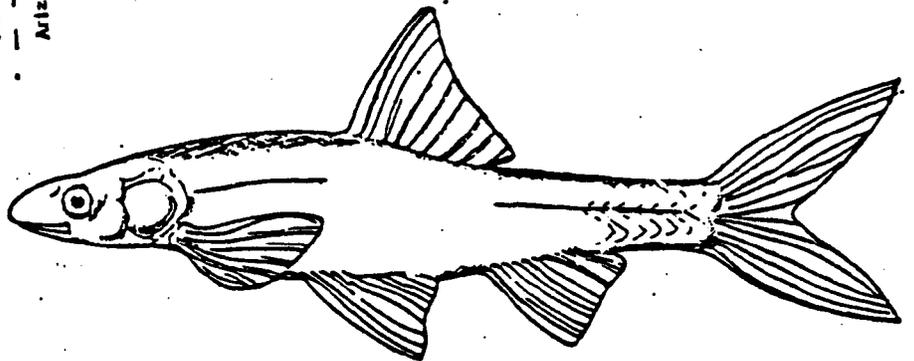
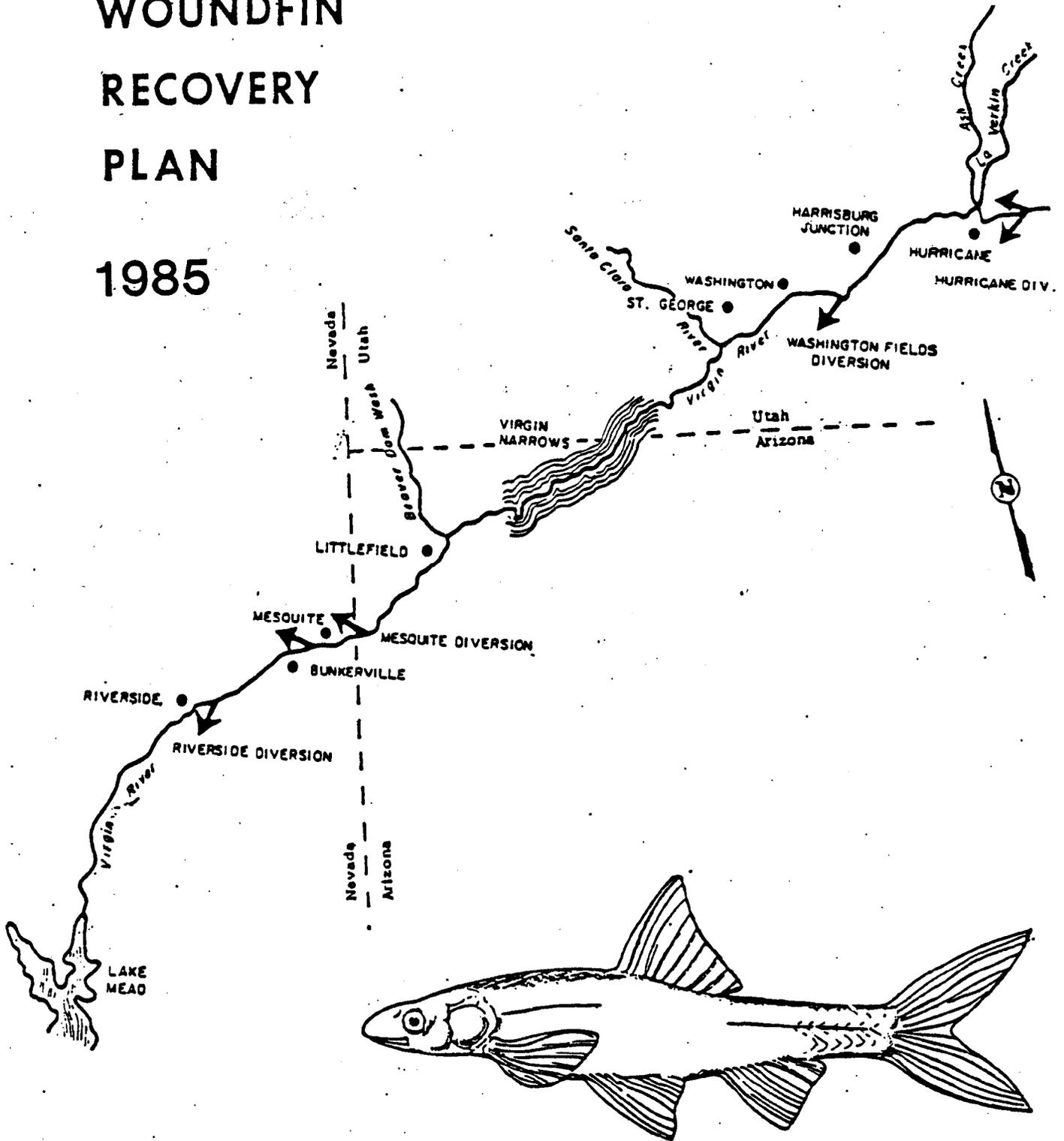


# WOUNDFIN RECOVERY PLAN

1985



RECOVERY PLAN  
FOR  
WOUNDFIN, Plagopterus argentissimus Cope

REVISED BY THE  
WOUNDFIN RECOVERY TEAM

Approved:

By Robert E. Simons  
Associate Director  
U. S. Fish and Wildlife Service

Date 10/1 - 1 1985

## **SUMMARY**

1. Point or condition **when** species will be considered for delisting:

The woundfin's current listing of endangered will be recommended for threatened status when: (1) present Virgin River habitat essential to survival of all life stages of **woundfin** are assured; (2) when present marginal Virgin River habitat is upgraded to maintain all life stages of woundf in; and (3) when an additional population is established in a separate stream within historic range in which adequate habitat for all life stages of **woundfin** are assured. Delisting can be accomplished when a third selfsustaining population is **established** and adequate habitat for all life stages of that population are assured.

2. What must be done to reach recovery:

Steps to reach recovery include protecting and maintaining the habitat, conducting transplants, identifying **and** conducting studies needed to improve **management** practices, monitoring populations, and increasing public education.

3. Management needs to keep the species recovered:

To keep the species recovered, it will be necessary to secure cooperative management agreements with private landowners and public agencies which assure the **woundfin** habitat over which they have control is **managed** to maintain the species as well as other Virgin River fishes.

## DISCLAIMER

This is the completed 1983 revision of the **Woundfin** Recovery Plan. It has been approved by the U.S. Fish and Wildlife Service. It does not necessarily represent official positions or approvals of cooperating agencies (and it does not necessarily represent the views of all recovery team members/individuals), **who played** the key role in preparing the plan. This plan is subject to **modification** as dictated by new findings and changes in species **status** and completion of tasks described in the plan. Goals and objectives will be obtained and funds will be expended contingent upon appropriations, priorities, and other budgetary constraints.

### **Acknowledgements**

The **Woundfin** Recovery Plan, dated March 1, 1985, **was** prepared by the U.S. Fish and Wildlife Service in cooperation with the **Woundfin** Recovery Team composed of the following individuals:

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The cover is a composite. The map has been modified from the Vaughn Hansen Report (1977) and the drawing is by **R. A. Johnson**.

Literature citation should read as follows:

U.S. Fish and Wildlife Service. 1984. Recovery Plan for Woundfin, Plagopterus  
argentissimus Cope. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

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## PREFACE

The original Recovery Plan for the endangered **woundfin** was first approved in July 1979. This plan supercedes the original and incorporates new information gained by researchers since 1979.

This Recovery Plan was developed for the **woundfi**. **the Woundfin** Recovery Team, an independent group of biologist<sup>6</sup> **operating** under the direction of the U.S. Fish and Wildlife Service.

The basis of this plan **is** the belief that State and Federal agencies charged with land and species management within the historic range of the **woundfin** are interested in its preservation and recovery. Using this basis, the Team has made management **recommendations** for the species and its habitat that take into consideration the biological needs of the species.

The overall objective of this plan is to prevent the extinction of the woundfin, and then to secure its survival. Achievement of this objective involves providing a secure habitat for the species where it presently exists and establishing self-sustaining populations in other streams within its historic range.

It is hoped this plan will be utilized by all agencies working with the **woundfin** to coordinate **management** activities. **As** the plan is **implemented**, it should be understood that revisions will likely be necessary. Plan **implementation** is the task of the managing agencies (especially Utah Division of **Wildl** fe Resources, Arizona Game and **Fish** Department, Nevada **Department** of Wildlife, U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, and U.S. Bureau of Land Management). Sound management of the resource and close coordination **between management** agencies should provide more stable habitat for **woundfin** in the Virgin River and restore it to unlisted status.



## WOUNDFIN RECOVERY PLAN

### PART I

#### INTRODUCTION

The woundfin, Plagopterus argentissimus, is a streamlined silvery minnow with a flat head and a conspicuous, sharp dorsal spine, from which its **common name** was derived. The type specimen was described by Cope in 1874 from a collection apparently made in Washington County, Utah (Miller and Hubbs 1960). The **woundfin** was first placed on the endangered species list by the **Department** of the Interior on October 13, 1970.

The historic range of **woundfin** has been documented in the Salt River near Tempe, Arizona; at the mouth of the **Gila** River near Yuma, Arizona; in the Colorado River near Yuma, Arizona; in the Virgin River in Nevada, Arizona, and Utah and in **LaVerkin** Creek, a tributary to the Virgin River in Utah (Gilbert and **Scofield** 1898; Snyder 1915; Miller and Hubbs 1960; Cross 1975). Attempts to transplant **woundfin** into four localities in Arizona at the periphery of their historic range have been unsuccessful.

**Woundfin** are capable of surviving and reproducing in a habitat that most fish would find intolerable. Adults are typically found in swift, shallow, highly turbid waters that sometimes reach a **summer** temperature of **37.6°C**. The ability to tolerate these harsh habitats has probably been an asset to the **woundfin** by limiting competition and predation from exotic fishes which cannot thrive under these conditions. Little is known of the historical abundance of woundfin, but it is now locally abundant in the Virgin River in reaches of permanent water. Some investigators believe populations have **remained** static for many years. Others believe populations have been increasing because of habitat modification and destruction.

Basic data on **woundfin** life history and ecology are being collected in studies conducted by Dr. James Deacon (University of Nevada, Las Vegas) and his staff. These studies include information on ecological distribution, spawning habits, **incremental** growth, **thermal** preference, response to salinity, habitat utilization, population fluctuations and food habits.

Continued **encroachment** upon **woundfin** habitat in the Virgin River must be carefully monitored to assure that "progress" will not adversely affect the last known stronghold of this unique species. Despite the present

and future proposals for Virgin River water, Federal agencies are required by the Endangered Species Act of 1973, as amended, to protect existing **woundfin** populations and habitat designated as essential to their survival.

#### DESCRIPTION

The **woundfin** is the **most** silvery of all American **minnows** (Miller and Hubbs 1960), reflecting blue in bright sunlight. The only breeding color noted has **been** a wash of light-yellow at the bases of the pectoral and pelvic fins. The species rarely achieves a standard length of more than 75 millimeters (mm).

The head and belly of the **woundfin** are flattened, and the overall aspect of the fish is one of an anteriorly-depressed, streamlined torpedo. **This** body shape is characteristic of fish inhabiting swift, shallow, **sand-**bottomed streams. Other adaptations to this type of habitat include expansive, falcate fins, barbels on the lips, reduced eyes, and extensive sensory buds, presumably **chemoreceptors**, on the lower part of the head (the gular region in Plagopterus) (Snyder 1915), and along the leading pectoral fin-rays (Moore 1950; **Branson** 1963, 1966; Cross 1967). **Woundfin** are essentially scaleless, with the exception of small plates of bone situated in the leathery skin, especially near the nape. Adaptive features unique to the **woundfin** include a modification of the two anterior fin-rays of the dorsal fin into enlarged, elongated, and solidified spinose rays, the second of which fits into a groove in the first. Also, the branched pelvic rays are thickened and **spinelike** on the basal half to three fourths of each ray. A further specialization **in** Plagopterus is a spinelike development near the base of the first few pectoral fin-rays.

#### TAXONOMIC STATUS

The woundf **in** is considered the most highly specialized species **in** the cyprinid tribe Plagopterini, subfamily Leuciscinae (Miller and Hubbs 1960). This unique tribe is composed of three genera, two of which, Meda and Plagopterus, are monotypic, while the third, Lepidomeda, is composed of four species, one of which contains two subspecies. The present taxonomic ranking of the group was initiated by Hubbs (1955), and is generally accepted. The uniqueness of this **compact** group of fishes has always impressed ichthyologists. Cope (1874) erected a full subfamily, the Plagopterinae, for the genera, and this was widely followed (Jordan and Gilbert 1883; Jordan and **Evermann** 1896). Jordan, et al. (1930) even erected a separate family, the Medidae, for the group, an action followed only by Tanner (1936). The entire **taxon** is endemic to the lower **basin** of the Colorado River and its ancestral tributary, the White River.

## HISTORIC DISTRIBUTION

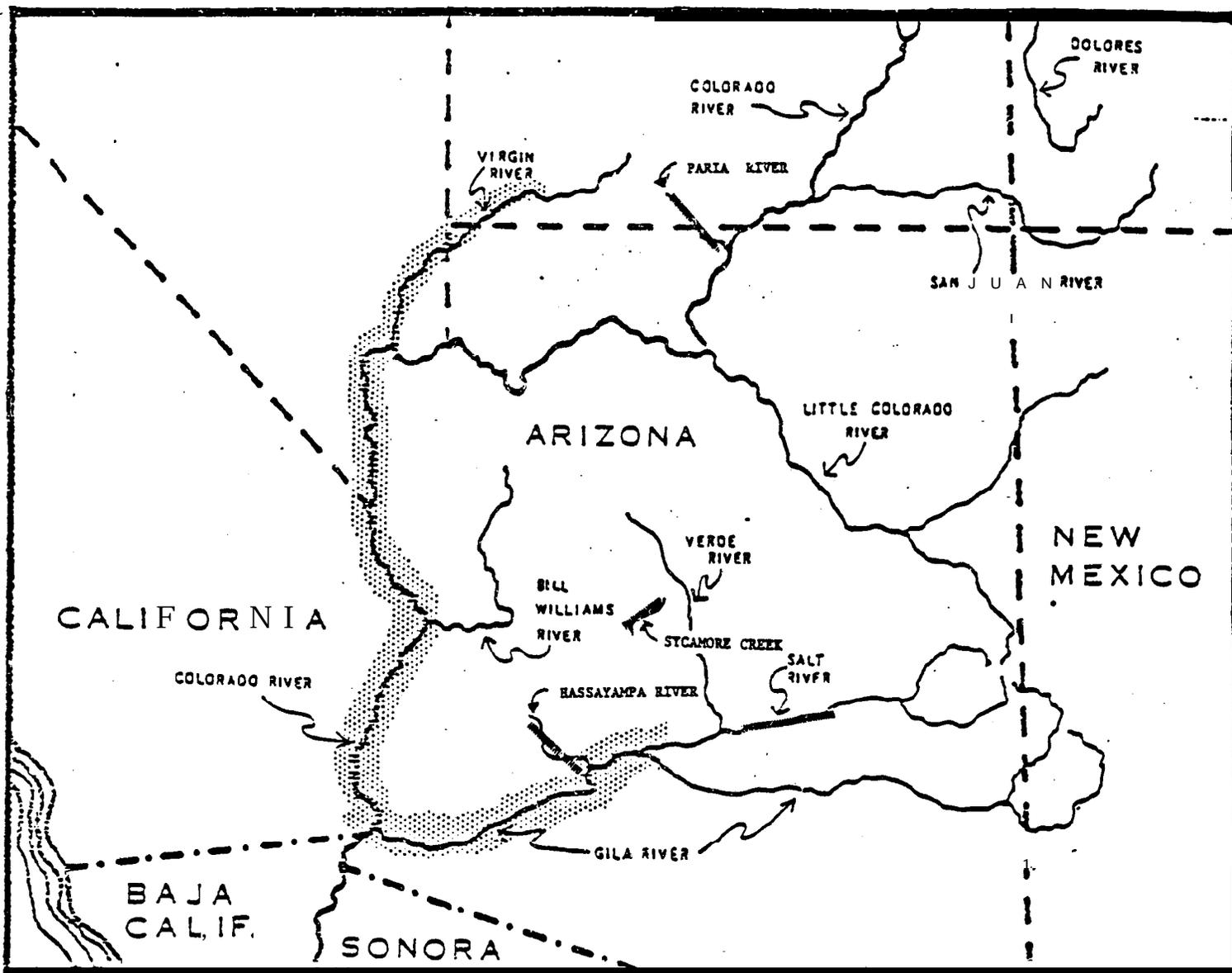
On the basis of early records, the original range of **woundfin** extended from near the junction of the **Salt** and Verde Rivers at Tempe, Arizona, to the mouth of the **Gila** River at Yuma (Gilbert and Scofield 1898); likely in the mainstream Colorado **River** near Yuma ("Fort **Yuma**," Jordan and **Everman** 1896; see also Meek 1904 and Follett, 1961); thence upstream to the Virgin River in Nevada, Arizona, Utah, and into LaVerkin Creek, a tributary to the Virgin River in Utah (Gilbert and Scofield 1898, Snyder 1915, Miller and Hubbs 1960, Cross **1975**), (Figure 1). However, from biological considerations alone, there is reason to believe that **woundfin** occurred further upstream on the Verde, Salt, **and Gila rivers**.

