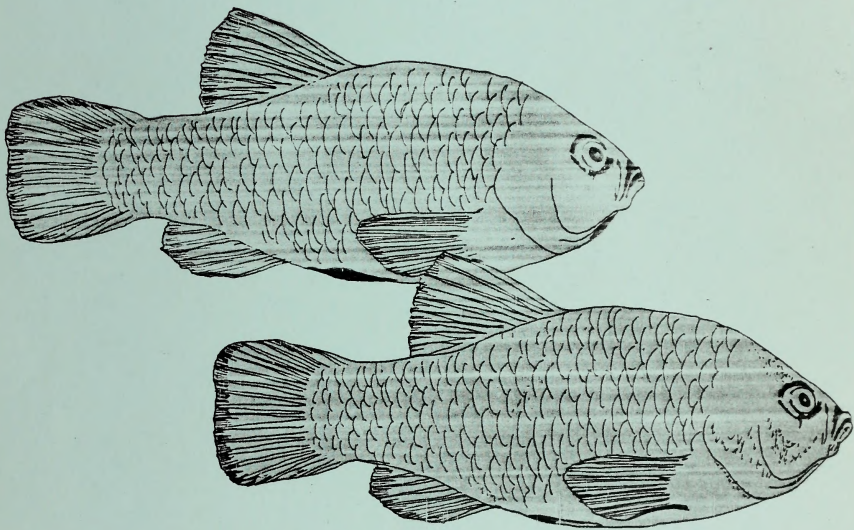


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INTRODUCTION



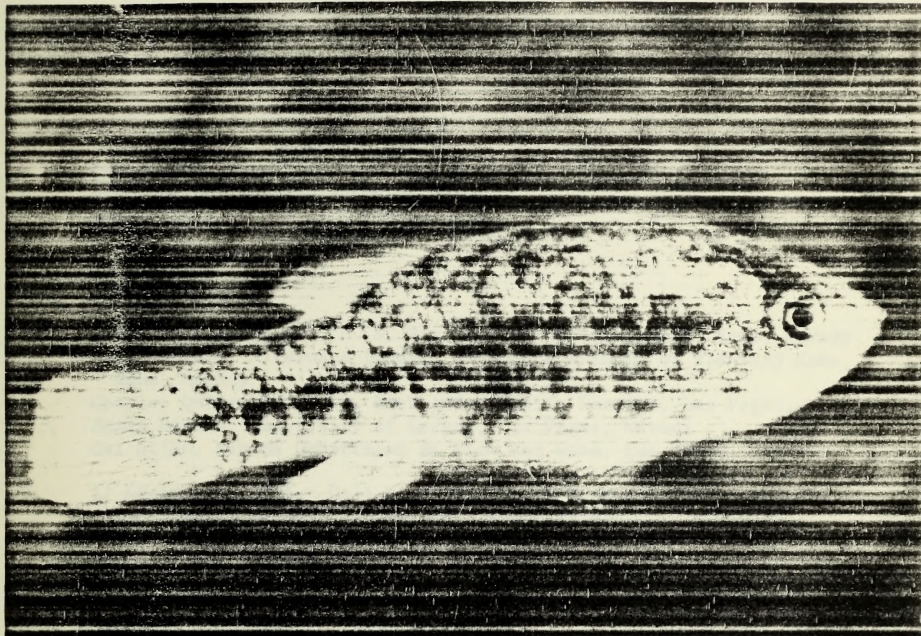
WARM SPRINGS PUFFISH RECOVERY PLAN

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Portrait of a Warm Springs Pupfish (Cyprinodon Nevadensis pectoralis).
(Photo by Alan Heller).

WARM SPRINGS PUFFISH RECOVERY PLAN

Prepared by the
WARM SPRINGS PUFFISH RECOVERY TEAM
August 1976

Team Members:

- James Yoakum, Leader, U. S. Bureau of Land Management, Reno, Nevada
 - Dale Lockard, Alternate Leader, Nevada Department of Fish and Game, Reno, Nevada
 - Charles Osborn 1/, U. S. Fish and Wildlife Service, Las Vegas, Nevada
 - James Deacon, University of Nevada, Las Vegas, Nevada
 - Cal Allan, Nevada Department of Fish and Game, Las Vegas, Nevada
- 1/ Active for 1975. Gail Kobetich, U. S. Fish and Wildlife Service, Las Vegas, Nevada, assumed duties for 1976.

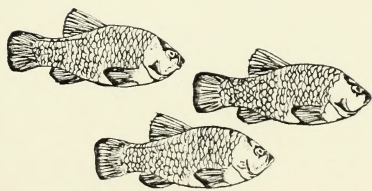
Approved: C. Phillip Agee
 Name
Acting Associate Director, FWS
 Title
November 10, 1976
 Date

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PART 1
INTRODUCTION

PART 1
INTRODUCTION



PART I
INTRODUCTION

WARM SPRINGS PUPFISH RECOVERY PLAN

Part I - INTRODUCTION

Status

The warm springs pupfish, Cyprinodon nevadensis pectoralis, is one of six described subspecies of Cyprinodon nevadensis. Two of the subspecies, C. n. shoshone and C. n. calidae, are considered to be extinct (Miller, personal communication). Of the remaining subspecies, C. n. pectoralis has the most localized distribution and maintains the smallest populations.

