

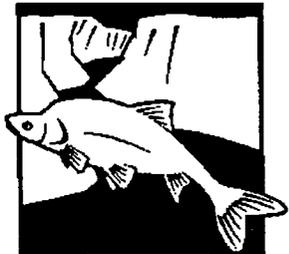
**FINAL**  
**ENVIRONMENTAL ASSESSMENT**  
**FOR**

**PROCEDURES FOR STOCKING OF NONNATIVE  
FISH SPECIES IN THE UPPER COLORADO RIVER BASIN**

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## ENVIRONMENTAL ASSESSMENT

**PROJECT TITLE:** Procedures for Stocking of Nonnative Fish Species in the Upper Colorado River Basin.

### I. PURPOSE AND NEED

- A. Purpose: Endangered fishes in the Upper Colorado River Basin (Basin) have been and continue to be impacted by water depletions, operation of dams, floodplain habitat disruption and nonnative fishes that compete with or prey upon native fishes. Numerous recovery actions are underway to resolve flow, migration barrier, and habitat quality problems. A strategic plan is being developed to remove or reduce existing populations of nonnative fish from habitat of the endangered fishes. The highest priority measure in the Recovery Program's draft strategic plan for control of nonnative fish is to prevent additional fish introductions that could further exacerbate the existing interactions between nonnative and endangered fishes.

The specific purpose of developing procedures to guide future nonnative fish stocking actions is to reduce, minimize, and/or eliminate impacts of nonnative fish on native fish. The goal is to continue to allow nonnative fish stocking for recreational fishing and private aquaculture, provided that such stocking is compatible with recovery of the endangered Colorado River fishes. The Recovery Program requires that "stocking of nonnative species will be confined to areas where the absence of potential conflict with rare or endangered species can be demonstrated."

- B. Need for Action: The Colorado squawfish (see Appendix A for list of fish scientific and common names used in this document) and humpback chub were listed as endangered species on March 11, 1967. The bonytail was listed as endangered on April 23, 1980. The razorback sucker was listed as endangered on October 23, 1991. All four of these species are protected under the Endangered Species Act of 1973, as amended, and various State laws and statues. Critical habitat was formally designated March 21, 1994. Critical habitat identifies the areas needed for the recovery of listed species and the features of the habitat that require protection. The formal designation included numerous reaches of river and the associated 100-year floodplain.

Habitat degradation has been identified as the major cause of declining populations of razorback sucker, Colorado squawfish, humpback chub, and bonytail. Habitat degradation has occurred primarily as a result of construction of dams, water depletions, and diking of the floodplain. These changes in habitat have created an environment conducive to the establishment and proliferation of nonnative fishes. In recent years, dams in the Upper Colorado River Basin have been reoperated to restore more natural conditions for the endangered fishes. Fish passage problems are being addressed (Recovery Program 1996). Flooded bottomland habitats are once again becoming accessible to the fish

(Recovery Program 1996). Stocking of endangered fishes has begun in areas of low numbers (Recovery Program 1996). However, until problems associated with nonnative fishes are addressed, it is unlikely that the endangered fishes will be recovered (establishment and protection of viable, self-reproducing populations).

The fish fauna in most areas of the Colorado River Basin bears little resemblance to what occurred historically. The geologic isolation of Basin rivers from other watersheds gave rise to a fish fauna in which 64 percent of the native species are found nowhere but in the Basin (Miller 1959). In addition to being unique, with only 36 species of native fish found in the Basin, the fish fauna is depauperate compared with other North American river basins. The native fish were adapted to the pre-development aquatic conditions (e.g. variable flows, high sediment levels, fluctuating temperatures) found in the Basin. Because there were only a few different native fish species within a specific habitat, inter-specific competition for the available resources was likely less intense.

The changes to Basin rivers resulting from human development activities have had a major impact on the native fish species. Some native fish species, adapted to the highly variable aquatic environment of the pre-development Basin, remained successful in the altered habitats. However, the creation of these altered habitats has contributed to the establishment of many nonnative fish species into the Basin. Aggressive competitors, the nonnative fish species soon dominated most of the altered Basin habitats. The role of habitat alteration versus nonnative fish establishment in the decline of native fish populations is unclear. In less altered river reaches, native fish appear to be able to compete more effectively with the nonnatives.

The introduction of fish species not native to the Basin began in the late 1800's. These fishes were introduced for a variety of reasons, including establishment of sport fish populations, as forage for the sport fish species, biological control of unwanted pests, aesthetic or ornamental purposes, release of unwanted pets or bait fish, and accidental releases (Taylor et al. 1984). Some of these introductions did not result in the species becoming established. Other introductions resulted in establishing a species throughout large areas of the Basin. Some species have been repeatedly stocked as part of recreational fisheries programs. Introductions have been made by Federal and State agencies, commercial enterprises, and private citizens.

Nonnative fish species have been clearly implicated in the population reductions or elimination of native fish species from the Basin's aquatic habitats (Dill 1944, Osmundson and Kaeding 1989, Behnke 1980, Joseph et al. 1977, Lanigan and Berry 1979, Minckley and Deacon 1968, Meffe 1985, Propst and Bestgen 1991, Rinne 1991 and others). Nonnative fishes have had an adverse impact on endangered fishes throughout the Basin and in many areas within the Basin it is a primary factor contributing to poor recruitment and low abundance of native species.

Nonnative fish species compete with native fish species in several ways. Physical factors in the environment regulate the capacity of a particular area to support aquatic life. Suitable habitat and food resources are the primary limiting factors. Because the amount of physical habitat available is finite, increasing the number of species present in the habitat usually equates to smaller populations of most species. The size of each species population in the system is controlled by the ability of each life stage to compete for habitat and food resources. The species better adapted to the physical features of the habitat would likely be a better competitor against less well adapted species, and thus have larger populations. Native species were well adapted to conditions in the basin prior to development, however, under current altered conditions nonnative fishes are quite competitive and viable.

- C. Federal Action: This Environmental Assessment (EA) is being developed under the implementing regulations of the National Environmental Policy Act (NEPA). The Federal action is the participation of the Fish and Wildlife Service (Service) in a Cooperative Agreement that allows routine stocking of nonnative fishes in situations that was be determined through the NEPA and section 7 process.
- D. Area to be Covered by Stocking Procedures: The selected stocking procedures alternative will be presented to the wildlife commissions for action, as appropriate, for the States of Colorado, Utah, and Wyoming. The procedures are intended to cover the Upper Colorado River Basin, excluding the San Juan River drainage, which includes the Colorado River and all its tributaries (Figure 1).

## II. BACKGROUND

The purpose of the Endangered Species Act of 1973, is to provide a means to conserve the ecosystems upon which endangered and threatened species depend, and to provide a program for the conservation of listed species. Under authority of the Endangered Species Act, the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) was formalized in January 1988. Signatories to this Recovery Program were the Governors of Colorado, Utah, and Wyoming; the Secretary of the Interior; and the Administrator of the Western Area Power Administration. The purpose of the Recovery Program is to recover the endangered fishes while providing for existing and new water development to proceed in the Upper Basin in compliance with the Endangered Species Act. The Recovery Program is also to serve as a reasonable and prudent alternative to avoid the likelihood of jeopardy to the continued existence of the endangered fishes and to avoid the destruction or adverse modification of critical habitat in section 7 consultations on water depletion impacts related to historic and new projects. The five principal elements of the Recovery Program are: 1) habitat management, 2) habitat development and maintenance, 3) native fish stocking, 4) nonnative species and sport fishing, and 5) research, data management, and monitoring (Fish and Wildlife Service 1987). The stocking procedures being developed address number 4 above by implementing guidelines to reduce or eliminate impacts from nonnative fishes.

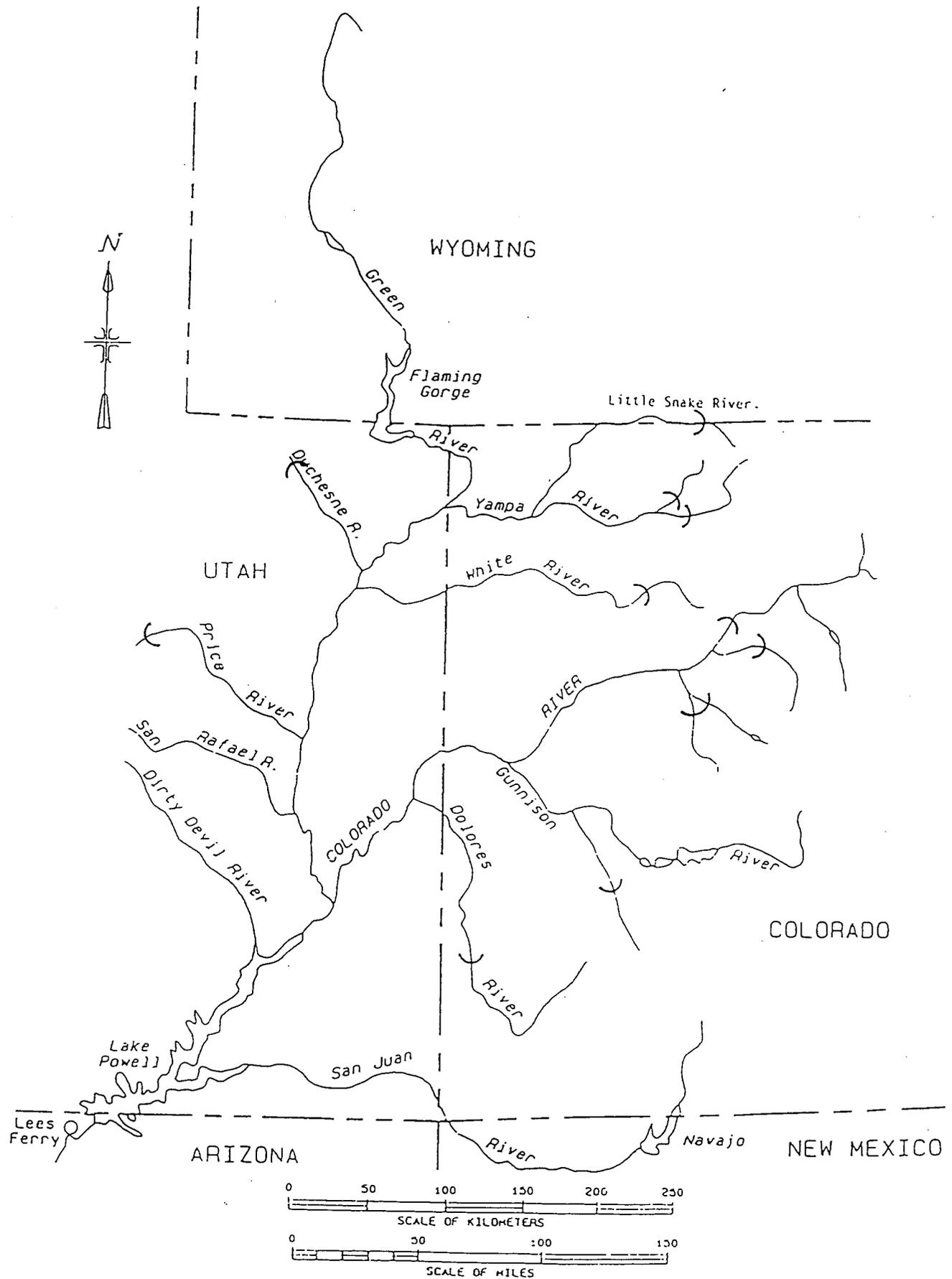


Figure 1. Approximate location of 6500-foot elevation above mean sea level on tributaries within the upper Colorado River basin (see Appendix D for township/range descriptions).

In October 1994, the Colorado, Utah, Wyoming, and the Fish and Wildlife Service implemented "Interim Stocking Procedures" to see how a process to address differences in stocking positions between agencies might work. During the period covered by the interim procedures, Colorado submitted eight lake management plans for waters in the floodplain. Because all these waters were within the 40-year floodplain, none were approved. Also, as part of the procedures, the Fish and Wildlife Service refuge at Ouray, Utah was not allowed to pump water from Pelican Lake because nonnative fishes were escaping from the refuge into the river. In accordance with the interim procedures, tiger muskie were stocked into Harvey Gap Reservoir, stocking of black crappie and bluegill was approved for McPhee Reservoir, and salmonid stocking continues in numerous locations basinwide. The interim procedures expired December, 1995. However, the States have voluntarily continued to abide by the interim procedures.

In April, 1995, an independent scientific review team was convened to review the draft stocking procedures that were being considered at that time. The teams made several major points: 1) nonnative fishes should not be stocked outside of their historic range, especially not into areas designated as critical habitat for the four endangered fish; 2) there is little biological difference between the 10-, 40-, 50-, and 100-year floodplains, nonnative fish will eventually escape into the river from ponds in these areas; and 3) if occurrence of largemouth bass, bluegill, and black crappie are low in the river, then concern over them being stocked in the floodplain may not be a major issue. Additionally, public meetings were held on the procedures December 5, 1995, in Denver, Colorado; December 6, 1995, in Craig, Colorado; December 7, 1995, in Grand Junction, Colorado; and December 12, 1995, in Vernal, Utah. At these meetings, presentations were made regarding the need to implement stocking procedures. Stocking procedures under consideration were also discussed. The primary purpose of the meetings was to get public input concerning regulating warmwater fish stocking in the Upper Colorado River Basin. Approximately 70 people attended one or more of the public meetings. Most people attending has questions regarding the procedures, specific sport fish species, and/or recovery of the endangered fish, but few expressed either support or opposition.

The Procedures will be implemented by a Cooperative Agreement among the Service and State fish and wildlife agencies in Colorado, Utah, and Wyoming. The roles and responsibilities of each agency will be clearly described in the Cooperative Agreement. Both the Service and the States have statutory responsibilities which cannot be abrogated. The States have the responsibility for managing fish and wildlife resources that includes threatened and endangered species occurring within their boundaries. The Service has certain legislated responsibilities for conserving fish and wildlife resources including administration of the Endangered Species Act.

The goal of the Service and the States is to reach consensus on issues related to stocking of nonnative fishes so that neither agency has to independently assert its authority. The Service and the States will make a concerted effort to resolve any disagreements that may arise from either public or private stocking proposals.

On June 7, 1995, President Clinton signed Executive Order 12962 relating to recreational fisheries. The executive order states that "Federal agencies shall, to the extent permitted by law and where practicable, and in cooperation with States and Tribes, improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities..." It further states that Federal agencies will work to identify and minimize conflicts between recreational fisheries and the Endangered Species Act.

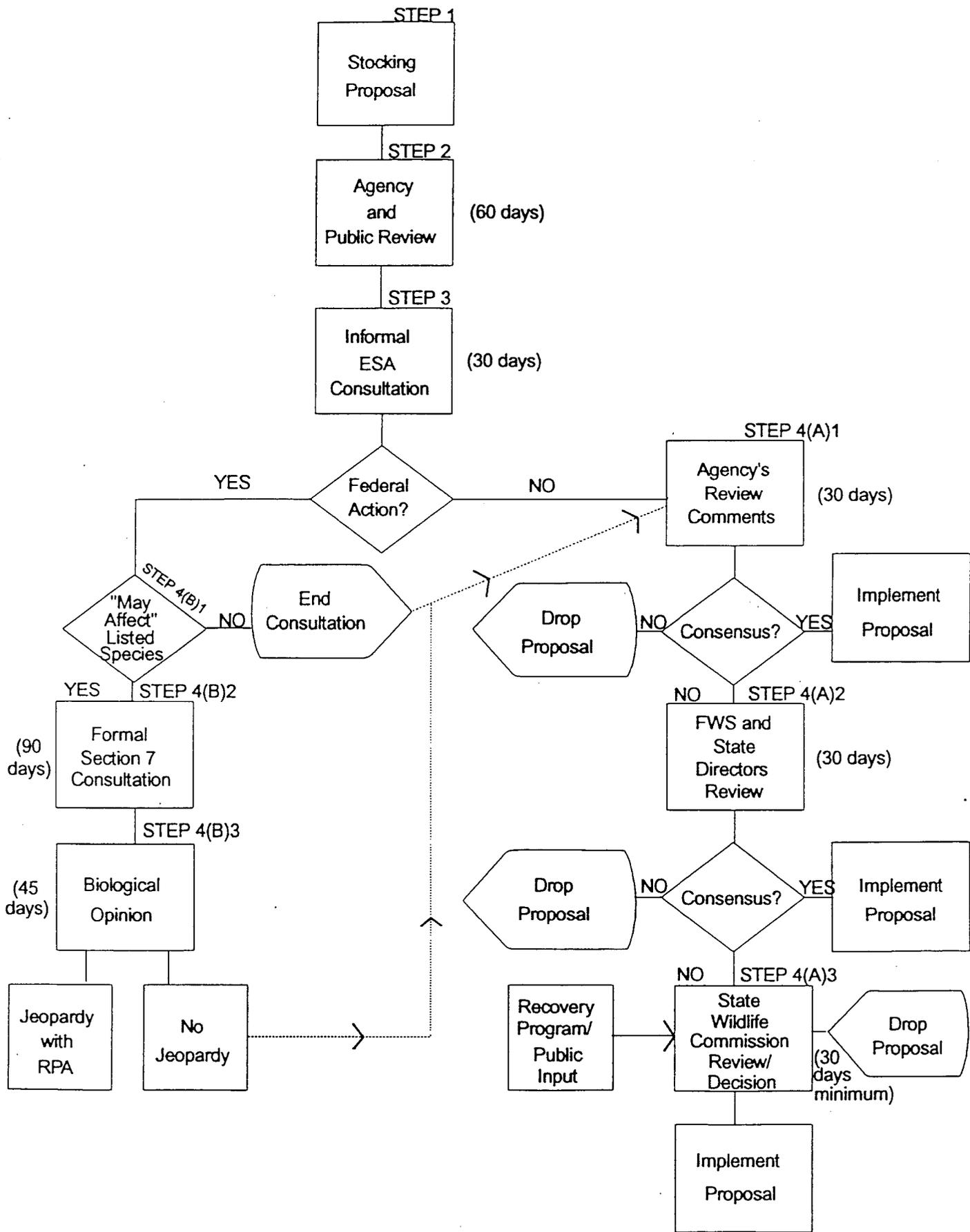
To this end, the Fish and Wildlife Service and National Marine Fisheries Service issued a joint draft policy December 13, 1995, for conserving species listed under the Endangered Species Act while providing and enhancing recreational fisheries opportunities. This draft policy discusses the decline in aquatic species and their habitats and the socio- and economic benefits of recreational fisheries. This policy stressed the importance of an ecosystem approach to management that recognizes multiple use of aquatic systems. The policy outlined several elements with respect to implementation of the Endangered Species Act that include: 1) increase efforts to work cooperatively with effected stakeholders, 2) encourage greater participation of stakeholders in implementation of recovery plans, and 3) provide more information to the public regarding the relationship between conservation and recovery of listed species and recreational fisheries.

On November 29, 1995, Colorado Governor Roy Romer and Secretary of the Interior Bruce Babbitt signed a Memorandum of Agreement to "facilitate and promote collaboration and cooperation in managing and conserving fish and wildlife species and habitat within Colorado in a manner that is consistent with the present direction of Colorado's Smart Growth Initiative as well as state and federal laws." One of the primary elements of this agreement was to facilitate collaborative development of conservation plans to address risks to species and their habitats so that mandatory measures required by law would not be invoked. The agreement also reiterated the Department of Interior's commitment to "promptly recover and de-list threatened and endangered species." It further states that the State and Department of Interior will work together to define recovery objectives and to seek down-listing or de-listing soon after those recovery objectives are met.

### **III. DESCRIPTION OF ALTERNATIVES**

This assessment examined a no action alternative and five action alternatives. The preferred alternative was developed from the alternatives analyzed in the draft Environmental Assessment and from public comment received during the comment period. Alternatives "no action" and number 4 are less restrictive than the preferred alternative and the Interim Stocking Procedures of October 1994. Alternatives 2 and 3 are more restrictive. Alternative 5 is very similar to the interim procedures but less restrictive than the preferred alternative. Alternative 1 would have required case-by-case review for waters below the 100-year floodplain boundary prior to stocking (Figure 2). The alternatives represented a range of options, which led to the development of the preferred alternative.

Figure 2. Nonnative fish stocking review procedures.



This environmental assessment covers the actual procedures for stocking nonnative fishes but does not cover actions such as pond reclamation and screening that will require their own NEPA analysis. Construction of berms within critical habitat would also have to undergo Endangered Species Act compliance in cases where there were Federal funds used or a COE 404 permit was required.

A description of the basic components of each of the alternatives is presented below. Tables 1-4 also summarize the similarities and differences between the preferred alternative and the other action alternatives.

#### A. NO ACTION ALTERNATIVE

No formal procedures would be in place. States would continue to seek input from the Fish and Wildlife Service and the public on case-by-case proposals to stock nonnative fish; however, in some cases stocking into public waters could take place that may allow nonnative fish to escape into habitat occupied by endangered fish. The States would maintain total discretion regarding stocking of warmwater fishes in rivers and floodplain habitat in the Upper Basin but would certainly consider potential impacts on the endangered fishes. Very little or no stocking of warmwater nonnative fishes is occurring within the Upper Colorado River Basin in Utah and Wyoming. The States may or may not pursue needed measures to minimize the stocking of warmwater fish species in privately owned isolated floodplain ponds and connected waters. It is more likely that stocking of warmwater species in private ponds in the floodplain would not be regulated (primarily in Colorado; stocking of private ponds in Utah and Wyoming are currently regulated though approval of warmwater stocking may still occur).

The highest priority measure in the Recovery Program's strategic plan for control of nonnative fish is to prevent additional fish introductions that could further exacerbate the existing interactions between nonnative and endangered fishes (Tyus and Saunders 1996). Recovery Program actions would continue to be implemented, for example; improve/protect flows, enhance flooded bottomlands downstream of existing and new sources of nonnative fishes, propagate fish, conduct monitoring and research activities. Isolated public and private ponds in the 10-year floodplain would be reclaimed (i.e. nonnative fish would be removed by draining the pond, applying rotenone, or other control techniques). Reclamation of privately owned ponds will be on a voluntary basis. Those that have warmwater fish and do not wish to have their ponds reclaimed will remain as sources for nonnative fish escapement into the river. Connected ponds within the 50-year floodplain would be reclaimed and have fish screens installed. Facilities would be installed on reservoirs to preclude escapement of nonnative fish.

## B. FEATURES COMMON TO ALL ACTION ALTERNATIVES

All of the action alternatives provide for warmwater fishing opportunities in the following locations:

- 1) Waters with "grandfathered" Lake Management Plans<sup>1</sup>: Mack Mesa Lake, McPhee Reservoir, Purdy Mesa Reservoir (formally Hallenbeck Reservoir), Rio Blanco Lake, Chipeta Lake, Crawford Reservoir, and Harvey Gap Reservoir.
- 2) Any waters above Flaming Gorge Dam can be stocked with channel catfish, mosquitofish, redbreast shiner, smallmouth bass.

Habitats used by trout and the endangered fishes generally do not overlap in the Upper Colorado River Basin. Negative impacts by trout have not been specifically identified in the Upper Basin nor considered a problem by the Recovery Implementation Program (U.S. Fish and Wildlife Service 1987). If impacts become evident in the future this information may be used to modify the stocking procedures. Therefore, stocking of trout anywhere in the Upper Basin, except in occupied habitat, is permitted. This includes the stocking of trout directly into riverine habitats. Also common to all the alternatives is that the stocking of nonsalmonid (fish other than trout) species would be prohibited directly into occupied endangered fish habitat.

Waters that are above the 50-year floodplain but have a direct connection to rivers in the Upper Colorado River Basin (e.g., Elkhead Reservoir, Highline Reservoir, and others) will be equipped or managed with an anti-escapement device or practice and have approved lake management plans acceptable to the Service and the State fish and wildlife agencies before the continued stocking of nonnative, warmwater fish species will be allowed.

In alternatives 1-5, stocking not permitted on a routine basis or not prohibited outright would require a case-by-case review prior to permitting that stocking to occur. The case-by-case review process has been outlined in Appendix B. Additionally, any proposal to introduce new fish species into the Upper Basin shall follow the rationale and justification of the American Fisheries Society policy statement "Introductions of Aquatic Species" (Appendix C; Items a-g on Page 52 of appendix). Proposals to stock in locations or situations not considered routine will be subject to case-by-case review and will include the following minimal information:

- A. The purpose and location of the proposed stocking.
- B. The species, numbers, and rationale for selecting the species.
- C. The potential for escapement, the potential for survival in critical habitat if escapement occurs, and control measures that could be implemented to reduce the risk of escapement.

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<sup>1</sup> Stocking limited to species approved within that management plan.

D. The potential for impact to threatened and endangered species and the specific measures available to remedy any impacts that may occur including their feasibility and likelihood of success.

E. A plan for monitoring the effects of stocking nonnative fishes on the endangered Colorado River fishes.

Monitoring to determine the impacts and remediation needs of stocking actions would be conducted for all the alternatives. The Interagency Standardized Monitoring Program currently in place under the Recovery Program would be used by all alternatives. However, the level of monitoring differs somewhat between the alternatives and is therefore addressed under each alternative.

### C. PREFERRED ALTERNATIVE

Habitats used by trout and the endangered fishes generally do not overlap in the Upper Colorado River Basin. Negative impacts by trout have not been specifically identified in the Upper Basin nor considered a problem by the Recovery Implementation Program (U.S. Fish and Wildlife Service 1987). If impacts become evident in the future this information may be used to modify the stocking procedures. Therefore, stocking of trout anywhere in the Upper Basin, except in occupied habitat, is permitted. This includes the stocking of trout directly into riverine habitats. Stocking permitted on a routine basis, including floodplain ponds is presented in Table 1. All other stocking below the 50-year floodplain, not allowed as routine, would be prohibited.