As detailed by Miller and Hubbs (**1960**), the stated type locality "San Luis Valley, Western Colorado (Cope and Yarrow **1875**)," was an obvious error, many of which **were** committed by collectors associated with the Wheeler Survey in 1871 to 1874. Miller and Hubbs also rejected as erroneous locality data the records **from** the "Colorado Chiquito River, Arizona" (**Bohike** 1953) **on** the basis of **no** other indications that the fish ever inhabited that stream. The Wheeler expedition maintained a base at Toquerville, Washington County, Utah, in 1872, on **LaVerkin** Creek (Wheeler **1889**), **from** where they worked in the Virgin River canyon and traveled to St. George. It seems likely that the type series of **P. argentissimus** was taken **from** the mainstream Virgin River (Miller and Hubbs 1960).

## PRESENT DISTRIBUTION

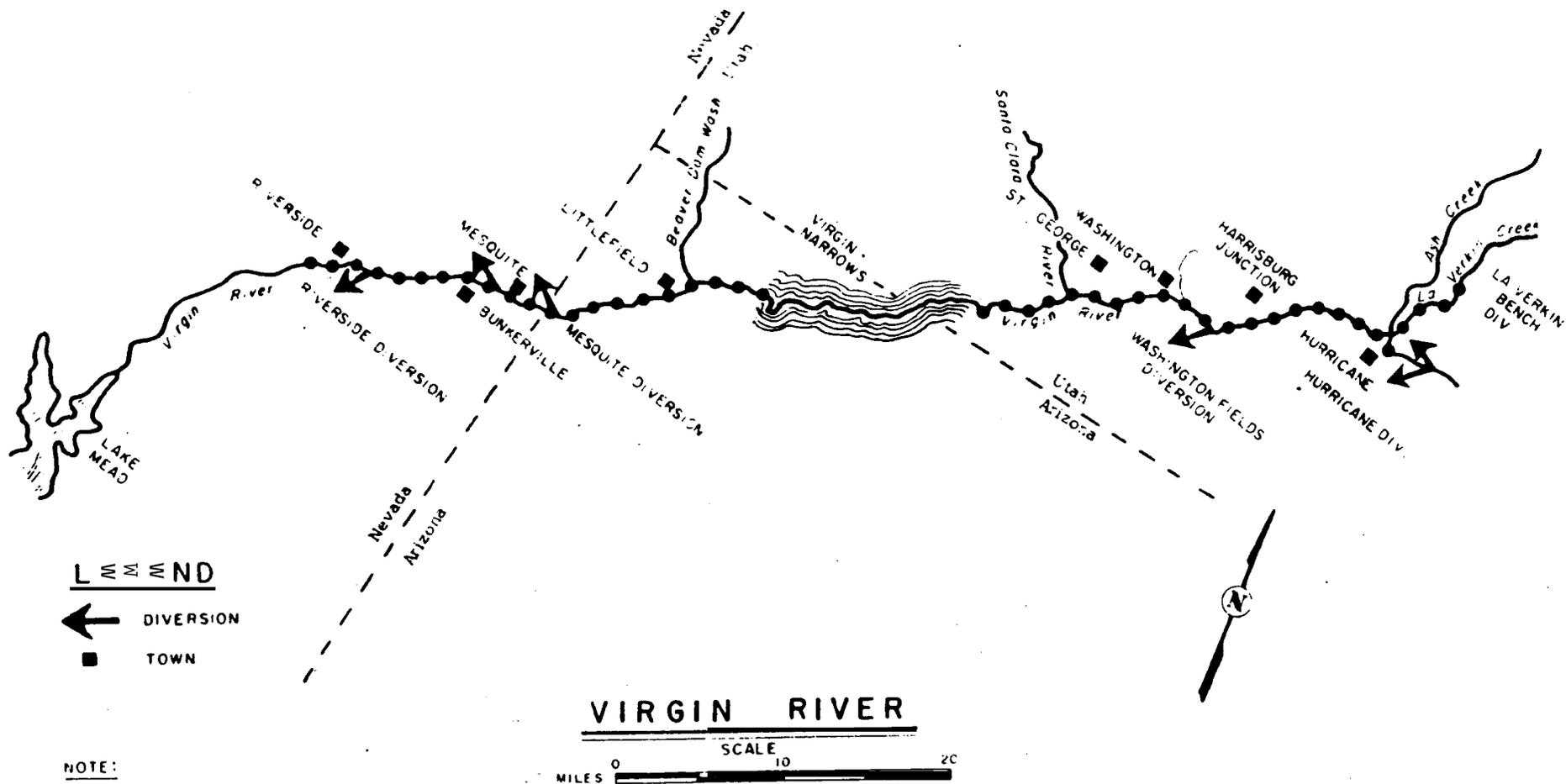
**Woundfin** range **from** LaVerkin Springs on the **mainstream** of the Virgin River and the **lower** portion of LaVerkin Creek in Utah, downstream to Lake Mead, Nevada (Figure 2). A single specimen was taken from the middle Moapa River, Clark County, Nevada, in the **late 1960's** (Deacon and Bradley 1972). The Moapa River was formerly a tributary to the Virgin River, but both streams now flow into Lake Mead. The species has been transplanted into four localities in attempts to establish populations. In one locality, the Hassayampa River in Arizona, reproduction occurred in the **summer** of 1972 but a flood in September of 1972 evidently destroyed the entire population (Minckley, pers. **comm.** 1977). In March, 1972, **woundfin** were also placed in the Salt River, Arizona, but none have been taken there since. In Sycamore Creek, Agua Fria drainage, Arizona, a few specimens stocked in spring, 1972 survived the severe flooding of 1972-3, and two individuals collected in late August, 1973 **were** gravid. However, none have been collected in Sycamore Creek **since 1973**. The fourth locality, the Paria River, along the 'Arizona-Utah border, was **stocked several times** between 1969 and 1972. No **woundfin** were found during surveys in May, 1974 and May, 1975 (unpub. data, Arizona Game and Fish Stocking Records).

Figure 1. Known historic distribution of the woundfin, Plagopterus argentissimus, and areas where transplants have been attempted.



LEGEND

-  Historic distribution
-  Transplant site



NOTE:  
 THIS MAP HAS BEEN ADAPTED FROM  
 DRAWING FURNISHED BY  
 VAUGHN HANSEN ASSOCIATES  
 SALT LAKE CITY, UTAH

FIGURE 2. Present distribution of the woundfin, Plagopterus argentissimus, in the Virgin River. ●●●●●

### HABITAT REQUIREMENTS

Woundfin are most often collected from **runs** and quiet waters adjacent to riffles where the mean velocity is 0.48 m/sec. (+0.23) and depths are 0.34 m (+0.18). These habitats have **predominately** sand or sand/gravel substrates. Juvenile woundfin are also collected most often in runs and quiet water having sand or sand/gravel substrates where the mean velocity is 0.43 m/sec. (+0.29) and depths average 0.38 m (+0.17) (Hardy and Deacon 1982). These habitats are generally slower and deeper than those characteristic of the adults. Woundfin fry are collected in backwater habitats that are associated with spawning areas in the river and have sand or mud substrates. The mean velocity and depth in these habitats is 0.08 m/sec. (+0.10) and 0.21 m (+0.16), respectively. Greger and Deacon (1982) found that spawning in an **artificial** stream system occurred at velocities from 0.06 to 0.09 m/sec. and in depths ranging from 0.07 to 0.10 m. The choice of substrates appeared to be fairly specific to cobble from 0.05 to 0.10 m in diameter. Eggs were adhered to the undersides of rocks. It is anticipated, however, that habitats having slightly greater depths and velocities are utilized under natural conditions. Deacon and Hardy (1982) and Hardy and Deacon (1982) also found that best reproductive success occurred when mean velocity flows ranged between 200 and 800 CFS during spawning. These authors found highest population densities and greatest spawning success occurred in areas of relatively unmodified habitats. Although woundfin are **primarily** found in the **mainstream** Virgin River, some adults and periodically large numbers of fry have been found in tributary streams such as LaVerkin Creek. Schumann, et al. (manuscript) reported adult thermal preference of 19.5° C, indicating the species is eurythermal. Lockhart (pers. comm. 1977) reported that when water temperatures approach 30° C, woundfin leave shallow water areas and congregate in the deeper portions of streams.

### ASSOCIATED SPECIES

At present, as many as 9 exotic fishes are known from the Virgin River system, along with 6 native forms. Plagopterus, however, is intimately associated with only 4 of the native fishes and one introduced species. Woundfin generally are found alone over shifting sand bottoms, but sometimes are accompanied by flannelmouth suckers Catostomus latipinnis and the desert sucker Pantosteus clarki. The **mainstream** form of speckled dace, Rhinichthys osculus, typically occupies areas lateral to habitats of woundfin, and is most abundant near spring inflows and tributary mouths. Pantosteus clarki shows a marked proclivity for swifter waters and **more solid** substrates than woundfin, and the flannelmouth is characteristic of deeper, slower waters behind boulders or other debris. The fourth native form, Gila rohusta seminuda, occurs in the deepest pools, again lateral to Plagopterus habitat. The Virgin spinedace Lepidomeda m. mollispinis is associated with woundfin at spring inflows and tributary confluences.

The red shiner, Notropis lutrensis, is found in low numbers near Littlefield, Arizona, where the Virgin River is relatively unmodified and perennial. However, in the **lower** reach of the river, where it becomes dewatered and is severely modified, the red shiner is the most abundant species, and although **woundfin** can be found, they are rare. Presently, **woundfin** are rarely taken below the Riverside Bridge. Of the remaining native species, only flannelmouth sucker is rarely collected from this disturbed segment of the river. These data may indicate that in unmodified habitat **woundfin** maintain a competitive advantage over the introduced red shiner or **merely** indicate habitat preferences. The exact mode of interaction between these two species is unknown and presently under study.

Predators on **woundfin** include piscivorous birds such as kingfishers and herons, soft-shelled turtles and other vertebrate species. This is especially true during periods of low flow and clear water. Fish that feed on **woundfin** doubtless include Gila robusta seminuda as a potential predator on all life-history stages, and Lepidomeda m. mollispinis as a predator on larvae and fry. The introduced largemouth bass (Micropterus salmoides) and green sunfish (Lepomis cyanellus) in the **mainstream** of the Virgin River are usually relatively small, limiting most predation by them to larvae and young. Channel catfish (Ictalurus punctatus), while rare in the Virgin system, may prey on all life-history stages. The mosquitofish (Gambusia affinis) may prey on larval woundfin.

Organisms associated with Plagopterus, other than fishes, are a few invertebrates such as **burrowing** dragonfly naids (Gomphidae), **burrowing** chironomid dipterans and, where stones or other solid substrates occur, simuliid dipterans, hydropsychid trichopterans, and a few **mayfly** nymphs (usually baetids).

#### FOOD HABITS

**Woundfin** are **omnivorous** and shift their food habits in response to changing food availability. Foods reported for **woundfin** include **filamentous algae**, detrital **material**, tamarisk seeds, insects (i.e., Ephemeroptera, dipteran adults, chironomid larvae, ceratopogonids, and **simuliids**) (Cross 1975, Lockhart 1979, **Winget** and Baumann 1977, Greger and Deacon 1982). Greger and Deacon (1982) suggested seasonal shifts in food selectivity corresponded to shifts in habitat utilization. They also documented dietary differences **between woundfin** populations in disturbed versus undisturbed segments of the lower river. These authors also made an important observation that showed that dietary overlaps between **woundfin** and red shiners **changed** directly with abundance of food. Dietary overlaps **were** greatest when food was abundant and **more** divergent during periods of **low** food availability.

#### REPRODUCTION

Some information on the reproductive biology of **woundfin** is presented by Peters (1970) and Greger and Deacon (1982). The reproductive cycle of the **woundfin** appears to be initiated by some combination of increasing

water temperatures, lengthening daylight and declining spring run-off. It would appear advantageous for **woundfin** to spawn as the high spring runoff is declining because eggs spawned prior to this **would** likely be carried away by the current or buried in silt. **Limited spawning** may occur in sheltered areas during high spring flows.

Gonad maturation has been observed in March, April, and May (Peters 1970) and fry have appeared in June (Cross 1975). Therefore, it is assumed that **woundfin** begin spawning in late May. As fry have also been found through late August, it is apparent that limited spawning occurs throughout the **summer**. Peak activity is probably in late May and early June. Recent information Deacon (1977b) indicated **woundfin** in downstream reaches of the Virgin River begin spawning more than one month earlier than fish near **LaVerkin** Creek. In 1977, the first appearance of young occurred in the lower river in early June and in the upper river in late July.

Deacon (1977a) reported apparent spawning activities on April 17, 1977, in the Virgin River south of Mesquite, Nevada. The water temperature was **14.5°C**. Greger and Deacon (1982) observed spawning behavior in an artificial stream at water temperatures ranging from 20 to 25° C. These investigators observed spawning behavior similar to Lockhart and **Schuman** as reported by Deacon (1977a). A female would leave a pool to join a **group** of males in swifter flowing water over cobble to gravel sized substrates. Following spawning, the female would return to the pool.

When fry appear they are generally found in **shallow** areas lateral to the main current and in the main channel only when water levels are low. **Fry** are conspicuously absent from pools containing potential predators such as mosquitofish, green sunfish, largemouth bass, and Virgin River roundtail chub. By late August, young-of-the-year **woundfin** are 20 to 30 mm total length. Growth occurs through October, and perhaps through December. The period of highest mortality coincides with the period of lowest flows and lowest temperatures and appears related to these two factors. **Deacon** and Hardy (1982) **showed** reduced survival of **young woundfin** at flows below 200 CFS. They also demonstrated this pattern **between** disturbed and undisturbed sections of the river and attributed it to water depletion. Reduced survival was also noted at flows above **300** CFS.

Attempts at artificial **propagation** have met with mixed success. Good hatching success has been achieved in artificial streams, 'but only occasionally in pool habitats. Fry survival in all cases has been poor.

#### MOVEMENTS

Little is known of **woundfin** movement. Collections within reaches of the Virgin River indicate large variations in population densities **between** seasons and years.

HABITAT DESTRUCTION

From older records and reports, it is certain that woundfin lived as far up the Gila River system as the Salt River at Tempe, Arizona. It can be surmised that woundfin also lived in most reaches of the Salt and Gila rivers between Tempe and Yuma, Arizona, in the Gila River above Phoenix, and the Salt and Verde rivers above Tempe. Today, six major dams on the Salt and Verde rivers and two on the Gila River have effectively cut off natural flows in the lower reaches of both the Salt and Gila rivers. Potential woundfin habitat may still exist in the Gila River above San Carlos Reservoir and the Verde River (tributary of the Salt River) above Horseshoe Reservoir.

On the mainstream of the Colorado River, a series of dams and reservoirs, beginning with the construction of Hoover Dam in the early 1930's, has eliminated all woundfin habitat. With the filling of Lake Mead, the lower end of the Virgin River and the Moapa River were also lost to woundfin. This, plus the habitat alterations caused by irrigation diversions and introduction of exotic species, has reduced the suitability of the remaining habitat. Woundfin populations are reduced due to the irrigation diversion at Mesquite, Nevada, and have been eliminated through the Virgin River Gorge because the river is intermittent due to irrigation diversions upstream. From 1 to 2 kilometers below the Washington-St. George Canal Company diversion, woundfin habitat is greatly diminished or non-existent during peak irrigation periods (Figure 2).