The Nevada pupfish, C. nevadensis, is distributed in numerous, varied habitats along the Amargosa River drainage of southwestern Nye County, Nevada and adjacent positions of Inyo and San Bernardino Counties, California. The warm springs pupfish was described from Lovell's (often referred to as School) Spring, approximately 1 km. west-northwest of Devils Hole, Ash Meadows, Nye County, Nevada (Miller, 1948). Recent examination of spring flows in the area has revealed that warm springs pupfish are more widely dispersed in the vicinity of School Spring than was previously supposed. Pupfish populations considered to be C. n. pectoralis have been found in six additional spring flows, all within less than 1 km. to the west and northwest of School Spring (Miller and Deacon, 1973; Soltz, 1974; Myers, 1970). Of the six populations, the one in Mexican Spring became extirpated in the summer of 1973.

The warm springs pupfish is the smallest of the subspecies of C. nevadensis, and can generally be distinguished from the other forms by its high number of pectoral rays, predominately 17. It also shows the strongest tendency toward reduction and loss of the pelvic fins (Soltz, 1974).

The warm springs pupfish, C. n. pectoralis, was declared an endangered species in 1970 by the Federal Government through publication in the Federal Register, Vol. 35, No. 199, October 13, 1970, and by the State of Nevada in 1970 and subsequent revisions, under Nevada State Board of Fish and Game General Regulation No. 1, Amendment No. 1, under authority of Nevada Revised Statutes 501.110, 503.584, and 503.585.

Decline of Populations

Although more populations of warm springs pupfish exist than was previously believed, they and the entire fish fauna of Ash Meadows, Nevada are threatened with extirpation due to disturbance of spring ecosystems by excessive pumping that is mining the water table of the area (Deacon and Bunnell, 1970). The warm springs pupfish is particularly threatened for a number of reasons. First, its distribution is extremely localized in an area less than 1.0 km. in diameter near the School Springs locality (see map in Part 4). Second, all spring flows and habitat areas are quite small, and thus very susceptible to rapid decrease due to increased pumping or other causes in the area. An example of this was the extirpation of the Mexican Spring population in the summer of 1973 following the building of livestock enclosure designed for its protection in the spring of that year. Unexpectedly the evapo-transpiration rate of the now ungrazed emergent vegetation in and around the spring was sufficient to actually dry-up this smallest (350 liters)

of pupfish habitats during the hot, dry summer months. From this experience and the experience gained in the maintenance of School Spring within its enclosure, it is evident that further studies on the effects of emergent vegetation on spring ecosystems is highly desirable. Third, all populations of C. n. pectoralis that have been studied are very small (less than 500 individuals maximum) and therefore are highly susceptible to disturbances that would reduce their numbers to below an effective reproductive population and thus lead to extinction. Population levels downstream from the spring heads appear to contain higher numbers in proportion to the amount of available habitat. Finally, the small size of the populations and their habits makes them highly vulnerable to accidental or malicious contamination.

Life History and Population Dynamics

The following information is abstracted from a study by Soltz (1974) of three of the warm springs pupfish populations.

The small size of the warm springs pupfish population obviously precluded all but very small collections for identification and laboratory breeding. Therefore, much important life history information, such as age at maturity, gonadal cycle, fecundity, etc., is unavailable. It was possible to quite accurately assess the size of the spring pool population using a combination of trapping and direct enumeration. The Indian Spring population underwent a relatively stable annual cycle increasing about twofold from a late winter minimum to a late summer maximum in both 1971 and 1972. The Marsh Spring population followed a similar annual cycle, however the population was recovering from a large collection made for identification purposes in November 1970 and the pupfish population size doubled between 1971 and 1972. The now extinct population in Mexican Spring, the smallest habitat, was followed in 1972 only during which it fluctuated twofold, never exceeding 50 individuals (see Table 1 for population estimates).

Trapping and tagging studies were conducted by personnel of the U. S. Fish and Wildlife Service at School Spring. Results were: 218 fish, November 1972; 136 fish, November 1973; and 231 fish, November 1974.

Although pupfish survive in the outlet streams of all springs, such habitat is extremely marginal with little or no reproduction occurring there. Consequently, the physically stable source pools or headwaters are critical to the survival of these populations. The man-made reservoir below Marsh Spring presently supports a pupfish population that may reach two to three thousand at the late summer peak. However, this relatively recent habitat is rapidly decreasing due to encroachment of emergent vegetation and deposition of organic debris. Such habitats are ephemeral in nature and cannot sustain pupfish populations for extended periods of time.

The age structure of the populations reveals definite increases in the population of juveniles during May, June and July, indicating a seasonal peak in recruitment. Spawning seasons were determined by direct observation of spawning behavior and presence of fry in samples. The spawning season

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THE POLICY AND THE POLICYHOLDER'S OBLIGATIONS

The following information is being furnished to you for your information and is not intended to constitute an offer of insurance.

The policy is a contract between you and the insurance company. It sets out the terms and conditions of the insurance. You must read the policy carefully to understand what is covered and what is not covered. The policy also sets out the obligations of both you and the insurance company. You must pay the premium on time and provide accurate information. The insurance company must pay the claim when it is due.