The following conditions apply to stocking of nonnative fishes within the 50-year floodplain<sup>2</sup>:

- A. Private Ponds: The stocking of largemouth bass, bluegill, black crappie, and triploid grass carp for ponds within the 50-year floodplain in the Upper Colorado River Basin will require that the ponds be bermed to FEMA standards to the 50-year floodplain. If an outlet exists on the pond, the outlet must be screened prior to stocking. The stocking plan, screening, and berming must be approved by the appropriate State wildlife agency and the Fish and Wildlife Service. Once approved, future stocking of that pond is considered routine, not requiring further approval. Screens and berms will be inspected annually by State wildlife agency personnel. If berming or screening fail to control escapement of nonnative fishes, then that pond will require a case-by-case review prior to any additional stocking.

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In areas where the 50- or 100-year floodplain boundary are not known, the point 5 feet above the OHWL may be used as the boundary location for the 50-year floodplain and 5 ½ feet above the OHWL can be used to represent the 100-year floodplain (see Appendix B).

B. Public Waters: Stocking of nonsalmonid, nonnative fishes in public waters within the 50-year floodplain will not occur except for the following exceptions.

(1) The State of Colorado has developed lake management plans or stocking plans for the following waters in the Upper Basin, excluding the San Juan River Basin, that have been approved by the Service since the inception of the Recovery Program. Stocking of approved species into the following these waters will be routine:

Rio Blanco Reservoir, Colorado  
Purdy Mesa Reservoir, Colorado (formally Hollenbeck Reservoir)  
Mack Mesa Reservoir, Colorado  
Chipeta Lake, Colorado  
Crawford Reservoir, Colorado  
McPhee Reservoir, Colorado  
Harvey Gap Reservoir, Colorado

(2) Routine stocking of largemouth bass, bluegill, black crappie, and triploid grass carp can occur in Corn Lake, the upper Connected Lakes, and Duke Lake once the Colorado Division of Wildlife and the Service have approved for these waters: 1) berming to FEMA specifications to functionally remove them from the 50-year floodplain; 2) screening of the outlets; and 3) the Lake Management Plans. These waters provide important recreational fishing opportunities for kids and others through programs such as Pathways to Fishing.

(3) Lake Management Plans and stocking proposals, that have been previously approved or are evaluated and accepted under these Procedures, may be reviewed at any time by mutual agreement of the Service and the State wildlife agency to insure compatibility with recovery objectives. Approved Lake Management Plans and stocking proposals will be reviewed every five years.

(4) Any party may petition the appropriate State wildlife agency to review an approved Lake Management Plan or stocking proposal based on new information that was not previously considered in the development or evaluation of the proposal.

Isolated public and isolated private waters, having no connection to the river, that are above the 50-year floodplain can be routinely stocked with largemouth bass, black crappie, bluegill, mosquitofish, and triploid grass carp.

Isolated public and isolated private waters, having no connection to the river, that are above the 6,500-foot msl (Appendix D) and above the 100-year floodplain can be routinely stocked with fathead minnow and channel catfish in addition to those species approved for above the 50-year floodplain.

Public and private waters that have a direct connection to rivers in the Upper Colorado River Basin (e.g., Elkhead Reservoir, Highline Reservoir, and many ponds) will be equipped or managed with an anti-escapement device or practice acceptable to the Service and the State fish and wildlife agency. Lake Management Plans will be prepared or revised and approved by the Service and the State fish and wildlife agency before the continued stocking of nonnative, warmwater fish species will be allowed. The Program will pursue funding for equipping public reservoirs with anti-escapement devices.

Stocking of nonnative fishes in public waters, not prohibited, that are not managed in the Upper Basin at the present time will require evaluation by the State wildlife agency and the Service on a case-by-case basis to ensure that the proposed stocking of these fishes will not adversely affect the endangered fishes. Minimum criteria for stocking will include: 1) no stocking of isolated ponds within the 50-year floodplain and 2) if the water has an outlet it must be screened or managed to control escapement. Stocking should be "confined to areas where absence of potential conflict with rare or endangered species can be demonstrated" (U.S. Fish and Wildlife Service 1987). The intent here will be to address escapement potential.

The States and the Service recognize that introducing new fish species, including hybrids, into an ecosystem can result in unanticipated impacts on native fishes. For this reason, few proposals, if any, to introduce new fish species or hybrids into the Upper Basin are anticipated. Introduction of new species will generally be discouraged.

Minimum criteria for stocking will include: 1) no stocking of isolated ponds within the 50-year floodplain and 2) if the water has an outlet, it must be screened or managed to control escapement. Stocking should be "confined to areas where absence of potential conflict with rare or endangered species can be demonstrated" (U.S. Fish and Wildlife Service 1987).

Proposals to stock fishes that do not presently occur in the basin will be subject to case-by-case review by the State wildlife agency and the Service and will include the following minimal information:

- A. The purpose and location of the proposed stocking.
- B. The species, numbers, and rationale for selecting the species.
- C. The potential for escapement, the potential for survival in critical habitat if escapement occurs, and control measures that could be implemented to reduce the risk of escapement.
- D. The potential for impact to threatened and endangered species and the specific measures available to remedy any impacts that may occur including their feasibility and likelihood of success.
- E. A plan for monitoring the effects of stocking nonnative fishes on the endangered Colorado River fishes.

Any proposal to introduce new fish species into the Upper Basin shall also follow the rationale and justification of the American Fisheries Society policy statement "Introductions of Aquatic Species" (Appendix C; Items a-g on Page 52).

Stocking of nonnative, nonsalmonid fish species in rivers within critical habitat or having a direct connection to critical habitat of the Upper Colorado River Basin is unacceptable. Stocking of nonnative, nonsalmonid fish species in the 0- to 50-year floodplain is unacceptable, except as provided in Table 1.

The following fish species would be prohibited from being stocked in any waters in the basin: northern pike, common carp, red shiner, black bullhead, yellow bullhead, wiper, green sunfish, flathead catfish, and white crappie. However, this prohibition does not include fish removed from the river or other problem areas and transplanted to waters already containing these species where escapement is not likely possible or waters created as part of a fish removal plan (subject to minimum criteria and State and Service approval).

#### D. ALTERNATIVE 1

This alternative allows routine stocking of species and in situations that are common to alternatives 2 through 5 (Table 2). All other proposed stocking would be reviewed on a case-by-case basis and follow the steps outlined in Figure 2 and Appendix A. These procedures are the most simple to understand but provides the fewest cases where routine stocking can occur.

Monitoring requirements would be included as part of each approved stocking. Additional monitoring information would be collected through the ISMP.

Table 1. Alternative 1 locations/situations where nonnative fish species can be stocked on a routine basis.

1. All waters of the Upper Basin: salmonids (trout).
2. Waters with "grandfathered" Lake Management Plans<sup>3</sup>: Mack Mesa Lake, McPhee Reservoir, Purdy Mesa Reservoir (formally Hollenbeck Reservoir), Rio Blanco Lake, Chipeta Lake, Crawford Reservoir, and Harvey Gap Reservoir.
3. Lake Management Plans will be prepared for Jerry Creek Reservoir and Juniata Reservoir. After these plans are accepted by the Colorado division of Wildlife and the Fish and Wildlife Service, these waters will be stocked on a routine basis.
4. Once anti-escapement devices are installed on Highline Reservoir and Elkhead Reservoir Lake Management Plans will be revised. After these plans are accepted by the Colorado Division of Wildlife and the Fish and Wildlife Service, these waters will be stocked on a routine basis.
5. Public and private isolated ponds above the 50-year floodplain: largemouth bass, black crappie, bluegill, mosquitofish, triploid grass carp<sup>4</sup>.
6. Any waters above Flaming Gorge Dam: channel catfish, mosquitofish, redbreast shiner, smallmouth bass.
7. Warmwater gamefish that are removed from the river or other problem areas can be transplanted to waters already containing that species once approved by the State and the Fish and Wildlife Service or waters created as part of a fish removal plan.
8. Warmwater species into standing waters above existing reservoirs where a reproducing population of that species exist once a Lake Management Plan has been approved by the involved State and Fish and Wildlife Service.
9. Routine stocking of largemouth bass, black crappie, bluegill, and certified triploid grass carp in:
  - a. Corn Lake, the upper ponds of Connected Lakes, and Duke Lake<sup>5</sup> once these waters have been bermed to FEMA specifications to functionally remove them from the 50-year floodplain and outlets screened to prevent escapement.
  - b. Private ponds that have been bermed to FEMA standards to functionally remove them from the 50-year floodplain, outlets screened to prevent escapement, and have already been approved for stocking the above species into that pond after an initial case-by-case review.

<sup>3</sup> Stocking limited to species approved within that management plan.

<sup>4</sup> Triploid grass carp include only those that have a certificate of genetic triploidy.

<sup>5</sup> These ponds provide important urban recreational fishing opportunities for kids and others.

Table 2. Alternative 1 locations/situations where nonnative fish species can be stocked on a routine basis.

<ol style="list-style-type: none"><li>1. All waters of the Upper Basin: salmonids (trout).</li><li>2. Largemouth bass, bluegill, black crappie, channel catfish, fathead minnow, mosquitofish, and triploid grass carp in isolated waters located outside of the 100-year floodplain.</li><li>3. Striped bass and threadfin shad in Lake Powell.</li><li>4. Channel catfish, mosquitofish, redbreast shiner, and smallmouth bass in all waters upstream of Flaming Gorge Dam.</li><li>5. Strawberry Reservoir: smallmouth bass.</li></ol>
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#### E. ALTERNATIVE 2

This alternative would allow stocking of largemouth bass, bluegill, black crappie, triploid grass carp, and mosquitofish in isolated ponds above the 50-year floodplain of critical habitat in ponds that are bermed to FEMA standards five feet above the Ordinary High Water Line (OHWL) and in connected waters that are adequately screened. Largemouth bass, bluegill, black crappie, channel catfish, triploid grass carp, mosquitofish, and fathead minnows could be routinely stocked in isolated ponds and reservoirs upstream of critical habitat if bermed to FEMA standards five feet above the OHWL. The following fish species would be prohibited from being stocked in any waters in the basin: northern pike, tiger muskie, common carp, red shiner, black bullhead, wiper, green sunfish, yellow perch, walleye, and white crappie.

Prior to implementing the routine stocking, the Recovery Program would conduct a peer reviewed study to evaluate the effectiveness of the ISMP to detect changes in the survivability and/or abundance of routinely stocked fish. Unless the study conclusively demonstrated that the ISMP is effective for tracking nonnative fishes, a program would have to be implemented to do so. If it is determined that nonnative fish escapement is occurring or that the survivability and abundance of a nonnative species is increasing in occupied habitat, then routine stocking of that species would be discontinued. Subsequent stockings of that species would then require case-by-case review until the problem is addressed.

Instances when and where nonnative fishes can be stocked on a routine basis (not requiring a case-by-case review) are presented in Table 3. Stocking of nonnative fishes that are not managed or not prohibited in the Upper Basin at the present time or are not included under routine stocking would require evaluation on a case-by-case basis to ensure that the proposed stocking of these fishes will not adversely affect the endangered fishes.

#### F. ALTERNATIVE 3

This alternative would confine stocking of fish except trout to above the 100-year floodplain in river reaches that are designated as critical habitat, would not condone the use of artificial dikes to remove ponds from the 100-year floodplain of critical habitat, and would not allow stocking (except trout) in connected waters regardless of proposed screening measures. The following fish species would be prohibited from being stocked in any waters in the basin: northern pike, tiger muskie, common carp, red shiner, black bullhead, wiper, green sunfish, yellow perch, walleye, and white crappie.

Prior to implementing the routine stocking, the Recovery Program would conduct a peer reviewed study to evaluate the effectiveness of the ISMP to detect changes in the survivability and/or abundance of routinely stocked fish. Unless the study conclusively demonstrated that the ISMP for tracking nonnative fishes, a program would have to be implemented to do so. If it is determined that nonnative fish escapement is occurring or that the survivability and abundance of a nonnative species is increasing in occupied habitat, then routine stocking of that species would be discontinued. Subsequent stockings of that species would then require case-by-case review until the problem is addressed.

Instances when and where nonnative fishes can be stocked on a routine basis (not requiring a case-by-case review) are presented in Table 4. Stocking of nonnative fishes that are not managed or not prohibited in the Upper Basin at the present time or are not included under routine stocking would require evaluation on a case-by-case basis to ensure that the proposed stocking of these fishes will not adversely affect the endangered fishes.

Table 3. Alternative 2 locations/situations where nonnative fish species can be stocked on a routine basis.

<p>A. Locations/situations where nonnative fish species can be stocked on a routine basis:</p> <ol style="list-style-type: none"><li>1. All waters of the Upper Basin: salmonids (trout).</li><li>2. Isolated ponds/reservoirs that are within the 50-year floodplain of river reaches upstream from critical habitat and that are bermed to FEMA specifications five feet above the OHWL: largemouth bass, black crappie, bluegill, channel catfish, fathead minnow, mosquito fish, triploid grass carp<sup>6</sup>.</li><li>3. Lake Powell: striped bass, threadfin shad.</li><li>4. Any waters above Flaming Gorge Dam: channel catfish, mosquitofish, redbreast shiner, smallmouth bass.</li><li>5. Strawberry Reservoir: smallmouth bass.</li><li>6. Routine stocking of largemouth bass, black crappie, bluegill in:<ol style="list-style-type: none"><li>a. Isolated ponds/reservoirs that are located above the 50-year floodplain for river reaches designated as critical habitat and that are bermed to FEMA specifications five feet above the OHWL.</li><li>b. Connected (to river reaches designated as critical habitat) ponds/reservoirs with facilities or operations that will prevent escapement of all but the eggs and larvae of these routinely stocked nonnative fishes.</li></ol></li></ol>
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Table 4. Alternative 3 locations/situations where nonnative fish species can be stocked on a routine basis.

<p>A. Locations/situations where nonnative fish species can be stocked on a routine basis:</p> <ol style="list-style-type: none"><li>1. All waters of the Upper Basin: salmonids (trout).</li><li>2. Isolated (no connection with the river system) ponds/reservoirs that are within the 100-year floodplain of river reaches upstream from critical habitat and that are bermed to FEMA specifications five feet above the OHWL: largemouth bass, black crappie, bluegill, channel catfish, fathead minnow, mosquito fish, triploid grass carp<sup>7</sup>.</li><li>3. Lake Powell: striped bass, threadfin shad.</li><li>4. Any waters above Flaming Gorge Dam: channel catfish, mosquitofish, redbreast shiner, smallmouth bass.</li><li>5. Strawberry Reservoir: smallmouth bass.</li><li>6. No other routine stocking within the 100-year floodplain for river reaches designated as critical habitat or in ponds/reservoirs connected to such river reaches.</li></ol>
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<sup>6</sup> Triploid grass carp include only those that have a certificate of genetic triploidy.

<sup>7</sup> Triploid grass carp include only those that have a certificate of genetic triploidy.

#### G. ALTERNATIVE 4

This alternative includes provisions to allow stocking of largemouth bass, bluegill, and black crappie in isolated ponds outside the 10-year floodplain of critical habitat, in ponds that are bermed to FEMA standards to artificially place them outside the 10-year floodplain of critical habitat, and in connected waters that are adequately screened (both those above the 10-year floodplain and those bermed to FEMA standards for the 10-year floodplain).

Under this alternative all standing waters located upstream of other standing waters (lakes or reservoirs higher in the drainage than one other lake or reservoir) could be stocked with any species already established in the downstream standing water (for example, smallmouth bass in Strawberry Reservoir because a reproducing population already exists downstream in Starvation Reservoir, Utah).

This alternative would allow the routine stocking of largemouth bass, bluegill, black crappie, channel catfish, mosquitofish, and fathead minnows in all isolated waters located 5 feet above the Ordinary High Water Line, without FEMA approved dikes and in all isolated waters located above an elevation of 6,500-foot msl (Figure 1).

Monitoring of changes in the nonnative fish populations in habitat occupied by the endangered fish for fish that are stocked on a routine basis will be done through the Recovery Programs Inter-Agency Standardized Monitoring Program and/or other studies being conducted by the Recovery Programs or State wildlife agencies.

Instances when and where nonnative fishes can be stocked on a routine basis (not requiring a case-by-case review) are presented in Table 5. Stocking of nonnative fishes that are not managed in the Upper Basin at the present time or are not included under routine stocking would require evaluation on a case-by-case basis to ensure that the proposed stocking of these fishes will not adversely affect the endangered fishes.

#### H. ALTERNATIVE 5

This alternative is similar to alternative 4 in that it provides more cases where routine stocking can occur than alternatives 2 and 3. The primary difference between this alternative and alternative 4 is that, alternative 4 states that a pond can be bermed to FEMA specification to functionally remove it from the portion of the floodplain in question. This alternative has no berming requirements or opportunities but states that limitations placed on stocking within a specific floodplain have no exceptions. Situations that require a case-by-case review for this alternative are identical to alternative 1.

Monitoring of changes in the nonnative fish populations in habitat occupied by the endangered fish for fish that are stocked on a routine basis will be done through the Recovery Programs Inter-Agency Standardized Monitoring Program and other studies being conducted by the Recovery Programs or State wildlife agencies. This requirement is identical to alternative 1.

Instances when and where nonnative fishes can be stocked on a routine basis (not requiring a case-by-case review) are presented in Table 6. Stocking of nonnative fishes that are not managed in the Upper Basin at the present time or are not included under routine stocking would require evaluation on a case-by-case basis to ensure that the proposed stocking of these fishes will not adversely affect the endangered fishes.

Table 5. Alternative 4 locations/situations where nonnative fish species can be stocked on a routine basis.

LOCATION/SITUATION	NONNATIVE FISH SPECIES <sup>8</sup>												
	BLC	BLG	CHC	FHM	LMB	MOS	RSS	SAL	SMB	STB	TFS	TGC	UTC
All waters in the Upper Basin													
Isolated ponds/reservoirs within critical habitat above the 50-year floodplain	X	X			X			X				X <sup>9</sup>	
Isolated ponds within critical habitat that are located between the 10- and 50-year floodplain of the Colorado and Gunnison Rivers.	X	X			X								
Ponds within critical habitat that are located in the 10-year floodplain of the Colorado and Gunnison Rivers that have a FEMA approved dike for a 10-year flood event.	X	X			X								
Isolated ponds/reservoirs outside critical habitat at or below 6,500-foot msl and 5 vertical feet above the OHWL <sup>10</sup>	X	X	X	X	X	X						X <sup>2</sup>	
Isolated ponds/reservoirs above 6,500-foot msl <sup>11</sup>	X	X	X	X	X	X	X					X <sup>2</sup>	
Ponds screened to prevent escapement by State requirements												X <sup>2</sup>	
Standing waters separated from occupied habitat by standing waters with established reproducing populations of the same species <sup>12</sup>	X	X	X	X	X	X			X				
Lake Powell													
Any waters (lakes/ponds/reservoirs) above Flaming Gorge Dam	X		X		X	X			X				
Standing waters in Utah sub-basins where the fish currently exists													X
Facilities that will prevent escapement													

<sup>8</sup> The abbreviations used for fish species are BLC - black crappie; BLG - bluegill; CHC - channel catfish; FHM - fathead minnow; LMB - largemouth bass; MOS - mosquitofish; RSS - redside shiner; SAL - salmonids; SMB - smallmouth bass; STB - striped bass; TFS - threadfin shad; TGC - triploid grass carp; UTC - Utah chub.

<sup>9</sup> Triploid grass carp must have a certificate of genetic triploidy to be stocked.

<sup>10</sup> OHWL = Ordinary high water line.

<sup>11</sup> msl = mean sea level.

<sup>12</sup> For example, above Starvation Reservoir in Utah and above McPhee Reservoir in Colorado.

Table 6. Alternative 5 locations/situations where nonnative fish species can be stocked on a routine basis.

LOCATION/SITUATION	NONNATIVE FISH SPECIES <sup>13</sup>												
	BLC	BLG	CHC	FHM	LMB	MOS	RSS	SAL	SMB	STB	TFS	TGC	UTC
All waters in the Upper Basin								X					
Isolated ponds/reservoirs within critical habitat above the 50-year floodplain	X	X			X							X <sup>14</sup>	
Isolated ponds within critical habitat that are located between the 10- and 50-year floodplain of the Colorado and Gunnison Rivers	X	X			X								
Isolated ponds/reservoirs outside critical habitat at or below 6,500-foot msl and 5 vertical feet above the OHWL <sup>15</sup>	X	X	X	X	X	X						X <sup>9</sup>	
Isolated ponds/reservoirs above 6,500-foot msl <sup>16</sup>	X	X	X	X	X	X	X					X <sup>9</sup>	
Ponds screened to prevent escapement by State requirements												X <sup>9</sup>	
Standing waters separated from occupied habitat by standing waters with established reproducing populations of the same species <sup>17</sup>	X	X	X	X	X	X			X				
Lake Powell										X	X		
Any waters (lakes/ponds/reservoirs) above Flaming Gorge Dam			X			X	X		X				
Standing waters in Utah sub-basins where the fish currently exists													X
Facilities that will prevent escapement						X							

<sup>13</sup> The abbreviations used for fish species are BLC - black crappie; BLG - bluegill; CHC - channel catfish; FHM - fathead minnow; LMB - largemouth bass; MOS - mosquitofish; RSS - reddsider shiner; SAL - salmonids; SMB - smallmouth bass; STB - striped bass; TFS - threadfin shad; TGC - triploid grass carp; UTC - Utah chub.

<sup>14</sup> Triploid grass carp must have a certificate of genetic triploidy to be stocked.

<sup>15</sup> OHWL = Ordinary high water line.

<sup>16</sup> msl = mean sea level.

<sup>17</sup> For example, above Starvation Reservoir in Utah and above McPhee Reservoir in Colorado.

## I. SUMMARY OF ALTERNATIVES

Tables 7-9 summarize some of the similarities and differences between the alternatives. However, not all of the stocking situations are covered in these tables. More information is contained under the description of each alternative.

Table 7. List of nonnative fish species (common names) that occur in the Upper Colorado River Basin, but are not currently managed (stocked) and their status under each of the alternatives (C/C = case-by-case review; No = Prohibited from being stocked; Yes = could be stocked without case-by-case review).

Fish Species	Preferred Alternative	No Action <sup>18</sup>	Alt # 1	Alt # 2	Alt # 3	Alt # 4	Alt # 5
Plains topminnow, creek chub, leatherside chub, lake chub, longnose dace, brassy minnow, sand shiner, golden shiner, common shiner, longnose sucker, Utah sucker, white sucker, yellow bullhead, Iowa darter, Johnny darter, plains killifish	No Some C/C	Yes	C/C	C/C	C/C	C/C	C/C
Northern pike	No	Yes	C/C	No	No	C/C	C/C
Tiger muskie	Yes (in Harvey Gap Res.)	Yes	C/C	No	No	C/C	C/C
Common carp	No	Yes	C/C	No	No	C/C	C/C
Red shiner	Only above Flaming Gorge Dam	Yes	C/C	No	No	C/C	C/C
Black bullhead	No	Yes	C/C	No	No	C/C	C/C
Wiper	C/C	Yes	C/C	No	No	C/C	C/C
Green sunfish	No	Yes	C/C	No	No	C/C	C/C
Yellow perch	C/C	Yes	C/C	No	No	C/C	C/C
Walleye	C/C	Yes	C/C	No	No	C/C	C/C
White crappie	No	Yes	C/C	No	No	C/C	C/C

<sup>18</sup> Stocking under the "No Action" alternative would be completely at the discretion of the State fish and wildlife agency. Some of these species would probably never be considered for stocking by the States.

Table 8. Comparison of alternatives in regards to floodplain pond fish stocking within critical habitat.

Management/Prevention Activity and/or Strategy	Preferred Alternative	Alt # 1	Alt # 2	Alt # 3	Alt # 4	Alt # 5
<b>Trout stocking: encouraged</b>						
0-10 yr	Yes	Yes	Yes	Yes	Yes	Yes
10-50 yr	Yes	Yes	Yes	Yes	Yes	Yes
50-100 yr	Yes	Yes	Yes	Yes	Yes	Yes
>100 yr	Yes	Yes	Yes	Yes	Yes	Yes
<b>Stock largemouth bass, bluegill, and black crappie: isolated/screened ponds</b>						
0-10 yr	Yes <sup>19</sup>	*C/C	No	No	Yes <sup>20</sup>	No
10-50 yr	Yes <sup>21</sup>	C/C	No	No	Yes	Yes
50-100 yr	Yes <sup>22</sup>	C/C	Yes	No	Yes	Yes
>100 yr	Yes <sup>21</sup>	Yes	Yes	Yes	Yes	Yes
<b>Certified triploid grass carp: isolated/screened ponds</b>						
0-10 yr	Yes <sup>20</sup>	C/C	No	No	Yes	No
10-50 yr	Yes <sup>20</sup>	C/C	No	No	Yes	No
50-100 yr	Yes <sup>21</sup>	C/C	Yes	Yes	Yes	Yes
>100 yr	Yes <sup>21</sup>	Yes	Yes	Yes	Yes	Yes

\*C/C would require a case-by-case review prior to occurring.

<sup>19</sup> Stocking under this alternative would be at the discretion of the private pond owner, but would probably not occur unless the pond was bermed to FEMA standards for the 50-year floodplain.

<sup>20</sup> Stocking permitted only if pond bermed to FEMA standards; 5 feet above OHWL.

<sup>21</sup> Stocking under this alternative would be at the discretion of the private pond owner, but pond must be bermed to FEMA standards for the 50-year floodplain.

<sup>22</sup> Private ponds only.

Table 9. Comparison of alternatives for future warmwater fish stocking and management outside or above critical habitat.

Management/Prevention Activity and/or Strategy	Preferred Alternative	Alt # 1	Alt # 2	Alt # 3	Alt # 4	Alt # 5
Five "grandfathered" Lake Management Plans	Yes	Yes	Yes	Yes	Yes	Yes
Striped bass and threadfin shad in Lake Powell	No	Yes	Yes	Yes	Yes	Yes
Stock CHC <sup>23</sup> , MOS, RSS and SMB above Flaming Gorge Dam	Yes	Yes	Yes	Yes	Yes	Yes
Stock Utah chub in standing waters in Utah where it currently exists	C/C	Yes	Yes	Yes	Yes	Yes
LMB, BLG, BLC, CHC, FHM and MOS in isolated waters outside critical habitat and above 6,500-foot msl	Yes	*C/C	Yes <sup>24</sup>	Yes <sup>23</sup>	Yes	Yes
Stock SMB in standing waters above Starvation Reservoir, Utah	Yes	Yes	Yes	Yes	Yes	Yes
Continue to stock tiger muskie in Harvey Gap Reservoir	Yes	C/C	No	No	Yes	Yes

\*C/C would require a case-by-case review prior to occurring.