Several proposed water projects on the Virgin River and its associated springs may pose problems for the woundfin. Each project should be evaluated for possible impacts on the species and its habitat. If a negative impact is found, all efforts should be made to eliminate it. Section 7 of the Endangered Species Act requires all federal agencies to consult with the Fish and Wildlife Service if any activity they fund, authorize, or carry out may affect a listed species.

CHANGES IN ABUNDANCE

Changes in the relative abundance of woundfin within the Virgin River system are difficult to assess as few collection records are available from the early period of human settlement in the basin. Collections and field notes examined at the University of Nevada, Las Vegas, Brigham Young University, The University of Michigan Museum of Zoology and the United States National Museum indicate that the abundance of woundfin in the mainstream above Mesquite, Nevada has not appreciably changed since the 1930's. Woundfin populations in the mainstream below Mesquite, however, have declined. When C. L. Hubbs, (unpublished field notes) collected P. argentisimus at Bunkerville, Nevada, in July 1942 (UMMZ 141655) he found it scarce but generally distributed in the main channel and more abundant in pools near the bank (which also con-

tained flannelmouth sucker, desert sucker, Virgin River roundtail, chub and speckled dace). Today, **woundfin** is the only native species usually collected below the water diversion at **Mesquite**, Nevada (flannelmouth sucker **occurs** only rarely in the lower river) and is much less abundant than the introduced red shiner. The red shiner has nearly replaced **woundfin** within the modified habitat in the lowermost reaches of the river.

Deacon and Hardy (1982) showed that population density and structure are affected by flow conditions in the river and vary within the river between the disturbed and undisturbed **segments** regardless of flows. These authors concluded that when mean monthly flows drop below 200 CFS during spawning, reproductive success is diminished in the undisturbed **segments** of the river, and **almost always** poor in the disturbed segments. These authors also found that when **woundfin** populations are **severely depleted**, such as during the 1977 drought, a 2-year lag **time** of favorable water conditions is required to rebuild population densities. They also noted that mean monthly flows of 800 CFS or higher during the reproductive period resulted in diminished reproductive success.

#### LIMITING FACTORS

The major limiting factor for **woundfin** today is modification and loss of habitat. The building of dams and associated reservoirs, water diversion structures, canals, laterals, aqueducts, and the dewatering of streams, are the main contributors to this problem. The **introduction** and spread of exotic fish species also appears to have had a negative impact on the species. With the human population increase in the desert southwest, the loss of **woundfin** habitat **will** surely continue unless protective measures are developed and **implemented**.

#### CONSERVATION EFFORTS

Since 1971, one of the major conservation efforts for **woundfin** has **been** the initiation of several studies relative to population dispersion, community structure, ecological requirements, and abundance. The studies **were** a result of funding by the U. S. Fish and Wildlife Service, the U. S. Bureau of Reclamation, the City of St. **George**, Utah, and the Interim **Woundfin** Recovery Team formed in Las Vegas, Nevada, **In** April, 1973. The official recovery team was formed in August, 1975, by a letter from Director Greenwalt of the U. S. Fish and Wildlife Service to team members. Other efforts include Section 7 consultations carried out by the Fish and Wildlife **Service**.

A major effort in the understanding of this species has been the research of Jeffrey Cross, University of Nevada, Las Vegas. His **master's** thesis, entitled Ecological Distribution of the Fishes of the Virgin River **represents** the first scientific **investigation** of **woundfin** in their present habitat. Others, such as Drs. James Deacon and W. L. **Minckley**, have

contributed substantially to our knowledge of the species. Deacon and Minckley's (1973) review of **woundfin** information **is** the most recent overview of the literature to date.

The State of Arizona has attempted reintroduction of **woundfin** into the Paria River and Sycamore Creek on several occasions. To date **none** of these attempts have succeeded.

The U. S. Bureau of Reclamation has funded a terrestrial vertebrate and vegetational inventory in the **LaVerkin** Springs-Toquerville-Virgin River area associated with their proposed desalting project. These data will add to our overall biological knowledge of the Virgin River.

The U.S. Bureau of Land Management has initiated Habitat Management Plans on several sections of the Virgin River. These plans will, when completed, delineate resources of the Virgin River valley and discuss steps which must be taken to **maintain** those resources. The woundfln and its habitat requirements are given special emphasis **in** the Habitat Management Plans. The recovery team has worked **with** the Bureau of Land Management to assure that the Habitat Management Plans contain the most recent information available concerning **woundfln** biology.

**In 1977**, the City of St. George, Utah contracted with Vaughn Hansen Associates to investigate potential impacts of the proposed Warner Valley Project on the Virgin River and woundfln. Information on food, distribution, reproduction, relative abundance, and population structure of **woundfin** was obtained.

The Washington County Water Conservancy District provided funding to Dr. James Deacon and Thomas Hardy during the summer of 1982 to prepare a biological assessment on the impacts of the Quail Creek Reservoir Project **on** woundfin. The results of this study **were** summarized in a report entitled Impact Analysis of the Proposed Quail Creek Reservoir on Plagopterus argentissimus (woundfln) in the Virgin River (Hardy and Deacon 1982).

As a condition of the non-jeopardy biological opinion issued by the U.S. Fish and Wildlife Service (December 1982) for the Quail Creek Reservoir Project, the Washington County Water Conservancy District agreed to fund a 5-year study on the **woundfin** in Utah. The study, designed to obtain pertinent life history information **on** the woundfin, will be reviewed and approved by the Utah Division of Wildlife Resources and the U.S. **Fish** and Wildlife Service.

In April, 1976 the Recovery Team **recommended** the Virgin River from LaVerkin Springs, Utah, to Lake Mead in Nevada be designated as critical habitat. The Fish and Wildlife Service contacted appropriate agencies and forwarded the **recommendation** to Washington. On November 2, 1977, critical habitat

was proposed in the Federal Register (See Appendix). This proposal **was** not finalized, but was withdrawn on March 6, 1979, due to the changed **requirements** in the 1978 amendments to the Endangered Species Act. (See Appendix).

The Recovery Team believes additional research must be initiated to fill in gaps of knowledge relative to the **woundfin** as well as other native Virgin River fishes. **Recommended** studies are given in Part II of the Recovery Plan.

Since the transplanting efforts of the early **1970's**, there have been numerous discussions on again attempting to reestablish the **woundfin** in other streams within its historic range. Potential sites have been identified and other governmental agencies have been contacted; however, no agreements have been reached. Hopefully, due to changes in the Endangered Species Act allowing endangered or threatened species to be reintroduced as experimental populations, reintroduction efforts can begin. The **initial** selection of suitable habitat for attempted reintroduction has **been** accomplished. The actual introduction into these sites should begin in 1985 or when suitable numbers of **woundfin** are available for this purpose.

## PART II

### THE ACTION PLAN

The primary objective of the recovery plan is to prevent the extinction of the **woundfin** and restore it to unlisted status. This will occur through implementation of the recovery actions and tasks proposed below. As the plan is implemented, the Fish and Wildlife Service, with assistance **from** the Recovery Team, will **recommend** appropriate **delisting** under Section 4 of the Endangered Species Act. It is estimated that the species could be downlisted to threatened status when: (1) present Virgin River habitat for all life stages of **woundfin** is being maintained; (2) present marginal Virgin River habitat, as defined below, is upgraded to maintain all life stages of **woundfin**; and (3) an additional population **is** established in a separate stream within historic range in which adequate habitat for all life stages of **woundfin** is assured. Delisting can be accomplished when a third self-sustaining population is established and adequate habitat for all life stages of that population **is** assured.

### STEP-DOWN OUTLINE

Primary goal: To delist the **woundfin** (Plagopterus argentissimus) through protection of existing habitats and populations and the establishment of at least two additional self-sustaining wild populations in their native ecosystems other than in the Virgin River.

- 1.0 Maintain and enhance existing **woundfin** populations and their habitats in the Virgin River.
  - 1.1 Monitor existing populations.
    - 1.11 Establish monitoring procedures and schedules.
    - 1.12 **Recommend monitoring** personnel.
  - 1.2 Monitor **woundfin** habitats.
    - 1.21 Establish monitoring procedures and schedules.
    - 1.22 Recommend monitoring personnel.
    - 1.23 Implement monitoring.
  - 1.3 Identify **existing** self-sustaining population **requirements**.
    - 1.31 Synthesize existing data on **woundfin**.
    - 1.32 Identify and describe preferred **woundfin** habitat.

- 1.33 Determine interaction **between** native and exotic fishes and factors presently excluding exotic fishes from the Virgin River.
- 1.34 Document and record **movements** of woundfin.
- 1.35 Perform additional studies to clarify **woundfin** life history requirements.
- 1.4 Identify factors maintaining present Virgin River habitat.
  - 1.41 Determine flows necessary to maintain optimum habitat conditions for woundfin.
  - 1.42 Document water movement in the Virgin River basin.
- 1.5 Protect **woundfin** habitat In the Virgin River.
  - 1.51 Review and comment on all projects which might impinge on **woundfin** and their habitats.
  - 1.52 Obtain management authority over **woundfin** habitats.
  - 1.53 Prepare **management** plans to protect habitat.
  - 1.54 Develop feasibility studies on vegetation management.
- 1.6 Enhance **marginal** habitat in present range.
  - 1.61 Identify marginal habitat.
  - 1.62 Identify needed habitat enhancement features.
    - 1.621 Identify experimental sections of the Virgin River that can be used to test habitat manipulation.
    - 1.622 Test and evaluate methods of enhancing the Virgin River as **woundfin** habitat within the test sites.
  - 1.63 Develop and Implement management plans to enhance marginal habitat.

- 1.64 Monitor the enhanced habitat and **woundfin** populations.
  - 1.641 Establish **monitoring** procedures and schedules.
  - 1.642 **Recommend monitoring** personnel.
  - 1.643 **Implement** monitoring.
- 2.0 Restore and **manage** populations of **woundfin** in suitable areas of **former** range.
  - 2.1 Select suitable habitat in former range.
    - 2.11 Identify and enhance habitat in introduction sites.
    - 2.12 Consider nonessential experimental population designation for **woundfin** introductions.
    - 2.13 Conduct environmental assessments for introduction sites.
  - 2.2 Obtain sufficient woundfln to introduce into suitable sites in former range.
    - 2.21 Develop hatchery propagation techniques for woundfin.
    - 2.22 Collect **woundfin** from the wild for use In introductions.
    - 2.23 Determine stocking rates.
    - 2.24 Introduce **woundfin** into suitable habitats.
  - 2.3 Monitor introduced fish and habitat.
    - 2.31 Establish monitoring procedures and schedules.
    - 2.32 Recommend **monitoring** personnel.
    - 2.33 Implement **monitoring**.
  - 2.4 Manage all restored **woundfin** habitat to assure self-sustaining populations.
    - 2.41 Obtain management authority over restored habitats.
    - 2.42 Review and **comment** on all projects which may affect woundfln and their habitat.

- 3.0 Establish an information and education program.
  - 3.1 Produce an information pamphlet **on** the Virgin River fishes.
  - 3.2 Produce an audio-visual program on the Virgin River ecosystem with **emphasis on** the native fish.
- 4.0 Enforce all State and Federal laws protecting woundfln populations and habitats.
  - 4.1 Inform the necessary agencies of the status of the **woundfin** and recovery effort.
  - 4.2 Assist **State** and Federal **agencies in** carrying out their regulatory **responsibilities.**

NARRATIVE

The **woundfin** should be considered reasonably safe from **extinction (i.e., downlist** to threatened) if the existing and marginal habitats **in** the Virgin River are upgraded and stabilized, present populations are maintained, and one other population established in a different drainage within the probable historic range. To **delist** the woundfin, a third self-sustaining population must be established in a separate drainage within the historic range. For these transplanted populations to be considered self-sustaining, the populations should number over 100,000 adults and exist in the habitat for at least 10 years. For Introduction sites stocked under the essential experimental population designation, successful reproduction and recruitment dependant upon the carrying capacity of each site will **determine** the presence of a self-sustaining population. The number 100,000 was chosen to provide a specific goal. It indicates the stocked fish have greatly expanded their numbers **in new** habitat and have found a suitable niche. This number compares favorably to the minimum estimate of **woundfin** in the Virgin River. In addition, both the Virgin River habitat and the habitat of the transplanted population **will** have to be free from threats associated with physical, chemical, or biological modification that might make the habitat unsuitable for woundfin.

In order to accomplish the primary objective, the following recovery effort is being proposed..

1.0 Maintain and enhance existing woundfln populations and their habitats in the Virgin River.

Presently the only viable **woundfin** population is in the **Virgin** River. The Recovery Team **recommends** that the first order of business in the recovery effort should be to protect and maintain this existing population and its habitats. It appears that the Virgin River population is in no immediate jeopardy providing the **remain-**ing habitats are not further degraded. The population, however, could be enhanced by rehabilitation of portions of the Virgin River that provide **marginal** habitat.

1.1 Monitor existing populations.

Population **monitoring** provides a **means** of assessing the well-being of a species and obtaining information on the success of **management** techniques. 'Little **is** known about historic **woundfin** population fluctuations in the Virgin River, **and** a **data** base is essential to further **management** attempts. Monitoring is now ongoing.

1.11 Establish monitoring procedures and schedules.

The monitoring procedure is contained In the Appendix along with a list of sampling station locations presently being **monitored**.

1.12 Recommend monitoring personnel.

An agreement has been reached between the U.S. **Fish** and Wildlife Service and the States Involved to contract monitoring activities to an outside firm. Presently, Dr. James **Deacon** is under **contract to** the U.S. Fish and Wildlife Service for this activity, and is being assisted by the Recovery Team. Annual reports of these activities are available.

1.2 Monitor **woundfin** habitats.

Because certain habitat **condi tions** in the Virgin River are essential to the well-being of woundfin, changes which may occur in the habitat may af **fect woundfin** populations. To evaluate changes in habitat and correlate these changes with woundf in numbers, trend data for habitat must be gathered. This information will be important in **maintaining** and enhancing existing **woundfin** populations.

1.21 Establish monitoring procedures and schedules.

Because of the inherent difficulty **in** monitoring habitat change **we** are not presently able to Initiate this program. Studies are needed **to** develop monitoring procedures and **recommenmoni toring** schedules. Information collection under **segments** 1.32 and 1.41 will aid in this effort.

1.22 Recommend monitoring **personnel**.

Monitoring personnel **recommendations** will be **made** when **monitoring procedures** and schedules are developed.

1.23 Implement monitoring.

Monitoring personnel will **monitor** according to procedures and schedules established in 1.21.

1.3 Identify existing self-sustaining population requirements.

Important data have been collected as a result of ongoing population monitoring work; however, additional studies are required to obtain **information** essential to **woundfin** population **management** and enhancement.

1.31 Synthesize existing data **on** woundfin.

A substantial amount of information relating to **woundfin** has been collected. Presently, this information is contained in numerous published and unpublished reports and data files. Summarizing these data into a **single** report would aid biologists in understanding what information is available, help in planning future directions, and possibly precipitate additional analysis and **interpretation** of **existing** data.

1.32 Identify and describe preferred **woundfin** habitat.

We presently have **some** information on preferred spawning and rearing habitats but lack data on habitat use during winter. Specific studies should be designed to identify winter habitat requirements of woundfin. Additional data should be collected and evaluated during other periods of the year, especially during **summer low** flow and spring high flow periods. These studies must adequately quantify preferred **woundfin** habitat for all life stages. Obtaining appropriate data would require a **minimum** of a two-year study with at least monthly sampling of depth, velocity, temperature, and water quality. The results of such studies can be used to protect existing populations and to evaluate potential enhancement and transplant opportunities.

1.33 Determine interaction between native and exotic fishes, and factors presently excluding exotic fishes from the Virgin **River**.

Much concern has been expressed about the negative impact that exotic fishes have on native fish populations, particularly the woundfin. Little specific data are available to identify the interactions that occur or the magnitude of the problem. Presently, few exotic fishes are found **in** the Virgin River where **woundfin** are most abundant. The reasons they are not present are unclear, but appear related to the harsh habitat conditions found **in** the Virgin River. Studies need to be performed to identify characteristics of the river which **must** be preserved to exclude exotic fishes. Studies of seasonal and spawning habitat preference (**same** as 1.32) of exotic fishes should be made and compared with available habitat in the Virgin River. These studies should be integrated with studies proposed under 1.32. Information should also be collected to describe the potential impact of predation on **woundfin**

and competition between woundfin and exotic fishes, particularly the red shiner. With these data in hand, positive management programs can be proposed **to** avoid these problems.