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for both Indian and Marsh Springs, and presumably for the other constant temperature warm springs with C. n. pectoralis populations, extends from late January through October. The two fluctuating temperature populations, Mexican Spring (now extirpated) and the reservoir below Marsh Spring, have a longer non-reproductive period of three to four months during the winter, with the exact period largely determined by water temperatures below 18°C. Although most warm springs pupfish populations have an extended spawning season, peak spawning occurs in the months of April, May and June when the photoperiod is increasing and when primary productivity of the springs is apparently maximal.

Mortality Factors

Although definitive information is lacking, some generalizations and contributing factors are known. Under natural circumstances, intra-specific competition for spawning territories and possibly for food are the primary limiting factors for spring dwelling populations of Cyprinodon nevadensis. The three most significant potential threats to the healthy survival of the warm springs pupfish populations are:

1. Lowering of water levels in the springs due to pumping of ground water. The critical shallow shoreline habitat where most reproductive territories occur would be rapidly eliminated by lowering water levels.
2. Loss of the reproductive territory areas due to dense growth of emergent vegetation when grazing is eliminated by protective enclosures. An investigation of the magnitude of the effect of emergent vegetation is recommended to be undertaken in 1976.
3. Competition for food and space with introduced exotic fishes. Mosquito fish (Gambusia affinis) are present in the lower portions of the outlet streams of most of the habitats. Fortunately, they have yet to successfully colonize and/or become established in any of the spring pools. Platyfish (Poecilia sp.) have been successfully eliminated from School Spring.

Other factors which contribute to mortality:

1. Predation - Numerous avian predators are known to take pupfish; one belted kingfisher (Megaceryle alcyon) has been observed feeding on warm springs pupfish. The introduced bullfrog (Rana catesbeiana) is probably present in all habitats; however, of seven bullfrogs taken from warm springs pupfish habitats none contain pupfish remains. Crayfish and various species of Odonata nymphs probably prey on pupfish fry and weakened individuals.

2. Parasitism - The few warm springs pupfish which have been dissected had a surprisingly high incidence (25%) of cestode metacercaria in the liver. One warm springs pupfish had a large nematode in the abdominal cavity.

Table 1. Estimates of maximum and minimum pupfish populations. Month of estimate in parentheses. Data not available (NA).

	1971		1972			
	Max	Min	Max	Min		
Indian Spring	111 (Nov)	39 (Feb)	164 (Sept)	44 (Mar)		
Marsh Spring	32 (Nov)	NA	80 (Sept)	21 (Jan)		
Mexican Spring	NA	NA	47 (July)	20 (Mar)		
School Spring	NA	NA	218	NA	1973 136	1974 231

References

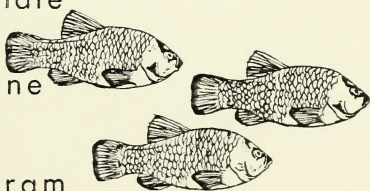
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- Miller, R. R. 1948. The Cyprinodont fishes of the Death Valley system of eastern California and southwestern Nevada. Misc. Publ. Mus. Zool. Univ. Mich. 68: 1-55.
- Miller, R. R. and J. E. Deacon. 1973. New localities of the rare warm springs pupfish, Cyprinodon nevadensis pectoralis, from Ash Meadows, Nevada. Copeia 1973: 137-140.
- Myers, L. H. 1970. Habitat management plan: Ash Meadows pupfish habitat N5-WHA-A1. Bureau of Land Management, Las Vegas, Nev. 9 p. plus appendices.
- Soltz, D. L. 1974. Variation in life history and social organization of some populations of Nevada pupfish, Cyprinodon nevadensis. Ph.D Dissert., Univ. Calif., Los Angeles. 148 pp.

PART 2 THE PLAN

-Objectives and Rationale

-Recovery Plan Outline

-Recovery Plan Diagram



Objectives

The primary objectives of managing the Warm Springs Pupfish (WSP) are:

1. To maintain a natural population of Warm Springs Pupfish (WSP) with comparable numbers and distribution to their 1975 range.
2. To remove from the endangered species list.

The following objectives need to be met in support of the Recovery Plan:

1. The habitat used by the WSP is extremely limited (approximately one mile square of land). The fishes' distribution had not been totally delineated until the Recovery Team began investigation. Its distribution is still not well documented and needs further field studies to verify earlier findings.
2. Man has and is manipulating the waters and lands inhabited by the WSP. Just one such adverse manipulation could wipe out all existing WSP populations. The Recovery Plan identifies the WSP "essential habitat" and proposes to withdraw lands from certain other uses that would be in conflict with species survival and to protect the ecosystem.
3. There are aspects of the species life history and requirements for habitat management that remain unknown. The Plan proposes field studies and basic research to obtain these data.
4. Since so few members of the public know or understand the plight of this unique species, the Plan identifies methods and needs to inform the public of the values of this subspecies and their relationship to its fragile ecosystem. This will be accomplished at a low-key level.
5. To insure the survival of all WSP populations, the acquisition and control of all suitable springs within the "essential habitat" is recommended for public ownership. Public land withdrawals of the springs will prevent conflicting uses of the habitat, including the water, from destroying fish populations.