<sup>23</sup> The abbreviations used for fish species are BLC - black crappie; BLG - bluegill; CHC - channel catfish; FHM - fathead minnow; LMB - largemouth bass; MOS - mosquitofish; RSS - redbreast shiner; SAL - salmonids; SMB - smallmouth bass; STB - striped bass; TFS - threadfin shad; TGC - triploid grass carp; UTC - Utah chub.

<sup>24</sup> Stocking permitted only if pond bermed to FEMA standards; 5 feet above OHWL.

## IV. DESCRIPTION OF THE ENVIRONMENT

### A. Aquatic Biological Resources

Forty-two nonnative fish species and subspecies have been introduced into the Upper Colorado River Basin (Tyus et al. 1982). However, not all of these were intentionally stocked for sport fishing purposes. A brief description of the major species addressed by the stocking procedure alternatives is presented below. Much of this information was extracted from a report entitled "Options for Selective Control of Nonnative Fishes in the Upper Colorado River Basin" by Lentsch et al. (1995). Additional information on the species discussed below and on other species can be obtained from Lentsch et al. (1995).

1. Colorado squawfish: This species is endemic (occurs here and nowhere else) to the Colorado River Basin. It is the largest member of the minnow family in North America. Once very common throughout the Colorado River Basin, its present range is restricted to rivers in the Upper Basin. Populations on the middle Green and Yampa Rivers are doing fairly well. Populations elsewhere are characterized by low numbers, but with some recruitment.

2. Razorback sucker: This species is also endemic to the Colorado River Basin. It was probably the most abundant and widespread of all the endangered fishes of the Basin. Remnant populations remain only in the Green River in the Upper Basin and Lake Mohave in the Lower Basin. Fish spawning occurs in both locations, but recruitment is limited due to predation from other fishes. These fish are currently being stocked in the Green and Gunnison Rivers to augment low numbers.

3. Humpback chub: This fish species is also endemic to the Colorado River Basin. Its early distribution is not well documented because this species occurs in canyon reaches that generally are not very accessible. The largest remaining population of this species in the Upper Basin is located in the Black Rocks and Westwater Canyon areas near the Utah/Colorado border.

4. Bonytail: The bonytail is also endemic to the Colorado River Basin and is considered the rarest native fish. Although this species appeared abundant in the system in the late 1800's, their disappearance coincides with construction of dams first in the Lower Basin and then in the Upper Basin. This species was considered extirpated from the Upper Basin, but it is currently being reintroduced into the Green River.

5. Largemouth bass: The native distribution is believed to be from northeastern Mexico east to Florida and north to southern Quebec and Ontario. Largemouth bass have been introduced throughout the Colorado River Basin, primarily in lakes, reservoirs and ponds. Although, not stocked directly into the mainstem rivers, bass that escape from standing waters move into low velocity habitats (the same habitats used by young endangered fishes). Their diet includes other fishes.

Largemouth bass were ranked 7th on the list of 28 nonnative fish species considered to adversely impact the native fishes in the Colorado River Basin (Hawkins and Nesler 1991).

6. Bluegill: The native distribution is in eastern and central North America from the Great Lakes to the Gulf of Mexico. Bluegill have been widely introduced in the Colorado River Basin in habitats similar to and often in association with largemouth bass. Although, not stocked directly into the mainstem rivers, fish that escape from standing waters move into low velocity habitats (the same habitats used by young endangered fishes). Their diet includes other fishes. Bluegill were ranked 11th on the list of 28 nonnative fish species considered to adversely impact the native fishes in the Colorado River Basin (Hawkins and Nesler 1991).

7. Black crappie: The native distribution is along the Atlantic Coast from Florida to Virginia, south along the Gulf Coast to central Texas, north to North Dakota and east to the Appalachian Mountains. This species has been introduced in standing waters of the Upper Colorado River Basin. Black crappie were not identified as a problem in 1991 by Hawkins and Nesler, however recent capture of large numbers in nursery areas in the Green River have raised concern about this piscivore (fish eater).

8. Channel catfish: The native distribution of this species is primarily the central drainages (Mississippi and Missouri Rivers) of the United States. Its native distribution may have also included portions of the Atlantic Coast. This species has been introduced into the mainstem rivers, lakes, reservoirs, and ponds in the Upper Colorado River. Their diet includes other fishes. Channel catfish were ranked 1st on the list of 28 nonnative fish species considered to adversely impact the native fishes in the Colorado River Basin (Hawkins and Nesler 1991).

9. Red shiner: The native distribution is in the Mississippi and Gulf drainages, from South Dakota through Illinois and from Louisiana westward into northern Mexico. This fish became established throughout the Colorado River Basin primarily through bait bucket transfers (being used as a baitfish, but released into a water where it did not previously occur). Known to eat larvae (newly hatched) endangered fishes. Red shiner were ranked 2nd on the list of 28 nonnative fish species considered to adversely impact the native fishes in the Colorado River Basin (Hawkins and Nesler 1991).

10. Mosquitofish: Their native distribution is in the central United States from southern Illinois and Indiana south to Veracruz, Mexico and Florida, and north along Atlantic slope to southern New Jersey. This fish has been introduced extensively in the Upper Basin for mosquito control. Occurs in standing waters and low velocity river habitats. Occasionally eats other fish, probably competes with native fishes for

food resources. Mosquitofish were ranked 8th on the list of 28 nonnative fish species considered to adversely impact the native fishes in the Colorado River Basin (Hawkins and Nesler 1991).

11. Fathead minnow: Their native distribution is in Central North America, from the east slope of the Rocky mountains east to the Appalachian mountains. Commonly introduced as a food source for sport fish and spread though use as a baitfish in the Colorado River Basin. Found in a variety of habitats including rivers, lakes, reservoirs, and ponds. Has been shown to eat larvae of other species, and is also considered a competitor with young endangered fishes. Fathead minnow were tied for 5th on the list of 28 nonnative fish species considered to adversely impact the native fishes in the Colorado River Basin (Hawkins and Nesler 1991).

12. Common carp: Their native distribution is the temperate regions of Europe and Asia. Introduced into the Colorado River drainage in the late 1800's as a food fish. Found in a variety of habitats including rivers, lakes, reservoirs, and ponds. Eat larvae of other fishes including Colorado squawfish and razorback sucker. Also competes with other fishes for food and other resources. Common carp were ranked 4th on the list of 28 nonnative fish species considered to adversely impact the native fishes in the Colorado River Basin (Hawkins and Nesler 1991).

13. Smallmouth bass: Their native distribution is in the United States from the Great Lakes south to the Tennessee River system in Alabama and west to eastern Oklahoma. This fish has been introduced into the Upper Colorado River as a sport fish. Escapement from reservoirs in the Yampa and Green rivers and establishment of a reproducing population in the Duchesne River has greatly increased the abundance of this species. Its diet includes other fish. Smallmouth bass were ranked 10th on the list of 28 nonnative fish species considered to adversely impact the native fishes in the Colorado River Basin (Hawkins and Nesler 1991).

14. Northern pike: Their native distribution in the United States is primarily from Nebraska east to the Appalachian Mountains, but also includes parts of Alaska. This fish was first introduced in the Upper Colorado River Basin (Elkhead Reservoir, Colorado) in 1977 as a sport fish. Their habitat ranges from lakes to rivers. Their diet is primarily other fish. Impacts include predation on and competition with native fishes. Northern pike were ranked 3rd on the list of 28 nonnative fish species considered to adversely impact the native fishes in the Colorado River Basin (Hawkins and Nesler 1991).

15. Tiger muskie: Tiger muskie are a hybrid cross between northern pike and muskellunge. Known as a top predator and introduced as a sport fish. Diet consists primarily of other fishes. Recently introduced in the Upper Colorado River Basin in Harvey Gap Reservoir in Colorado (as a sport fish) and Forsyth and Mill Meadow reservoirs in Utah (as part of a whirling disease control study; to be removed in 1996). This species does not reproduce and therefore must be

maintained by stocking. Because this species is a recent introduction to the Basin, it was not included in Hawkins and Nesler (1991).

16. Green sunfish: The native distribution of this species is in North America east of the Continental Divide and west of the Appalachian Mountains, from the Great Lakes region south to the Gulf of Mexico. Introduced primarily as prey for other fish. Diet includes other fishes. Known to eat eggs and larvae of endangered fishes and considered a competitor. Green sunfish were tied for 5th on the list of 28 nonnative fish species considered to adversely impact the native fishes in the Colorado River Basin (Hawkins and Nesler 1991).

17. White crappie: Their native distribution is east central North America from Minnesota west to the Appalachian Mountains south to the Gulf Coast and west to Texas. Incidental catches of this species have occurred in Navajo Reservoir, New Mexico. This species has a greater tolerance for turbid waters and would likely fare better than black crappie in mainstem habitats. Diet includes other fishes. White crappie were ranked 28th on the list of 28 nonnative fish species considered to adversely impact the native fishes in the Colorado River Basin (Hawkins and Nesler 1991). Their low ranking is related to their limited distribution in the Basin.

18. Grass carp: Their native range is Asia, primarily China and Thailand. Have been introduced into the United States as a vegetation control. Only triploid grass carp are being used in the Upper Basin, because they lack the ability to reproduce. This allows their numbers and distribution to be controlled. Habitats include lakes, reservoirs, ponds, rivers, and irrigation ditches. Not known to prey on other fishes, but can alter habitats of other fishes by changing vegetation. This species was not included on the list of 28 nonnative fish species by Hawkins and Nesler (1991), though considered by many as undesirable in mainstem rivers.

## B. Recreational Fishing

1. Colorado: Anglers fished approximately 8.2 million days in 1991; each angler fished an average of 12.1 days each (Colorado Division of Wildlife 1992). Seventy-nine percent of this fishing occurred in coldwater lakes and streams. The remaining 21 percent was in cool and warm waters. In the nine counties of the northwest region of Colorado (area representing the Upper Basin), anglers fished 955,398 days (23 percent) of the State total. Over 70 percent of this fishing was in cold water habitats. Fishing for warmwater species (black crappie, largemouth bass, catfish, etc.) represented about six percent of the fishing effort. Warmwater fishing in the northwest region accounts for about 9.5 percent of the total warmwater fishing in Colorado. The Colorado Division of Wildlife would like to increase warmwater fishing opportunities in western Colorado.

A survey of warmwater anglers in Delta, Garfield, Mesa, and Montrose counties concluded that anglers fished most often for catfish (36

percent) and largemouth bass (25 percent; Colorado Division of Wildlife 1996). In ponds that would be reclaimed through Recovery Program efforts, 75 percent supported restocking with largemouth bass, bluegill, and black crappie, 52 percent supported restocking with only trout. Sixty-three percent of the anglers reported that they were satisfied with local fishing opportunities. When asked which type of warmwater fishing opportunity they would like to see, the greatest percentage (44 percent) stated they would like more large reservoirs.

2. Utah: Anglers in Utah fished 2.7 million days in 1991 (U.S. Department of the Interior 1993) and increased to 5.6 million days in 1996. Of this, approximately 30 percent of the days were spent warmwater fishing. Currently, Utah's only plan for stocking warmwater species in the Upper Basin is possibly smallmouth bass in Strawberry Reservoir in the Duchesne River drainage.

3. Wyoming: In 1994, Wyoming issued 115,148 resident fishing licenses. Anglers currently fish an estimated 4.2 days annually. Comparisons between in 1988 and 1994 indicated that anglers places less importance on catching fish and more on the aesthetic features of this activity (Wenzel and Hubert 1995). The desire to have more warmwater fishing also declined from 1988 to 1994. However, recent fishing pressure surveys indicate a continued increase in reservoir and warmwater demand. Most anglers preferred fishing for trout (especially wild trout).

#### C. Recovery of Endangered Fishes

In a survey conducted by Colorado State University (1995), 75 percent of the respondents and 72 percent of the anglers felt that stocking of nonnative fish should only be done if it does not harm endangered fishes. Only 34 percent of the respondents supported the practice of stocking nonnative fishes in the Upper Colorado River Basin, although 54 percent supported stocking mosquitofish and grass carp for insect and vegetation control, respectively. Warmwater anglers in Delta, Garfield, Mesa, and Montrose counties, Colorado opposed (55 percent) recovery efforts for the endangered fish that included removing warmwater sport fish from ponds next to the river; 32 percent of the warmwater anglers supported this proposed practice (Colorado Division of Wildlife 1996).

#### D. Economy

1. Water Development: The Recovery Program for the endangered fishes in the Upper Basin was established as a way to recover the fish while allowing water development to proceed. By implementing recovery actions such as floodplain restoration, broodstock development, and controlling nonnative fishes, the recovery program serves as a reasonable and prudent alternative for section 7 compliance with the Endangered Species Act. This simplifies the regulatory requirements for water development projects both large and small. Without the Recovery Program continuing to make sufficient progress towards

recovery, billions of dollars of water development and subsequent economic growth could be impacted. The ability of the Recovery Program to serve as a reasonable and prudent alternative for water development was reduced in 1996. One reason for this was the lack of action to address nonnative fish problems and implement solutions. Stocking procedures that contribute significantly towards the recovery of the fish will, in part, allow the Recovery Program to serve as a reasonable and prudent alternative for water development. Stocking procedures that do not adequately address the nonnative fish issues will not serve as a reasonable and prudent alternative.

2. Aquaculture Industry: Most fish stocked into private ponds come from privately owned aquaculture facilities. Aquaculture facilities produce fish for stocking as well as for consumption. Some facilities serve as a middle man, acquiring fish from other locations for stocking into private ponds. Species commonly sold by these facilities include rainbow trout, channel catfish, largemouth bass, bluegill, mosquitofish, and triploid grass carp. Ponds stocked with warmwater fish usually do not require annual stockings; some rainbow trout waters require stocking each year. Markets for triploid grass carp are increasing throughout the West, due to its' ability to control vegetation. Warmwater fish stocking in the last five years occurred in four percent of the ponds along the Colorado River representing 20 percent of the surface acres.

3. Private Ponds: Mitchell (1995) identified 308 ponds representing 878 surface acres along the Gunnison and Colorado rivers; a few ponds also exist along the White and Yampa rivers. For comparative purposes, Harvey Gap Reservoir is 196 surface acres and Taylor Draw Reservoir on the White River is 615 surface acres. On the Colorado River, 73 percent of the ponds are privately owned and 44 percent of the ponds on the Gunnison River are privately owned (Mitchell 1995). Nine percent of warmwater anglers surveyed in western Colorado reported that they fished in private ponds (Colorado Division of Wildlife 1996). Only one pond owner that reported along the Gunnison River indicated that his pond was used for fishing, and that was for rainbow trout. For ponds on the Colorado River, fishing was reported in ponds representing about 105 surface acres. Twenty-three surface acres contained only largemouth bass, bluegill, and/or black crappie. Many of the others contained channel catfish, in addition to largemouth bass, bluegill, and/or black crappie. At least one pond reported that it contained grass carp. The survey did not include the Yampa or White Rivers.

Mapping the floodplain revealed little difference (only a few inches in elevation) between the 50- and 100-year floodplains (Colorado Water Conservation Board 1995; Appendix D). The boundaries of these two floodplains generally overlap. Mitchell (1995) surveyed pond owners, in part, to determine what ponds contained fish. Of the 246 ponds Mitchell surveyed between Palisade and Loma, Colorado, 55 were above the 100-year floodplain, none were located between the 50-100 year floodplains, 55 were between the 10-50 year floodplain, and 136 were below the 10-year floodplain. For the Gunnison River between Delta and

the confluence with the Colorado River for which floodplain information existed (17 ponds), none were above the 100-year floodplain, 9 were located between the 50-100 year floodplains, 6 were between the 10-50 year floodplain, and 2 were below the 10-year floodplain. Maps with sufficient detail were not available to determine the 10-year floodplain boundaries on other rivers.

Less than five ponds have been permitted for warmwater fishes in the Green River Basin in Utah. Most pond permits issued in Utah have been for salmonids (trout). It is unknown whether any of the ponds containing warmwater fish are in the floodplain. The last pond permitted in Utah for warmwater fish followed the draft stocking procedures that were being considered at that time. They therefore located the pond above the floodplain. No private ponds used for warmwater fishing are known to occur in the portion of Wyoming covered by these procedures. The only floodplain pond is near the Town of Baggs along the Little Snake River and is stocked with trout provided by the Wyoming Game and Fish Department.

## V. IMPACT ASSESSMENT/ENVIRONMENTAL CONSEQUENCES

While physical habitat parameters have an influence on the ability of a species to compete against other species, the evolutionary history of both species also plays an important role. Species that evolved in river basins supporting large numbers of species are usually more aggressive and successful competitors than species from depauperate basins. As discussed previously, the Colorado River Basin fish fauna is a depauperate one and competition was limited. Most of the introduced nonnative fish species are from basins with larger and more varied fish faunas, and evolved in very competitive environments.

Nonnative fish may physically compete for space and food with native species. Other adverse effects include direct predation, harassment or the introduction of diseases or parasites. Predation, especially on egg, larval and juvenile stages, is a significant factor in determining population survival through the effects to recruitment. Research has shown that nonnative fish play an important role in suppressing native fish recruitment. Spawning adults of the four Colorado River endangered fish can be found during the breeding seasons. Actual spawning has been documented for all species and larvae have also been found. Yet recruitment of juveniles into these populations is very low.

Tyus and Saunders (1996) summarized scientific studies in the Colorado River Basin that documented predation as follows: "Direct proof of predation by nonnative fishes on the native species in the Colorado River basin included reports by Jonez and Sumner (razorback sucker eggs eaten by common carp; 1954); Coon (Colorado squawfish eaten by channel catfish; 1965), Taba (Colorado squawfish and chubs eaten by bullheads; 1964), Meffe (Sonoran topminnow eaten by mosquitofish; 1985); Langhorst and Marsh (razorback sucker eaten by green sunfish; 1986), Hendrickson and Brooks (Colorado squawfish eaten by smallmouth bass and bullheads;

1987), Osmundson (Colorado squawfish eaten by largemouth bass, green sunfish, black crappie, and black bullhead; 1987), Marsh and Brooks (razorback sucker eaten by channel and flathead catfishes; 1993); Ruppert et al. bluehead sucker eaten by red shiner; 1993); Crowl and Lentsch (Colorado squawfish eaten by northern pike; 1995), Mueller (razorback sucker eaten by sunfishes and largemouth bass; 1995), Muth and Beyers (Colorado squawfish and razorback sucker larvae eaten by channel catfish and green sunfish; in press), Nesler (roundtail chub, speckled dace, bluehead and flannelmouth suckers eaten by northern pike; 1995), and Valdez and Ryel (humpback chub eaten by brown and rainbow trouts and channel catfish; 1995). Razorback sucker eggs and larvae are eaten by channel catfish, green sunfish and carp (Medel-Ulmer 1983, Minckley 1983, Langhorst 1987, Marsh and Langhorst 1988)."

The other potential effects to native fish from nonnative species are more difficult to quantify. Harassment of native species by nonnative fish can include nonpredatory attacks that disrupt sheltering, breeding or feeding behavior or the elimination of habitat features (e.g. aquatic vegetation) utilized by the native species. These types of actions make it more difficult for the native fish to successfully utilize a specific habitat, thus contributing to declines in or the local extinction of the population. The role of nonnative fish introductions in the spread of new diseases and parasites in the Basin has not been fully evaluated. The spread of the parasite Lernea sp. in the Basin is very likely the result of nonnative introductions.

The continued stocking of nonnative fish, even those already established in the Basin, adversely affects the native fish species. The stocking may enable a species to maintain a higher population level than the habitat could support, increasing the effectiveness of competition against the native species. In cases where natural events such as drought or floods have reduced nonnative fish populations, stocking allows them to regain pre-event population levels faster than would occur naturally. This may suppress native fish recovery in the area. However, it should be noted that at present, very little warmwater stocking occurs in Utah and Wyoming.

#### A. No Action Alternative

1. Aquatic Biological Resources: Although Utah and Wyoming have no current plans for stocking warmwater fishes in the Upper Basin, with no stocking procedures in place future stockings could occur. As such stockings occur, nonnative fish occurrence in the river would increase. Additionally, determinations could be made to introduce new species into the basin. In the recent past, Utah has considered impacts to the endangered fishes even though no stocking procedures have been in place. Utah considered stocking rainbow smelt into Lake Powell to improve recreational fishing, but through a review process, tabled their proposal because of concerns on the downstream humpback chub population. In the past, Wyoming has stocked channel catfish into the Little Snake River. They stopped stocking in 1990, when a Colorado squawfish was captured in the Wyoming portion of the Little Snake

River. However, with no formal procedures in place, resuming stocking would be totally at their discretion.

Stocking in Colorado by the aquaculture industry into private ponds for approved species would continue and likely increase. Chronic escapement from ponds with outlets to the river and when the floodplain became inundated would continue and probably increase. The occurrence of channel catfish, largemouth bass, bluegill, black crappie, fathead minnows, green sunfish, etc. in the river would therefore increase. Competition with and predation on the endangered fish would increase. Stocking by the Colorado Division of Wildlife would continue in public waters. Colorado would continue to try and increase warmwater fishing opportunities in western Colorado, while trying to minimize impacts to the endangered fishes. Stocking into private ponds would likely occur in floodplain areas, thereby increasing the probability of escapement into the river.

2. Recreation: Recreational opportunities in Utah and Wyoming would be unchanged, or show a slight increase if nonnative abundance increases dramatically. Recreational fishing opportunities would also remain about the same in Colorado. As ponds are reclaimed through Recovery Program efforts, some waters may be restocked with sport fish by the Colorado Division of Wildlife or aquaculture industry.

3. Recovery of Endangered Fishes: Efforts to reduce impacts of nonnative fishes on the endangered fish would be circumvented. Introductions of new species and hybrids would likely increase over time. Abundance and occurrence of nonnative fishes may increase. All this would result in endangered fish populations remaining near present levels, with little chance of recovery.

4. Economy: Recreational expenditures would remain the same or increase. Increased demand for fish from the aquaculture industry for stocking into private ponds would occur. The ability of the Recovery Program to serve as a reasonable and prudent alternative for future water development would be significantly diminished, affecting not only Colorado, but Utah and Wyoming also. Without the Recovery Program continuing to make sufficient progress towards recovery, billions of dollars of water development and subsequent economic growth could be impacted. Positive biological responses to other recovery efforts would be hindered by increased negative interactions with nonnative fishes.

## B. Preferred Alternative

1. Aquatic Biological Resources: The abundance of nonnative top-of-the-line predatory fishes, in the Upper Basin Rivers containing endangered fishes, would decrease. Nonnative fishes would still occur between the 50- and 100-year floodplain, however, they would be in private ponds bermed and screened to prevent escapement up to the 50-year event. Some nonnatives would still occur in private ponds below the 50-year floodplain that are not volunteered for reclamation.

Nongame nonnative fishes with established riverine populations would continue to be another problem.

2. Recreation: Recreational opportunities in Utah and Wyoming would be unaffected by this alternative, except that new private ponds to be stocked would have to be outside the 50-year floodplain or bermed to above the 50-year floodplain. In Colorado, future private ponds below the 50-year floodplain wishing to have fishing but not wanting to berm to above the 50-year floodplain would have to purchase trout rather than warmwater fishes from the aquaculture industry. Ponds would probably not be suitable for trout during summer months. Fishing in private ponds would be concentrated during spring and fall months. Private ponds below the 50-year floodplain that currently have warmwater fishing would retain it, unless they voluntarily allowed their pond to be reclaimed. If their warmwater fishery collapsed for some reason, the pond could only be restocked with trout. Localized losses in warmwater fishing opportunities might occur, especially during summer months. However, approval of management plans for Jerry Creek Reservoir and Juniata Reservoir will increase warmwater fishing opportunities above current levels. Additionally, the screening of Highline and Elkhead Reservoirs will provide additional future recreational fishing opportunities.

3. Recovery of Endangered Fishes: The few ponds that might be bermed to FEMA standards would reduce and isolate the amount of floodplain habitat available to the endangered fishes during high flow events. Nutrients and plankton in these floodplain habitats will be isolated from the river. However, because so few ponds might be bermed, there would be little negative impact. Ponds bermed to FEMA standards may also have positive benefits including: 1) preclude re-invasion of the river by nonnative sport fish stocked into that pond, 2) would not trap endangered fishes during high flow events, and 3) preserve warmwater angling opportunities in some ponds. Flows greater than a 50-year event will still allow nonnative fishes to escape to the river, but few ponds exist at this elevation.

4. Economy: Costs of berming ponds to FEMA standards have been estimated to be about \$36/linear foot (CDOW estimate for Corn Lake). It is likely that stocking of private ponds with warmwater species would decrease causing impacts to the warmwater fish brokers in the aquaculture industry. This may be partially offset by increased trout purchases by the private sector. The change in overall fishing days in Colorado would be minimal. This alternative may reduce fishing expenditures by some unknown amount. Warmwater anglers generally spend about \$40/day, although it is probably much less on privately owned ponds.

#### C. Alternative 1.

1. Aquatic Biological Resources: The case by case review process would help to insure that no fish species known to adversely effect the endangered fishes would be stocked in areas or situations where they

could escape to the river. Some nonnative fish species would decrease in abundance in the riverine habitats, thus slightly increasing the likelihood of survival for the endangered fishes. Nongame nonnative fishes with established riverine populations would continue to be a major problem.

