	1	1		2
53					
54					
55					
56					
57					
58					
59					
60					
SAMPLE SIZE	151	155	148		454

EVAN MECHAM, Governor

Commissioners:

FRED S. BAKER, Elgin, Chairman
LARRY D. ADAMS, Bullhead City
FRANCES W. WERNER, Tucson
THOMAS G. WOODS, JR., Phoenix
PHILLIP W. ASHCROFT, Eagar

Director

TEMPLE A. REYNOLDS

Assistant Director

DUANE L. SHROUFE



ARIZONA GAME & FISH DEPARTMENT

2222 West Greenway Road Phoenix, Arizona 85025 942-3000

RECEIVED	
Organ Pipe Cactus Nat. M.	
OCT 21 '87	
ACTION	NOTED
SUPERINTENDENT	☒
ADMIN. SERV.	☐
EXT. AFFAIRS	☐
FIN. TECH.	☐
INSTR. DIV.	☐
LABORATORY	☐
LEGAL COUNSEL	☐
PLANT & ANIMAL	☐
RECORDS & COMM.	☐
TRAINING	☐
WILDLIFE	☐
October 22, 1987	

Mr. Harold J. Smith, Superintendent
Organ Pipe Cactus National Monument
Route 1, Box 100
Ajo, Arizona 85321

Dear Mr. Smith:

Russ Earnest recently provided me with a copy (attached) of your Federal permit to take and possess Cyprinodon macularius eremus (desert pupfish). Your permit stipulates that it is functional only when used in combination with a valid State permit. The purpose of this letter is to provide you that permit, under the authorities of R12-4-111 (copy attached). The stipulations as to take, possession and release shall be as stated in the attached letter from Mr. Earnest to you.

As with all State permits, the authorities conveyed expire on 31 December of the year of issuance. Within 30 days of that date, or as otherwise requested by the Department, you must file a report summarizing all activities carried out under your permit. A permit renewal notice and a report form will be sent to you in early December to remind you of these responsibilities.

Please contact me or any of our Nongame Branch staff if you have any questions on this matter.

Sincerely,

Temple A. Reynolds, Director

Terry B. Johnson
Nongame Branch Supervisor

TBJ:tbj

cc: Tom Spalding
Don Wingfield
Don Vance
Russ Earnest
NGB Staff

Amended 4/22/80

R12-4-111. Taking and Handling Wildlife for Management, Research and Law Enforcement Purposes

- A. The Director may authorize Department employees and employees of cooperating governmental agencies to take, possess, transport or otherwise handle wildlife in the performance of their lawful management, research and law enforcement activities.
- B. The Department may import, export, buy or sell wildlife as approved by the Commission for research, management and law enforcement purposes.
- C. The Department may export or approve exportation of wildlife seized in violation of A.R.S. Section 17-306 and Commission Rule R12-4-319.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
POST OFFICE BOX 1306
ALBUQUERQUE, N.M. 87103

SEP 25 1987

In Reply Refer To
Region 2: SE

Memorandum

TO: Superintendent, Organ Pipe Cactus National Monument,
National Park Service, Route 1, Box 100, Ajo, Arizona 85321

FROM: ~~Acting~~ Regional Director, Region 2

SUBJECT: Permit to Conduct Annual Pupfish Census

Mr. Harold J. Smith, Mr. Bill Mikus, Mr. Roy L. Irving, and Mr. Charles Conner are hereby authorized, through December 1987, to use the Regional Director's blanket permit PRT-676811 as a sub-permittee. The specific activities for which you are covered as a subpermittee are given in this memorandum. You are authorized to conduct a census of the desert pupfish (Cyprinodon macularius eremus) which reside in the Quitobaquito Pond at Organ Pipe Cactus National Monument. Restrictions will include holding individuals for no more than 3 days and termination of the census when mortality is greater than or equal to 35 individuals. Every effort should be made to limit handling of fish to keep mortality at a minimum.

Please note that this permit is limited to the above activities and species and is functional only when used in combination with a valid State permit. Be aware that you are constrained by the stipulations on the attached copy of the Regional Director's permit and that you must abide by them.

A report of the activities conducted under authority of this permit and a request for renewal, if appropriate, must be submitted to the Regional Director by December 1, 1987.

You must have a copy of this memorandum and the permit in your possession while conducting the activities authorized.

R. O. Carver

Attachment

cc: Director, Arizona Game and Fish Department, Phoenix, AZ
Chief, Federal Wildlife Permit Office, Washington, D.C.
Assistant Regional Director, Law Enforcement, Region 2



FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

- REGIONAL DIRECTOR, REGION 2
U.S. FISH AND WILDLIFE SERVICE
P.O. BOX 1306
ALBUQUERQUE NM 87103

Subpermittee: Harold J. Smith, Superintendent
Organ Pipe Cactus National Monument
National Park Service, Rt. 1, Box 100
Ajo, Arizona 85321

AUTHORITY-STATUTES

16 USC 1539 (a)
16 USC 1533 (d)

REGULATIONS (Attached)

50 CFR 17.22
50 CFR 17.32

3. NUMBER

PRT-676811

4. RENEWABLE

☒ YES
☐ NO

5. MAY COPY

☒ YES
☐ NO

6. EFFECTIVE

12/ 9/86

7. EXPIRES

12/31/87

8. NAME AND TITLE OF PRINCIPAL OFFICER (If #1 is a business)

REGIONAL DIRECTOR
MICHAEL SPEAR

9. TYPE OF PERMIT

ENDANGERED/THREATENED SPECIES

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED

TAKE: WITHIN USFWS REGION 2 & IN ADJACENT STATES UPON CONCURRENCE
FROM APPROPRIATE STATE & USFWS REGIONAL AUTHORITIES.
IMPORT: THROUGH ANY PORT LISTED IN 50 CFR 14.12 OR 14.16.