Rationale

Since the Warm Springs Pupfish is so restricted in the area that it exists on earth, the major need is to perpetuate its limited habitat (mainly a one-mile square area), thereby assuring this species biological right to life on earth. The next goal is to maintain a quality environment so that the species can continue to reproduce and survive. This fish has existed successfully for eons before the arrival of modern man and can continue to exist today, if man will not deleteriously tamper with the habitat.

The Recovery Team believes when the prime objective has been accomplished, the WSP would no longer be in danger of extinction and could be reclassified to threatened.

WARM SPRINGS PUFFISH RECOVERY PLAN OUTLINE

Prime Objectives: (a) To maintain a natural population with comparable numbers and distribution to their 1975 range; (b) maintain and enhance habitat; and (c) remove subspecies from endangered list.

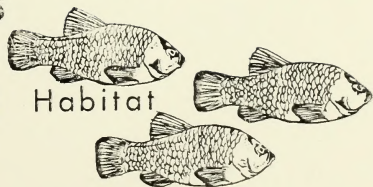
1. Insure natural population in School Spring and outflow.
 11. Secure appropriate lands.
 111. Public land withdrawal within one mile of spring source.
 112. Procure private lands within one mile of spring source.
 12. Perfect water rights.
 121. Procure existing water rights.
 13. Manage habitat.
 132. Manage vegetation.
 1321. Determine fish-vegetation-water relationships.
 1322. Maintain natural habitat for perpetuation enclosure.
 1323. Control vegetation in observation enclosure.
 133. Document and supplement water flow as appropriate.
 14. Manage pectoralis.
 141. Determine quantity of fish.
 142. Determine quality of fish (taxonomy).
 143. Transplant when needed.
 15. Educate public.
 151. Site posting.
 152. Maintain observation facility.
 153. "Low-key" program education.
 16. Enforcement.
 161. Obtain proper authority.
 162. Execute authority (when needed).
2. Insure natural population in Indian Springs and outflow.
 21. Secure appropriate lands.
 211. Public land withdrawal within one mile of spring source.
 212. Procure private lands within one mile of spring source.
 22. Perfect water rights.
 221. Procure existing water rights.
 222. Obtain certificate from State Engineer.
 23. Manage habitat.
 231. Protect from exotics (provide necessary barriers).
 232. Manage vegetation.
 234. Manage vegetation as required (after 1321).
 24. Manage pectoralis.
 241. Determine quantity of fish.
 242. Determine quality of fish (taxonomy).
 243. Transplant when needed.
 244. Remove exotics.
 25. Educate public.
 251. Site posting.
 253. Low-key program education.
 26. Enforcement.
 261. Obtain proper authority.
 262. Execute author (when needed).

3. Insure natural population in Scruggs Spring #1 and outflow.
 31. Secure appropriate lands.
 311. Public land withdrawal within one mile of spring source.
 312. Procure private lands within one mile of spring source.
 32. Perfect water rights.
 321. Procure existing water rights.
 322. Obtain certificate from State Engineer.
 33. Manage habitat.
 331. Protect from exotics (provide necessary barriers).
 332. Manage vegetation.
 3324. Manage vegetation as required (after 1321).
 34. Manage pectoralis.
 341. Determine quantity of fish.
 342. Determine quality of fish (taxonomy).
 343. Transplant when needed.
 344. Remove exotics.
 35. Educate public.
 351. Site posting.
 353. Low-key program education.
 36. Enforcement
 361. Obtain proper authority
 362. Execute authority (when needed).
4. Insure natural population in Scruggs Springs #2 and outflow.
 41. Secure appropriate lands.
 411. Public land withdrawal within one mile of spring source.
 412. Procure private lands within one mile of spring source.
 42. Perfect water rights.
 421. Procure existing water rights.
 422. Obtain certificate from State Engineer.
 43. Manage habitat.
 431. Protect from exotics (provide necessary barriers).
 432. Manage vegetation.
 4324. Manage vegetation as required (after 1321).
 44. Manage pectoralis.
 441. Determine quantity of fish.
 442. Determine quality of fish (taxonomy).
 443. Transplant when needed.
 444. Remove exotics.
 45. Educate public
 451. Site posting
 453. Low-key program education.
 46. Enforcement.
 461. Obtain proper authority.
 462. Execute authority (when needed).
5. Insure natural populations in Marsh Spring and outflow.
 51. Secure appropriate lands.
 511. Public land withdrawal within one mile of spring source.
 512. Procure private lands within one mile of spring source.

- 52. Perfect water rights.
 - 521. Procure existing water rights.
 - 522. Obtain certificate from State Engineer.
- 53. Manage habitat.
 - 531. Protect from exotics (provide necessary barriers).
 - 532. Manage vegetation.
 - 5324. Manage vegetation as required (after 1321).
- 54. Manage pectoralis.
 - 541. Determine quantity of fish.
 - 542. Determine quality of fish (taxonomy).
 - 543. Transplant when needed.
 - 544. Remove exotics.
- 55. Educate public.
 - 551. Site posting
 - 555. Low-key program education.
- 56. Enforcement.
 - 561. Obtain proper authority.
 - 562. Execute authority (when needed).
- 6. Maintain populations in other sites as needed.