1.34 Document and record movements of woundfin.

Essentially nothing is known of **woundfin** movement in the Virgin River, although some investigators suspect their movements may be significant. Effort should be made to document major movement by woundfin. Of particular interest will be **movements between** habitats and into and out of tributary streams. Mobility exhibited by **woundfin** will be an important consideration in management and reintroduction efforts. A suitable marking technique must be developed prior to initiating a movement study.

1.35 Perform additional studies to clarify woundfin life history requirements.

These are studies that will add to our existing **knowledge** of **woundfin** biology, and should increase our capacity to understand and be responsive to the needs of the woundfin. These studies would be of smaller scope and could possibly be incorporated into larger study objectives. Among studies included under this category would be: (1) determining use of irrigation canals by woundfin; (2) assessing woundfin reproduction and mortality below Mesquite Diversion; (3) determining use of LaVerkin Creek and other tributaries by woundfin; (4) conducting laboratory studies to record chemical (salinity, chlorine, etc.) preferences and limits for woundfin; (5) etc.

1.4 Identify factors maintaining present Virgin River habitat.

Habitats **in** the Virgin River from **LaVerkin** Springs to the Mesquite Diversion currently support self-sustaining **woundfin** populations. To maintain **woundfin** in that area it will be necessary to prevent further deterioration of habitat conditions that now exist.

1.41 Determine flows necessary to maintain optimum habitat conditions for woundfin.

**Studies** should be initiated to correlate available flows to habitat maintenance. Additional gauging stations are required to provide more precise flow information in the

Virgin River. **Once** the relationship between flow and habitat is established, recommendations based upon results of items 1.32 and 1.33 can be made to provide a flow regime which **will maintain** the desired **woundfin** habitat in the river.

1.42 Document water movement in the Virgin River basin.

Considerable information is available reporting water movement in the Virgin River basin. These data and any additional data necessary should be collected and summarized **to document when**, where, and how much **water** is being removed or received in the basin. It is essential that the water budget of the Virgin River basin be adequately defined so the feasibility of various **water** management proposals can be determined.

1.5 Protect **woundfin** habitat in the Virgin River.

If the self-sustaining **woundfin** population **in** the Virgin River is to be **maintained** and the species delisted, it is vital that the habitat be secured.

1.51 Review and comment on all projects which might Impinge on **woundfin** and their habitats.

To achieve objective 1.0 it will be necessary to stay abreast of proposed projects in the watershed that may impact **woundfin** and their habitat. Primary responsibility for review and comment **on** these projects will rest **with** the individual States or agencies under whose jurisdiction they fall.

1.52 Obtain management authority over **woundfin** habitats.

An effort should be made to obtain **management** authority for woundf In habitats. River access la needed **by management** agencies to perform habitat maintenance and enhancement programs. The State agencies should be the parties obtaining such authorities.

1.53 Prepare management plans to protect habitat.

A Virgin River habitat **management** plan should be prepared to identify **woundfin** habitat to be protected through specific **management** practices. ,

1.54 Develop feasibility studies on vegetation management.

Vegetation adjacent to the Virgin River and within the watershed influence habitat conditions for woundfin. Feasibility studies should be initiated to **determine** the best means of vegetation management.

1.6 Enhance marginal habitat In present range.

To increase the size of the present **woundfin** population in the Virgin River, it is **recommended** that marginal habitat reaches be examined for possible enhancement potential. This work will be based largely on Information obtained by habitat preference and hydrology studies. (Tasks 1.32 and 1.4)

1.61 Identify marginal habitat.

Marginal reaches of the Virgin River that are recommended for possible upgrading include the reaches from the Mesquite diversion to Lake Mead and **from** the Washington-St. George Canal Company diversion downstream to Little Round Valley .

1.62 Identify needed habitat enhancement features.

From studies accomplished under items 1.3 and 1.4, enhancement features can be recommended and marginal habitat can be manipulated for **woundfin** populations. Enhancement features could range **from** placement of **instream** structures, to channelization, to control of water rights.

1.621 Identify experimental sections of the Virgin River that can be used to test habitat manipulation.

To evaluate the overall value of enhancement features, **experimental** sections of the river should be selected for field testing. The Team recommends **segments** of the marginal habitat identified in 1.61 be considered as possible test sites. Prior to field testing of **enhancement** alternatives, a one-year baseline study should be performed to establish pre-study conditions.

1.622 Test and evaluate methods of enhancing the Virgin River as **woundfin** habitat **within** the test sites.

Determine enhancement alternatives for test sites and evaluate their effectiveness in creating and

maintaining viable woundf in habitat. If necessary, additional stocks of **woundfin will** be introduced into test sites. Enhancement features and results should be continuously monitored for a minimum of 3 years before final evaluation.

1.63 Develop and implement management plans to enhance marginal habitat.

Once it is determined which enhancement features have the greatest potential benefit, propose site specific enhancement procedures for each of the marginal habitats in the Virgin River. Management plans should be phased so sections of marginal habitat can be enhanced as money becomes available. Budgeting and personnel to carry out the enhancement project should be identified.

1.64 Monitor the enhanced habitat and **woundfin** populations.

Once marginal habitats are enhanced, **woundfin** population monitoring within these areas will provide a **means** for determining the long term **effectiveness** of the habitat management techniques.

1.641 Establish monitoring procedures and schedules.

Habitat monitoring procedures will need to be developed for the enhanced sections. **Woundfin** population monitoring procedures should follow closely techniques described under 1.11.

1.642 Recommend monitoring personnel.

Recommendations of monitoring personnel **will** be made when monitoring procedures and schedules are developed.

1.643 Implement monitoring.

Monitoring will be done according to procedures contained within the appendix (Population Monitoring Procedures ). New sites will be identified.

2.0 Restore and **manage** populations of **woundfin** in suitable areas of former range.

Two additional populations of **woundfin** should be established and maintained in **suitable** habitat within their probable historic range.

2.1 Enhance habitat in introduction sites.

Using criteria developed from monitoring studies and field observations on the Virgin River **woundfin** population, recommend enhancement features at introduction sites with probable historic range.

2.11 Identify and enhance habitat in Introduction sites.

Potential sites **will** be prioritized with needed **enhancement** features recommended. Potential sites will include, but not be limited to, that portion of the Verde River between **Perkinsville** and Sycamore Creek, the **Gila** River mainstream above Safford, and the San Francisco River above its confluence with the **Gila**. In addition, **Tonto** Creek and the Hassayampa River will be evaluated for their suitability. A final report prepared by the Arizona Game and Fish Department **will** be presented to the U.S. Fish and Wildlife Service.

2.12 Consider obtaining experimental, nonessential population designation for **woundfin** introductions.

Once the U.S. Fish and Wildlife Service receives a **recommen-**dation for **woundfin** introduction sites the designation of these introduced populations as experimental, nonessential, under the Endangered Species Act, as amended, may be necessary. It will be the responsibility of the U.S. Fish and Wildlife Service to gain experimental population status for the proposed introductions in accordance to Section **10(j)** of Endangered Species Act Amendments of 1982, Pub. L. **97-304**.

2.13 Conduct environmental assessments for introduction sites.

To comply with the NEPA process, it will be necessary to prepare an environmental assessment for all sites found suitable for **woundfin** introductions on public lands. The environmental assessment **will** identify any conflicts with current management practices by land management agencies, make recommendations for elimination of such conflicts, and identify agency roles in management of the introduction(s). Preparation of the environmental assessments will begin after the initial selection of introduction sites **is** accomplished.

2.2 Obtain sufficient woundfln to introduce into suitable sites in former range.

Once suitable habitat has been selected and state permission to stock obtained, **woundfin** will be Introduced. State agencies

and the U.S. Fish and Wildlife Service will conduct the actual stockings by providing **equipment** and personnel. Fish for stocking will be provided by the U.S. Fish and Wildlife Service from **woundfin** propagation at Dexter National Fish Hatchery and/or from collection in the wild.

2.21 Develop hatchery propagation techniques for woundfin.

**Woundfin** broodstock have been collected from the Virgin River and transported to Dexter for propagation. Techniques will be developed to produce 10,000 fish per year for Introduction purposes until two experimental populations have been established.

2.22 Collect woundfin from the wild for use in introductions.

**Woundfin** for Introductions should be collected from the wild during the period March-April prior to initiation of spawning. This time period is also before irrigation diversion when fish congregate below diversion structures for the Washington-St. George Canal Company (Utah) and the Mesquite irrigation diversion (Nevada).

2.23 Determine **Stocking** Rates

At least 1,000 **woundfin** (numbers dependent upon **availability**) **will** be introduced into each approved site. Stocking will be conducted annually until two experimental populations are established.

2.24 Introduce **woundfin** into suitable habitats.

Using fish from either Dexter NFH, or fish collected from the Virgin River, stock suitable habitat with at least 1,000 **woundfin** into each site.

2.3 Monitor Introduced fish and habitat.

Introduction sites **will** be monitored twice annually to determine success of the Introductions. Monitoring **will** include observations on **woundfin** presence and abundance, water flow and quality, and other fish species present. Monitoring of

ongoing and proposed management practices which may affect the success of the introduction(s) will also be conducted. **Introductions** Into selected sites should continue for 10 year, . . . until natural reproduction occurs. Stocking should then **ease** but monitoring should continue annually. If, **at** the end of 10 years, natural reproduction has not occurred, stocking should be discontinued. Data obtained from such sites should be evaluated for refinement of criteria used in selecting introduction sites.

2.31 Establish monitoring procedures and schedules.

Methodologies established under 1.11 and 1.21 will be used to develop **monitoring** procedures and schedules.

2.32 Recommend monitoring personnel.

**Recommendations** of **monitoring** personnel will be made when monitoring procedures and schedules are established.

2.33 Implement monitoring.

Monitoring personnel will **monitor** according to procedures and schedules established in 2.31.

2.4 Manage all restored **woundfin** habitat to assure self-sustaining populations.

Using information collected under 1.3 and 1.4 implement a habitat **management** program to assure a self-sustaining **woundfin** population.

2.41 Obtain management authority over restored habitats.

Refer to **discussion** under 1.53.

2.42 Review and comment on all projects which may affect **woundfin** and their habitat.

Refer to discussion under 1.52.

3.0 Establish **an** information and education program.

To inform the **public** of the recovery effort and to **give** them information about the woundfln, funds should be expended on information and education material.

3.1 Produce an information pamphlet **on** the Virgin **River** fishes.

An information pamphlet should be prepared describing the **woundfin** and explaining some of its biology. The pamphlet should also describe the **Virgin** River and its importance to the **woundfin** and other fish and wildlife. A section giving reasons for preserving species in nature should also be included.

3.2 Produce an audio-visual program on the Virgin river ecosystem . with **emphasis** on the native fish.

Along with the pamphlet, a short film (15-20 minutes) should be prepared on **the** Virgin River ecosystem. This film should present a view of the ecosystem as a whole, In which the **wound-**fin is an integral part and not a special animal separate from the rest.

4.0 Enforce all State and Federal laws protecting **woundfin** populations and habitat.

**Woundfin** are protected **by** the Department of the Interior and the States of Arizona, Nevada, and Utah. Agencies or groups hating or proposing projects should be informed of the status of the **woundfin** and **woundfin** habitat and their responsibility to conserve listed species and their habitat so that no unintentional Infractions of laws or destruction of fish or habitat occurs. Section 7 consultation requirements must be pointed out to all Federal agencies considering projects which may impact the species or its habitat.

4.1 Inform the necessary agencies of the status of the **woundfin** and recovery effort.

The Recovery Plan and annual **monitoring** reports **will** be distributed to all concerned agencies by the FWS.

4.2 Assist State and Federal agencies In carrying out their regulatory responsibilities.

The U.S. Fish and Wildlife Service will, by updating and refining the Recovery Plan and by providing informed **comment** on related 'issues, assist state and other Federal **agencies** in carrying out their regulatory **responsibility** to protect the **woundfin** **and** its habitat.

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## PART III

### IMPLEMENTATION SCHEDULE

#### Definition of **Priorities**

- Priority 1 - Those actions that are absolutely essential to prevent the extinction of the species.
- Priority 2 - Those actions necessary to maintain the species' current population status.
- Priority 3 - All other actions necessary to provide for full recovery of the species.

#### Abbreviations Used

BLM - Bureau of Land Management

BR - Bureau of Reclamation

HP - U.S. Fish and Wildlife Service's Office of Habitat Preservation

**AG&FD - Arizona Game and Fish Department**

SE - U. S. Fish and Wildlife Service's Office of Endangered Species

FR - U. S. Fish and Wildlife **Service's** Office of Fishery Resources

LE - U. S. Fish and Wildlife Service's Office of Law Enforcement

## GENERAL CATEGORIES FOR IMPLEMENTATION SCHEDULES

**Information Gathering - I or R (research)**

1. Population status
2. Habitat status
3. Habitat requirements
4. **Management** techniques
5. **Taxonomic** studies
6. Demographic studies
7. Propagation
8. Migration
9. Predation
10. Competition
11. Disease
12. Environmental contaminant
13. Reintroduction
14. Other information

**Management - M**

1. Propagation
2. Reintroduction
3. Habitat maintenance and manipulation
4. Predator and competitor control
5. Depredation control
6. Disease control
7. Other management

**Acquisition - A**

1. Lease
2. Easement
3. Management agreement
4. Exchange
5. Withdrawal
6. Fee title
7. Other

**Other - 0**

1. Information and education
2. Law **enforcement**
3. Regulations
4. Administration

PART III IMPLEMENTATION SCHEDULE

GENERAL CATEGORY (1)	PLAN TASK (2)	TASK # (3)	PRIORITY # (4)	TASK DURATION (5)	RESPONSIBLE AGENCY			FISCAL YEAR COSTS (EST.)*			COMMENTS (9)
					FW		OTHER (7)	M1 (8)	FY2	FY3	
					REG ION (6)	PROGRAM (6a)					
I1	Monitoring existing populations.	1.1	2	Ongoing	2	SE		4,500	4,500	5,000	
12	Monitor woundfin habitats.	1.2	2	Ongoing	2	SE	States				Costs included in 1.1
114	Synthesize existing data for woundfin.	1.31	3	1 year	2	SE	BR BLM	20,000			One-time Contract
R3	Identify and describe preferred habitat.	1.32	2	2 years	2	SE	BR BLM	35,000	35,000		Contract
R10	Determine interaction between native and exotic fishes and factors which exclude exotic fishes.	1.33	3	2 years	2	SE	BR BLM	15,000	15,000		
R8	Document and record movements.	1.34	2	2 years	2	SE	BR BLM		10,000	10,000	Marking techniques to be developed at Dexter NFH
R3	Perform additional studies to clarify woundfin life history requirements.	1.35	2	5 years		SE	BR BLM	25,000	25,000	25,000	Contract

\*Costs refer to USFWS expenditures only.

PART III IMPLEMENTATION SCHEDULE

GENERAL CATEGORY (1)	PLAN TASK (2)	TASK # (3)	PRIORITY # (4)	TASK DURATION (5)	RESPONSIBLE AGENCY			FISCAL YEAR COSTS (EST.)*			COMMENTS (9)
					FWS		OTHER (7)	FY1 (8)	FY2	FY3	
					LEGION (6)	PROGRAM (6a)					
R3	Determine flows necessary to maintain optimum habitat.	1.41	2	3 years	2	SE	BLM BR	75,000	50,000	50,000	Contract
14	Document water movement in the Virgin River basin.	1.42	3	1 year	2	SE	BR	10,000			
M3	Pranote legislation for instream flows.	1.51	3	ongoing	2, 6	SE	BLM BR States				
03	Review and comment on projects which might impinge on woudfin and their habitat.	1.52	1	ongoing	2, 6	SE HP	BLM BR States				
A-3	Obtain management authority of woudfin habitats.	1.53	3	ongoing	2, 6	SE	BLM States				Cost dependent upon results
M7	Prepare management plans to protect habitat	1.54	3	1 year	2	SE	BLM	5,000			

\*Costs refer to USFWS expenditures only.