2. Recreation: Existing recreational opportunities in Utah and Wyoming would be unaffected by this alternative. In most cases, future private ponds wishing to have fishing would have to purchase trout rather than warmwater fishes from the aquaculture industry. Ponds would probably not be suitable for trout during summer months. Fishing in private ponds would be concentrated during spring and fall months. If the same level of warmwater fishing opportunities in Colorado are to be maintained, Colorado and the Recovery Program would have to seek opportunities elsewhere. This might include agreements with entities such as water districts that own waters not currently available to the public for fishing. Berming of public waters to FEMA standards would likely be required to maintain warmwater fishing. Warmwater fishing opportunities would continue to be provided, but at a greater cost to the Colorado Division of Wildlife. Because warmwater fishing in Colorado represents a small percentage of the total fishing, overall numbers of fishing days are unlikely to decrease significantly.

3. Recovery of Endangered Fishes: The reduction of nonnative fishes escaping into the river would decrease, somewhat, competition with and predation on the endangered fishes. Survival of eggs, larvae, and juveniles of the endangered fishes would slightly increase. External sources of nonnative fishes would no longer compound recovery efforts. Other recovery actions would exhibit measurable positive responses in the endangered fish populations.

4. Economy: The case-by-case review would increase the workload of State and Federal wildlife agencies in preparing and reviewing all future stockings. Plan preparation for private ponds would increase cost to either the States or property owners seeking to create private fisheries. This alternative may reduce fishing expenditures by some unknown amount. Warmwater anglers generally spend about \$40/day, although it is probably much less on privately owned ponds.

#### D. Alternative 2.

1. Aquatic Biological Resources: The abundance of nonnative top-of-the-line predatory fishes, in the Upper Basin rivers containing endangered fishes, would decrease. Chances of escapement would be reduced for flows less than the 100-year flow event. Nonnative fishes would still occur between the 50- and 100-year floodplain, however; they would be in ponds bermed and screened to prevent escapement up to the 100-year event. Some nonnatives would still occur in private ponds that are not volunteered for reclamation. Certain species could not be stocked within the basin. Nongame nonnative fishes with established riverine populations would continue to be a major problem.

2. Recreation: Recreational opportunities in Utah and Wyoming would be unaffected by this alternative, except that new ponds to be stocked with largemouth bass, bluegill, and black crappie would have to be outside the 50-year floodplain. In Colorado, future private ponds below the 50-year floodplain wishing to have fishing would have to purchase trout rather than warmwater fishes from the aquaculture industry. Ponds would probably not be suitable for trout during summer months. Fishing in private ponds would be concentrated during spring and fall months. Private ponds below the 50-year floodplain that currently have warmwater fishing would retain it, unless they voluntarily allowed their pond to be reclaimed. If their warmwater fishery collapsed for some reason, the pond could only be restocked with trout. If the same level of warmwater fishing opportunities in Colorado are to be maintained, Colorado and the Recovery Program would have to seek opportunities elsewhere. This might include agreements with entities such as water districts that own waters not currently available to the public for fishing. Most of Colorado's current fishing in the floodplain is below the 50-year floodplain and would have to be trout only. Localized losses in fishing opportunities would occur, especially during summer months, if alternative fishing locations were not obtained.

3. Recovery of Endangered Fishes: The reduction of nonnative fishes escaping into the river would decrease, somewhat, competition with and predation on the endangered fishes. Survival of eggs, larvae, and juveniles of the endangered fishes would slightly increase. Other recovery actions would exhibit measurable positive responses in the endangered fish populations.

4. Economy: Costs of berming ponds to FEMA standards could be significant, although few ponds exist between the 50- and 100-year floodplains. Costs of berming ponds to FEMA standards have been estimated to be about \$36/linear foot (CDOW estimate for Corn Lake). Stocking of private ponds would decrease causing economic impacts to the aquaculture industry and loss of future fishing opportunities in private ponds. Stocking of rainbow trout produced by the aquaculture industry should correspondingly increase. The change in overall fishing days in Colorado would be minimal. This alternative may reduce fishing expenditures by some unknown amount. Warmwater anglers generally spend about \$40/day, although it is probably much less on privately owned ponds.

#### E. Alternative 3.

1. Aquatic Biological Resources: Numbers and abundance of nonnative fishes in the river would decrease. Chances of escapement would be eliminated for flows less than the 100-year flow event, except from private ponds that are not reclaimed. Nonnative fishes would still occur in the floodplain but their numbers would be greatly reduced. Certain species could not be stocked within the basin. Nongame nonnative fishes with established riverine populations would continue to be a major problem.

2. Recreation: Recreational opportunities in Utah and Wyoming would be unaffected by this alternative, except that new ponds stocked with largemouth bass, bluegill, and black crappie would have to be outside the 100-year floodplain. In Colorado, future private ponds below the 100-year floodplain wishing to have fishing would have to purchase trout rather than warmwater fishes from the aquaculture industry. Ponds would probably not be suitable for trout during summer months. Fishing in private ponds would be concentrated during spring and fall months. Private ponds that currently have warmwater fishing would retain it, unless they voluntarily allowed their pond to be reclaimed. If their warmwater fishery collapsed for some reason, the pond could only be restocked with trout. If the same level of warmwater fishing opportunities in Colorado are to be maintained, Colorado and the Recovery Program would have to seek opportunities elsewhere. This might include agreements with entities such as water districts that own waters not currently available to the public for fishing. Most of Colorado's current public warmwater fishing in the floodplain is below the 100-year floodplain and would have to be trout only. Localized losses in fishing opportunities would occur, especially during summer months, if alternative fishing locations were not obtained.

3. Recovery of Endangered Fishes: The reduction of nonnative fishes escaping into the river would decrease, somewhat, competition with and predation on the endangered fishes. Survival of eggs, larvae, and juveniles of the endangered fishes would slightly increase. External sources of nonnative fishes would no longer compound recovery efforts. Other recovery actions would exhibit measurable positive responses in the endangered fish populations.

4. Economy: Stocking of private ponds with warmwater fishes would decrease causing impacts to the aquaculture industry and loss of future fishing opportunities in private ponds. Stocking of rainbow trout produced by the aquaculture industry should correspondingly increase. Substitutes for mosquitofish and grass carp would be in the form of pesticides and herbicides. The change in overall fishing days in Colorado would be minimal. This alternative may reduce fishing expenditures by some unknown amount. Warmwater anglers generally spend about \$40/day, although it is probably much less on privately owned ponds.

#### F. Alternative 4.

1. Aquatic Biological Resources: Stocking in the floodplain would continue and some escapement would continue to occur. Stocking of ponds in the 10-year floodplain would require berming to FEMA standards. Therefore, because of the cost of such berming, the numbers of new private ponds contributing nonnative fish to the system would not likely increase. Stocking above the 10-year floodplain would allow for the periodic escapement of nonnative fish into the river. These same fish would serve as seed fish for ponds that had been reclaimed, thereby compromising pond reclamation efforts. Because of the problem of fish above the 10-year floodplain and upstream of critical habitat

reseeding lower elevation ponds, numbers of nonnatives in the river would rebound periodically; thus progress towards recovery would be less than would occur under alternatives 2 and 3. Nongame nonnative fishes with established riverine populations would continue to be a major problem.

2. Recreation: Recreational opportunities in Utah and Wyoming would be unaffected by this alternative. Future private pond owners, below the 10-year floodplain, wishing to have fishing would have to purchase trout rather than warmwater fishes from the aquaculture industry. Ponds would probably not be suitable for trout during summer months. Fishing in private ponds would be concentrated during spring and fall months. Warmwater fishing opportunities would continue to increase above the 10-year floodplain. If the same level of warmwater fishing opportunities in Colorado are to be maintained, Colorado and the Recovery Program would have to seek opportunities elsewhere, including ponds above the 10-year floodplain. This might include agreements with entities such as water districts that own waters not currently available to the public for fishing. Colorado would likely berm some public waters to FEMA standards to maintain fishing. Because warmwater fishing in Colorado represents a small percentage of the total fishing, overall numbers of fishing days are unlikely to decrease significantly.

3. Recovery of Endangered Fishes: Flows greater than a 10-year event will still allow nonnative fishes to escape to the river and establish in lower elevation ponds that have been reclaimed through Recovery Program efforts. Recovery would continue, but would be impeded by nonnative fishes in the system.

4. Economy: Costs of berming ponds to FEMA standards could be significant. Costs of berming ponds to FEMA standards have been estimated to be about \$36/linear foot (CDOW estimate for Corn Lake). It is likely that stocking of warmwater fishes in private ponds would decrease causing impacts to the aquaculture industry and loss of fishing opportunities in private ponds. Trout sales from the aquaculture industry may likely increase. The change in overall fishing days in Colorado would be minimal. This alternative may reduce fishing expenditures by some unknown amount. Warmwater anglers generally spend about \$40/day, although it is probably much less on privately owned ponds.

#### G. Alternative 5.

1. Aquatic Biological Resources: Stocking in the floodplain (above the 10-year floodplain) would continue and some escapement would continue to occur. Any increases in the numbers of ponds with warmwater sport fish above the 10-year floodplain would be offset by decreases in the number of ponds below the 10-year floodplain. Stocking above the 10-year floodplain would allow for the periodic escapement of nonnative fish into the river. These same fish would serve as seed fish for ponds that had been reclaimed, thereby compounding pond reclamation efforts. Because of the problem of fish above the 10-year floodplain

and upstream of critical habitat reseeding lower elevation ponds, numbers of nonnatives in the river would rebound periodically. Nongame nonnative fishes with established riverine populations would continue to be a major problem.

2. Recreation: Recreational opportunities in Utah and Wyoming would be unaffected by this alternative. Future private ponds below the 10-year floodplain wishing to have fishing would have to purchase trout rather than warmwater fishes from the aquaculture industry. Ponds would probably not be suitable for trout during summer months. Fishing in private ponds would be concentrated during spring and fall months. If the same level of warmwater fishing opportunities in Colorado are to be maintained, Colorado and the Recovery Program would have to seek opportunities elsewhere. This might include agreements with entities such as water districts that own waters not currently available to the public for fishing. Colorado public waters below the 10-year floodplain would only be stocked with trout. Because warmwater fishing in Colorado represents a small percentage of the total fishing and additional trout could be provided for ponds near the river, overall numbers of fishing days are unlikely to decrease significantly.

3. Recovery of Endangered Fishes: Flows greater than a 10-year event will still allow nonnative fishes to escape to the river and establish in lower elevation ponds that have been reclaimed though Recovery Program efforts. Recovery would continue, but would be impeded by nonnative fishes in the system.

4. Economy: No costs of berming ponds to FEMA standards occur in this alternative. It is likely that stocking of warmwater fishes in private ponds would decrease causing impacts to the aquaculture industry and loss of fishing opportunities in private ponds. Trout sales from the aquaculture industry may likely increase. The change in overall fishing days in Colorado would be minimal. This alternative may reduce fishing expenditures by some unknown amount. Warmwater anglers generally spend about \$40/day, although it is probably much less on privately owned ponds.

#### H. Other Aspects Not Affected by Stocking Procedures.

Many of the actions that could be implemented as part of the stocking procedures would require a separate NEPA analysis if implemented by a Federal agency or with Federal dollars. Because these are only procedures to regulate stocking and not an on-the-ground type activity factors such as air quality, water quality (pond reclamation will require separate NEPA analysis), soils, geology, mineral resources, vegetation, esthetics, cultural resources, etc. are not impacted. The only environmental impacts identified are decreases in the numbers of nonnative fishes and increases in the endangered fish populations.

Table 10 summarizes the impacts of each of the alternatives. Positive and negative impacts are not equally weighted, but must be considered all together prior to selecting a set of procedures for implementation.

Table 10. Summary of possible impacts associated with each alternative [ranked 1=least impact to 6=greatest impact)].

Factor Impacted by Alternative	Preferred Alternative	Alt # 1	Alt # 2	Alt # 3	Alt # 4	Alt # 5
Predation on endangered fishes: eggs, larvae, juveniles, adults	3	4	2	1	6	5
Competition with endangered fishes: larvae, juveniles, adults	3	4	2	1	6	5
Overall benefits of floodplain for endangered fish during flooding	3	4	2	1	6	5
Warmwater recreational fishing (public waters)	3	4	5	6	1	2
Warmwater recreational fishing (private waters)	2	3	5	6	1	4
Aquaculture industry	3	2	5	6	1	4
Future water development	2	4	3	1	6	5
<b>OVERALL RANKING</b>	<b>2.7</b>	<b>3.6</b>	<b>3.4</b>	<b>3.1</b>	<b>3.9</b>	<b>4.3</b>

#### V. CONSULTATION AND COORDINATION WITH OTHERS

- Colorado Division of Wildlife
- Utah Division of Wildlife Resources
- Wyoming Game and Fish Department
- Environmental Defense Fund
- Michael J. Mitchell, Aquaculture Industry

The most significant comments provided during the review process were from Mr. Jerry Hart, United Sportsman's of Colorado. A copy of his and other comments are attached as appendix F.

The following public meetings were held to receive comment on the draft environmental assessment:

Grand Junction, Colorado, May 21, 1996  
 Denver, Colorado, May 22, 1996  
 Craig, Colorado, May 23, 1996

Oral and written public and agency comments were used to develop a preferred alternative and Cooperative Agreement for implementing the stocking procedures.

## VI. LIST OF DEFINITIONS

Critical habitat: River reaches formally designated as critical in accordance with the Endangered Species Act of 1973, as amended. Includes portions of the Colorado, Green, Duchesne, White, Yampa, and Gunnison Rivers and portions of the associated 100-year floodplains that contain areas essential to recovery of the endangered fishes.

Direct Connection: Waters that flow directly into critical habitat. This does not include waters above reservoirs where escapement has been addressed in accordance with these Procedures.

ESA: Acronym for Endangered Species Act.

FEMA specifications: Dikes built to isolate ponds from flooding must have a minimum of three feet of freeboard above the baseflood elevation. They must have a minimum of one additional foot of freeboard if the dike is within 100 feet of an area where the water is constricted. The upstream end of the dike must have a minimum of an additional one-half foot elevation of dike. The dike must be designed and constructed in accordance with recognized and accepted engineering methodologies. The dike must be "watertight, substantially impermeable to the passage of water, and be capable of withstanding hydrodynamic and hydrostatic forces, and the effects of buoyancy." For existing dikes to qualify, they must be certified via a written report by a qualified engineer. The report will consider depth of flooding, floodplain elevation, duration of flooding, embankment geometry, embankment and foundation materials, embankment compaction, penetrations, other design factors affecting penetration, channel constriction, and any other factors that may effect the ability of the dike to withstand floods.

Ordinary High Water Line (OHWL): This is the water level which represents the water surface elevation during a normal (annual) high water event. The physical evidence denoting the OHWL is the point where perennial hydrophytic plant life converges with bare substrate (rock, gravel, sand, fines) or with substrate interspersed with annual vegetation.

5 feet above ordinary high water line: This term refers to the vertical distance from the lowest point on the natural (or artificial/man-made) dike that forms the isolated pond to the ordinary high water line (OHWL) of adjacent streams. This height above the OHWL approximates the 50-year floodplain that is based on professional judgment and field observations of State and Service hydrologists and gaging tables for the Upper Colorado River Basin. Five and one-half feet above the OHWL approximates the 100-year floodplain. This is a relatively simple method for approximating the 50- and 100-year floodplains that is accurate and definable during on-site visits.

Isolated Ponds or Waters: Ponds or waters that have no connection with the river (no outlet).

6,500-feet msl: Most areas above the 6,500-foot msl are coldwater habitats that will not support warmwater fishes. There are very few floodplain situations above 6,500-feet msl where isolated ponds occur and these are typically stocked with salmonids (see Figure 1).

## VII. LITERATURE CITED

- Behnke, R.J. 1980. The impacts of habitat alterations on the endangered and threatened fishes of the Upper Colorado River Basin: A discussion. In Energy Development in the Southwest: Problems of water, fish and wildlife in the Upper Colorado River Basin, vol.2, ed. W.O. Spofford, Jr., A.L. Parker, and A.V. Kneese, pp. 182-192. Research Paper R-18. Washington, D.C: Resources for the Future.
- Colorado Division of Wildlife. 1992. 1991 Angler Harvest Survey. Federal Aid to Sportfish Restoration, Job Progress Report, Project F-85-R-5. 3 pp. + appendices.
- Colorado Division of Wildlife. 1996. Results of a survey of Colorado warmwater anglers residing in Delta, Garfield, Mesa, and Montrose counties. 19 pp.
- Colorado Water Conservation Board. 1995. Floodplain Information Report, Volumes 1-4. Prepared for the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. Colorado Water Conservation Board, Denver, Colorado.
- Dill, W.A. 1944. The fishery of the lower Colorado River. California Fish and Game 30:109-211.
- Hawkins, J.A., T. P. Nesler. 1991. Nonnative fishes of the Upper Colorado River Basin: An issue paper. Larval Fish Laboratory. Colorado State University, Fort Collins. 72 pp.
- Joseph, T.W., J.A. Sinning, R.J. Behnke, and P.B. Holden. 1977. An evaluation of the status, life history and habitat requirements of endangered and threatened fishes of the Upper Colorado River System. U.S. Fish and Wildlife Service, FWS/OBS-77/2, Fort Collins, Colorado, USA.
- Lanigan, S.H., and C.R. Berry, Jr. 1979. Distribution and abundance of endemic fishes in the White River in Utah, final report. Contract # 14-16-006-78-0925. U.S. Bureau of Land Management, Salt Lake City, Utah. 84 pp.
- Lentsch, L. D., R. T. Muth, P. D. Thompson, T. A. Crowl, and B. G. Hoskins. 1995. Options for selective control of nonnative fishes in the Upper Colorado River Basin. Draft Report. Project Number 93-FG(18)-8. Utah Division of Wildlife Resources. Colorado River Fishery Project. Salt Lake City, Utah. 163 pp.
- Meffe, G.K. 1985. Predation and species replacement on American southwestern fishes: a case study. Southwestern Naturalist 30(2):173-187.
- Miller, R.R. 1959. Origin and affinities of the freshwater fish fauna of western North America. Pages 187-222 In C.L. Hubbs, editor. Zoogeography. American Association for the Advancement of Science, Publication 51.

- Minckley, W.L. and J.E. Deacon. 1968. Southwestern fishes and the enigma of "endangered species." *Science*, 159:1424-1432.
- Mitchell, M. J. 1995. Impact of the procedures for stocking nonnative fish species in the Upper Colorado River Basin on private landowners and the commercial aquaculture industry. Inventory of public and private ponds along the upper Colorado and lower Gunnison Rivers in Colorado. Colorado Department of Agriculture Contract 95-0021. Queen of the River Fish Company, Inc., Longmont, Colorado. 38 pp. + appendices
- Osmundson, D.B. and L.R. Kaeding. 1989. Studies of Colorado squawfish and razorback sucker use of the "15-mile reach" of the Upper Colorado River as part of conservation measures for the Green Mountain and Ruedi Reservoir water sales. U.S. Fish and Wildlife Service, Final Report. Grand Junction, Colorado.
- Propst, D.L. and K.R. Bestgen. 1991. Habitat and biology of the loach minnow, Tiaroga cobitis, in New Mexico. *Copeia* 1991(1):29-30.
- Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. 1996. Fiscal Year 1995 Summary Report. U.S. Fish and Wildlife Service, Region 6, Denver, Colorado. 34 pp.
- Rinne, J.N. 1991. Habitat use by spikedace, Meda fulgida (Pisces: Cyprinidae) in southwestern streams with reference to probable habitat competition by red shiner (Pisces: Cyprinidae). *Southwestern Naturalist* 36(1):7-13.
- Taylor, J.N., W.R. Courtenay, Jr., and J.A. McCann. 1984. Known impacts of exotic fishes in the continental United states. In distribution, biology, and management of exotic fishes, ed. W.R. Courtenay, Jr., and J.R. Stauffer, Jr., pp. 322-373. Baltimore, Md.: Johns Hopkins University Press.
- Tyus, H. M., B. D. Burdick, R. A. Valdez, C. M. Haynes, T. A. Lytle, and C. R. Berry. 1982. Fishes of the Upper Colorado River Basin: Distribution, abundance, and status. In W. H. Miller, H. M. Tyus, and C. A. Carlson, eds. Fishes of the upper Colorado River system: present and future. American Fisheries Society, Bethesda, Maryland. 131 pp.
- Tyus, H. M. and J. F. Saunders, III. 1996. Nonnative fish problems: An evaluation and strategic plan for fish control in the Upper Colorado River Basin. Cooperative Agreement No. 14-48-0006-95-923. Draft Report for U.S. Fish and Wildlife Service. University of Colorado, Boulder.
- U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, Bureau of the Census. 1993. 1991 National survey of fishing, hunting, and wildlife-associated recreation. Government Printing Office, Washington, D.C. 124 pp. + appendices.

- U.S. Fish and Wildlife Service. 1987. Recovery implementation program for endangered fish species in the Upper Colorado River Basin. U.S. Department of the Interior, Fish and Wildlife Service, Denver, Colorado. 6 sections, various pagination.
- Vaske, J. J., M. P. Donnelly, and M. Lyon. 1995. Knowledge, beliefs, and attitudes toward endangered fish of the Upper Colorado River Basin. Project Report for the U.S. Fish and Wildlife Service. Human Dimensions in Natural Resources Unit Report No. 20, Colorado State University, Fort Collins. 91 pp.
- Wenzel, C. R. and W. A. Hubert. 1995. 1994 Wyoming anglers surveys. Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Laramie. 119 pp.

APPENDIX A

FAMILY, SCIENTIFIC NAME, AND COMMON NAMES  
OF  
FISHES MENTIONED IN THE ENVIRONMENTAL ASSESSMENT

Family

<u>Scientific Name</u>	<u>Common Name</u>
<b>Esocidae (Pikes)</b>	
<u>Esox lucius</u> . . . . .	northern pike
<u>Esox lucius</u> X <u>Esox masquinongy</u> . . . . .	tiger muskie
<b>Clupeidae (Herrings)</b>	
<u>Dorosoma petenense</u> . . . . .	threadfin shad
<b>Salmonidae (Trout)</b>	
<u>Oncorhynchus gairdneri</u> . . . . .	rainbow trout
<u>Salmo trutta</u> . . . . .	brown trout
<b>Cyprinidae (Minnows)</b>	
<u>Ctenopharyngodon idella</u> . . . . .	triploid grass carp
<u>Cyprinus carpio</u> . . . . .	common carp
<u>Gila atraria</u> . . . . .	Utah chub
<u>Gila cypha</u> . . . . .	humpback chub
<u>Gila elegans</u> . . . . .	bonytail
<u>Notropis lutrensis</u> . . . . .	red shiner
<u>Pimephales promelas</u> . . . . .	fathead minnow
<u>Ptychocheilus lucius</u> . . . . .	Colorado squawfish
<u>Rhinichthys osculus</u> . . . . .	speckled dace
<u>Richardsonius balteatus</u> . . . . .	redside shiner
<b>Catostomidae (Suckers)</b>	
<u>Catostomus commersoni</u> . . . . .	white sucker
<u>Catostomus discobolus</u> . . . . .	white sucker
<u>Catostomus latipinnis</u> . . . . .	flannelmouth sucker
<u>Xyrauchen texanus</u> . . . . .	razorback sucker
<b>Ictaluridae (Catfishes)</b>	
<u>Ictalurus melas</u> . . . . .	black bullhead
<u>Ictalurus natalis</u> . . . . .	yellow bullhead
<u>Ictalurus punctatus</u> . . . . .	channel catfish
<u>Pylodictis olivaris</u> . . . . .	flathead catfish
<b>Poeciliidae (Livebearers)</b>	

Gambusia affinis . . . . . mosquitofish  
Poeciliopsis occidentalis . . . . . Sonoran topminnow

**Percichthyidae (Temperate Basses)**

Morone chrysops X Morone saxatilis . . . . . wiper  
Morone saxatilis . . . . . striped bass

**Centrarchidae (Sunfishes)**

Lepomis cyanellus . . . . . green sunfish  
Lepomis macrocheilus . . . . . bluegill  
Micropterus dolomieu . . . . . smallmouth bass  
Micropterus salmoides . . . . . largemouth bass  
Pomoxis nigromaculatus . . . . . black crappie

**Percidae (Perches)**

Perca flavescens . . . . . yellow perch  
Stizostedion vitreum . . . . . walleye

## APPENDIX B

### STEPS IN THE REVIEW OF STOCKING PROPOSALS (CASE-BY-CASE REVIEW)

The steps or process for reviewing stocking proposals Lake Management Plans developed under Sections IV.3.A, IV.6, V, VI, and VIII.2, .3, and .4 of these Procedures are summarized in Figure 2 and are explained below:

Step 1. Formal Stocking Proposal. The review process is initiated with a formal stocking proposal developed in accordance with the guidelines outlined in Sections IV.3.A, IV.6, V, VI, and VIII.2, .3, and .4 of the Procedures.

Proposals to stock nonnative fishes will be founded on sound biological evaluations and contain sufficient information to allow for an objective and complete evaluation.

Proposals to stock private waters should be submitted through the appropriate State agency.

Step 2. Public and Agency Review. Stocking proposals will be submitted to the Service, the States, participants in the Recovery Program and other interested parties for review and comment for a 60-day period. Evaluations by the Service and the States will be based on sound biological principles and the criteria in Sections V and VI. Furthermore, if the Service or State agency objects to a stocking proposal, that agency will make a concerted effort to identify reasonable alternatives (i.e. different species, screening, berming, different location).

Step 3. Informal ESA Consultation. The proponent of the proposal (Federal agency) will, within 30 days of receiving the stocking proposal from the State wildlife agency, contact the Service to determine (a) if any Federally listed or candidate species may be affected by the stocking proposal, (b) if a review of the stocking proposal pursuant to section 7 of the Endangered Species Act is required, and (c) other ESA requirements, if any, that need to be addressed during the review of the stocking proposal. The proponent of a stocking proposal may elect to withdraw or modify a proposal based on the results of the informal ESA consultation.

Step 4(A) Proposals Not Subject to Section 7, ESA Consultation.