PART 3
SCHEDULE OF PRIORITIES

Description of Critical Habitat



PART 3
SCHEDULE OF PRIORITIES, RESPONSIBILITIES, AND COSTS
"Warm Springs Pupfish"

Group Priority	Name of Action	Plan Designation	Lead	Responsibility Cooperators	Target Date	Estimated Costs
A. LANDS 1	Public land withdrawal	111	BLM		FY 77	\$ 1,500
		211				
		311				
2	Private land purchase	411	FWS	BLM	FY 78	Unknown (Appraisal needed)
		112				
		212				
		312				
412						
B. WATER 1	Procure existing rights	121	FWS	NDF&G	FY 78	Unknown (Related to lands appraisal)
		221				
		321				
		421				
		122				
2	Obtain certificates	222	NDF&G	FWS	FY 78	100
		322				
		422				
C. SPECIES INVESTIGATION AND MANAGEMENT 1	Determine quality (taxonomy)	142	USFWS	NDF&G	FY 77	1,500
		242				
		342				
		442				
		542				
2	Determine quantity	141	USFWS	NDF&G	FY 77	3,000
		241				
		341				
		441				
541						

Group Priority	Name of Action	Plan Designation	Responsibility Lead	Cooperators	Target Date	Estimated Costs
3	Remove exotics	244 344 444	USFWS	NDF&G	FY 78	Unknown
4	Needed transplant (Historical ranges)	544 143 243 343 443 543 6	USFWS	NDF&G	As needed	Unknown
5	Needed transplant (New sites)		USFWS	NDF&G	As needed	Unknown
D. HABITAT MANAGEMENT						
1	Vegetation manipulation Observation pond at School Spring	1323	BLM		FY 76	\$ 500
2	Maintain natural habitat perpetuation enclosure	1322	BLM		FY 76	None
3	Fish, vegetation, water relationships	1321 3321	USFWS	BLM UNLV NDF&G	FY 76	3,000
4	Manage vegetation as needed	2324 3324 4324 5324	BLM		As needed	500
5	Document and supplement flow as appropriate	133 233 333 433 533	BLM	USGS	FY 77	500
6	Protect from exotics	231 431	BLM	NDF&G	As needed	500

Group Priority	Name of Action	Plan Designation	Responsibility Lead	Cooperators	Target Date	Estimated Costs
E. ADMINISTRATIVE 1	Obtain LE authority	161	USFWS		FY 76 & continuing	None
		261				
		361				
		461				
2	Executive authority	561	USFWS		FY 76 & continuing	Unknown
		162				
		262				
		362				
3	Maintain observation facility	462	BLM	NDF&G	FY 76 & continuing	\$ 1,000
		562				
		152				
		151				
4	Site posting	251	BLM	NDF&G	FY 76 & continuing	\$ 1,000
		351				
		451				
		451				
5	Program education to public	153	BLM	USFWS	FY 76 & continuing	\$ 2,000
		253				
		353				
		453				
			NDF&G	UNLV		

Description of the Proposed Warm Springs
Pupfish Essential Habitat

Section 7 of the Endangered Species Act of 1973 (P.L. 93-205) instructs the Secretary of Interior to take appropriate action to prevent destruction or modification of habitat considered critical to the survival of any endangered or threatened species. The Secretary, after consultation with individuals and organizations aware of the needs of the species, proposes that the following lands and waters be considered as critical habitat for the survival of the warm springs pupfish (Cyprinodon nevadensis pectoralis). On the basis of the best information currently available, these lands and waters appear to comprise the most important habitats and also the minimal amount of habitat the species needs for survival. These waters contain the entire world's population of (Cyprinodon nevadensis pectoralis) and, as critical habitat, contain the following vital needs:

1. Space for normal growth, movements, or territorial behavior;
2. Nutritional requirements, such as food, water or minerals;
3. Sites for breeding, reproduction, or rearing of young;
4. Cover or shelter; or
5. Other biological, physical, or chemical requirements such as water of proper temperature and chemical composition.

Any proposed use change or modification of the below listed lands and/or waters should be carefully evaluated for possible effects on the survival of the warm springs pupfish:

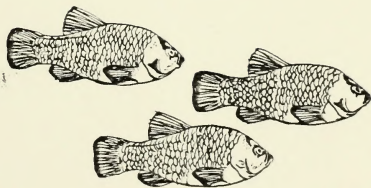
T. 17 S., R. 50 E., M.D.B.&M.
Sec. 26, S $\frac{1}{2}$;
Sec. 34, E $\frac{1}{2}$;
Sec. 35, All;
Sec. 36, W $\frac{1}{2}$.