"ART III IMPLEMENTATION SCHEDULE

GENERAL CATEGORY (1)	PLAN TASK (2)	TASK # (3)	PRIORITY # (4)	TASK DURATION (5)	RESPONSIBLE AGENCY			FISCAL YEAR COSTS ( ST.)*			COMMENTS (9)
					FW		OTHER	FY1 (8)	FY2	FY3	
					REGION (6)	PROGRAM (6a)	(7)				
R3	Develop feasibility studies on vegetation management.	1.55	3	2 years	2	SE	BLM	10,000	10,000		
M3	Identify marginal habitat	1.61	3	1 year	2	SE	AG&FD	2,000			
M3	Identify habitat enhancement features.	1.62	3	1 year	2	SE	BLM	100,000	50,000	50,000	Dependent upon results of Task 1.3 ii 1.4
M3	Develop and implement management plans.	1.63	3	3 years	2	SE	BLM States				Cost dependent upon results of Task 1.41
M3	Monitor enhanced habitat and populations.	1.64	3	ongoing	2	SE	States	10,000	10,000	10,000	

\*Costs refer to USPWS expenditures only.

PART III IMPLEMENTATION SCHEDULE

GENERAL CATEGORY (1)	PLAN TASK (2)	TASK # (3)	PRIORITY # (4)	DURATION (5)	RESPONSIBLE AGENCY			FISCAL YEAR COSTS ( ST. )*			COMMENTS (9)
					FWS		OTHER (7)	FY1 (8)	FY2	FY3	
					REGION (6)	PROGRAM (6a)					
M2	Enhance habitat in introduction sites.	2.11	3	2 years	2	SE	BLM BR States				Dependent upon results of Task 1.622
M7	Obtain experimental population designation for reintroductions.	2.12	3	1 year	2, 6	SE					Assistance of the States, BR & BLM may be needed
M2	Conduct <b>environmental</b> assessments.	2.13	3	1 year	2	SE	BLM BR States	15,000			
M1	Develop hatchery propagation techniques.	2.21	2	2 years	2	SE FR	AG&FD	10,000	10,000		Underway at Dexter NFH

\*Costs refer to USFWS expenditures only.

PART III IMPLEMENTATION SCHEDULE

GENERAL CATEGORY (1)	PLAN TASK (2)	TASK # (3)	PRIORITY # (4)	TASK DURATION (5)	RESPONSIBLE AGENCY			FISCAL YEAR COSTS (EST.)*			COMMENTS (9)
					FWS		OTHER (7)	FY1 (8)	FY2	FY3	
					REGION (6)	PROGRAM (6a)					
M2	Collect <b>woundfin</b> from the wild.	2.22	3	1 year			States	2,000			Will be sent to Dexter NFH
M2	Determine stocking rates	2.23	3	3 years	2	\$E	States	3,000	3,000	3,000	
M2	Introduce <b>woundfin</b> into suitable habitats.	2.24	3	10 years	2	\$E	States	2,000	<b>2,000</b>	2,000	stocking will cease when populations are established
M2	Monitor introduced fish and habitat.	2.3	3	10 years			States	7,000	7,000	7,000	
A3	Obtain management authority over restored habitat.	2.41	3	2 years	2	\$E	BLM States				cost can't be estimated until sites are identified.

\*Costs refer to USFWS expenditures only.

PART III IMPLEMENTATION SCHEDULE

GENERAL CATEGORY (1)	PLAN TASK (2)	TASK # (3)	PRIORITY # (4)	TASK DURATION (5)	RESPONSIBLE AGENCY			FISCAL YEAR COSTS ( ST.)*			COMMENTS (9)
					FwS		OTHER (7)	FY1 (8)	FY2	FY3	
					REGION (6)	PROGRAM (6a)					
03	Review and <b>comment</b> on projects which may affect introduced populations.	2.42	3	ongoing	2	SE HP	AG&FD				Level of review dependent upon results of 2.12
01	Produce a pamphlet on Virgin River fishes.	3.1	3	1 year	2, 6	SE	States BLM BR	3,000			
01	Produce an audio-visual program on the Virgin River ecosystem.	3.2	3	1 year	2, 6	SE	States BLM BR		20,000		
02	Enforce all State and Federal laws protecting <b>woundfin</b> populations and habitat.	4.0	1	ongoing	2, 6	SE LE HP	States				Dependent upon need

\*Costs refer to USFWS expenditures only.

## APPENDIX

POPULATION **MONITORING** PROCEDURES

PURPOSE: The purpose of **monitoring** the Virgin River **woundfin** population is to assess the current status of the **population** and chart long term population fluctuations. The Team recommends continuation of a long range monitoring program in order to provide for future management needs.

PROCEDURE: Six sampling stations along the Virgin River have been established. The location of these stations is included in the Appendix. Each station is being sampled twice a year. The sampling periods are as follows: (1) In late spring, preferably the last 2 weeks of April and no later than the first of May. This sampling time provides data on the population available for spring spawning. (2) In early autumn, preferably during the last 2 weeks in September and no later than the middle of October. This sampling time yields data on the size of the **woundfin** population after the summer growing and **recruitment** season. Autumn **recruitment** can also be determined.

The purpose of this population monitoring effort is to record numbers **of woundfin** and associated species, and to assess reproductive success of woundfin. Total length of all species is recorded to provide additional information on the structure of the population.

At each station, several uniform odcrohabltats are **sampled** using 15' wide x 6' deep, 1/4" nylon mesh seines. Habitats sampled are selected so that the width does not exceed 3 meters and the length 10 meters. **Repeated seine** hauls are made in each habitat until the number of fish captured in a haul is 10 percent or less of the highest seine haul. The number of fish of each species are counted for each seine haul. Fish are retained in buckets after each seine haul until the last seine haul is completed. All fish from each microhabitat are counted, measured, and **then** returned to the site of capture. **When** the cumulative number of fish of any species **in** any specific microhabitat exceeds 100, measurements of all individuals of that species taken in that specific microhabitat are continued; however, **measurements** of that species from additional microhabitats at that station are not taken. Depth, velocity and substrate **for each** microhabitat **is recorded** by taking 3 transects through the area sampled and recording these values at a minimum of three points on each transect.

## POPULATION MONITORING PROCEDURES - cont.

The data from these samplings are compiled after each trip and annually at the end of the **autumn** sampling. An annual report **is** issued to the U.S. Fish and Wildlife Service. The report and all raw data are available to anyone making a **written** request to the Service.

Monitoring personnel are presently under contract to the U.S. Fish and Wildlife Service and are being assisted by the **Woundfin** Recovery Team and other interested persons working with the Team. The **Recovery** Team is assisting with the monitoring because they consider it important for all Team members to be familiar with **woundfin** biology and habitat.

**Woundfin** Monitoring Stations

<u>Station Number</u>	<u>Location</u>
one	Riverside Bridge downstream to USGS gauging station.
<b>two</b>	Above the Mesquite diversion 300 m.
three	Littlefield, upstream about 550 m from interstate <b>bridge</b> .
four	<b>Twin</b> bridges, at St. George.
five	2 miles <b>below</b> Berry Springs.
<b>six</b>	Confluence of <b>Laverkin</b> and Ash Creeks with Virgin River.

## CRITERIA FOR SELECTING REINTRODUCTION SITES FOR WOUNDFIN

1. Historic habitat. Streams must be in historic habitat of the woundfin. Areas adjacent to historic habitat that **logically contained** the species, but where it **was** not recorded historically, **should** also be considered.
2. Physical habitat. Waters selected for reintroduction of **woundfin** should be permanently flowing medium to large streams in the low desert biome (below 3,000 feet elevation). Until more detailed information **on habitat requirements** has been determined, selected streams should provide habitats similar to those found in the Virgin River near Beaver Dam Wash, Arizona. Substrate should be sand or sand/gravel with abundant runs and riffles. Water temperature should follow ambient fluctuations. It **is** not known if high silt **loads** are necessary for **woundfin** survival, but they do not appear to pose a problem in the Virgin River.
3. Biological habitat. Most biologists believe **woundfin** are not well adapted to compete with a wide variety of additional fish species. Reintroduction **streams** should contain few exotic species of fish or show a general depauperate fauna. Predator populations should be at low numbers or absent. Food items, including aquatic and terrestrial insects, should be present but need not be abundant.
4. Man-made threats. **Woundfin** seem able to exist in the Virgin River, in spite of 100 percent allocation of the water to irrigation, by living in return waters. However, they do not seem to be able to withstand industrial or agricultural pollutant **s**. Site selection should take present and future water demands, allocations, and uses into account.
5. Environmental impacts. Introduction of **woundfin** back into historic areas should not result in major impacts to **the** habitat or its associated fauna because the **woundfin is** a natural part of that habitat and fauna. However, the impact of the reintroduction should still be considered in **light** of potential changes in the ecosystem that may have **taken** place since the **woundfin** was extirpated.

## LETTERS OF COMMENT

The following letters of comment are those received when the Initial **Woundfin Recovery Plan** was drafted In 1979. The 1985 revision of that plan did not receive agency review but did undergo technical review. It was the feeling of the recovery team that most of the new information contained in this recovery plan was technical and no new information which would be of interest to agencies was incorporated into the revised plan. Page numbers and paragraphs referred to in the letters refer to the original plan and not the revision.

Governor  
WESLEY BOLIN

Commissioners:  
CHARLES F. ROBERTS, O.D., Bisbee, Chairman  
FRANK FERGOUSON, JR., Yuma  
MILTON G. EVANS, Flagstaff  
C. GENE TOLLE, Phoenix  
WILLIAM H. BEERS, Prescott  
Director  
ROBERT A. JANTZEN

Asst. Director, Operations  
PHIL M. COSPER

Asst. Director, Services  
ROGER J. GRUENEWALD



44

ARIZONA GAME & FISH DEPARTMENT

2222 West Greenway Road

Phoenix, Arizona 85023

942-3000

23 February 1978

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W. O. Nelson, Regional Director  
Fish & Wildlife Service  
P. O. Box 1306  
Albuquerque, NM 87103

Dear Bill:

Sorry about the delay in reviewing the **woundfin** recovery plan. We simply **don't** have the staff to attend to endangered species issues in a timely **manner**. We hope our **comments** can still be **considered** even though **they are** submitted late.

The recovery plan in general is **well done** and obviously represents a lot of thought and work on **the** part of team members. We do, however, have several critical comments to offer, **mostly** having to do with the transplant recoaaendation.

A1

One fact which **the** team has apparently not considered in determining the feasibility of a transplant is that if the **woundfin** vanished from historic habitat it probably did so because of habitat degradation. If habitat changes of a magnitude severe enough to **cause** extirpation of a species occurred some time in the past, what **evidence** is there that the habitat has now improved to the point **where it can** again support the **woundfin**? We find it extremely difficult to believe any **such improvement** is likely to have taken place. The recovery plan nowhere addresses this question which we think is extremely basic to any reintroduction **● tteapt**. **The fact that** unsuccessful **attempts** have already been **made to reintroduce** this species in several waters suggests that the species may well **require** habitat **conditions** not easily met.

A2

**The team's recognition** that **we presently lack knowledge about** habitat preferences **and needs** would **also seem to suggest the desirability of** making haste slowly with reintroduction **attempts**. **The recovery plan points up** the need for research to **provide** more data **on such elements** as feeding habits, **winter habitat requirements, spanning needs, and hydrologic conditions** necessary **for viable** habitat. **Such research** in fact **is** given top priority ranking. Yet despite the recognized deficiency in the **data** base, reintroductions **are** being proposed to either precede or **coincide with** the **studies** that will, it is hoped, fill in the blanks. We are inclined to think the studies should come first.

A3

On page 29 it is **recommended** that habitat management plans for the Virgin River should be developed by the **BLM**. It seems doubtful that the **BLM** could accomplish this without the close attention of the **Recovery Team**. The **REC**

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. W. O. Nelson

23 February 1978

drafting of something as potentially vital to the welfare of an endangered species as a habitat management plan would seem more logically to fall within the purview of the Recovery Team itself.

**A 4** This recovery plan, like others reviewed by Arizona Game and Fish, suffers from one other shortcoming. It fails to indicate to any satisfaction the basis for the cost estimates, e.g. man days of effort, travel costs, equipment, etc. It also fails to indicate the financial contribution expected from each agency. Without such information it will be impossible to budget for, or receive Commission approval for, activities outlined in the recovery plan.

We hope the shortcomings we've drawn attention will be addressed before the final plan is approved.

Sincerely,

  
Robert A. Jantzen, Director

RAJ:rb

Woody	
Justice	
Johnson	
Halvorson	
Sanchez	
Sarg	
ACTION	
FILE	Woundfin
Rec. Plan	



DIVISION OF WILDLIFE RESOURCES

DONALD A. SMITH 1596 West North Temple/Salt Lake City, Utah 84116/801-538-9333  
Director

January 23, 1978

1/20 [Handwritten initials]

Mr. W. O. Nelson, Jr.  
Regional Director  
U. S. Fish and Wildlife Service  
P. O. Box 1306  
Albuquerque, New Mexico 87103

2 AFA  
cy SE plz [Handwritten initials]

Dear Bill:

Following are our comments on the Final Draft Woundfin Recovery Plan.

**B1**

p. 2, para. 2. We question the wisdom of reference to "proposed projects" on the river system in the recovery plan lest the proponents feel the deck is already stacked against them. Recovery plans should deal with species' status as it exists now. If you agree, paragraph 3 is also unnecessary.

**B2**

p. 14, para. 2 and 3. Should also be eliminated for reasons given above.

p. 20, Primary Goal. Since the woundfin is already established in the Virgin River, we recommend the wording be changed to comply with the narrative reasoning on p. 23, para. 1. "To restore the woundfin, . . . , to non-endangered status by maintaining and enhancing the present population in the Virgin River and the establishment of at least two additional self-sustaining wild populations in their native ecosystems."

**B3**

p. 21, step 24. We feel that, if the woundfin as a species need managing more than its habitat, then perhaps the species is destined to extinction. Emphasis here should be on habitat management.

**B4**

p. 23, para. 1. We are curious as to how the number 100,000 was arrived at, and its true meaning. Is this a total for all populations, each, or what? Also, if there is a good rationale for this number, it should be explained here.

**B5**

p. 24, step 111. The first two sentences are contradictory. If more data are necessary on population fluctuations, etc., then population density referred to in the first sentence is for a point in time.

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Mr. W. O. Nelson, Jr.  
 January 23, 1978  
 Page 2

- B6** p. 26, para. 1. We feel the two studies proposed here are really so closely allied that both should be conducted concurrently for a two- or three-year period. Habitat is a function of hydraulics.
- B7** p. 27, step 13. The last sentence indicates the woundfin population will be monitored three times a year, but for how many years?
- B8** p. 27, step 132. We strongly object to the first sentence. Since the inception of the Recovery Team concept, it has been continually stressed these teams function only to develop plans, to advise in the implementation of plans, and to provide expertise when requested. Properly funded efforts by state wildlife agencies drawing on well designed recovery plans should be adequate in restoring endangered species.
- B9** p. 29, step 144. The Team recommends two habitat management plans be developed, but gives no hint as to how they are to differ. I'm sure BLM must be scratching their heads over this as they are assigned the responsibility. This section should also explain in more detail some of the "habitat management" programs alluded to, such as practices and agencies involved.
- B10** p. 31, step 212. We suggest that somewhere in the plan the Team consider other rivers for reintroduction. Possibilities in Utah include the Muddy, Fremont (Dirty Devil below their confluence), and the San Rafael Rivers. Physical and chemical parameters are available.
- B11** p. 32, step 222. The \$500 figure advanced isn't explained as per trip or total effort.
- B12** p. 32, step 232. The cost estimated here is probably too low.
- B13** p. 32, step 245. We feel this approach is backward. Elsewhere in the plan it states that reintroductions could not be considered successful until ten years had passed. If critical habitat is to be used at all should it not be done sooner? Many adverse alterations and practices could take place in the intervening period.
- B14**

The budget figures seem to be consistently low in all categories. A more realistic appraisal in view of today's costs should be made before this Plan is submitted for approval.

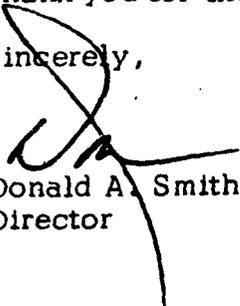
Mr. W. O. Nelson, Jr.  
January 23, 1978  
Page 3

In general, we agree with the philosophies and approach of the plan. In certain areas the narrative is weak or incomplete, but I'm sure many of these deficiencies will be corrected either from other comments received or by the Team members themselves as they continually review their product.