Stockings of nonnative fishes classified as routine that are initiated by State or private parties and do not require Federal approval, authorization, funding, etc., would not require a review pursuant to section 7 of the ESA. Reviews of stocking proposals that do not require section 7 consultation would be in accordance with the following process:

Step 4(A)(1). At the conclusion of the 60-day comment period, the States and the Service would review the comments and within 30 days indicate whether they support or oppose the proposed stocking. These parties will make a concerted effort to resolve any disagreements or objections to the proposal. If none of these parties objects to the proposal, if disagreements over the proposal are resolved, or the proposal is modified sufficiently to address the concerns, then the proponent can proceed to implement the proposal. The proponent of the proposal may also elect to withdraw the proposal based on identified concerns.

Step 4(A)(2). In the event that an agency(s) still objects to a proposal and the proponent still desires to proceed, the proposal and the review comments will be submitted to the Regional Director of the Service and the Directors of the State Wildlife agencies. Within 30 days, these parties will make a concerted effort to resolve any disagreements or objections to the proposal. The Regional Director of the Service and the Directors of the State wildlife agencies may, at their discretion, meet as a panel to discuss the proposal and accept public comment. If objections are resolved, or the proposal is modified sufficiently to address the concerns, then the proponent can proceed to implement the proposal. The proponent of the proposal may also elect to withdraw the proposal based on identified concerns.

Step 4(A)(3). In the event that the disagreements cannot be resolved and the proponent still desires to proceed, the stocking proposal and all agency comments on the proposal will be distributed to the appropriate State Wildlife Commission for final review and decision. The State Wildlife Commission will provide at least a 30-day notice before taking action on the proposal. The States, Service, other participants in the Recovery Program, and other interested parties will be notified of State Wildlife Commission hearing and be invited to provide comments to the Commission on the stocking proposal. The Service will advise the Commission if there is a potential for "take" as defined by the ESA, as amended. The basis for the final decision by the State Wildlife Commission will be documented and distributed to the public on the Recovery Program's mailing list, members of the Recovery Program, and other interested parties.

Step 4(B) Proposals Subject to Section 7, ESA Consultation.

Section 7 consultation will only be required prior to proceeding with any stocking in cases where the Service, in consultation with the lead Federal agency, determines that there is a Federal action and/or Federal discretionary involvement in the stocking proposal that "may affect" an endangered fish or result in "an adverse modification" to its critical habitat. Examples of proposals which may require section 7 consultation include

projects where a Federal permit is needed to stock fish on Federal lands, the stocking is paid for partially or wholly with Federal funds, and/or the fish are being provided from a Federal fish hatchery.

Section 7 consultation will be conducted by the Service in accordance with the ESA section 7 Regulations (50 CFR Part 402), as summarized below.

Step 4(B)(1). The Service in consultation with the Federal agency that is responsible for approving the project will determine if the proposed stocking may affect any listed species or adversely modify critical habitat. If the stocking proposal is not likely to adversely affect a listed species or modify critical habitat, the section 7 consultation ends. In this event, the proposal would be reviewed in accordance with Step 4(A), above.

Step 4(B)(2). If a "may affect" determination is made, the Service would then enter into formal section 7 consultation with the lead Federal agency to determine if the proposed stocking jeopardizes the continued existence of any listed species or adversely modifies their critical habitat. The Service has 90 days to complete formal section 7 consultation.

Step 4(B)(3). The Service will issue its biological opinion within 45 days after completion of section 7 consultation. The Service's biological opinion will include a detailed discussion of the effects of the action on listed species and critical habitat and the Service's opinion on whether the action is or is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of its critical habitat.

If the biological opinion concludes the project will jeopardize and/or result in adverse modification of critical habitat, "reasonable and prudent alternatives" if available will be provided. An alternative is considered to be "reasonable and prudent" if it (a) can be implemented in a manner consistent with the intended purpose of the project, (b) can be implemented within the scope of the Federal agency's authority or jurisdiction, (c) is technologically feasible, and (d) avoids jeopardy to the species or adverse modification of critical habitat.

Upon issuance of the biological opinion, the Federal agency shall determine whether and in what manner to proceed with the project. If the project concludes with a no jeopardy biological opinion the proponent would submit the stocking proposal to the other States for a 30-day review. Resolution of any issues over a stocking proposal among the States would be in accordance with Step 4(A), above.

## INTRODUCTIONS OF AQUATIC SPECIES

Christopher C. Kohler and Walter R. Courtenay, Jr.

## A. Issue Definition

The increased frequency of inter- and intranational transfers of aquatic species carried out over the last two decades has prompted concern relative to the potential for debasement of integrity of aquatic communities. Past introductions, intentional or otherwise, have run the full gamut from spectacular booms (e.g., Pacific salmon to the Great Lakes) to spectacular busts (e.g., the waterweed hydrilla to portions of the United States). Considering the manifestations of such extremes in terms of ecological and economical impacts, it is not surprising that opposing viewpoints exist with respect to the relative pros and cons of effectuating introductions of aquatic species. Nevertheless, natural resource managers concur that substantially improved measures can and should be taken to increase the odds that benefits of a given introduction will exceed risks. Currently, a number of international commissions have adopted or are considering adopting formal "codes of practice" for regulating the introduction of aquatic species (see Sindermann 1986; Welcomme 1986; Kohler and Courtenay 1986). Implementation of such codes (protocols, guidelines, etc.) can ensure that decisions regarding future introductions are based on sound ecological evidence, and that introductions effectuated are properly evaluated.

## B. Negative Impacts on Aquatic Communities

The impacts of introduced aquatic organisms on native aquatic communities in North America have been summarized by Contreras and Escalante (1984) for Mexico, by Taylor et al. (1984) for the continental United States, and by Crossman (1984) for Canada. These impacts can be classified into five broad categories: habitat alteration, trophic alteration, spatial alteration, gene pool deterioration, and introduction of diseases.

*Habitat Alteration*

Introduced plants such as water hyacinth (see Table 1 for scientific names of organisms cited in text), Eurasian watermilfoil, alligator weed, and hydrilla have seriously infested a number of water bodies in North America (Shireman 1984). Excessive vegetation interferes with swimming and fishing activities, upsets predator-prey relationships by providing too much cover, causes water quality problems during growth and decomposition, and is aesthetically unpleasant (Noble 1980). Ironically, exotic fishes, particularly grass carp and the tilapias, are frequently used as biological controls. Both the grass carp and the tilapias have reproducing populations in North America, although the habitat requirement for larval grass carp has so far proved to be limiting and the tilapias are basically limited to the southern extreme of the United States and to Mexico.

Although grass carp have proven to be an excellent biological control for aquatic vegetation, a risk exists that aquatic plants

(including native forms) might become overly decimated as a result of grass carp predation which in turn would limit nursery areas for juvenile fishes, cause bank erosion, and accelerate eutrophication through release of nutrients previously stored in the plants. A risk also exists that grass carp could adversely impact waterfowl habitat and rice fields. However, no major adverse impacts associated with grass carp have yet been documented.

Although common carp was not introduced to North America for aquatic weed control, its foraging behavior results in vegetation removal both by direct consumption and by uprooting due to its proclivity to dig through substrate in search of food. The latter activity also results in increased water turbidity. The common carp is the most often cited nuisance introduced fish in North America (Kohler and Stanley 1984) with millions of dollars having been spent for control and eradication, but with little success (Laycock 1966; Courtenay and Robins 1973).

Besides grass carp, only the redbelly tilapia has been widely used in weed control programs in North America. No effects on native communities have yet been attributed to vegetation removal by any of the tilapias (Taylor et al. 1984), though increases in turbidity have been attributed to digging activities of the blue tilapia (Noble et al. 1975) and to organic enrichment through fecal decomposition by redbelly tilapia (Hickling 1961; Phillippy 1969).

*Trophic Alteration*

Taylor et al. (1984) speculated that the introduction of any species into a novel environment should alter community trophic structure, with the nature and extent of such changes being complex and unpredictable. Though this aspect is not well documented, there is little doubt that when an introduced fish exhibits explosive population increases, as has occurred with the tilapias (Germany 1977; Knaggs 1977; Shafland 1979), substantial changes in native communities must occur. Likewise, several dozen studies have documented dietary overlap between introduced and native fishes (see Taylor et al. 1984). However, these studies only demonstrate that the potential for competition exists. Linking dietary overlap to competition has proven to be a difficult task for all but the most controlled ecological studies regardless of whether non-native species are involved.

Documentation of predation by introduced species on native species serves as the most definitive example of impacts on communities. The most frequently cited example in North America concerns declines in populations of native trouts attributable to brown trout predation (see Moyle 1976a,b; Sharpe 1962; Alexander 1977, 1979). Several other introduced fishes have been implicated as major causes of mortality among native fishes, including pike killifish (Miley 1978; Turner 1981; Anderson 1981, 1982), oscar (Hogg 1976), and the bairdiella (Quast 1961). Though frequently cited as a potential threat of

considerable consequence, predation on eggs or young by introduced fishes has not been demonstrated to be a common occurrence (Taylor et al. 1984).

#### Spatial Alteration

Concomittant overlap in usage of space by non-native and native fishes may lead to competitive interaction if space is in limited supply or of variable quality. Evidence exists implicating displacement of brook trout by brown trout, but in general, displacements are largely inferential (Taylor et al. 1984). Conversely, high densities of introduced fishes have been shown to exert negative effects on native fishes. For example, Noble et al. (1975) observed that largemouth bass populations in Trinidad Lake, Texas, declined with no evidence of recruitment as densities of blue tilapia rose to approximately 2,240 kg/ha<sup>2</sup> during the period of 1972-1975.

#### Gene Pool Deterioration

Through reduction of heterogeneity through inbreeding is clearly a threat to any species being produced in a hatchery (Phillip et al. 1983), the risk is most acute with species of intercontinental origin because the initial broodstock invariably represent limited gene pools at the outset. The larger the stocking program, the more inbreeding among original broodstock is necessary. Thus species introduced to a novel habitat may or may not have the genetic characteristics necessary for them to adapt and/or perform as predicted.

Fortunately, hybridization events among introduced and native species in open waters are rare (Taylor et al. 1984). Nevertheless, the possibility of native gene pools being altered through such hybridization does exist. For example, brown trout are known to hybridize with native forms in North America (Schwartz 1972, 1981; Dangel et al. 1973; Chevassus 1979).

#### Introduction of Diseases

Diseases caused by bacteria, viruses, and parasites are all too often conveyed along with introduced aquatic species (see Hoffinan and Schubert 1984; Shotts and Gratzek 1984 for reviews). This aspect represents one of the most severe threats that an introduced species may pose to a native community. Transfer of diseased fish was no doubt responsible for introduction of whirling disease into North America from Europe. Recently, infectious hypodermal and hematopoietic necrosis virus (IHHNV) has been spread to a number of countries in conjunction with shipments of live penaeid shrimp. IHHNV was first diagnosed in 1981 at shrimp culture facilities in Hawaii among shrimp introduced from Panama (Sindermann 1986). Even "ich," one of the most common fish diseases worldwide, caused by a ciliated protozoan, is thought to have been transferred from Asia throughout the temperate zone with shipments of fishes (Hoffman 1970, 1981).

#### C. Courses of Action

Introduction of species to aquatic communities are commonly employed as a fisheries management tool or occur as a result of escapes from aquaculture or ornamental fish holding facilities. It is not feasible, nor desirable, to legislate against all such introductions. What is needed is more education on the role that introduced species can and should play in the context of aquatic resources management. The more informed natural resource managers are about such issues, the less likely that

Table 1. Organisms cited in text.

Common Name	Scientific Name
<i>Plants</i>	
hydrilia	<i>Hydrilla verticillata</i>
water hyacinth	<i>Eichornia crassipes</i>
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
alligator weed	<i>Alternanthera philoxeroides</i>
<i>Fish</i>	
Pacific salmon	<i>Oncorhynchus</i> sp.
grass carp	<i>Ctenopharyngodon idella</i>
common carp	<i>Cyprinus carpio</i>
tilapias	<i>Oreochromis</i> , <i>Sarotherodon</i> and <i>Tilapia</i> sp.
blue tilapia	<i>Oreochromis aureus</i> (= <i>Tilapia aureau</i> )
redbelly tilapia	<i>Tilapia zilli</i>
brown trout	<i>Salmo trutta</i>
pike killifish	<i>Belonesox belizanus</i>
oscar	<i>Astronotus ocellatus</i>
bairdiella	<i>Bairdiella icistia</i>
brook trout	<i>Salvelinus fontinalis</i>
largemouth bass	<i>Micropterus salmoides</i>
coho salmon	<i>Oncorhynchus kisutch</i>
striped bass	<i>Morone saxatilis</i>
walking catfish	<i>Catfish batrachus</i>
<i>Other</i>	
whirling disease	<i>Myxosoma cerebralis</i>
"ich"	<i>Ichthyophthirius multifiliis</i>

mistakes will be made or that legislation will be necessary to enforce an "attitude of caution." The following actions toward that end are recommended.

A. The membership reaffirms its endorsement of the 1972 "Position of the American Fisheries Society on Introduction of Exotic Aquatic Species" as modified:

#### Position of American Fisheries Society on Introduced Aquatic Species.

Our purpose is to formulate a broad mechanism for planning, regulating, implementing, and monitoring all introductions of aquatic species.

Some introductions of species into ecosystems in which they are not native have been successful and others unfortunate.

Species not native to an ecosystem will be termed "introduced." Some introductions are in some sense, planned and purposeful for management reasons; others are accidental or are simply ways of disposing of unwanted pets or research organisms.

It is recommended that the policy of the American Fisheries Society be:

1. Encourage fish importers, farmers, dealers, and hobbyists to prevent and discourage the accidental or purposeful introduction of aquatic species into their local ecosystems.

2. Urge that no city, county, state, province, or federal agency introduce, or allow to be introduced, any species into any waters within its jurisdiction which might contaminate any waters outside its jurisdiction without official sanction of the exposed jurisdiction.

3. Urge that only ornamental aquarium fish dealers be permitted to import such fishes for sale or distribution to hobbyists

The "dealer" would be defined as a firm or person whose income derives from live ornamental aquarium fishes.

4. Urge that the importation of fishes for purposes of research not involving introduction into a natural ecosystem, or for display in public aquaria by individuals or organizations, be made under agreement with responsible government agencies. Such importers will be subject to investigatory procedures currently existing and/or to be developed, and species so imported shall be kept under conditions preventing escape or accidental introduction. Aquarium hobbyists should be encouraged to purchase rare ornamental fishes through such importers. No fishes shall be released into any natural ecosystem upon termination of research or display.

5. Urge that all species considered for release be prohibited and considered undesirable for any purposes of introduction into any ecosystem unless that species shall have been evaluated upon the following bases and found to be desirable:

a. **RATIONALE.** Reasons for seeking an import should be clearly stated and demonstrated. It should be clearly noted what qualities are sought that would make the import more desirable than native forms.

b. **SEARCH.** Within the qualifications set forth under **RATIONALE**, a search of possible contenders should be made, with a list prepared of those that appear most likely to succeed, and the favorable and unfavorable aspects of each species noted.

c. **PRELIMINARY ASSESSMENT OF THE IMPACT.** This should go beyond the area of **RATIONALE** to consider impact on target aquatic ecosystems, general effect on game and food fishes or waterfowl, on aquatic plants and public health. The published information on the species should be reviewed and the species should be studied in preliminary fashion in its biotope.

d. **PUBLICITY AND REVIEW.** The subject should be entirely open and expert advice should be sought. It is at this point that thoroughness is in order. No importation is so urgent that it should not be subject to careful evaluation.

e. **EXPERIMENTAL RESEARCH.** If a prospective import passes the first four steps, a research program should be initiated by an appropriate agency or organization to test the import in confined waters (experimental ponds, etc.)

f. **EVALUATION OR RECOMMENDATION.** Again publicity is in order and complete reports should be circulated amongst interested scientists and presented for publication.

g. **INTRODUCTION.** With favorable evaluation, the releases should be effected and monitored, with results published or circulated.

Because animals do not respect political boundaries, it would seem that an international, national, and regional agency should be involved at the start and have the veto power at the end. Under this procedure there is no doubt that fewer introductions would be accomplished, but quality and not quantity is desired and many mistakes might be avoided.

B. The Society encourages international, national, and regional natural resource agencies to endorse and follow the intent of the above position.

C. The Society encourages international harmonization of guidelines, protocols, codes of practice, etc., as they apply to introduction of aquatic species

D. Fisheries professionals and other aquatic specialists are urged to become more aware of issues relating to introduced species.

#### Literature Cited

- Alexander, G. R. 1977. Consumption of small trout by large predatory brown trout in the North Branch of the Au Sable River, Michigan. Michigan Department of Natural Resources, Fisheries Research Report 1855:1-26.
- . 1979. Predators of fish in coldwater streams. Pages 153-170 in H. Clepper, ed. Predator-prey systems in fisheries management. Sport Fishing Institute, Washington, DC
- Anderson, R. S. 1981. Food habits of selected non-native fishes: stomach contents. First annual performance report, Non-Native Fish Research Laboratory, Florida Game and Fresh Water Fish Commission, Boca Raton, FL. 16 pp.
- . 1982. Food habits of selected non-native fishes: stomach contents. Second annual performance report, Non-Native Fish Research Laboratory, Florida Game and Fresh Water Fish Commission, Boca Raton, FL. 22 pp.
- Chevassus, B. 1979. Hybridization in salmonids: results and perspectives. *Aquaculture* 17:113-128.
- Contreras-B. S., and M. A. Escalante-C. 1984. Distribution and known impacts of exotic fishes in Mexico. Pages 102-130 in W. R. Courtenay, Jr. and J. R. Stauffer, Jr., eds. Distribution, biology, and management of exotic fishes. The Johns Hopkins Univ. Press, Baltimore, MD.
- Courtenay, W. R., Jr., and C. R. Robins. 1973. Exotic aquatic organisms in Florida with emphasis on fishes: a review and recommendations. *Trans. Am. Fish. Soc.* 102:1-12.
- Crossman, E. J. 1984. Introduction of exotic fishes into Canada. Pages 78-101 in W. R. Courtenay, Jr. and J. R. Stauffer, Jr., eds. Distribution, biology, and management of exotic fishes. The Johns Hopkins Univ. Press, Baltimore, MD.
- Dangel, J. R., P. T. Macy, and F. C. Withler. 1973. Annotated bibliography of interspecific hybridization of fishes of the subfamily Salmoninae. U.S. Department of Commerce, NOAA Technical Memorandum WNMFS-FC-1. 48 pp.
- Germany, R. D. 1977. Population dynamics of the blue tilapia and its effects on the fish populations of Trinidad Lake, Texas. Doctoral dissertation, Texas A&M University, College Station, TX. 55 pp.
- Hickling, C. F. 1961. Tropical inland fisheries. John Wiley and Sons, New York, NY. 287 pp.
- Hogg, R. G. 1976. Ecology of fishes of the family Cichlidae introduced into the fresh waters of Dade County, Florida. Doctoral dissertation, University of Miami, Coral Gables, FL. 142 pp.
- Hoffman, G. L. 1970. Intercontinental and transcontinental dissemination and translocation of fish parasites with emphasis on whirling disease (*Myxosoma cerebralis*). *Am. Fish. Soc. Spec. Publ.* 5:57-51
- . 1981. Recently imported parasites of baitfishes and relatives. Pages 45-46 in Third annual proceeding Catfish Farmers of America research workshop, Las Vegas, NV.
- Hoffman, G. L. and G. Schubert. 1984. Some parasites of exotic fishes. Pages 233-261 in W. R. Courtenay, Jr. and J. R. Stauffer, Jr., eds. Distribution, biology, and management of exotic fishes. The Johns Hopkins Univ. Press, Baltimore, MD
- Knaggs, F. H. 1977. Status of the genus *Tilapia* in California's estuarine and marine waters. *California-Nevada Wildlife Transactions* 1977:60-67
- Kohler, C. C., and W. R. Courtenay, Jr. 1986. Regulating introduced aquatic species: a review of past initiatives. *Fisheries* 11(2):34-35
- Kohler, C. C., and J. G. Stanley. 1984. A suggested protocol for evaluating proposed exotic fish introductions in the United States. Pages 387-406 in W. R. Courtenay, Jr. and J. R. Stauffer, Jr., eds. Distribution, biology, and management of exotic fishes. The Johns Hopkins Univ. Press, Baltimore, MD

- Laycock, G. 1966. The alien animals. Natural History Press, Garden City, NY. 240 pp.
- Miley, W. W., II. 1978. Ecological impact on the pike killifish, *Belonesox belizanus* Kner (Poeciliidae), in southern Florida. Master's thesis, Florida Atlantic University, Boca Raton, FL. 55 pp.
- Moyle, P. B. 1976a. Inland fishes of California. University of California Press, Berkeley, CA. 405 pp.
- \_\_\_\_\_. 1976b. Fish introductions in California: history and impact on native fishes. *Biol. Conserv.* 9:101-118.
- Noble, R. L. 1980. Management of lakes, reservoirs, and ponds. Pages 265-295 in R. T. Lackey and L. A. Nielsen, eds. *Fisheries Management*. John Wiley and Sons, New York, NY.
- Noble, R. L., R. D. Germany and C. R. Hall. 1975. Interactions of blue tilapia and largemouth bass in a power plant cooling reservoir. *Proc. Annu. Conf. Southeast. Assoc. Game Fish Comm.* 29:247-251.
- Philipp, D. P., W. F. Childers, and G. S. Whitt. 1983. A biochemical genetic evaluation of the northern and Florida subspecies of largemouth bass. *Trans. Am. Fish. Soc.* 112:1-20.
- Phillippy, C. L. 1969. *Tilapia melanopleura* as a control for aquatic vegetation. Mimeographed report, Florida Game and Fresh Water Fish Commission. 13 pp.
- Quast, J. C. 1961. The food of the bairdiella. *Calif. Dep. Fish Game Fish. Bull.* 113:153-164.
- Schwartz, F. J. 1972. World literature to fish hybrids with an analysis by family, species, and hybrid. Publication no. 3, Gulf Coast Research Laboratory and Museum, Ocean Springs, MS. 328 pp.
- \_\_\_\_\_. 1981. World literature to fish hybrids with an analysis by family, species, and hybrid. Supplement 1. NOAA Technical Report no. 750, NMFS, Special Scientific Report-Fisheries. 507 pp.
- Shaffland, P. L. 1979. Non-native fish introductions with special reference to Florida. *Fisheries* 4(3):18-24.
- Sharpe, F. P. 1952. Some observations of the feeding habits of brown trout. *Prog. Fish-Cult.* 24(2):60-61
- Shireman, J. V. 1984. Control of aquatic weeds with exotic fishes. Pages 302-312 in W. R. Courtenay, Jr. and J. R. Stauffer, Jr., eds. *Distribution, biology, and management of exotic fishes*. The Johns Hopkins Univ. Press, Baltimore, MD.
- Shotts, E. B., Jr., and J. B. Gratzek. 1984. Bacteria, parasites, and viruses of aquarium fish and their shipping waters. Pages 215-232 in W. R. Courtenay, Jr. and J. R. Stauffer, Jr., eds. *Distribution, biology, and management of exotic fishes*. The Johns Hopkins Univ. Press, Baltimore, MD.
- Sindermann, C. J. 1986. Strategies for reducing risks from introductions of aquatic organisms: a marine perspective. *Fisheries* 11(2):10-15.
- Taylor, J. N., W. R. Courtenay, Jr., and J. A. McCann. 1984. Known impacts of exotic fishes in the continental United States. Pages 322-373 in W. R. Courtenay, Jr. and J. R. Stauffer, Jr., eds. *Distribution, biology, and management of exotic fishes*. The Johns Hopkins Univ. Press, Baltimore, MD.
- Turner, J. S. 1981. Population structure and reproduction in the introduced Florida population of the pike killifish, *Belonesox belizanus* (Pisces: Poeciliidae). Master's thesis, University of Central Florida, Orlando, FL. 56 pp.
- Welcomme, R. L. 1986. International measures for the control of introductions of aquatic organisms. *Fisheries* 11(2):4-9.

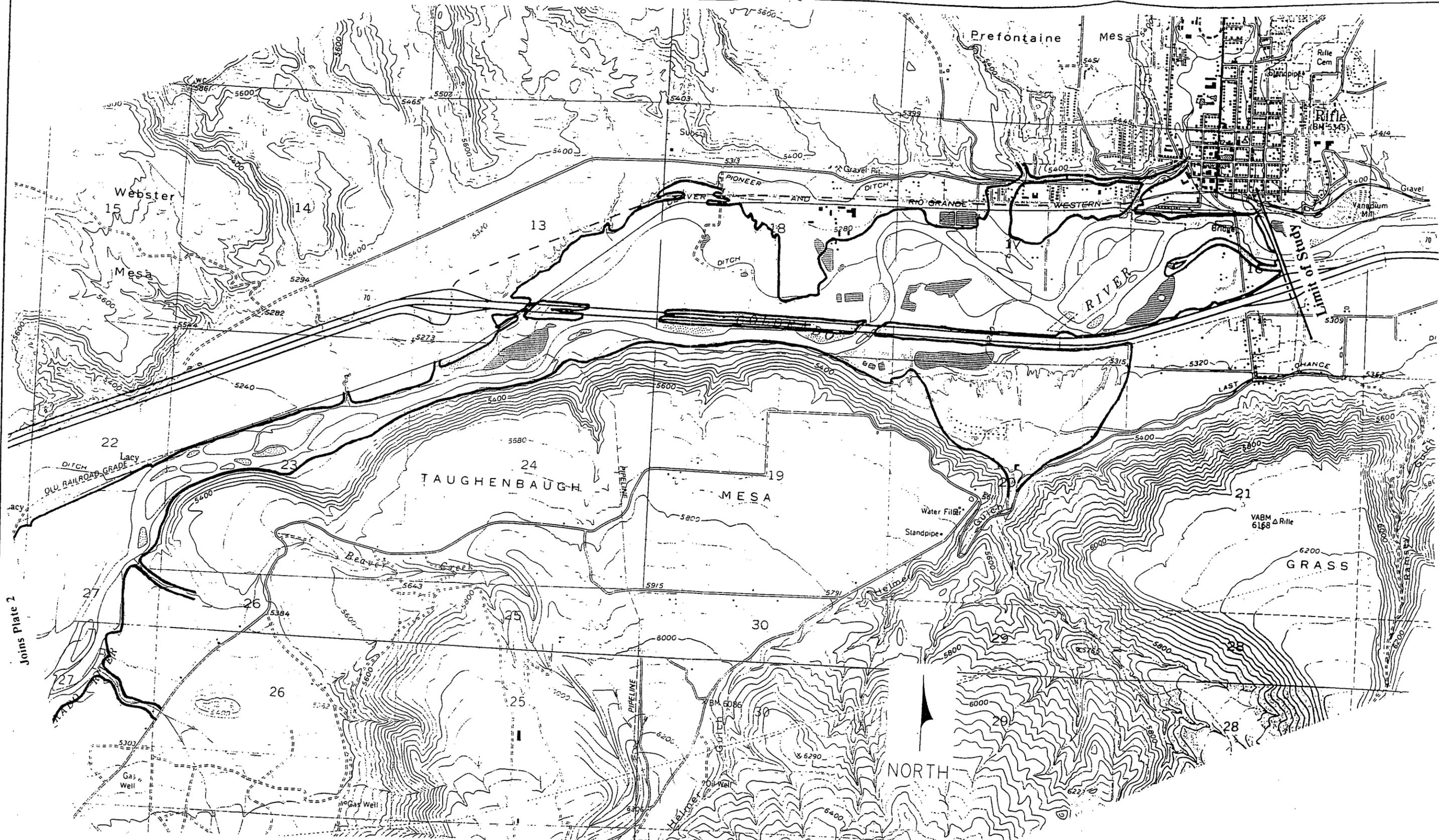
## APPENDIX D

### MAPS DELINEATING FLOODPLAIN BOUNDARIES

The Colorado Water Conservation Board delineated the 50- and 100-year floodplain boundaries for the Upper Colorado River, Gunnison River, White River and Yampa River (Colorado Water Conservation Board 1995; Volumes I-IV). This was funded by the Recovery Implementation Program to aid in identifying the location of ponds in relation to the floodplain boundaries. Using Federal Emergency Management Agency information (flood elevations at cross section locations) from their Flood Insurance Studies, the Fish and Wildlife Service was able to add the 10-year floodplain boundary in river reaches where two-foot contour maps were available (Upper Colorado River only). The maps included in the Appendix represent the areas believed to potentially be the most affected by the stocking procedure alternatives.