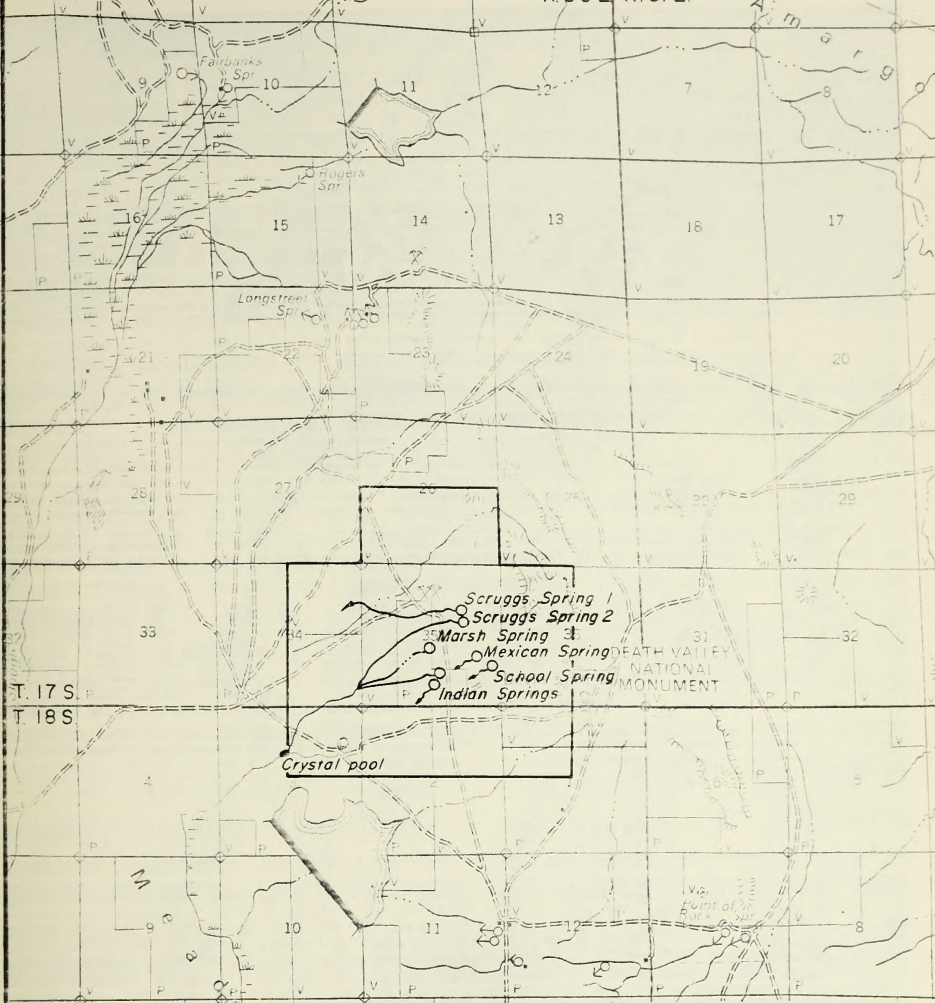
T. 18 S., R. 50 E., M.D.B.&M.
Sec. 3, NE $\frac{1}{4}$;
Sec. 2, N $\frac{1}{2}$;
Sec. 1, NW $\frac{1}{4}$.

All above lands are within Nye County, Nevada. This totals approximately 2,240 acres. See Map No. 2 in Part 5 for delineation of this acreage.

**PART 4
PHOTOGRAPHS AND MAPS**

PART 4
PHOTOS & MAPS





T. 17 S.
T. 18 S.

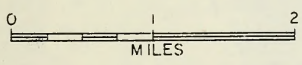
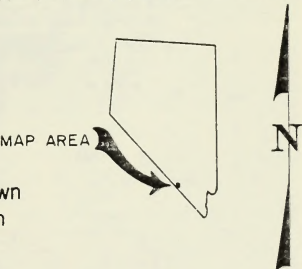


Figure 1. Springs and water tributaries with known populations of Warm Springs Pupfish in Ash Meadows, Nye County, Nevada.

KEY

- Boundary of Essential Habitat
- P Private Lands
- V Public Lands (BLM)