**B15** Bill, I hate to terminate this on a negative note, but my concerns and objections to usurpation of states' rights mentioned in my comments earlier are only reinforced by statements in the section entitled "Population Monitoring Procedures," Appendix I. Here again, the Team insists in involving itself in tasks that are not their prerogative.

Thank you for the opportunity to comment.

Sincerely,



Donald A. Smith  
Director



New Mexico  
Department  
Of Fish  
And Game

GLEN K. GRIFFITH  
DIRECTOR

49  
Woundfin  
Rec. Plan

MIKE O'CALLAGHAN  
GOVERNOR

1100 VALLEY • • • BOX 10878 • RENO, NEVADA 89510 • TELEPHONE (702) 784-621

December 16, 1977

To SE  
Woody

Hr. Bill Nelson  
Regional Director  
Fish & Wildlife Service  
P.O. Box 1306  
Albuquerque, New Mexico 87103

Dear Bill:

I have received your letter and draft copy of the Woundfin Recovery Plan. I had responded to the Fish & Wildlife Service earlier; however, perhaps it did not reach your desk.

We support the draft plan as it is written. One of our personnel participated in the initial stages of the plan and relayed our thoughts and concerns.

Thank you for your letter and my best to you for the Holidays.

Sincerely,

*G. Griffith*  
Glen K. Griffith  
Director

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DEC 19 '77

OFFICE OF THE  
REGIONAL DIRECTOR



## United States Department of the Interior

BUREAU OF RECLAMATION  
LOWER COLORADO REGIONAL OFFICE

P.O. BOX 427

BOULDER CITY, NEVADA 89005

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SB*IN REPLY  
REFER TO: LC-150  
565.

JAN 19 1978

## Memorandum

To: Regional Director, Fish and Wildlife Service, P.O. Box 1306,  
Albuquerque, New Mexico 87103

From: , , , Regional Director

Subject: Review of Draft **Woundfin** Recovery Plan

We have reviewed the subject plan and agree with the need to delineate reasonable actions which will promote the goal of removing the **woundfin** from the endangered or threatened species list. However, we feel that the plan needs to be updated to include the data from the Vaughn Hansen Associates study and Jack Williams' thesis. In addition, we feel there is a need for hydrological and biological comparisons of the Virgin River and suitable transplant locations.

We also offer the following specific comments:

Page 2, Second paragraph - Reference should be made to Jack Williams' master's thesis and the 1977 Vaughn Hansen study.

Page 8 - The discussion on the red shiner should be updated to reflect the data of the Vaughn Hansen report.

Page 9, First paragraph - The Vaughn Hansen study could be used or referenced for a more complete discussion on invertebrates.

Page 9, Food Habits - This section should be updated to include data from the Vaughn Hansen study.

Page 11, Second paragraph - The discussion on the period of highest mortality is somewhat vague and needs further study.

Page 12, Inter-specific Interaction, First paragraph - This paragraph needs to be updated to reflect data from Vaughn Hansen study and Jack Williams' thesis.

Page 13, Second paragraph - Virtually all irrigation structures and allocations of the Virgin River waters were established by the early 1900's.



- C1** Page 14, Potential Destruction, Lines 8 and 9 - More information is needed on why and where habitat will be destroyed through excessive siltation. We believe the statement that "habitat **will be** destroyed through excessive siltation" is in error and ignores the natural hydrologic potentials of the river and actions of floodflows which will not be diverted.
- Page 14, Potential Destruction, Lines 13 and 14 - The description of the La Verkin Springs Unit is not quite correct. The sentence ". . . through a series of low profile, collapsible dams" should be changed as follows:
- ". . . By bypassing riverflows around the springs through use of a **low-profile** dam and pipeline; and collecting the springs flow behind a low-profile control dam."
- C2** Page 15, Second paragraph - Virtually all irrigation structures and all allocations of the Virgin River waters were established by the early 1900's. An analysis of population projections, water rights, and water needs. shows that significant changes in the habitat of the Virgin River are unlikely.
- C1** Page 16, Conservation Efforts - Add the city of St. George as funding the Vaughn Hansen study.
- B13** Page 22, Item 245 - The Bureau of Reclamation is opposed to designating as critical habitat those areas where **woundfin** are transplanted; We feel that such action would establish a dangerous precedent.
- B4** Page 23, Line 6 - The reference to a specific number of individuals seems arbitrary. On what scientific data was it based?
- C3** Page 23, Item 11 - You state that "Some of the habitat in the Virgin River obviously cannot support **woundfin** . . . ." Why, then, is the entire reach of the river from La Verkin Springs to Lake Mead nominated for critical habitat?
- C4** Page 24, paragraph 112, Lines 5 and 6 - The Vaughn Hansen study provides data on flow volume requirements for maintenance of viable habitat.
- C5** Page 26, paragraphs 141 and 142 - Some estimates should be given of the amount of land adjacent to the river that will be acquired.
- C6** Page 30, paragraph 245 - The Bureau of Reclamation is opposed to this action.
- Appendix 1, page 1, paragraph 1 - The statement ". . . no one knows if the Virgin River **woundfin** population numbers are higher or lower than

**C7**

they were ten, twenty, or thirty years ago" is contradictory to other statements of "decreasing populations" due to "declining habitat." Consistency is suggested.

Thank you for the opportunity to comment on this draft.

*4-c [Signature]*

In duplicate



United States Department of the Interior 6840 (932)

BUREAU OF LAND MANAGEMENT
ARIZONA STATE OFFICE
2400 VALLEY BANK CENTER
PHOENIX, ARIZONA 85073

DIRECTOR OF THE REGIONAL DIRECTOR

Administrative routing stamp with checkboxes for 'Searched', 'Indexed', 'Serialized', 'Filed', and 'Action'. Includes handwritten file number 'Woodfin' and 'Rec Plan'.

DEC 28 1977

Handwritten signature and initials 'S K'.

Mr. W. O. Nelson, Jr.
Regional Director
U.S. Fish and Wildlife Service
P.O. Box 1306
Albuquerque, New Mexico 87103

Dear Mr. Nelson:

We have reviewed the final draft of the Woundfin Recovery Plan and have the following cuts:

- 1. Page 6 - Present Distribution. The history of the prior transplant should be documented more precisely. State exact location and number of release sites, survey and fish planted. State the reason the transplants were unsuccessful. (D1)
2. Page 21, Nom. 145 and 146. We still agree with our memorandum of May 12, 1976, Subject: Determination of Critical Habitat - Woundfin. In that memo we stated that based upon biological requirements of the woundfin, we agree that the Virgin River within Arizona should be designated as "critical habitat". (D2)
3. Page 24, No. 112 - Study Existing Habitat. No mention is made in this section of the importance of riparian habitat. The biotic parameters in the riparian zone which are conducive to good woundfin habitat should be discussed. A discussion should also be made of how streambank communities buffer change agents. (D3)
4. Page 29, No. 144 - Habitat Management Plans. We recommend that only one Habitat Management Plan be developed for the Virgin River, even though part of this river may be in three different states. The rationale for this is that from a priority and funding basis this would ensure that this HMP is given higher priority within the Bureau. Historically, within the BLM in Arizona, habitat management plans have cost more than \$3,000 each. Because of the complexity of this HMP, we suggest that a closer estimate for this HMP would be \$11,000. (D4)
5. Page 31, Item 212 - Identify and Enhance Former Range. Cila River near the mouth of San Francisco River - this number one priority area for reintroducing the woundfin into its probable historical range is on public land. As specified in Item 245 (Critical Habitat) after establishment of woundfin in the reintroduction area, (D5)

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the area **will** have to be identified, recommended and designated as critical habitat. This is a significant action since the species is not presently inhabiting the area. Therefore, the Bureau will have to write an EAR prior to the reintroduction.

**D<sub>6</sub>**

6. Pages 35, 36 and 37, Part 3 - Schedules of Priority, Responsibility and Cost. Column heading: Responsibilities - Cooperators. The term 'all concerned agencies' should be broken down into those agencies concerned and the cost target identified for that agency.

**D7**

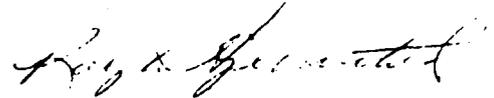
7. Page 36, Task 144. This task identifies that the Bureau is to program \$6,000 for development of two **HMPs** in FY 78. As identified in Item 144, we recommend that **this** be changed to one HMP and \$11,000. The Bureau's Annual Work Plan (AWP) for **FY** 78 has been submitted to Washington and no monies were identified for HMP development along the Virgin River. To date, the **BLM**, 'nationwide, has not received additional funding for endangered species work. Until such time as funds are made available, we do not anticipate being able to write this Management Plan.

**D4**

- a. Page 38, Estimated Annual Expenditures by Agency. The comments on the \$6,000 Identified for BLM expenditures in FY 78 are the same as discussed in Item 7.

We appreciate the opportunity to review this Plan.

Sincerely,



Acting State Director

**E5** Page 29, Habitat Management Plan Narrative: Preparation of HMP's All - depend on agency's capabilities and funding. Our Cedar City District plans, in the near future (FY78-79), to develop the Beaver Dam Wash HMP which would provide for the majority of woundfin habitat. BLM could be the lead agency for developing the HMP's, but state and other federal agency participation would be mandatory since fish species are present. BLM could not propose and implement programs on private lands.

**E6** Page 30, Item 151: The last sentence in the paragraph would be better worded, "Section 7 consultation requirements must be pointed out to all agencies."

**D6** Page 35-37, Part III table, it is not clear in this table if other concerned agencies under cooperators are expected to contribute funding or if Fish and Wildlife Service will bear the total expense. This should be clarified in the narrative.

**E7** Page 36, Part III, Item 141: BLM or other federal agencies should be inserted into the Lead Responsibility column if this is what is alluded to item 144: Target date for one HMP should be FY79; for the second HMP if needed, probably FY80; funding cost per unit would probably be \$6,000 or \$12,000 total. Budget appropriations for FY78 do not make it possible for us to allocate funds for any itemized in FY78. Hopefully, our wildlife program appropriations will increase in future years.

We appreciate the opportunity to review this draft plan and hope our comments will assist you in finalizing the plan. Please continue to keep us informed on the status of this plan and field operations so that we can continue to plan for and participate in this recovery effort.

*Paul L. Howard*



FEB 21 1978

OFFICE OF THE  
REGIONAL DIRECTOR

Region 3  
517 Gold Avenue, SW.  
Albuquerque, New Mexico 87102

2630  
February 21, 1978



Mr. W. O. Nelson, Jr.  
Regional Director  
Fish and Wildlife Service, USDI  
P. D. Box 1306  
Albuquerque, New Mexico 87103

1:2  
2/23  
TC SE

Dear Mr. Nelson:

We appreciate the opportunity of reviewing the final draft of the Woundfin Recovery Plan. The plan is well written and easily communicates an orderly progression of steps to recovery of the species.

F1

Does the primary goal of restoring the woundfin to non-endangered status (page 20) mean that it would be reclassified as threatened after establishing these self-sustaining populations? If this is the case, we feel a primary goal which would lead to total delisting is more desirable.

F2

The plan would be improved by estimating Forest Service costs for identifying transplant sites, enhancing and protecting habitat and habitat research. Priorities should be indicated. This would help insure adequate National Forest involvement in transplant site selection, while insuring lead time to accomplish any needed enhancement and protection of the sites and to coordinate plan objectives with other National Forest uses. With such modifications, we can support the plan.

F3

No lead time was available to the Prescott National Forest when the Arizona Game and Fish Department introduced woundfin into Sycamore Creek, a tributary to the Aqua Fria drainage. After the introduction, the Prescott National Forest took several actions at considerable cost to improve the habitat. Cattle were fenced out along four miles of the stream, riparian tree species were planted, and Prescott National Forest personnel assisted the Department in surveys and studies. It appears the introduction failed, but if the coordination efforts by the Forest had been done a year or two before the fish were planted, perhaps the effort would have succeeded.

We hope this review will lead to a revision of the final draft and thereby benefit the species. If we can be of assistance in this effort, please call on us.

Sincerely,

*M. J. Hassell*  
M. J. HASSELL  
Regional Forester

UNITED STATES GOVERNMENT

# Memorandum

52-  
Rec. Plan  
Woundfin  
Rec. Plan

TO : ARD, SE, Regional Office, Albuquerque, NM DATE: Dec. 29, 1977

FROM : Staff Assistant, Area Office, Phoenix, Az.

SUBJECT: Review of Draft Woundfin Recovery Plan

I have reviewed the subject draft recovery plan and offer the following comments:

- 1. Page 14, second paragraph, second sentence; typo error, s missing in spelling of system.
- 2. Page 15, last paragraph, second to last sentence; typo error, mush should read much.
- G1 3. Page 23, first paragraph, second sentence; does the 100,000 fish figure refer to total estimated population of woundfin? or does it refer to adult fish only?
- G2 4. Page 26, first paragraph; a hydraulic study of a river such as the Virgin would only result in a finding that at that particular time, under those conditions, a certain type of habitat existed in a specific locale. The data gathered would have no long term use because of the rapid channel changes which occur in the Virgin river,.
- 5. Page 31, second paragraph, last sentence; recent investigations of the Bill Williams River near Planet Ranch cast serious doubt on the suitability of this area for re-introduction of woundfin.
- G3 6. Page 33, last paragraph, last sentence; filming cost of \$10,000 for a 15-20 film may be very unrealistic.

The opportunity to review and comment on the subject draft recovery plan is appreciated.

*Wally Borton*



FWS REG.2  
RECEIVED

JAN 4 1978

SE



United States Department of the Interior

ADDRESS ONLY THE DIRECTOR,  
FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE SERVICE  
WASHINGTON, D.C. 20240

SEARCHED	INDEXED
SERIALIZED	FILED
DEC 23 1977	
REGION	
Woundfin	
Rec. Plan	

In Reply Refer To:  
FWS/OES 310.6

Memorandum

To: Regional Director - Region 2  
Acting Associate  
From: Director

Subject: Review of Draft Woundfin Recovery Plan

(SE)

We have reviewed the above "Technical Review Draft" and offer the following minor comments:

Step-down Outline

H1

p. 20, Primary goal - This should be clarified.  
Is the goal to delist or reclassify?

p. 21, Delete #146 and change #145 to read  
"Designate essential habitat."

p. 22, Delete #246 and change #245 to read  
"Designate essential habitat."

H2

p. 22, Delete #31 and renumber (#311 to 31 and #312 to #32).

Part III - Schedule of Priorities, Responsibilities, and costs

Review Part III and make sure that all tasks listed in the step-down outline are assigned to a cooperator for implementation.

Some tasks

not assigned are numbers 121, 151, 152, 212, 221, 241-246, 251, and 252.

We hope these comments will assist in preparation of the "Agency Review Draft."

*Charles K. Thorne*



FWS REG. 2  
RECEIVED

378

SE

UNITED STATES GOVERNMENT

FISH AND WILDLIFE SERVICE  
P.O. BOX 3737 PORTLAND, OREGON 97208

# Memorandum

TO : Regional Director, Region 2, Albuquerque, NM DATE: December 22, 1977  
(SE)

FROM : <sup>noting</sup> Regional Director, Region 1, Portland, Oregon (AFA-SE)

SUBJECT: Review of Draft Woundfin Recovery Plan  
(Re: , your 12/6/77 memo)

SEARCHED	INDEXED
SERIALIZED	FILED
DEC 28 1977	
FBI - PORTLAND	
1 ACTION	
Woundfin	
Rec Plan	

We **received** the subject draft plan for review. Overall, the plan is prepared, and we have only minor **comment** as follows:

**I** 1 Page 28 (and Part III, page 2) - **Item 141**. The team's recommendation "to put into public ownership lands immediately adjacent to the Virgin River" must be more specific to be of value for agency implementation. Along how many river miles and between what points is this recommendation applicable to? How far back from the water course is acquisition necessary? Approximate acreage of private lands involved, by state, etc.

**I** 2 There are a number of cases where the step-down is incomplete or doesn't follow through. For example, **Item 12** of the step-down, the enhancement of marginal habitat in present range, will not be accomplished through completion of **Items 121 and 122** that call only for identification of habitat and habitat enhancement features. An additional objective, 123, that entails the actual enhancement work, must be included to fulfill 12. In general, **as was** the case with acquisition, objectives and actions should be more specific. This goes for the prime objective, which as stated calls for **restoration to non-endangered status**. Presumably this means **restore** to threatened status; or does the team feel full plan **completion** would qualify the fish for complete de-listing?