Maps 1-7 are the floodplain areas of the Upper Colorado River, Colorado; Maps 8-9 are of the Gunnison River; Map 10 is of the White River; and Maps 11-12 are of the Yampa River. For Maps 1-7, 9, and 11 the 50-year and 100-year floodplain boundaries are identical (differences too small to display); the dashed line on Maps 3-7 represent the 10-year floodplain boundary; only Maps 8, 10, and 12 show a separate 50-year floodplain boundary.

Similar maps have not been prepared for Utah and Wyoming; however, the old high water line (see definition section) is a reasonable indication of where the 50- and 100-year floodplain boundaries occur.



Map 1  
53

**APPROXIMATE FLOOD PLAIN STUDY  
UPPER COLORADO RIVER BASIN  
COLORADO RIVER IN COLORADO**

PREPARED BY THE COLORADO WATER  
CONSERVATION BOARD 3/95

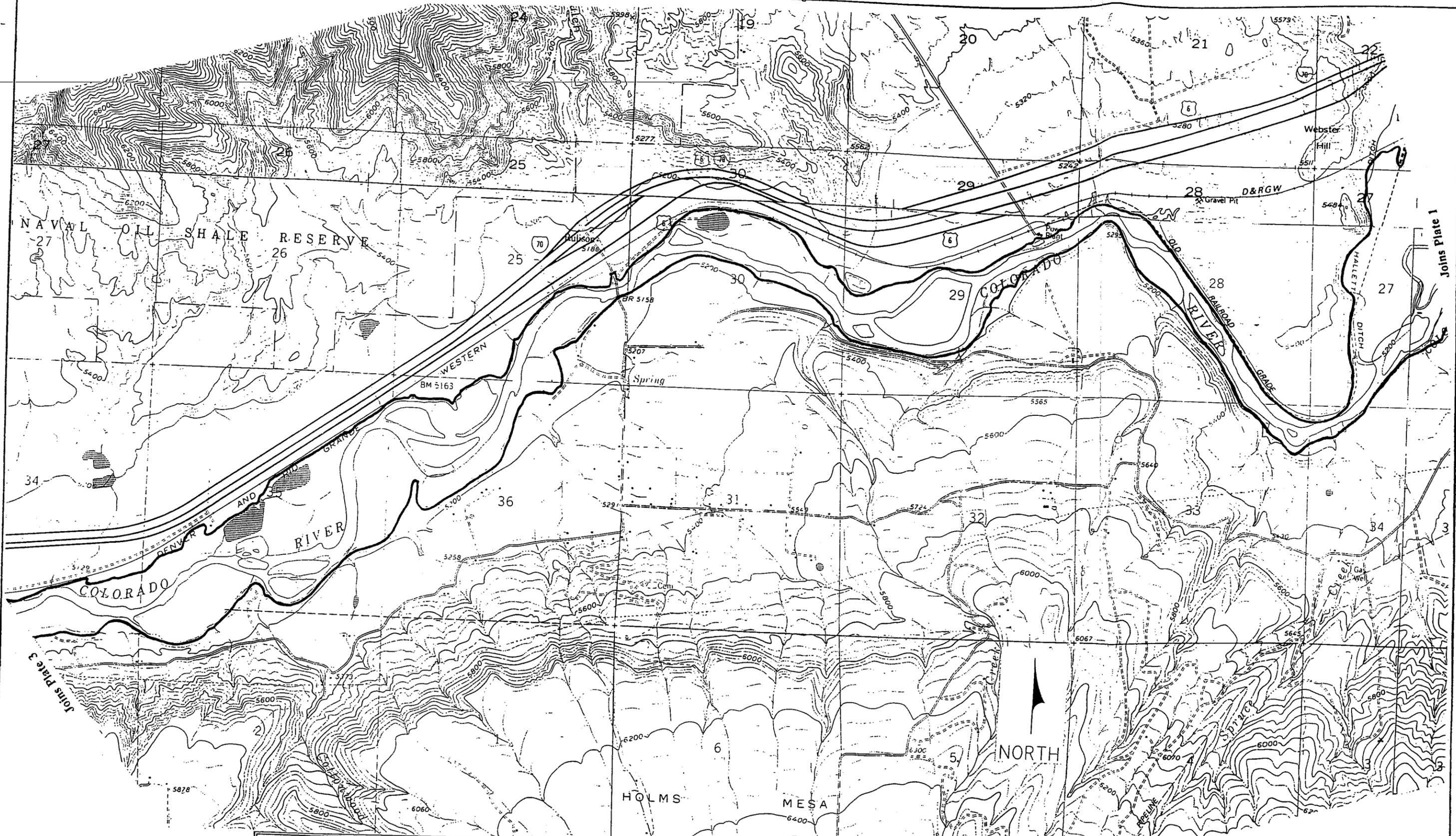
**LEGEND**

- APPROXIMATE 100-YEAR LIMIT
- - - APPROXIMATE 50-YEAR LIMIT

Where 50 and 100-year flood plains are coincident, only  
the 100-year boundary will be shown

PLATE 1 OF 16

USGS 7.5 MINUTE TOPOGRAPHIC  
QUADRANGLE BASE MAP  
SCALE: 1" = 2000'



Map 2  
54

**APPROXIMATE FLOOD PLAIN STUDY  
UPPER COLORADO RIVER BASIN  
COLORADO RIVER IN COLORADO**

PREPARED BY THE COLORADO WATER  
CONSERVATION BOARD 3/95

**LEGEND**

— APPROXIMATE 100-YEAR LIMIT  
- - - APPROXIMATE 50-YEAR LIMIT

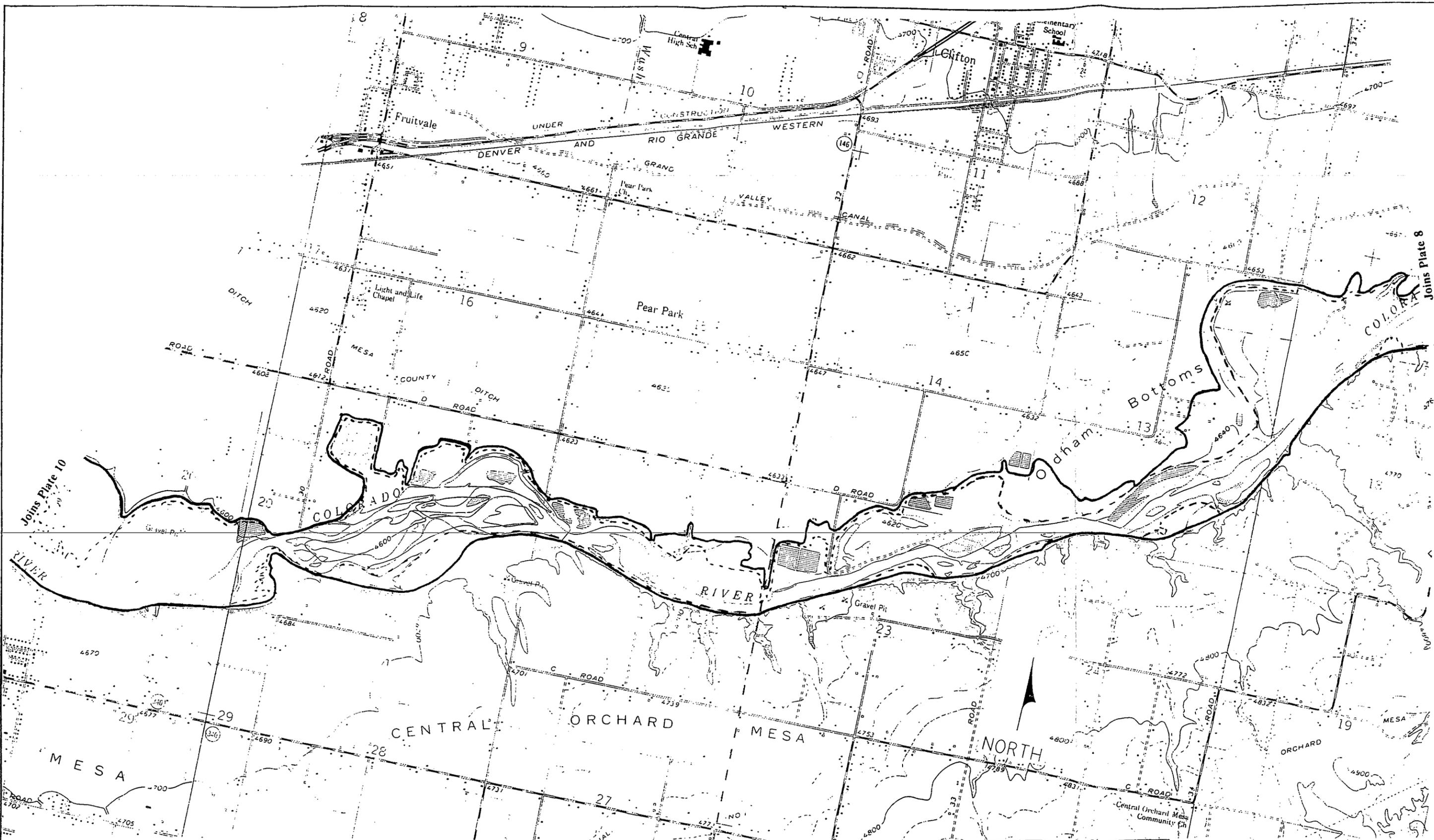
Where 50 and 100-year flood plains are coincident, only  
the 100-year boundary will be shown

**PLATE 2 OF 16**

USGS 7.5 MINUTE TOPOGRAPHIC  
QUADRANGLE BASE MAP  
SCALE: 1" = 2000'

Joins Plate 1

Joins Plate 3



Map 3  
55

**APPROXIMATE FLOOD PLAIN STUDY**  
**UPPER COLORADO RIVER BASIN**  
**COLORADO RIVER IN COLORADO**

PREPARED BY THE COLORADO WATER  
 CONSERVATION BOARD 3/95

**LEGEND**

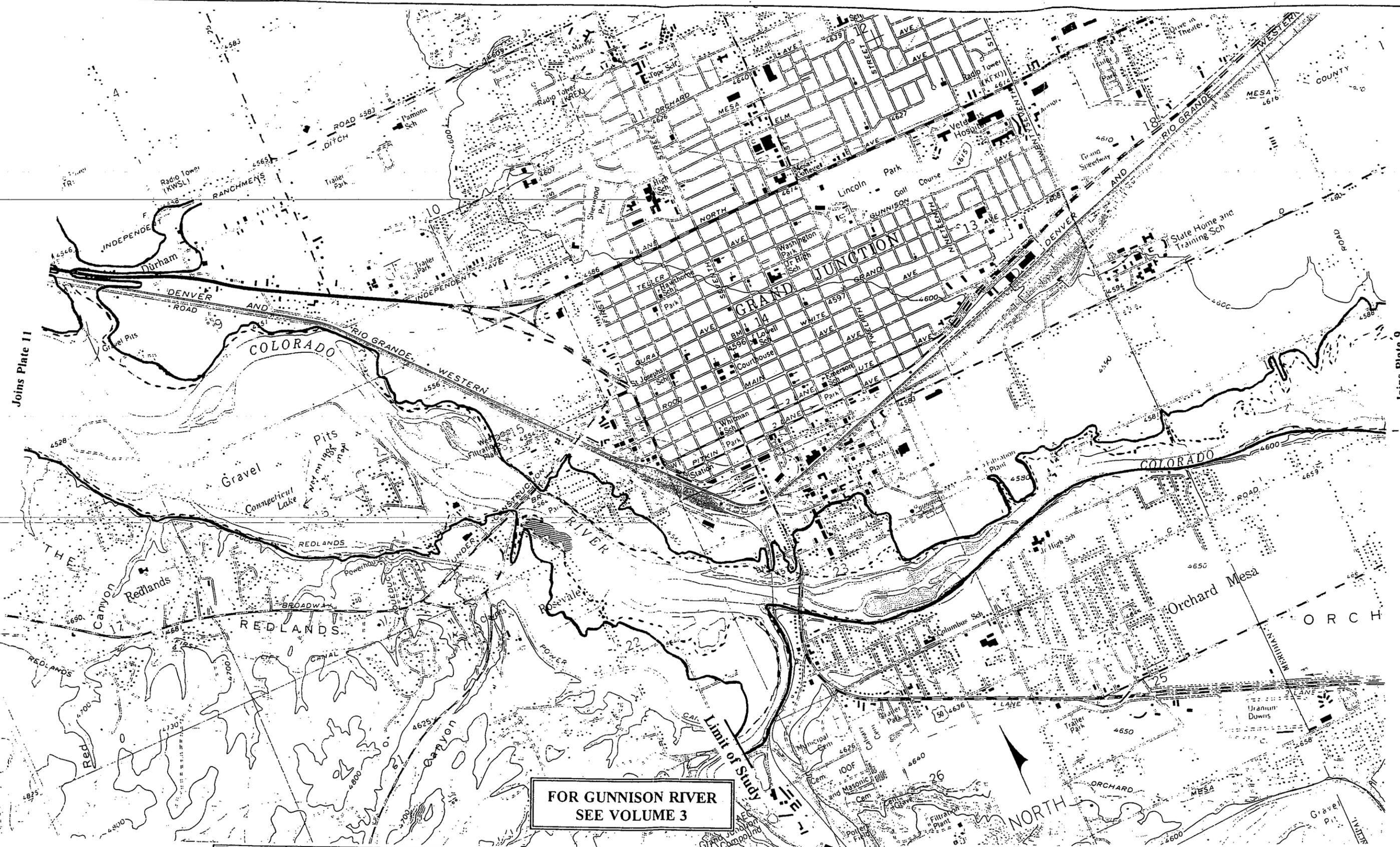
— APPROXIMATE 100-YEAR LIMIT  
 - - - APPROXIMATE 50-YEAR LIMIT

Where 50 and 100-year flood plains are coincident, only  
 the 100-year boundary will be shown

PLATE 9 OF 16

USGS 7.5 MINUTE TOPOGRAPHIC  
 QUADRANGLE BASE MAP  
 SCALE: 1" = 2000'

2 contour sheets  
 6,544



Joins Plate 11

Joins Plate 9

FOR GUNNISON RIVER  
SEE VOLUME 3

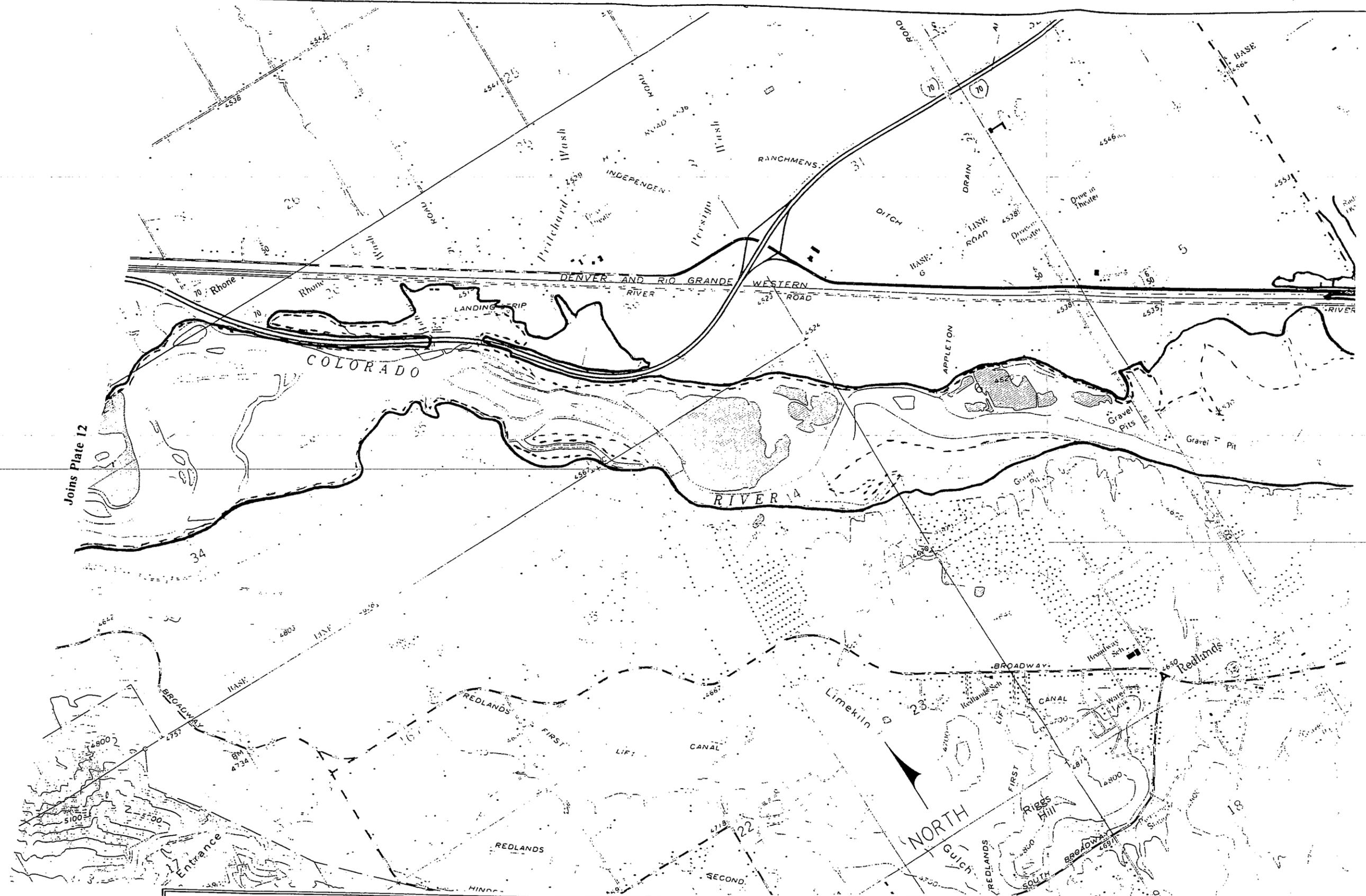
**APPROXIMATE FLOOD PLAIN STUDY  
UPPER COLORADO RIVER BASIN  
COLORADO RIVER IN COLORADO**  
  
 PREPARED BY THE COLORADO WATER  
 CONSERVATION BOARD 3/95

**LEGEND**  
 ——— APPROXIMATE 100-YEAR LIMIT  
 - - - APPROXIMATE 50-YEAR LIMIT  
 Where 50 and 100-year flood plains are coincident, only  
 the 100-year boundary will be shown

PLATE 10 OF 16  
 USGS 7.5 MINUTE TOPOGRAPHIC  
 QUADRANGLE BASE MAP  
 SCALE: 1" = 2000'

Map 4  
56

2 sheets # 9, 8 + 7



Joins Plate 12

Joins Plate 10

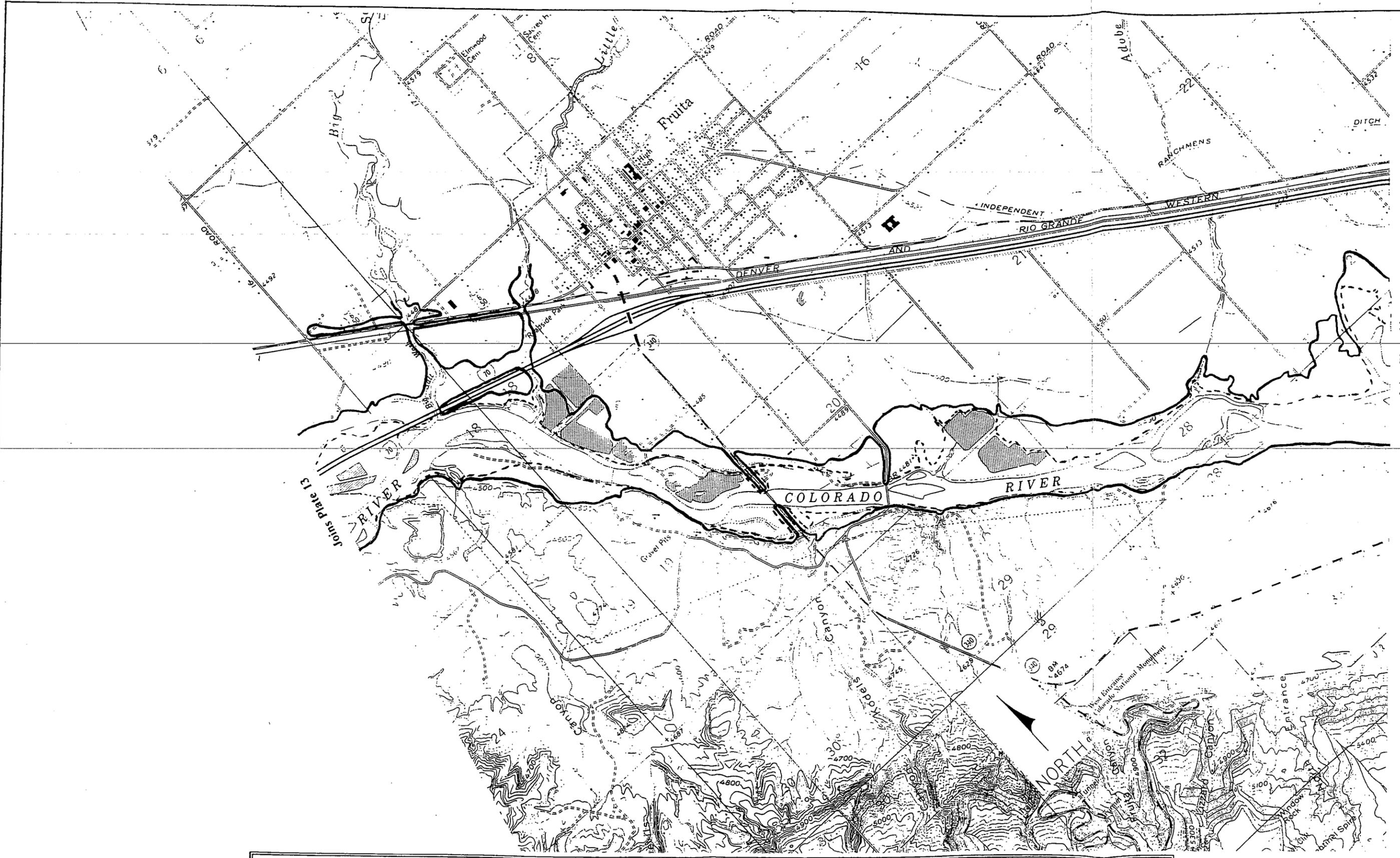
Map 5  
57

**APPROXIMATE FLOOD PLAIN STUDY  
UPPER COLORADO RIVER BASIN  
COLORADO RIVER IN COLORADO**  
  
PREPARED BY THE COLORADO WATER  
CONSERVATION BOARD 3/95

**LEGEND**  
 ——— APPROXIMATE 100-YEAR LIMIT  
 - - - APPROXIMATE 50-YEAR LIMIT  
 Where 50 and 100-year flood plains are coincident, only  
 the 100-year boundary will be shown

PLATE 11 OF 16  
 USGS 7.5 MINUTE TOPOGRAPHIC  
 QUADRANGLE BASE MAP  
 SCALE: 1" = 2000'