Spring Source

SCHOOL SPRINGS

Location of
Warm Springs Pupfish

Bureau of Land Management

Main Pool

Spring Source

Locked gate

Boy Scout Pool

Buried pipe

Cyclonefence

N

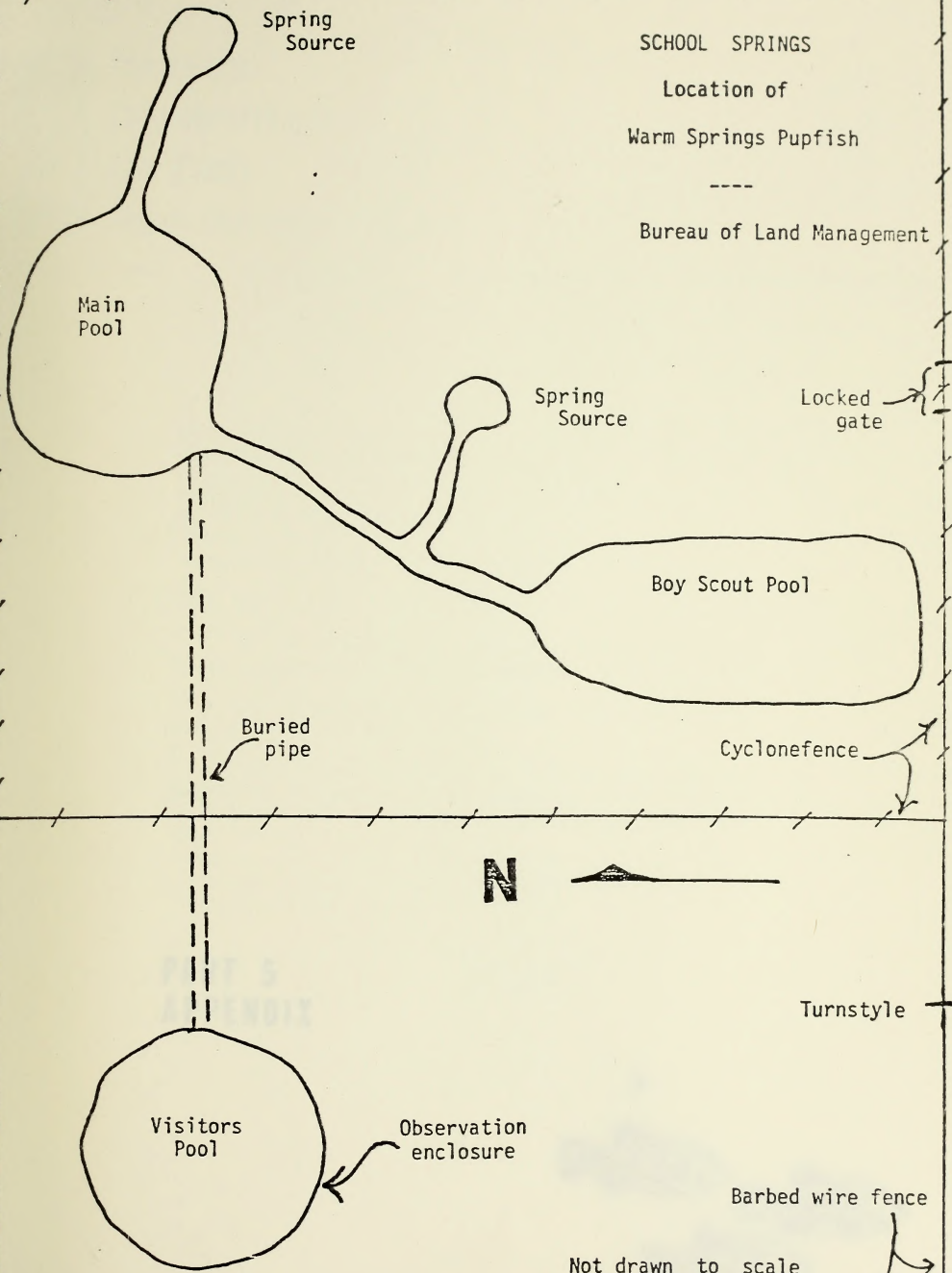
Turnstyle

Visitors Pool

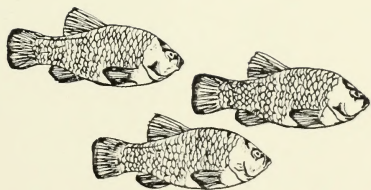
Observation enclosure

Barbed wire fence

Not drawn to scale



**PART 5
APPENDIX**





Nevada
Department
Of Fish
And Game

GLEN K. GRIFFITH
DIRECTOR



MIKE O'CALLAGHAN
GOVERNOR

1100 VALLEY ROAD

P.O. BOX 10678

RENO, NEVADA 89510

TELEPHONE (702) 784-6219

July 13, 1976

Mr. Jim Yoakum, Leader
Warm Springs Pupfish Recovery Team
Bureau of Land Management
Nevada State Office
Rm. 3008 Federal Building
300 Booth Street
Reno, Nevada 89509

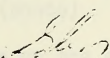
Dear Jim:

We are in receipt of your letter of May 28 and the draft proposal of the Warm Springs Pupfish Recovery Plan.

The plan appears quite complete as written, yet is simple and to the point.

Our responsibilities to the fishery resources of Nevada are spelled out in statute and we will cooperate in the completion of the plan contingent upon the available funding.

Sincerely,


Glen K. Griffith
Director



United States Department of the Interior

FISH AND WILDLIFE SERVICE

1500 N.E. IRVING STREET
P.O. BOX 3737
PORTLAND, OREGON 97208

July 9, 1976

James D. Yoakum, Leader
Warm Springs Pupfish Recovery Team
Bureau of Land Management
300 Booth Street
Reno, Nevada 89502

Dear Mr. Yoakum:

Your letter of May 28, 1976, with copies of the Warm Springs Pupfish Recovery Plan draft has been received. A copy of the draft plan was sent to cooperating agencies, as represented by members on the recovery team, requesting their review and that their comments be forwarded to you.

This office has also reviewed the draft plan and found it adequate and unique. We compliment the recovery team on the innovative format of the plan; it adds a new dimension. Our further comments are listed below:

Suggest putting the disclaimer statement, now on the front cover, on a page behind the title page.

Figures 1 and 2 are both good, but suggest using only one of them (Figure 2) and renumber as Figure 1. Also suggest explaining the symbols "V" and "P" used on the figure to describe land ownership.

Suggest adding location description on map (Figure 1), e.g., Nye County, Nevada, to orient the reader. The same for Ash Meadows, Figure 2 (photo).

Also suggest putting a date on the aerial photo, when it was taken. Such a date would be helpful as a base reference for future management and field studies.