DBMarshall:PALehenbauer:imb

FWS REG. 2  
RECEIVED

DEC 28 '77

SE

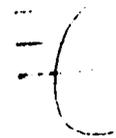
ARIZONA STATE  
UNIVERSITY

DEPARTMENT OF ZOOLOGY

TEMPE, ARIZONA 85281

16 December 1977

12-23



SEARCHED	
SERIALIZED	
INDEXED	
FILED	
DEC 21 1977	
FBI - PHOENIX	

FILE Wound  
Recovery

Mr. W. O. Nelson  
Regional Director  
U. S. Fish and Wildlife Service  
P.O. Box 1 06  
Albuquerque, NM 87103

Dear Mr. Nelson:

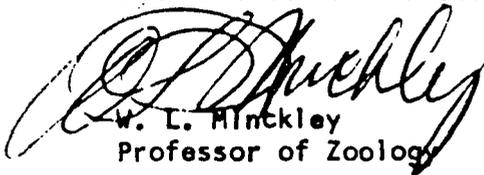
Enclosed are two pages of comments, mostly editorial, on the Woundfin Recovery Plan. Many of them are simply typographical in nature, and may be taken as such.

J1

One possible suggestion to clarify the over-all plan--when local names of irrigation diversions, small towns, etc. are used, it is confusing to the truly interested reader. I recommend a detailed map of the area (or maps) detailing the places where proposed modifications are planned, places where water diversions deplete populations seasonally, and so on.

Thanks for the opportunity to review the materials--I think the woundfin plan is relatively solid, but am sure the fish is against formidable odds relative to projected water uses in the Virgin system. Be advised that I have large amounts of data on the proposed Gila River transplant site, which will be available through BLM for any use toward moving the fish in 1977.

Best Wishes for the Season,

  
W. L. Hinckley  
Professor of Zoology

FWS  
RE

DEC 21

SE



REPLY TO LETTERS OF COMMENT

- A-1. A preliminary set of criteria have been developed to assess potential **woundfin** reintroduction sites using the presently occupied habitat in the Virgin River as a model (Appendix). These criteria have been used to identify the **Gila** River above Safford, Arizona, and the Verde River above Horseshoe Reservoir, Arizona, as first priority reintroduction sites. This technique was not used on earlier transplant sites. No thorough information is available on the habitat changes that have occurred along these reaches over the past 100-200 years so a discussion of what may have eliminated the species in the first place is mere speculation. The present condition of the **Gila** River above Safford and the Verde River above Horseshoe Reservoir appear similar to the Virgin River that presently supports woundfin.
- A-2. Enough information is presently available on **woundfin** needs to begin a methodical reintroduction effort. If reintroduction attempts are delayed until all biological needs of the species have been determined, the chances of extinction are increased. We see nothing to lose and everything to gain by attempting methodical reintroductions using the criteria in the Appendix to help assure success and reduce environmental impacts.
- A-3. Development of Habitat Management Plans **is** not a function of the Recovery Team. However, the Team will be able to assist the Bureau of Land Management by providing current data and reviewing drafts for content and techniques.
- A-4. Cost figures have been **determined by** estimating the cost of contracting the tasks to outside firms. Agency personnel have reviewed the cost figures and found them reasonable estimates. **The** total cost of the project (salaries, travel, equipment, etc.) is included in the estimate.
- B-1. These proposed projects are one of the major threats the endangered **woundfin** presently faces. If the Virgin River could be completely protected from man's influence, there would be little reason to protect the species.
- B-2. A form of this recommendation has been incorporated into this final Recovery Plan.
- B-3. This recommendation has been incorporated into the final Recovery Plan.
- B-4. This portion of the Recovery Plan has been clarified.
- B-5. This portion of the Recovery Plan has been clarified.

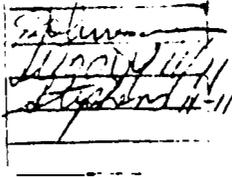
- B-6. A form of this recommendation has been incorporated into the final Recovery Plan.
- B-7. **Woundfin** populations should be monitored **in** the Virgin River and reintroduction localities until the species no longer faces extinction and can be down-listed.
- B-8. Agree that the Team should not be monitoring **woundfin** populations in the Virgin River. This effort is now being contracted out to a single group as agreed upon by the three state agencies involved.
- B-9. The Habitat Management Plans alluded to have been combined into one master Habitat Management Plan. Specific details have been omitted from the Recovery Plan but will be made available to the Bureau of Land Management through the state and federal agencies involved and the Team.
- B-10. Several potential reintroduction sites have been suggested in the Recovery Plan. The rivers suggested here are all above the Grand Canyon and are outside of the historic range of the woundfin, as is the Paria River originally suggested **in** the draft Recovery Plan.
- B-11. The figure **is** the estimated cost to make one transplant of **woundfin** from the Virgin River. Most reintroduction efforts **will** include several transplants over a 3-5 year period and two transplants are suggested for Arizona (**Gila** and Verde rivers).
- B-12. Cost has been increased.
- B-13. At present the designation of critical habitat for reintroduced populations is in a great state of flux. The approach suggested **in** the Recovery Plan seems reasonable until more definite **guide-**lines are available.
- B-14. In many cases, the costs have been increased to meet current prices.
- B-15. This change has been made in the final Recovery Plan. ;
- c-1. These suggestions have been incorporated into the final Recovery Plan.
- c-2. Population projections alone for the St. George, Utah, area indicate a definite increasing demand on the Virgin **River** water.
- c-3. The proposal for woundfin critical habitat was published **in** the November 2, 1977, Federal Register and included, the Virgin River from LaVerkln Springs to Lake Mead and the lower six miles of LaVerkln Creek. Plans were to refine this **in** the final **rule-**

making to exclude the reach between Riverside, Nevada, and Lake Mead and the reach within the Virgin River Gorge. The woundfln critical habitat proposal was withdrawn **in** the March 6, 1979, Federal Register and will have to be repropoed.

- c-4. The Vaughn Hansen Report provides conflicting data on flow volume requirements for maintenance of viable **woundfln** habitat. A Fish and Wildlife Section 7 consultation with the Bureau of Land Management set minimum stream flows for the Virgin River using median minimum flows, but additional information is needed.
- c-5. These estimates have partially been incorporated into the final Recovery Plan.
- C-6. Critical habitat. See B-13.
- c-7. This has been clarified in the final Recovery Plan. There is little doubt that woundfln numbers have declined dramatically throughout their historic range over the past 150 years. However, no specific data **is** available on the Virgin River **woundfln** population except that they are now significantly less abundant **in** the reach below Bunkerville, Nevada, than they were in 1942 when Dr. Carl Hubbs collected them there.
- D-1. This suggestion has been incorporated into the final Recovery Plan.
- D-2. See B-13 and C-3. The Arizona portion of the Virgin **River** was included **in** the proposed critical habitat for **woundfln**.
- D-3. Riparian communities play an important role **in** most aquatic habitats. However, the impact of the Virgin River riparian community on woundfln habitat has not been well documented. Extremely variable flows, unstable channel and the broad, shallow nature of the river valley and the river itself indicate the aquatic habitat **is** less influenced by the riparian **community** in the Virgin River than most other desert rivers.
- D-4. This suggestion has been incorporated into the final Recovery Plan.
- D-5. The Bureau of Land Management manages little land **in** the area of the proposed reintroduction on the Gila **River**. However, negotiations have been underway for more than two years **in** an attempt to coordinate this reintroduction with state and federal agencies, including the Bureau of Land Management.
- D-6. Costs for the identified action should be borne by the lead agency unless other plans are made with one or more of the **potential** cooperating agencies.

- D-7. See D-4. The Endangered Species Act of 1973, as amended in 1978, charges all federal agencies to "...utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species...." The Woundfin Recovery Plan is an attempt to coordinate the recovery of an endangered species through positive management practices. All efforts should be made by Federal agencies to meet their recommended goals.
- E-1. This suggestion has been incorporated into the final Recovery Plan.
- E-2. This section has been entirely changed in the final Recovery Plan.
- E-3. This suggestion has been incorporated into the final Recovery Plan.
- E-4. This suggestion has been incorporated into the final Recovery Plan.
- E-5. Agree. State agencies and the U. S. Fish and Wildlife Service should also be involved in the Habitat Management Plan.
- E-6. This suggestion has been modified and incorporated into the final Recovery Plan.
- E-7. Item 1.41 is now 1.21, and involves purchase of lands along the Virgin River. Land purchasing will vary with the agency for this activity and the U.S. Fish and Wildlife Service has been identified to coordinate purchases with state and other federal agencies. Ownership will dictate what the Habitat Management Plan (1.24) addresses up to a certain point. However, it seems best to direct the Habitat Management Plan towards the necessary habitat management in order to suit the woundfin, and then determine if it can be accomplished under the present ownership.
- F-1. The primary goal of the Recovery Plan is to restore woundfin to a non-endangered status. To accomplish this, the Team recommends improving the marginal habitats in the Virgin River and establishing one additional population within the historic range. At this point the species no longer faces imminent extinction and can be down-listed to Threatened status. In order to completely delist the species, an additional population (the third) should be established.
- F-2. The Recovery Plan identifies two potential reintroduction sites, and one, the Verde River, is on National Forest lands. Criteria for site selection is included in the Appendix. All reintroductions have a top priority (see budget) with the lead agency for the Gila and Verde river transplants recommended as Arizona Game and Fish, and with the Fish and Wildlife Service, Forest Service, and BLM as cooperators.

- F-3. All pertinent agencies will be a part of the reintroduction effort from the beginning. The habitat improvement work you discuss on Sycamore Creek may or may not have benefited woundfin. See D-3.
- G-1. The 100,000 fish needed to determine if a reintroduction **is** successful is the winter population low.
- G-2. The hydrologic study of the Virgin River is to determine habitat parameters for the woundfin. We agree that conditions in the Virgin River are constantly shifting. Suitable habitat for the **woundfin** may move from one side of the stream to the other, or migrate up or downstream slightly, but it appears to maintain some degree of consistency because the species has survived in the Virgin River and not in other desert rivers. This consistency of **woundfin** habitat is what the study is to determine.
- G-3. This figure has been changed to \$20,000 in the final Recovery Plan.
- H-1. The primary goal is to remove the **woundfin** from the threat of extinction. Once this has been achieved, **it** can be down-listed to threatened. See F-1.
- H-2. These recommended changes have been incorporated into the final Recovery Plan.
- I-1. Some of these recommendations have been incorporated into the final Recovery Plan.
- I-2. Some of these recommendations have been incorporated into the final Recovery Plan. In some cases **it** has not been possible to be more specific (**e.g.**, habitat enhancement, land **acqui-**sition). As Recovery Plan implementation proceeds, these areas will be updated.
- J-1. This recommendation has been incorporated into the final Recovery Plan (Figure 2).
- K-1. Portions of the Baumann findings have been incorporated into the final Recovery Plan.


  
 [Signature]

November 11, 1976

Director, U.S. Fish and Wildlife Service  
Washington, D.C. (AFA)

Regional Director  
Region 2 (SE)

Determination of Critical Habitat for the Endangered Woundfin  
(Plagopterus argentissimus)

In April, 1976, the Woundfin Recovery Team submitted to this office their recommendation of critical habitat for Plagopterus argentissimus under the provision of Section 7 of the Endangered Species Act of 1973 (see Appendix I). The reasons for recommending certain specific areas for this species include: 1). decline or elimination of woundfin from the majority of its historic range, 2). continued alteration of much of the remaining habitat, and 3). ever increasing demands of a potentially non-compatible nature on the remaining habitat.

In compliance with the intent of the Endangered Species Act of 1973, the Memorandum of Understanding on Interagency Coordination in Non-emergency Endangered Species Critical Habitat Determination, and Service policy, requests for comments on the recommended areas were sent to all concerned state and federal agencies (Appendix II). It was necessary to make a second request of several agencies (Appendix III), and of this date all but two (\*) have responded. Requests were sent to:

Arizona Game and Fish Department  
 Nevada Department of Fish and Game  
 \*Utah Division of Wildlife Resources  
 Bureau of Reclamation, Boulder City  
 Bureau of Reclamation, Salt Lake City  
 Bureau of Land Management, Utah  
 Bureau of Land Management, Arizona  
 \*Bureau of Land Management, Nevada

Copies of these comments are included as Appendix IV of this document. Of the states replying none raised objections to the recommended critical habitat. The federal agencies voiced concern about how the recommended designation might alter proposed or ongoing federal projects such as the LaVerkin Springs Desalination Project, Allen-Warner Valley Water Diversion and Power Project, recreation sites, scenic corridors

and primitive areas, and livestock grazing. The B. L. M. discussed their plans for initiating several long-term impact studies in the area but did not request the designation wait for their completion.

Since objections of a biological nature concerning the woundfin or its habitat were not received, and this Regional Office supports the Recovery Teams recommendations, we request the following areas be designated critical habitat for the woundfin (map in Appendix I):

1. The Virgin River from LaVerkin Springs (Utah) to Lake Mead (Nevada), approximately 85 stream miles. (From Sect. 25, T.41 S., R.13.W. to Sect. 31, T.15 S., R.69 E.)
2. LaVerkin Creek (Utah) from its convergence with the Virgin River upstream six miles to the uppermost location woundfin have been recently captured. (From Sect. 25, T.41 S., R.13 W. to Sect. 31, T.40 S., R.12 W.)

Additional information concerning the designation is included in Appendix V. It should be realized that designating these reaches of the Virgin River as critical habitat may have a significant impact on several private and federal agency projects, especially the Bureau of Reclamation. This office recognizes the urgency of this designation, and will complete the Environmental Analysis necessary for the designation within the next two weeks.

/s/ Robert F. Stephens

#### Attachments

cc: Region 6 (SE) Denver  
 salt Lake City Area Office  
 Buddy Jensen, FWS, Parker, Ariz.  
 Gail Kobetich, FWS, Las Vegas, Nev.  
 Jim Williams, FWS, Washington, OES

Mr. Keith N. Schreiner, Associate Director--Federal Assistance, Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C. 20240, 202-343-4846.

**SUPPLEMENTARY INFORMATION:  
BACKGROUND**

Historically, the woundfin was known from much of the Colorado River system downstream from the Grand Canyon in northern Arizona. It inhabits silty streams with moderate to swift current. The woundfin has been extirpated throughout most of its native range, and is now known only from the Virgin River system in southern Nevada, northwestern Arizona and southwestern Utah.

The survival and recovery of this species depends upon the maintenance of suitable, undisturbed habitat in the Virgin River system. The Service recognizes that areas containing such streams may qualify for recognition as Critical Habitat as referred to in Section 7 of the Endangered Species Act of 1973. A notice of intent to determine Critical Habitat for the woundfin was published by the Service in the FEDERAL REGISTER of May 16, 1975 (40 FR 21499-21500). The Albuquerque Regional Office (Region 2) of the Fish and Wildlife Service forwarded the Recovery Team report recommending that the Virgin River be designated as Critical Habitat for the woundfin. Additional Service contract reports from the Denver Regional Office (Region 6) also support the proposed Critical Habitat.

After evaluating this recommendation and supporting data, a decision was made to proceed with the proposed rulemaking. The areas delineated below are inhabited by a woundfin and contain the species' only known habitat and breeding sites. If more populations are discovered in the future, additional areas may be proposed for Critical Habitat designation.

**EFFECT OF THE RULEMAKING**

The effects of this determination are involved primarily with Section 7 of the Act, which states:

The Secretary shall review other programs administered by him and utilize such programs in furtherance of the purposes of this Act. All other Federal departments and agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act and by taking such action necessary to insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of such endangered species and threatened species or result in the destruction or modification of habitat of such species which is determined by the Secretary, after consultation as appropriate with the affected States, to be critical.

An interpretation of the term Critical Habitat was published by the Fish and Wildlife Service and the National Marine Fisheries Service in the FEDERAL REGISTER of April 22, 1975 (40 FR 17764-17765).

[ 4310-55 ]

**DEPARTMENT OF THE INTERIOR**

**Fish and Wildlife Service**

[ 50 CFR Part 17 ]

**ENDANGERED AND THREATENED  
WILDLIFE AND PLANTS**

**Proposed Determination of Critical Habitat  
for the Woundfin**

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Proposed rule.