2 sheets # 11 & 10



Joins Plate 11

Map 6  
58

**APPROXIMATE FLOOD PLAIN STUDY  
UPPER COLORADO RIVER BASIN  
COLORADO RIVER IN COLORADO**

PREPARED BY THE COLORADO WATER  
CONSERVATION BOARD 3/95

**LEGEND**

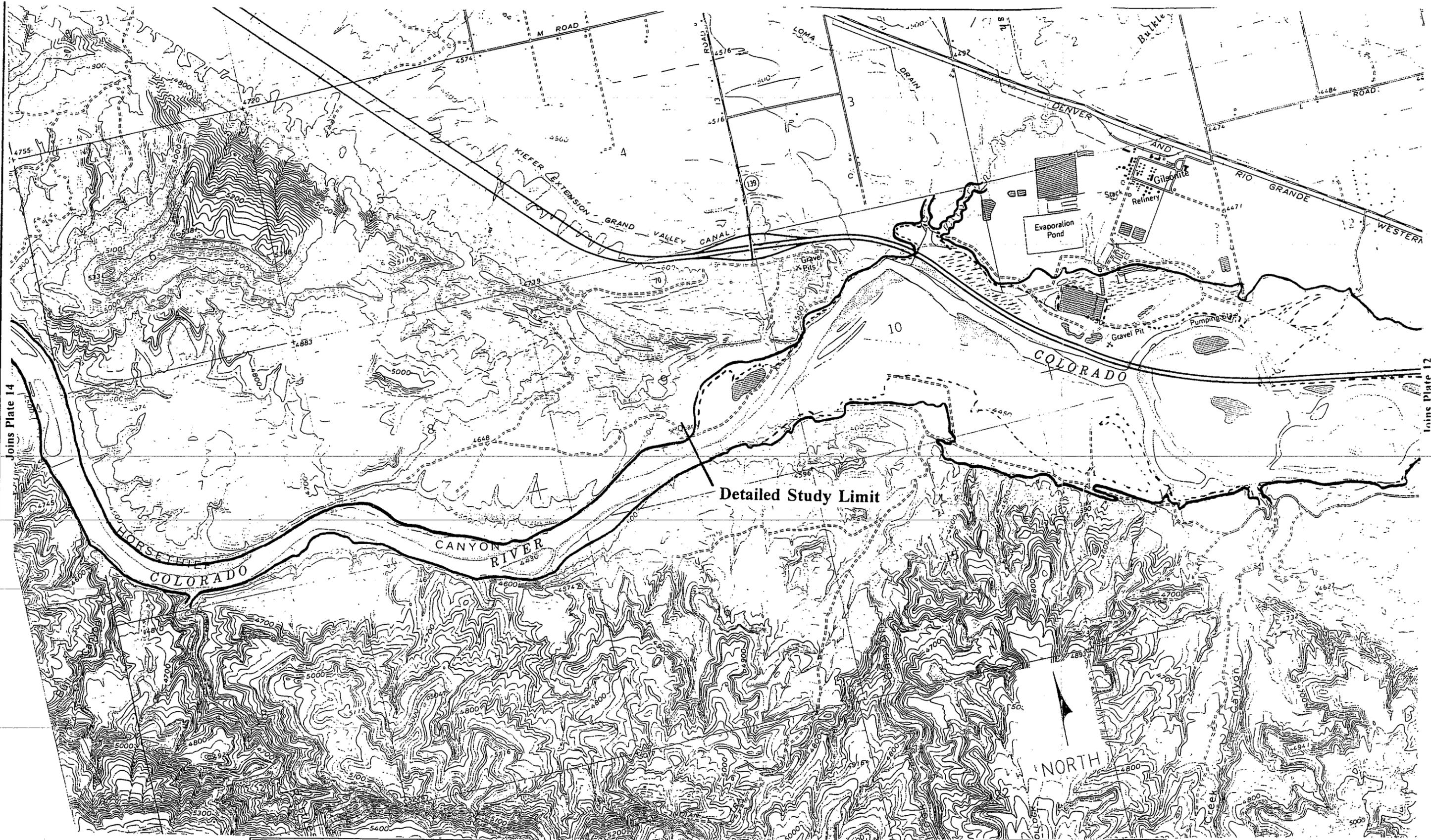
— APPROXIMATE 100-YEAR LIMIT  
- - - APPROXIMATE 50-YEAR LIMIT

Where 50 and 100-year flood plains are coincident, only  
the 100-year boundary will be shown

PLATE 2 OF 16

USGS 7.5 MINUTE TOPOGRAPHIC  
QUADRANGLE BASE MAP  
SCALE: 1" = 2000'

514.13-12



Joins Plate 14

Joins Plate 12

Detailed Study Limit

NORTH

Map 7  
59

**APPROXIMATE FLOOD PLAIN STUDY  
UPPER COLORADO RIVER BASIN  
COLORADO RIVER IN COLORADO**

PREPARED BY THE COLORADO WATER  
CONSERVATION BOARD 3/95

**LEGEND**

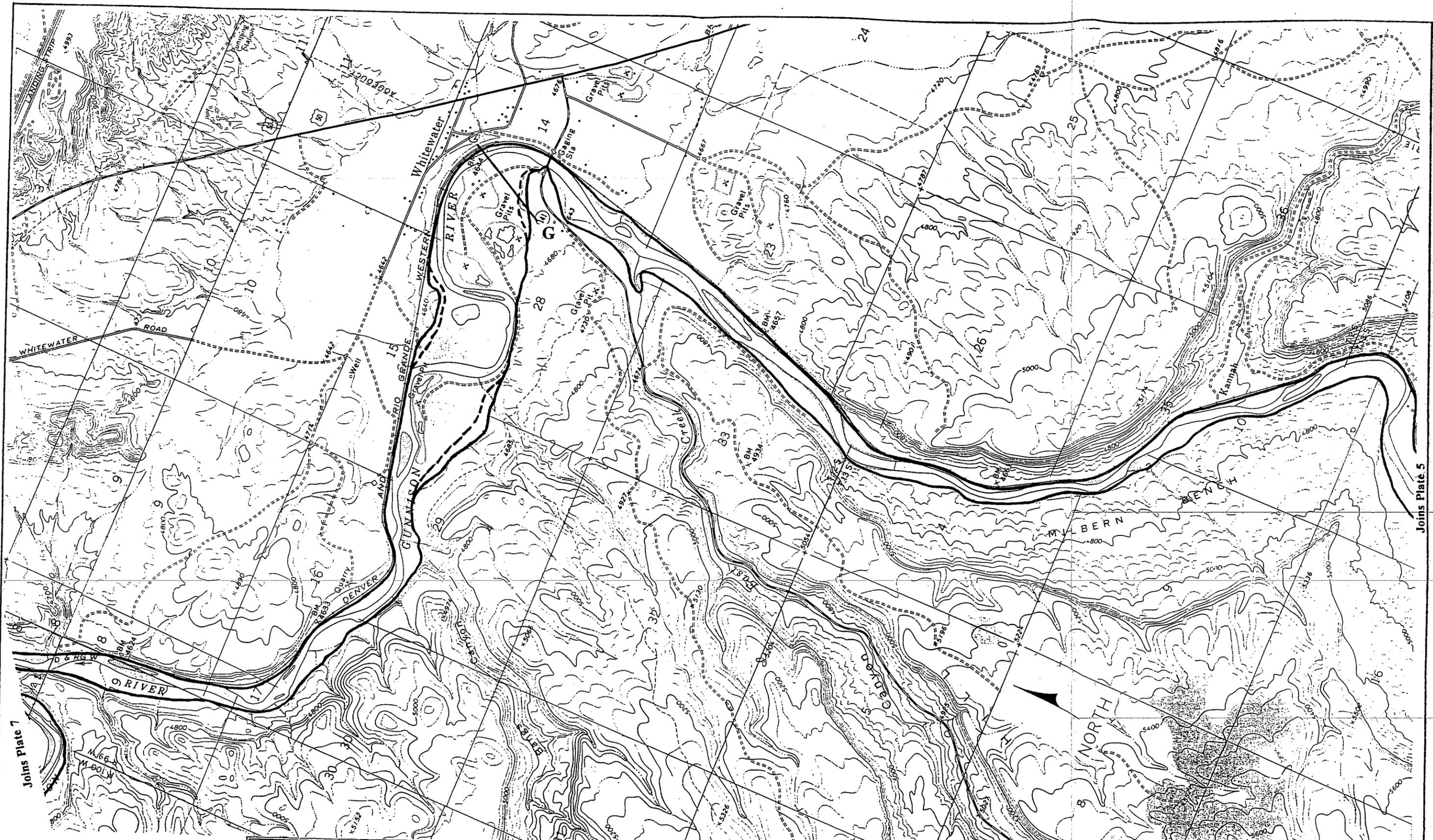
— APPROXIMATE 100-YEAR LIMIT  
- - - APPROXIMATE 50-YEAR LIMIT

Where 50 and 100-year flood plains are coincident, only  
the 100-year boundary will be shown

PLATE 13 OF 16

USGS 7.5 MINUTE TOPOGRAPHIC  
QUADRANGLE BASE MAP  
SCALE: 1" = 2000'

16-15



**APPROXIMATE FLOOD PLAIN STUDY  
UPPER COLORADO RIVER BASIN  
GUNNISON RIVER IN COLORADO**

PREPARED BY THE COLORADO WATER  
CONSERVATION BOARD 3/95

**LEGEND**

— APPROXIMATE 100-YEAR LIMIT  
- - - APPROXIMATE 50-YEAR LIMIT

Where 50 and 100-year flood plains are coincident, only  
the 100-year boundary will be shown

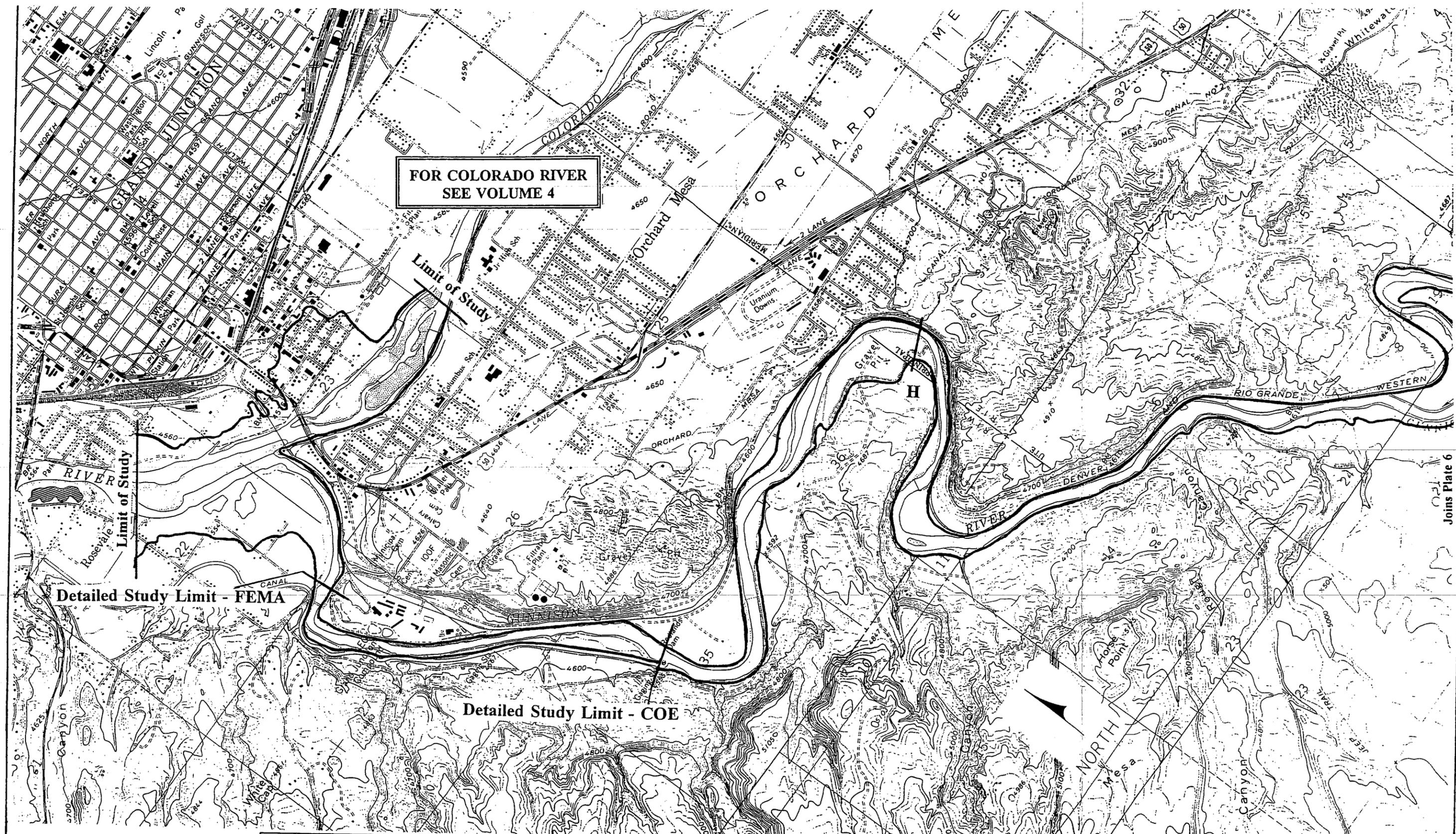
PLATE 6 OF 10

USGS 7.5 MINUTE TOPOGRAPHIC  
QUADRANGLE BASE MAP  
SCALE: 1" = 2000'

Map 8  
60

Joins Plate 7

Joins Plate 5



FOR COLORADO RIVER  
SEE VOLUME 4

Limit of Study

Detailed Study Limit - FEMA

Detailed Study Limit - COE

**APPROXIMATE FLOOD PLAIN STUDY  
UPPER COLORADO RIVER BASIN  
GUNNISON RIVER IN COLORADO**

PREPARED BY THE COLORADO WATER  
CONSERVATION BOARD 3/95

**LEGEND**

— APPROXIMATE 100-YEAR LIMIT  
- - - APPROXIMATE 50-YEAR LIMIT

Where 50. and 100-year flood plains are coincident, only  
the 100-year boundary will be shown

PLATE 7 OF 10

USGS 7.5 MINUTE TOPOGRAPHIC  
QUADRANGLE BASE MAP  
SCALE: 1" = 2000'



Joins Plate 8

Joins Plate 6

Detailed Study Limit

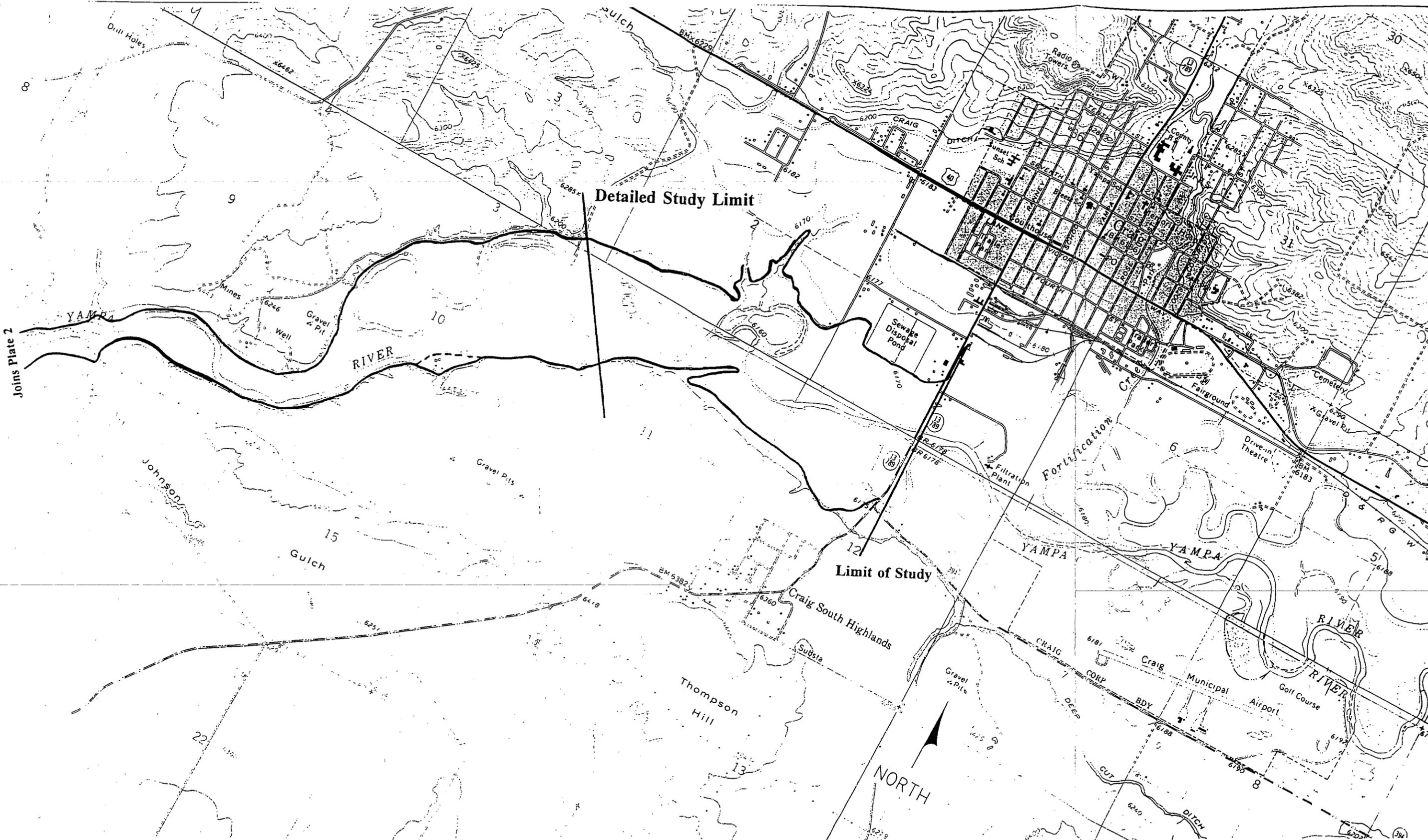
Detailed Study Limit

Map 10  
62

**APPROXIMATE FLOOD PLAIN STUDY  
UPPER COLORADO RIVER BASIN  
WHITE RIVER IN COLORADO**  
  
 PREPARED BY THE COLORADO WATER  
 CONSERVATION BOARD 3/95

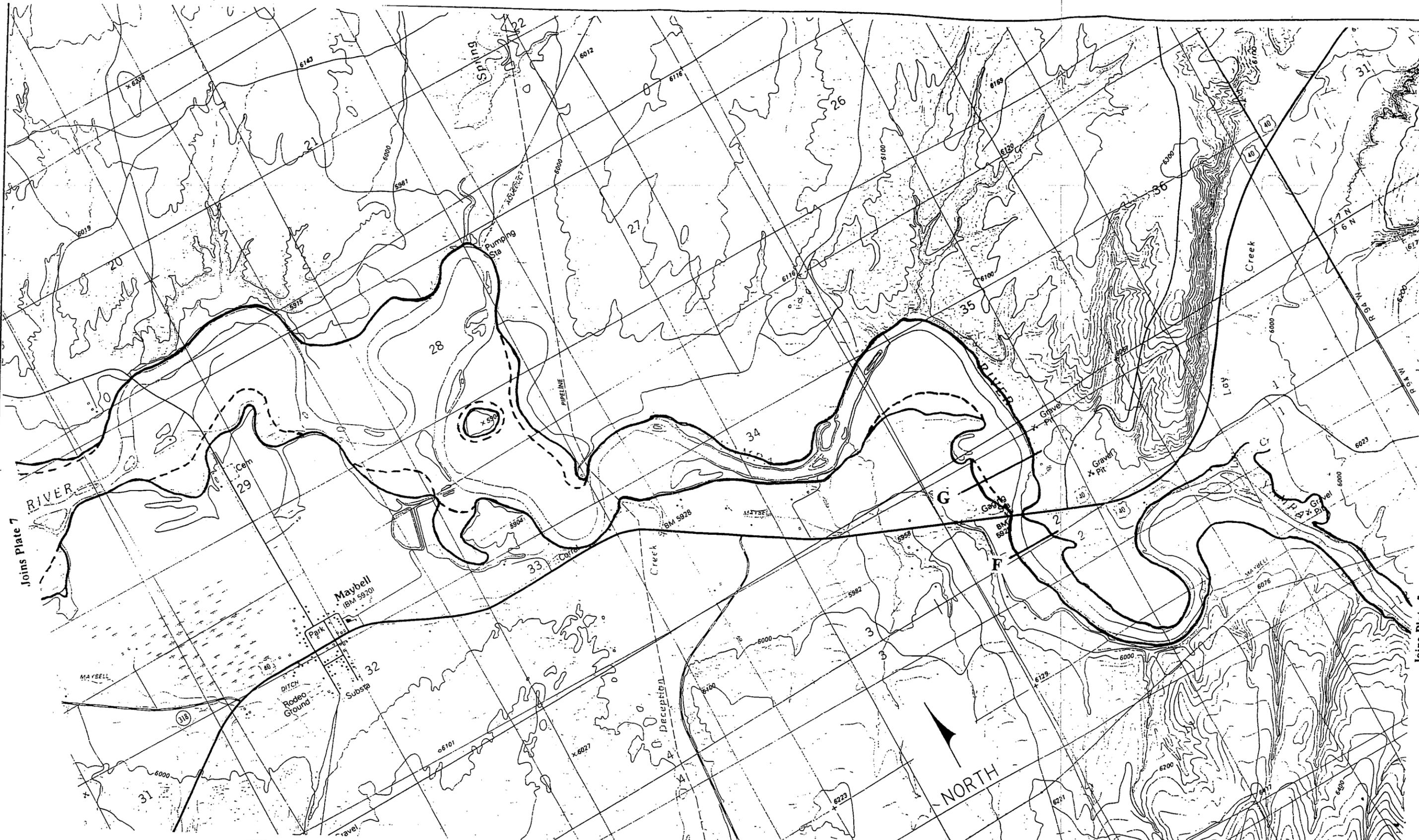
**LEGEND**  
 ——— APPROXIMATE 100-YEAR LIMIT  
 - - - APPROXIMATE 50-YEAR LIMIT  
 Where 50 and 100-year flood plains are coincident, only  
 the 100-year boundary will be shown

**PLATE 7 OF 12**  
 USGS 7.5 MINUTE TOPOGRAPHIC  
 QUADRANGLE BASE MAP  
 SCALE: 1" = 2000'



Joins Plate 2

<p><b>APPROXIMATE FLOOD PLAIN STUDY</b>  <b>UPPER COLORADO RIVER BASIN</b>  <b>YAMPA RIVER IN COLORADO</b></p> <p>PREPARED BY THE COLORADO WATER          CONSERVATION BOARD 3/95</p>	<p><b>LEGEND</b></p> <p>— APPROXIMATE 100-YEAR LIMIT          - - - APPROXIMATE 50-YEAR LIMIT</p> <p>Where 50- and 100-year flood plains are coincident, only          the 100-year boundary will be shown</p>	<p>PLATE 1 OF 14</p> <p>USGS 7.5 MINUTE TOPOGRAPHIC          QUADRANGLE BASE MAP          SCALE: 1" = 2000'</p>
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Joins Plate 7

Joins Plate 5

Map 12  
64

**APPROXIMATE FLOOD PLAIN STUDY  
UPPER COLORADO RIVER BASIN  
YAMPA RIVER IN COLORADO**  
  
 PREPARED BY THE COLORADO WATER  
 CONSERVATION BOARD 3/95

**LEGEND**  
 ——— APPROXIMATE 100-YEAR LIMIT  
 - - - APPROXIMATE 50-YEAR LIMIT  
  
 Where 50 and 100-year flood-plains are coincident, only  
 the 100-year boundary will be shown

**PLATE 6 OF 14**  
  
 USGS 7.5 MINUTE TOPOGRAPHIC  
 QUADRANGLE BASE MAP  
 SCALE: 1" = 2000'

## APPENDIX E

### LOCATION BY SECTION, RANGE, AND TOWNSHIP FOR THE 6,500-FOOT ELEVATION ON THE COLORADO AND GREEN RIVERS AND THEIR TRIBUTARIES IN THE UPPER COLORADO RIVER BASIN

#### GREEN RIVER

**Little Snake River:** Northeast Corner, Section 14, Township 12 North, Range 89 West, Fly Creek Quadrangle, Colorado

**Yampa River:** Northwest Corner, Section 18, Township 6 North, Range 86 West, Cow Creek Quadrangle, Colorado

**White River:** Southwest Corner, Section 14, Township 1 South, Range 93 West, Veatch Gulch Quadrangle, Colorado

**Duchesne River:** Northeast Corner, Section 31, Township 1 South, Range 7 West, Tabiona Quadrangle, Utah (note: This location is 6,500 feet, not 6,520 feet)