The objective approach to potential threats on the survival of the pupfish as stated on page 4 (mortality factors) is good. Item 2, "loss of the reproductive areas due to dense



growth of emergent vegetation, etc.", deserves close and objective examination of water levels, exotic plants and animals, exclosures and enclosures as may affect reproductive territory. We note your proposed study of these factors on page 14, Part III, D-1 and plan outline designation 1321 on page 8.

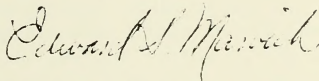
On page 7, third paragraph, item 2, we suggest substituting word "essential" for word "critical", also in other parts of the plan.

In order to avoid confusion with the formal legal determination of "critical habitat" called for in Section 7 of the Endangered Species Act and described in the Federal Register, the terms "critical habitat" or "determination of critical habitat" will not be used per se in recovery plans. Use of the term "critical habitat" in a Director approved plan prior to the legal determination of "critical habitat" would be construed to mean Director approval of "critical habitat" as described in the plan. Habitat which the recovery team considers essential or necessary for maintenance or restoration of their assigned species can be referred to as "essential" or "necessary". These above comments are taken from the latest revision of Recovery Team and Plan Guidelines from our Washington Office. Accordingly, our comments on the Warm Springs Pupfish Essential Habitat in Part 3 should reflect these changes.

In the Warm Springs Pupfish Essential Habitat section it would be most helpful to have a breakdown of approximate private and government acreages, within this habitat, in Ash Meadows.

Our compliments to you and your recovery team for their efforts in drafting this plan. We look forward to receiving the team's final recovery draft of the plan.

Sincerely yours,



Edward S. Marvich
Acting Assistant Regional
Director - Federal Assistance



United States Department of the Interior

FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

In Reply Refer To:
FWS/OES 310.6

NOV 10 1978

MEMORANDUM

To: Regional Director, Region 1
~~acting Associate~~
From: Director

Subject: Warm Springs Pupfish Recovery Plan

This constitutes basic approval of the subject plan, but we are requesting clarification and elaboration on several points.

Overall the plan is attractive, and covers what needs to be covered without excessive detail. The quality of the writing is excellent. We wish other plans could be as explicit. Perhaps it is too brief in that we find some clarification is in order and are placing some conditions on our approval. These are minor as follows:

Page 7, 8 and action diagram: Both prime and primary objectives are referred to and they differ on each of the three pages. Primary objective 1 on page 7 and (a) on page 8 appear similar. So are (c) on page 8 and the one on the action diagram. We feel (a) on page 8, "To maintain a natural population with comparable numbers and distribution to their 1975 range" to be the most definitive. The text could state that if it is accomplished the team feels the fish would qualify for Threatened status or removal from the list altogether. Objective 2 on page 7 and (b) on page 8 relate to habitat improvement. This is not the prime or primary objective. It is just one of several second or third echelon objectives identified as 13, 23, 33 etc. Objective 2 on page 7 (center of page) reads that the Recovery Plan identified critical habitat. We must take exception to this in that the Department in consultation with the States determines critical habitat, and this has not been done for the Warm Springs Pupfish.



Page 8: Items 1321 and 1322 make reference to perpetuation and observation enclosures. Although page 3 mentions experience gained in maintaining an enclosure in School Spring, it is not clear in the plan what these enclosures are, their purpose and if only one or both have been built. An explanation of this is needed and provisions should be made in the plan for constructing any enclosures that have not been built. Objective 132, "manage vegetation" identifies three tasks for accomplishment. It appears there should be a fourth. The three above will not manage vegetation other than in the enclosures; or do the enclosures cover the entire spring? Item 244 on this page is missing.

As mentioned to Mr. Lostetter during his visit here, the Ash Meadows area supports some endemic snails. Obviously, we were remiss in not supplying the team a copy of "Status of the Inland Aquatic and Semi-Aquatic Mollusks of the American Southwest" by James L. Landye of Arizona State University, Tempe, Arizona. This report, dated December 15, 1976, was the outcome of a contract to the Service. In managing the fish, we must not adversely affect any of these snails. Job 1323 calling for a study of fish-vegetation-water relationships should also include invertebrates. It should also be understood that the removal of exotic fish (Item 244, 344 etc. and vegetation control (132, 232)) should not involve techniques that would jeopardize the snail populations. Presumably this would restrict such operations to mechanical control.

It has been noted that the Exotic Oriental Snail (Melanoides tuberculatus) has been introduced to Big Spring in Ash Meadows (Landye Report). Considering its spread elsewhere, the possibility exists it could appear in other springs of the Ash Meadow area. Care should be taken to avoid this where possible. A highly disturbed spring could be expected to be more attractive to it. Page 56 and 57 of the Landye Report cites laboratory work in which fish reproduction in tanks failed with the presence of Melanoides. It would, therefore, appear the presence of Melanoides in Ash Meadows could pose a threat to fishes as well as endemic snails.

We urge caution with Objective 6 relating to development of Warm Springs Pupfish populations in these sites. While we approve of such introductions within the native range of this pupfish, we hesitate to approve of introductions outside native range without a full assessment of need and possible adverse affects on other organisms.

We have been somewhat picky of an excellent plan. This is because we would like to distribute this plan for other recovery teams to see, and want them

to obtain the full range of our thoughts on it. Please express our deepest thanks to Jim Yoakum and the rest of the Recovery Team; and may we have 50 copies of the plan.

D. P. ...