**SUMMARY:** The Service issues this proposed rulemaking which would determine the Critical Habitat of the Endangered woundfin (*Plagopterus argentissimus*). This action is being taken because of the threatened modification of its remaining habitat. Destruction of habitat in the past has been and is presently a major factor which jeopardizes the continued existence of this species. The area proposed is in the Virgin River system in Nevada, Arizona, and Utah. This proposal would provide for Federal protection of the only remaining habitat of the woundfin.

**DATES:** Comments from the public must be received by January 3, 1978. Comments from the Governor of States involved with this action must be received by February 1, 1978.

**ADDRESSES:** Submit comments to Director (OES), U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

Comments and materials received will be available for public inspection during normal business hours at the Service's Office of Endangered Species, Suite 1100, 1612 K Street, N.W., Washington, D.C. 20240.

**FOR FURTHER INFORMATION CONTACT:**

PROPOSED RULES

57330

Some of the major points of that interpretation are: (1) Critical Habitat could be the entire habitat of a species, or any portion thereof, if any constituent element is necessary to the normal needs of survival of that species; (2) actions by a Federal agency affecting Critical Habitat of a species would not conform with Section 7 if such actions might be expected to result in a reduction in the numbers or distribution of that species of sufficient magnitude to place the species in further jeopardy, or restrict the potential and reasonable recovery of that species; and (3) there may be many kinds of actions which can be carried out within the Critical Habitat of a species which would not be expected to adversely affect that species. In addition, it should be noted that the prohibitions of Section 7 apply only to Federal agencies.

A Critical Habitat designation is based solely on biological factors and serves only to officially notify Federal agencies that their responsibilities under Section 7 of the Act are applicable in a certain area. The impact of specific Federal actions on listed species should be dealt with after Critical Habitat has been designated, as they are not relevant to the biological basis of Critical Habitat determination. The Service, in cooperation with other Federal agencies, has drafted guidelines which establish a consultation and assistance process for evaluating the possible effects of actions on the Critical Habitat of listed species involved. Proposed regulations for Interagency Cooperation were published on January 26, 1977, in the FEDERAL REGISTER (42 FR 4866-4875) which will assist Federal agencies in complying with Section 7 of the Act when published in final form.

PUBLIC COMMENTS SOLICITED

The Director intends that the rules finally adopted be as accurate as possible

in delineating the Critical Habitat of the woundfin. The Director, therefore, desires to obtain the comments and suggestions of the public, other concerned governmental agencies, the scientific community, or any other interested party on these proposed rules.

Final promulgation of Critical Habitat regulations will take into consideration the comments received by the Director. Such comments and any additional information received may lead the Director to adopt final regulations that differ from this proposal.

An environmental assessment has been prepared in conjunction with this proposal. It is on file in the Service's Office of Endangered Species, 1612 K Street, N.W., Washington, D.C. 20240, and may be examined during regular business hours or may be obtained by mail. A determination will be made at the time of final rulemaking as to whether this is a major Federal action which would significantly affect the quality of the human environment within the meaning of Section 102(2)(C) of the National Environmental Policy Act of 1969.

The primary author of this document is Dr. James D. Williams, Office of Endangered Species, Washington, D.C. 20240, 202-343-7814.

REGULATION PROMULGATION

Accordingly, the Service proposes to amend § 17.95(e) by adding Critical Habitat of the woundfin after that of the slender chub as follows:

§ 17.95 Critical habitat—fish and wildlife.

(e) Fishes.

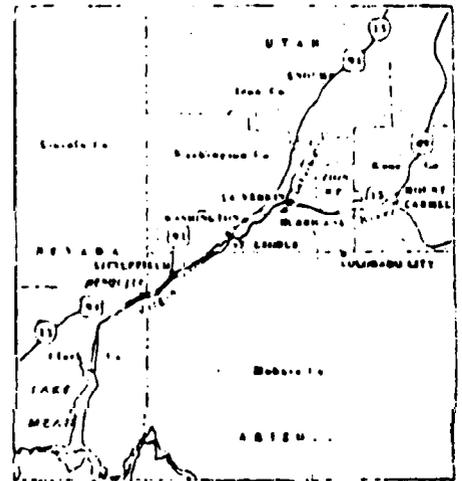
Woundfin (*Plagiopterus argentissimus*)

Nevada, Clark County. Main channel of Virgin River from the backwaters of Lake

Mead upstream to the Nevada-Arizona State line.

Arizona, Mohave County. Main channel of Virgin River from the Nevada-Arizona State line to the Arizona-Utah State line.

Utah, Washington County. Main channel of Virgin River from the Arizona-Utah State line upstream to Utah Highway 18 crossing north of Hurricane, Utah. La Verkin Creek from its junction with the Virgin River upstream through Section 31, Township 40 South Range 12 West.



CRITICAL HABITAT FOR THE WOUNDFIN

Note—The Department of the Interior has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11949 and OMB Circular A-107.

Dated: October 25, 1977.

LYNN A. GREENWALT,  
Director, Fish and  
Wildlife Service.

[FR Doc.77-31708 Filed 11-1-77 8:45 am]

[4310-55-M]

## DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[50 CFR Part 17]

ENDANGERED AND THREATENED WILDLIFE  
AND PLANTS

Requirement to withdraw or supplement proposals to determine various U.S. taxa of plants and wildlife as Endangered or Threatened or to determine Critical Habitat for such species.

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice.

SUMMARY: The Service provides notice that proposals to list certain species of plants and wildlife as Endangered or Threatened or to determine Critical Habitat for such species pursuant to the Endangered Species Act of 1973 do not meet requirements set forth in the Endangered Species Act Amendments of 1978 (Public Law 95-632, 92 Stat. 3751). Proposals to list species will require supplementation prior to the issuance of final rules. Specifically, the Service will determine whether critical habitat should be proposed for these species. Proposals to determine Critical Habitat are withdrawn and will require re-proposal if appropriate.

## FOR FURTHER INFORMATION CONTACT:

John L. Spinks, Jr., Chief, Office of Endangered Species, Fish and Wildlife Service, Washington, D.C. 20240 (703-235-2771).

## SUPPLEMENTARY INFORMATION:

## BACKGROUND

The Service has made a number of proposals to list species of plants and wildlife as Endangered or Threatened or to determine Critical Habitat for such species pursuant to the Endangered Species Act of 1973. These proposals, made before the Endangered Species Act Amendments of 1978 (hereinafter, Amendments) became effective, do not fulfill certain requirements set forth in that legislation. Specifically, the Amendments require that:

1. A proposal to list a species as Endangered or Threatened be accompanied, to the maximum extent prudent, by a specification of Critical Habitat for the species to be listed, and that notice of any proposal which specifies Critical Habitat be published in a newspaper of general circulation in or adjacent to such habitat.

2. The substance of the FEDERAL REGISTER notice of any proposal to de-

termine a species as Endangered or Threatened or specify its Critical Habitat be offered for publication in appropriate scientific journals.

3. All general local governments located within or adjacent to a proposed Critical Habitat be notified of the proposed regulation at least 60 days before its effective date.

4. A public meeting (and if requested, a public hearing) be held on any proposed regulation which specifies Critical Habitat within the area in which such habitat is located in each State, and, if requested in each such State.

5. A public meeting be held on a proposed regulation which does not specify Critical Habitat if such a meeting is requested by any person within 45 days of the date of publication of the notice of proposal.

6. Any proposed regulation, which includes a specification of Critical Habitat be accompanied by a brief description and evaluation of those activities which may adversely modify such habitat or may be impacted by such specification.

7. In determining the Critical Habitat of any Endangered or Threatened species, consideration be made of the economic impact, and any other relevant impacts, of specifying any particular area as Critical Habitat and that any such area may be excluded from a Critical Habitat if the benefits of such exclusion are found to outweigh the benefits of specifying the area as part of the Critical Habitat and if the exclusion would not result in the extinction of the species.

Actions affected by these requirements include:

1. Proposals to list species. These now require supplementation. To the maximum extent prudent, by proposals of Critical Habitat as a result, the Service will propose critical habitat for these species if appropriate. The public will be afforded full opportunity to comment on any such proposal;

2. Proposals to determine Critical Habitat. These are withdrawn, and

3. Proposals to list species and determine Critical Habitat. These are withdrawn only to the extent that they propose Critical Habitat and otherwise require supplementation by proposal of Critical Habitat in the manner discussed above.

All withdrawals made pursuant to this notice are conducted voluntarily by the Service to comply with the provisions of the Endangered Species Act Amendments of 1978 set out above. Because the withdrawals are not required by section 11.5 of the Amendments, the Service need not comply with the requirements of that section prior to re-proposal.

Affected proposals are listed below, referenced by publication of notice in the FEDERAL REGISTER:

Proposed title	Date of notice	FR reference
Proposed Endangered status for 216 species appearing on Convention on International Trade	Sept. 26, 1975	40 FR 44329-33
Proposed Endangered or Threatened status for 32 U.S. snails	April 28, 1976	41 FR 17743-8
Proposed to determine 2 birds, 1 lizard, 3 snails, and 1 insect, all indigenous to the California Channel Islands, to be Endangered species	June 1, 1976	41 FR 32073-5
Proposed Endangered status for some 1700 U.S. vascular plant taxa	June 16, 1976	41 FR 24524-72
Proposed determination of Critical Habitat for Grizzly Bear	Nov. 6, 1976	41 FR 46757-9
Proposed Endangered or Threatened status for 41 U.S. species of Fauna	Jan. 11, 1977	42 FR 25071-18
Proposed determination of Critical Habitat for 6 butterflies and 2 plants	Feb. 6, 1977	42 FR 10713-75
Proposed Threatened status and Critical Habitat for the black toad	March 11, 1977	42 FR 13567-66
Proposed determination of Critical Habitat for the Houston Toad	May 26, 1977	42 FR 27009-11
Proposed determination of Critical Habitat for the woodfin	Nov. 2, 1977	42 FR 57329-30
Proposed Endangered status and Critical Habitat for 4 fishes	Nov. 29, 1977	42 FR 60765-66
Proposed Endangered listing and Critical Habitat determination for the Virginia Ozark bigear darter	Dec. 2, 1977	42 FR 61280-82
Proposed Endangered status and Critical Habitat for 8 fishes	Dec. 30, 1977	42 FR 65209-12
Proposed Endangered status for the bonetail chub and Threatened status for the razor back sucker	April 24, 1978	43 FR 17375-77
Proposed determination of Critical Habitat for the Maryland darter	May 12, 1978	43 FR 20518-19
Proposed Endangered status and Critical Habitat for 2 species of turtles	May 19, 1978	43 FR 21702-5
Proposed determination of Critical Habitat for the hawksbill sea turtle	May 24, 1978	43 FR 22224-5
Proposed listing and Critical Habitat determination for 2 Hawaiian cave arthropods	June 16, 1978	43 FR 28064-7
Proposed determination of Critical Habitat for the Santa Cruz long-toed salamander	June 22, 1978	43 FR 26759-6-6
Proposed Endangered or Threatened status or Critical Habitat for 10 butterflies or moths	July 2, 1978	43 FR 28938-45
Proposed Endangered status and Critical Habitat for the Illinois mud turtle	July 6, 1978	43 FR 29152-4
Proposed listing and Critical Habitat determination for a fish and a salamander	July 14, 1978	43 FR 30310-9
Proposed Endangered or Threatened status and Critical Habitat for 10 beetles	Aug. 10, 1978	43 FR 38630-43
Proposed Endangered and Threatened status and Critical Habitat for 3 Texas fishes	Aug. 15, 1978	43 FR 38117-20
Proposed Critical Habitat for the whooping crane	Aug. 17, 1978	43 FR 36598-90
Proposed Endangered status and Critical Habitat for the Beaver Dam Snake population of the Desert tortoise	Aug. 23, 1978	43 FR 37462-5
Proposed Endangered status and Critical Habitat for the Virgin River chub	Aug. 23, 1978	43 FR 37068-70
Proposed Critical Habitat for the Colorado squawfish	Sept. 14, 1978	43 FR 41000-2
Proposed listing and Critical Habitat determination for the Coast Range Valley fringe-toed lizard	Sept. 28, 1978	43 FR 44806-8

\*Requires supplementation only insofar as it applies to the species listed below. The remaining taxa affected by this proposal have already been the subjects of a final rulemaking.

#### Molluscs

*Limpia satura*—plain pocketbook mussel.

\*Requires supplementation except insofar as it applies to the species listed below, which have already been the subject of a final rulemaking.

#### Snails

*Angustipira picta*—painted snake coiled forest snail.

*Diclis mucronata*—Iowa Pleistocene snail.

*Mesodon clarki nantahala*—noonday snail.

*Orthalicus rosea*—Stock Island tree snail.

*Polygyrus virginianus*—Virginia fringed mountain snail.

*Succinea chittenangoensis*—Chittenango ovate amber snail.

*Tridopna platyspines*—flat-spined three-toothed snail.

\*Requires supplementation only insofar as it applies to the species listed below. The remaining taxa affected by this proposal have either been previously withdrawn or have already been the subjects of a final rulemaking.

#### Insects

*Coenonycha clementina*—San Clemente coenonycha beetle.

\*Requires supplementation except insofar as it applies to the following species, which have already been subjects of final rulemakings.

#### Plants

*Betula picea*—Virginia round leaf birch.

*Brassicaceae*, Mustard family

*Arabis nigrodonaldiana*—McDonald's rock cress

*Erysimum capitatum* var. *angustatum*—Contra Costa wallflower.

*Crossulaceae*, Stonecrop family: *Dudleya frankiae*—Santa Barbara Island liveforever.

*Fabaceae*, Pea family

*Astragalus penanus*—Rydberg milk vetch.

*Baptisia arachnifera*—hairy rattlesnake.

*Lotus scoparius* ssp. *frankiae*—San Clemente broom.

*Vicia menziesii*—Hawaiian wild broad bean.

*Hydrophyllaceae*, Waterleaf family: *Phacelia argillacea*—unnamed phacelia.

*Lamiaceae*, Mint family: *Popovya abramsii*—San Diego popovya.

*Liliaceae*, Lily family: *Trillium perlatense*—perlatent trillium.

*Malvaceae*, Mallow family: *Malacothamnus clementinus*—San Clemente Island bushmallow.

*Onagraceae*, Evening primrose family:

*Onocheira ovata* ssp. *curekensis*—Eureka evening-primrose.

*Onocheira deltoidea* ssp. *huxvillii*—Antloch Dunes evening-primrose.

## PROPOSED RULES

**Poaceae, Grass family:***Orcuttia mucronata*—Crampton's Orcutt grass.*Stellaria alexandriae*—Eureka dune grass.*Zizania texana*—Texas wild-rice.**Ranunculaceae, Buttercup family:***Aconitum not Edwardsense*—northern wild monkshood.*Delphinium kinkadee*—San Clemente Island larkspur.**Scrophulariaceae, Snopdraxon family:***Castilleja grisea*—San Clemente Island Indian paintbrush.*Cordylanthus maritimus* ssp. *maritimus*—salt marsh bird's beak.*Pedicularis furibunda*—Furbish's lousewort.

\* Requires supplementation except insofar as it applies to the following species, which have already been the subjects of a final rulemaking.

**Fishes:***Ptychocheilus boschungii*—Stuckwater darter.*Hybopsis cahnii*—Sierra chub.*Hybopsis monacha*—Spottfin chub.*Noturus flavipinnis*—Yellowfin madtom.*Speoplatyrhinus poulsoni*—Alabama cave fish.

\* Withdrawn except insofar as it applies to the following species, which have already been the subject of a final rulemaking.

**Plants:**Brassicaceae, Mustard family *Erysimum capitatum* var. *angustatum*—Cerro Costa wallflower.Onagraceae: *Oenothera deltoides* ssp. *hirsutella*—Antioch flumed evening primrose.

\* Withdrawn insofar as it applies to areas C, D(3), D(4), D(5), and D(6). The other proposed areas have either been previously withdrawn or have been subjects of a final rulemaking.

Comments received from the public concerning the proposals will be considered in the formulation of supplements to meet the requirements of the Amendments. In addition, comments concerning supplemented proposals will be solicited by letter from all persons who have made substantive comments on the original proposals.

The primary author of this notice is Dr. John J. Fay, Office of Endangered Species, U.S. Fish and Wildlife Service, Washington, D.C. 20240 (703/235-1975).

Dated: February 26, 1979.

LYNN A. GREENWALT,

Director, Fish and Wildlife Service.

(FTR Doc. 79 6675 Filed 3-5-79; 8:45 am)