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

D. Acceptance of this permit serves as evidence that the permittee understands and agrees to abide by the "Special Conditions for Marine Mammals and Native Endangered and Threatened Species" (copy attached).

E. Authorized to conduct certain activities, as specified, with the species listed on the attached sheet for scientific research or enhancement of propagation or survival, including:

1. Actions necessary to recover specimens which will otherwise be lost because of natural processes or circumstances beyond the permittee's control;
2. Actions designated in the Service Program Advice; or
3. Actions outlined in any approved recovery plan.

☒ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ON REVERSE ALSO APPLY

SEE REVERSE...

12. REPORTING REQUIREMENTS

FIRST ANNUAL REPORT DUE 1/31/87
COMPLETE REPORT OF ACTIVITIES MUST BE SUBMITTED TO FWPO, 1000 N. GLEBE RD., ROOM 611, ARL. VA., 22201, 1/31 OF EACH YEAR PERMIT IS IN EFFECT

ISSUED BY

TITLE

Chief, Federal Wildlife Permit Office

DATE

12/ 9/86

ORIGINAL

cc: Director, Arizona G&F Dept, Phoenix, AZ
Chief, FWPO, Washington, D.C.
ARD, LE, Region 2

SPECIAL CONDITIONS FOR NATIVE ENDANGERED & THREATENED SPECIES PERMITS

1. This permit shall be accompanied by a State permit and, when applicable, by permits from the appropriate Federal land management agencies.
2. Authorized wildlife killed accidentally shall be salvaged and preserved in a proper manner. The Endangered Species Office must be notified within 24 hours of such accidental kills. As proof of legal take, preserved specimens shall be permanently accompanied by a copy of this permit and cover letter. Specimens shall be deposited in a certified museum.
3. Any injured specimens of wildlife covered by this permit must be cared for properly. The Endangered Species Office must be notified within 24 hours of any such injured specimens.
4. Unexpected escape of wildlife covered by this permit must be reported to the Service's Endangered Species Office (505) 766-3972 within 24 hours.
5. Numbers and sex of affected individuals, the time of year and location of permitted activities are specified in the cover letter, and your efforts must be conducted in accordance with those specifications.
6. Disposition of live or dead specimens shall be coordinated with the appropriate biologist at the Endangered Species Office, P.O. Box 1306, Albuquerque, New Mexico 87102, (505) 766-3972.
7. A final report on your efforts is due at the completion of work or December 1, 1987, whichever comes first.

N1423

September 9, 1987

To: Regional Director, U.S. Fish & Wildlife Service
Office of Endangered Species

Attn: Mr. Jim Johnson

From: Superintendent, Organ Pipe Cactus National Monument

Subject: Annual Pupfish Census

Through this letter I am requesting a permit to conduct our annual census of the desert pupfish (Cyprinodon macularius eremus) which resides in the Quitobaquito Pond at Organ Pipe Cactus National Monument. Tentative dates for this sampling are scheduled for September 16 and 17.

It is our objective to use a population depletion technique to obtain an estimate of population size. This will be done by the placement of 60 minnow traps at varied locations around the perimeter of the pond at depths 10 to 30 centimeters. The traps are checked at 2 hour intervals and fish catches recorded per trap. The fish from each "run" will be held in 3 holding tanks which are kept in the pond in the vicinity of the present water inlet. Three runs will be made on each of two days with all fish being released from the holding tanks at the end of the second day. A random number of fish will be measured for length (ca.300) to obtain the age-class make up of the population and to construct a data base for future comparisons. This measurement is only momentary with all individuals being returned immediately to the pond.

The expected impact to the species is minimal. During the May, 1985 sampling, approximately 2000 fish were captured with a loss of 20 individuals. Even at the end of 2 days trapping, depletion patterns showed to be very irregular. Population estimates for this sampling period still showed 8900 fish. We feel this figure may be a considerable underestimate! Every effort will be made to keep handling of the fish to a minimum. The population/depletion technique proposed replaces a mark-recapture method used in prior years. This latter method proved very unreliable in estimating population size and involved considerably more handling of the fish which we hope to avoid in the future.

Please refer to the attached report by Dr. William J. Matter for additional detail on the technique used and results for the May, 1985 survey. Dr. Matter was contracted in 1985 to field test the technique we propose to use this year.

The individuals involved with this year's survey effort are Mr. Bill Mikus, Mr. Roy L. Irving and Mr. Charles Conner.

We thank you for consideration of this request.

Sincerely yours,

Harold J. Smith
Superintendent

Enclosures