**Price River:** Southeast Corner, Section 16, Township 12 South, Range 9 East, Kyune Quadrangle, Utah

**Muddy Creek:** Northwest Corner, Section 16, Township 21 South, Range 6 East, Emery West Quadrangle, Utah

#### Three Main Branches of the San Rafael River

**Ferron Creek:** Southeast Corner, Section 29, Township 19 South, Range 6 East, Ferron Canyon Quadrangle, Utah

**Cottonwood Creek:** Southwest Corner, Section 31, Township 17 South, Range 7 East, Mahogany Point Quadrangle, Utah

**Huntington Creek:** Northwest Corner, Section 31, Township 17 South, Range 8 East, Hiawatha Quadrangle, Utah

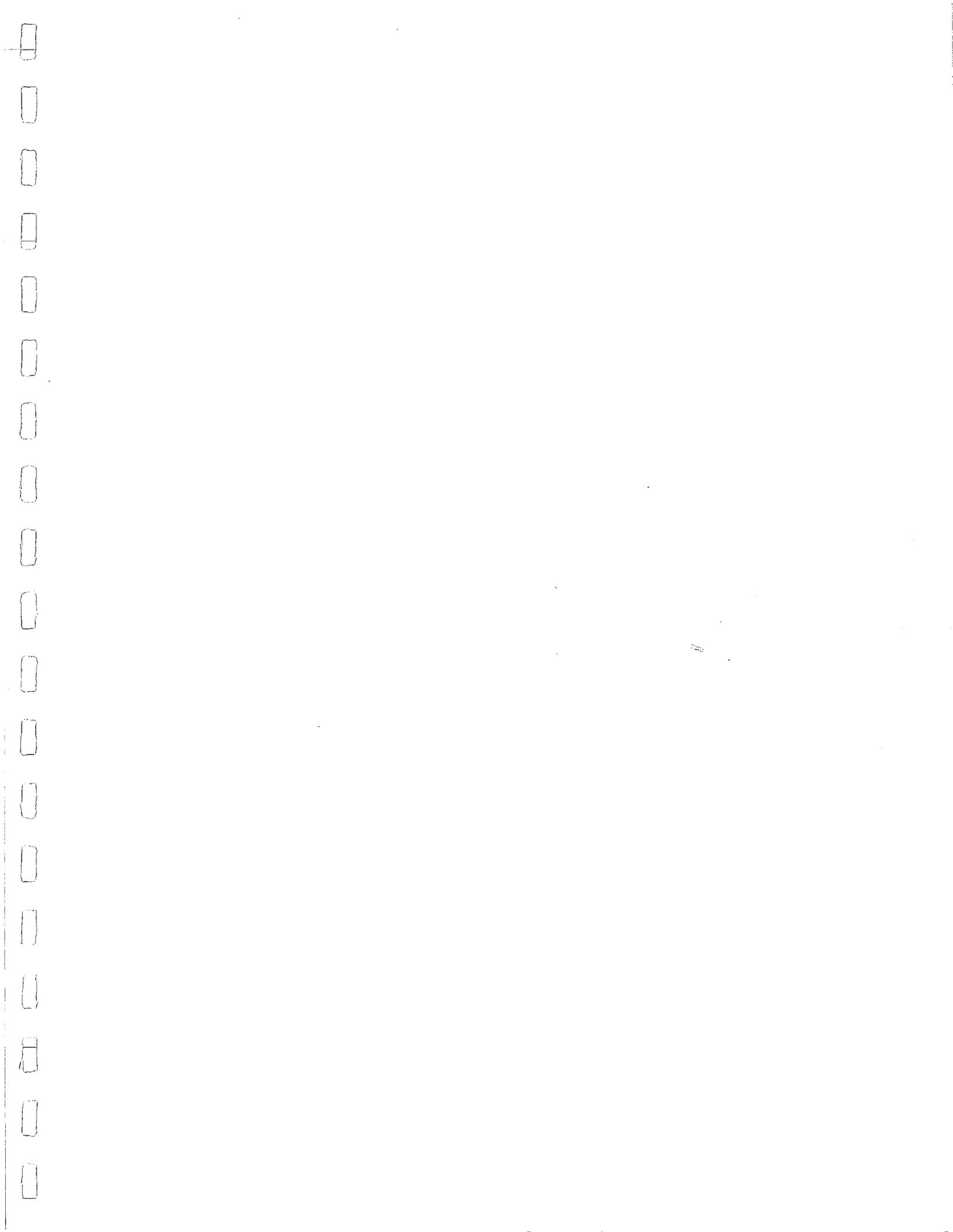
#### COLORADO RIVER

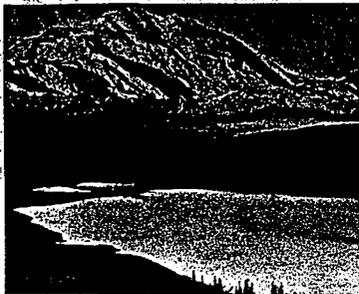
**Colorado River:** Northwest Corner, Section 7, Township 2 South, Range 84 West, Blue Hill Quadrangle, Colorado

**Gunnison River:** Southwest Corner, Section 10, Township 49 North, Range 7 West, Grizzly Ridge Quadrangle, Colorado

**Dolores River:** Northwest Corner, Section 24, Township 39 North, Range 17 West, Yellow Jacket Quadrangle, Colorado

**APPENDIX F**  
**WRITTEN PUBLIC COMMENTS**





Sunrise, Mt. McKinley

Ansel Adams

# SIERRA CLUB LEGAL DEFENSE FUND, INC.

*The Law Firm for the Environmental Movement*

1631 Glenarm Place, Suite 300, Denver, CO 80202



(303) 623-9466 FAX (303) 623-81

June 3, 1996

BY FAX 236-8163, WITH HARD COPY TO FOLLOW

Mike Stempel  
Division of Fishery Resources  
U.S. Fish and Wildlife Service  
P.O. Box 25486 -- DFC  
Denver, CO 80225

Re: Comments on the Draft Environmental Assessment For Procedures For Stocking Nonnative Fish Species In The Upper Colorado River Basin

Mr. Stempel:

On behalf of the Colorado Environmental Coalition, the Sierra Club Legal Defense Fund offers the following comments on the Draft Environmental Assessment For Procedures For Stocking Nonnative Fish Species In The Upper Colorado River Basin, dated April 30, 1996 ("Draft EA"). As you know, we have followed closely the development of the Stocking Procedures over the past several years, and submitted comments to the Fish and Wildlife Service (the "Service") on numerous related documents. We incorporate by reference all our previous comments into this letter.

Of the six alternatives analyzed in the Draft EA, four<sup>1</sup> will not meet either the goals of the specific federal action proposed here, development of Stocking Procedures for nonnative fish in the Upper Colorado River Basin (the "Basin"), or the more general purposes of the Recovery Program. Of the remaining two alternatives, alternative 2 will lead to violations of the Endangered Species Act. Accordingly, we encourage the Service to select alternative 3 as the preferred alternative.

<sup>1</sup> These four alternatives are the no action alternative and alternatives 1, 4 and 5.



A. The No Action Alternative and Alternatives 1, 4 and 5 Will Not Meet the Purposes of Either this Specific Federal Action or the Recovery Program

1. The No Action Alternative and Alternatives 4 and 5 are Legally Unavailable to the Service

The Recovery Program for the endangered native fish states that "stocking of nonnative species will be confined to areas where the absence of potential conflict with rare or endangered species can be demonstrated." Draft EA at 1. The Draft EA analyzes alternatives to guide the Service and its state partners in complying with this provision of the Recovery Program by developing Basin-wide uniform Stocking Procedures guiding the stocking of nonnative fish. According to the Draft EA, the Procedures will "reduce, minimize, and/or eliminate impacts of nonnative fish on native fish." Draft EA at 1.

The Service's own analysis, however, indicates that the no action alternative (alternative "NA") and alternatives 4 and 5 can not meet this purpose, and actually may exacerbate current problems. Specifically, Table 9, Draft EA at 34, indicates that alternatives NA, 4 and 5 will (1) increase predation on endangered fishes, (2) do nothing to decrease competition between nonnatives and native fish, and (3) reduce the benefits of the floodplain for the endangered fish during flooding.

Accordingly, implementation of any of these alternatives would impair the Recovery Program's ability to provide for recovery of the endangered fish while allowing water development projects to proceed. The Draft EA acknowledges that reducing the impacts of nonnative fish stocking on native fish recovery is crucial to the success of the Recovery Program:

By implementing recovery actions such as . . . controlling nonnative fishes, the recovery program serves as a reasonable and prudent alternative for Section 7 compliance with the Endangered Species Act. . . . Stocking procedures that contribute significantly towards the recovery of the fish will, in part, allow the Recovery Program to serve as a reasonable and prudent alternative for water development. Stocking procedures that do not adequately address the nonnative fish issues will not serve as a reasonable and prudent alternative.

Draft EA at 24-25 (emphasis added). The impacts of alternatives NA, 4 and 5, as described in Table 9, will substantially constrain the Service's ability to make a biologically-defensible finding that the Colorado River Fish Recovery Program is making sufficient progress towards recovery. Further restrictions on water development in the Basin will be required if alternatives NA, 4 or 5 are selected. Table

9 confirms that alternatives NA and 4 will have negative effects on future water development, and alternative 5 will do nothing to improve the current situation.

Because alternatives NA, 4 and 5 will not achieve the purposes of either the general Recovery Program or the specific federal action analyzed in the EA, and therefore will not be "[s]tocking procedures that contribute significantly towards the recovery of the [endangered] fish," selection of one of those alternatives would be arbitrary and capricious, and lead to violations of the Endangered Species Act. Since these alternatives accordingly are not legally available to the Service, they are not discussed further in these comments.

## 2. Alternative 1 Will Cause Unpredictability and Conflict

Alternative 1 will accomplish little because it relies almost exclusively on case-by-case determinations for stocking requests. Not only will this increase administrative costs and costs to private landowners, Draft EA at 29, but it will add a high degree of uncertainty and potential for conflict to the recovery process. Because of the complete lack of predictability for anglers, businesses and water developers, this alternative will not meet the stated goals of either this specific federal action or the more general Recovery Program. Also, there will be a high potential for conflict and for litigation, both by private landowners who will challenge any perceived inconsistencies in individual determinations, and by environmentalists who may question the effectiveness of a prescribed protective measure in specific circumstances. See issues raised in discussion of alternative 2, below.

To meet the goals of the Recovery Program, the Procedures should provide for predictability for all interested parties, reduce administrative agency involvement in as many situations as possible, and reduce or eliminate the potential for conflicts. Simply relying on case-by-case analysis will not accomplish any of these goals. Alternative 1 should be rejected.

## 3. Certain Fish Species Should not be Stocked.

Alternatives NA, 1, 4 and 5 will not prohibit the stocking of several notorious predator species, which even in small numbers will have devastating impacts on endangered fish. Others are problem species noted for predation on endangered fish. Such species include northern pike, tiger muskie, common carp, red shiner, black bullhead, yellow bullhead, wiper, green sunfish, yellow perch, and walleye. Alternatives 2 and 3 incorporate a prohibition on stocking these species, but the other alternatives do not. Any selected alternative should include a ban on stocking these species anywhere in the Basin.

Could make exception

Tiger muskie in Huron GOLF  
Northern can be relocated TO  
Isolated waters already containing  
Northern Pike

Rest of list & situations banned

B. Objections Common to Alternatives 2 and 3

1. The Economic Analysis Has No Basis

As with any situation involving protection of endangered species, some interested parties, especially the Colorado Division of Wildlife, have argued that taking the steps needed to protect the endangered native fish will cause economic hardship. This issue has caused unnecessary delays in the recovery process, yet the Draft EA fails to provide meaningful information on the economics of warm water fishing, or how reducing nonnative fish stocking may affect the recreational fishing market. For example, Part IV of the Draft EA, describing the Impact Assessment/Environmental Consequences, includes the following identical language for alternatives 1 through 5:

This alternative may reduce fishing expenditures by some unknown amount. As an example, if future warmwater fishing opportunities are reduced by 20 surface acres, assuming 100 days fishing/acre at \$40/day expenditure, the direct economic impact could be \$80,000/year; if reduced by 100 surface acres the direct impact would be \$400,000/year.

Draft EA at 29, 30, 31, 32, and 33. The Draft EA cites no source for these numbers. The only information related to a determination of economic impacts is from a study of warmwater fishermen, who were from four northwestern Colorado counties. No explanation for the limited survey is offered. Also, the numbers cited in the above quote appear to assume that warmwater anglers would completely stop fishing if nonnative fish stocking restrictions were implemented. The Draft EA offers no basis for this assumption, and anyone who knows a fisherman would question that conclusion. It is just as likely (if not more likely) that this "loss" will be reapportioned within the recreational fishing industry. Unless adequate analysis of potential market changes is included in the EA, the false threat of "jobs v. environment" will continue to dog the recovery process.

In fact, the Draft EA states in several places that there will be little to no economic impact if nonnative fish stocking is reduced to protect the endangered fish. For example, even alternative 3, the most restrictive alternative analyzed, would cause minimal change in overall fishing days. Draft EA at 31. According to the Draft EA, some types of aquaculture will be reduced, but this would be balanced by a "corresponding increase" in other types. Id. The Service should clearly state that there will be minimal economic impact caused by reduction in nonnative fish stocking, and completely eliminate the above quote, which is not supported by the information contained in the Draft EA.

The largest economic impact is not mentioned in any of the "Economy" sections under Section IV, though it is included in a

separate section: that if the impacts of nonnative fish stocking on the endangered native fish are not controlled, "billions of dollars of water development and subsequent economic growth could be impacted." Draft EA at 24. This very real and very large economic impact of not controlling nonnative stocking should be balanced against the minimal or fanciful economic impact described in section IV of the Draft EA.

C. Alternative 2

We have significant reservations regarding several major components of Alternative 2. First, routine stocking of dangerous non-natives would be permitted within the designated critical habitat of the endangered native fish. Second, alternative 2 would allow ponds to be artificially removed from the floodplain by berming, and will allow screening to be used in connected waters. Draft EA at 10-11. These provisions will lead to violations of the Endangered Species Act.

1. **Routine Stocking of Dangerous Nonnatives Should Not Be Permitted Within the Critical Habitat of the Endangered Native Fish**

Alternative 2 contemplates routine stocking of largemouth bass, bluegill, and black crappie within the critical habitat of the endangered native fish, i.e. within the one-hundred-year floodplain and in waters connected to river reaches designated as critical habitat. Draft EA at 12, Table 2 at A.6.a. and b. This is an impermissible adverse modification of critical habitat.

Each of these three centrarchids is a known competitor and/or predator of endangered fish, and should not be stocked in habitat necessary for the survival and recovery of the endangered native fish.

a. **Largemouth bass** are repeat offenders when it comes to predation on Colorado River endangered fish. Langhorst (1989), Hendrickson and Brooks (1987), and Osmundson (1987) all report largemouth bass predation on both razorback sucker and Colorado squawfish. In fact, Osmundson (1987) reported that largemouth bass actually prefer young Colorado squawfish to other species, including red shiner and fathead minnow, when given a choice of prey.

b. **Bluegill** were identified as competitors with endangered species by expert government biologists surveyed by Hawkins and Nesler (1991).

c. **Black crappie** predation on young Colorado squawfish in floodplain grow-out ponds along the Colorado River was noted by Osmundson (1989).

Stocking these species in areas below the 100 year floodplain in critical habitat reaches poses a level of risk to the endangered fish that is incompatible with the RIP's own standards, and is prohibited by state and federal law. Allowing stocking of piscivorous warmwater species within the 100 year floodplain in areas designated as critical habitat for the endangered fish would constitute an adverse modification of the endangered fishes' designated critical habitat. See Draft EA at 27 ("The continued stocking of nonnative fish, even those already established in the Basin, adversely affects the native fish species"). The Endangered Species Act (ESA) forbids the Service from approving any procedures which might lead to such an adverse modification.

**2. Artificially Removing Ponds from Floodplain Would Likely Violate the ESA**

Alternative 2 would allow ponds to be artificially raised above the fifty-year floodplain, and then stocked with nonnatives known to prey on and compete with the endangered fish. Draft EA at 11 and Table 2 at A.2. Such berming of ponds which are included within critical habitat may constitute a modification which will adversely impact the endangered fish and their habitat. The Endangered Species Act and NEPA require prior analysis of the impact of removing ponds from critical habitat before such berming may be allowed.

**3. Installation of Fish Control Structures Does Not Preclude Escapement, and Provides Inadequate Justification For Stocking Nonnatives**

Alternative 2 would allow stocking in waters connected to critical habitat if fish control structures or devices are installed which will "prevent escapement of all but the eggs and larvae" of the nonnatives. This restriction provides inadequate protection to endangered fish.

Fish control structures such as screens may reduce escapement, but they do not prevent it. Nonnatives already regularly and frequently escape from tributary reservoirs and easily reach endangered fish habitat. Further, floods render fish control structures useless. The RIP instructs that warmwater nonnatives should not be stocked in areas where potential for conflict with endangered species exists. The potential for conflict is especially high in waters connected directly to critical habitat.

Also, the Service offers no reason for determining that the escapement of eggs and larvae is innocuous. On what basis does the Service exclude eggs and larvae from control in critical habitat? The Service must either offer biologically sound

justification for this exclusion, or eliminate the exclusion from the chosen alternative.

D. Alternative 3

Except for our objections to the economic analysis described above, alternative 3 is the alternative most consistent with the stated goals of this federal action and with the goals of the Recovery Program. It is also the least likely to cause violations of the Endangered Species Act, since it avoids berming, screening and other modification of the critical habitat of the endangered native fish. Alternative 3 will lead to predictability in decisionmaking, and allow anglers, business interests, water developers and environmentalists to move on from the stocking issue and address other portions of the recovery process. We encourage the Service to choose alternative 3 as the preferred alternative.

E. Because of the Potential Significant Impacts Which Will Be Caused By Any Alternative Other Than Alternative 3, an EIS Will Be Required If Alternative 3 is Not Selected

All the alternatives other than alternative 3 will cause significant impacts on the environment within the meaning of NEPA and its implementing regulations. See 42 U.S.C. § 4332(C); 40 C.F.R. § 1508.27. Any alternative causing a significant impact will require completion of an EIS. See 40 C.F.R. §§ 1501.4(b) and 1508.9.

For example, alternatives 1, 2, 4 and 5 all contemplate modification of the endangered native species' designated critical habitat, by berming, screening, and adding predators and competitors of the protected species. Critical habitat, defined as the area containing features essential to the conservation of a species which may require special management, 16 U.S.C. § 1532(5)(A), clearly is an "ecologically critical area" requiring special consideration when determining the significance of an impact. 40 C.F.R. § 1508.27(b)(3). Also, as described above, all the alternatives other than alternative 3 will lead to violations of the Endangered Species Act. An action which threatens violation of federal law also requires special consideration. 40 C.F.R. § 1508.27(b)(10).

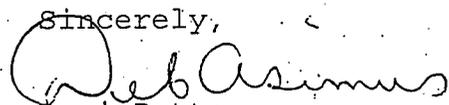
Accordingly, if an alternative other than alternative 3 is selected as the preferred alternative, an EA/FONSI will be inadequate, and an EIS will become necessary.

F. Conclusion

For all the reasons stated above, we encourage the Service to reject the no action alternative and alternatives 1, 4 and 5 because they will not meet the stated purposes of the proposed federal action, and alternative 2 as likely to lead to violations of the Endangered Species Act. Alternative 3 will meet the goals stated in the Draft EA, and is the alternative most compatible with the goals of the Recovery Program. We encourage the Service to select Alternative 3 as the preferred alternative.

We appreciate the opportunity to comment on the Draft EA. Please note that the Sierra Club Legal Defense Fund is a law firm, and is separate from the Sierra Club. Thank you.

Sincerely,



Lori Potter

Debra Asimus

Sarah Dormon

SCLDF, Rocky Mountain Office

Works Cited

Hawkins, J. A., and T.P. Nesler. 1991. Nonnative Fishes of the Upper Colorado River Basin: An Issue Paper. Colorado State University and Colorado Division of Wildlife.

Hendrickson, D.A. and J.E. Brooks. 1987. Colorado River squawfish introduction studies. Proceedings of the Desert Fishes Society 18:207.

Langhorst, D.R. 1989. A monitoring study of razorback sucker reintroduced into the lower Colorado River in 1988. California Department of Fish and Game.

Osmundson, D.B. 1987. Growth and survival of Colorado squawfish stocked in riverside ponds, with reference to largemouth bass predation. Final Report, Utah Cooperative Fish and Wildlife Research Unit, Utah State University.



5/28/96

Mr. Mike Stemple  
P.O. Box 25486  
Denver Federal Center  
Denver, CO 80225-048

Dear Mike:

The enclosed petitions were placed at two Grand Junction sporting goods stores along with the EA. One was located at Gene Taylor's Sporting Goods, 445 W. Gunnison Ave, and the other at Western Angler, 2454 Hwy 6&24 Suite 103. I realize these are not as powerful as a personal letter, but at least they show there is interest in our local warm water fisheries.

Sincerely,

Lynn M. Ensley  
Executive Director  
Colorado Sportsmen Wildlife Fund Inc.



5/24/96

Mr. Mike Stemple MS 60140  
U.S. Fish & Wildlife Service  
P.O. Box 25486  
Denver Federal Center  
Denver, CO 80225

Dear Mike:

We the undersigned urge the U.S. Fish and Wildlife Service to implement Alternative 4 as outlined the the Environmental Assessment for Procedures for Stocking of Nonnative Fish Species in the Upper Colorado River Basin. We agree that berming of ponds in the 10 year flood plain to the 50 year flood level will protect endanger fish and preserve the warm water fisheries that we enjoy for recreational fishing. We also realize that Alternatives 1, 2, and 3 will stop all recreational fishing in the ponds of the upper Colorado River Basin.

Name	Address		
Pat Rish	1431 W 16th St	Grand Jct CO	81501
STEVE FISHER	2110 Yellowstone Rd	GRAND JCT Colo	81503 241-7241
BILL KLINGENR	2236 WINDSOR	LI GR JCT	81503
DAN GRAY	2145 BROADWAY	GJ. CO.	81503
M. J. ...	2313 ARRIBA DR	GJ. CO	81503 243-6027
...	3050 F...	...	81504 434-9523
Ray ...	269 Dike Rd.	E. F. Co	81503 243-8304
Jim Roberts	470 23 RD	GJ CO	81503 248-3570
Michelle Huber	928 N. 6th St.	G. J. CO	81501 243-3789
Chris Bacon	453 Gallery Ct	Clifton Co	81520 434-3768
Sandy ...	2278 VILLAGE CT.	GRAND JCT, CO	81503 241-6735
Dean ...	2970 North Ave.	Grand Jct.	81504 245-4325
Doug ...	347 N. ORCHARD	FAMILY CO	81521 855-4441
Dustin ...	205 Jasmine Lane	81506 Grand Jct CO	241-6741
AMBER R. TERREY	1630 BLUEGILL DR.	Grand Jct. Co.	81505
KON TERREY	16809 E. PACIFIC DR.	AURORA CO.	80013
Auke ...	428 1/2 prospectors pt.	GJ CO	81503 245-280
Janet T. ...	1934 S Broadway	FJ CO	81503 242-8525
Brian ...	3171 E RA	Grand Jct Colo	81504 245-2307
...	3453 1/2 G ROAD	CLIFTON CO	81520 464-7202
...	616 LODGEPOLE ST.	GJ CO	81504
...	570 29th Rd.	GJ CO	81504 242-8996
...	497 Meadowlark	Clifton CO	81520 434-5385
...	3548 E 1/2 Rd.	Palisade, CO	81526 464-5246
Gary ...	506 N 25th St	GJCT CO.	81501 243-3593

5/24/96

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U.S. Fish & Wildlife Service  
P.O. Box 25486  
Denver Federal Center  
Denver, CO 80225

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Name	Address		
Dr. Todd Mitchell	1300 N. 7 <sup>th</sup> St.	G.J.	2412323
David Munk	3280 C.R.D.	G.J.	5231342
Tom Taylor	105 Mantey Hts	GJ	81805
Richard Johnson	603 Arapahoe Hwy	GJT	81506 244-6995
Frank Johnson	320 W. W. Dr.	Del Co	81505 2411546
John Johnson	1187 1/2 Glenview Dr	Del Co	81503 242-5736
Glenn Bizzelle	2103 Gunnison Ave	Del Co	81501 242-9313
Robert Jimenez	28791 Navajo Way	Del Co	81506 243-9675
Bob Taylor	636 W. Co.	Del Co	81505 243-091
Robert Taylor	2919 Dawn Dr #4	Del Co	81504 256-7134
James McPherson	2919 Dawn Dr #4	GJ CO	81504 256-7134
Ronald C. Taylor DDS	320 Cedar Court	Grand Junction	81501 243-8911
Bob Taylor	2680 Bk Rd #203	G.J.	81503 243-8960
Harold Kivert	491 Harmony	GJ	81504 2430527
Douglas Monroe	452 Wildwood Dr.	GS CO	81503 242-0598
Heather Clary	452 Wildwood Dr.	GJ CO	81503 242-0599
John Smith	526 Fenwickwood	Del Co	81501
Michael Maclean	202 North Ave 183	GJ	81501
Bob Ryan	202 North Ave 183	GJ	81501
Bell Caribist	911 A St	Delta Co	81406 970-874-7153
Bob Thies	3607 E 1/2 Rd	Palisade CO	81526
John Carter	63027 Newport Dr	Montrose	81401 240-4093
John Cameron	320 W. W. Dr.	Del Co	81505 241-1546
John R. Magdal	333 39 Road	Palisade Co	
John R. Magdal	679 S Maple	Palisade Co	81521
John R. Magdal	205 Jasmine Lane	Grand Jct CO	81506 241-65

5/24/96

Mr. Mike Stemple MS 60140  
U.S. Fish & Wildlife Service  
P.O. Box 25486  
Denver Federal Center  
Denver, CO 80225

Dear Mike:

We the undersigned urge the U.S. Fish and Wildlife Service to implement Alternative 4 as outlined in the Environmental Assessment for Procedures for Stocking of Nonnative Fish Species in the Upper Colorado River Basin. We agree that berming of ponds in the 10 year flood plain to the 50 year flood level will protect endanger fish and preserve the warm water fisheries that we enjoy for recreational fishing. We also realize that Alternatives 1, 2, and 3 will stop all recreational fishing in the ponds of the upper Colorado River Basin.

Name	Address
Mark Turner	705 Jasmine Lane Grand Jct. CO 81506 24/64
Ray A. Hill	1026 S. Park Ave. #6 Montrose CO 81401
Richard Collins	617 PANORAMA DR. GRD. JCT. CO. 81503
Barbara Collins	617 PANORAMA DR. GR. JCT CO 81503
Alma Jordan	1873 Res. Palso. Grand Jct Co. 81503
D. Patrick Casselberry	604 Wagon Trail Dr. Grand Jct. Co 81503
Henry S. Metz	3089 Huisington Grand Jct Co 81504
Donald Pearson	710 S Rd MCK, CO 81525
Paul Hancock	6560 E Holiday Dr. Mesa, AZ 85215
John W. Langer	7937 KATHY RD GRAND JCT CO 81503
Alba Miller	4977 S Avenida Languaje Grand Jct 81503
Bill Beam	480 S 1741 Hwy White Water CO 81522
Brian Langfitt	365 Plateau Dr. G. J. Co. 81503



5/24/96

Mr. Mike Stemple MS 60140  
U.S. Fish & Wildlife Service  
P.O. Box 25486  
Denver Federal Center  
Denver, CO 80225

Dear Mike:

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Name	Address	City	State	Zip
Bob Freyschlag	504 W. PRINCETON	GWS	CO	81601
Robert A. Mathews	11772 - 320th	Aspen	CO	81650
Dirk Jensen	11772 - 320th	Aspen	CO	81650
Mike Perry	203 CEDAR 132	GREENWOOD	SPRING CO.	81601
Shawn	607	Iron Canyon	OT	81650
John	619	Craig Rd	New Castle	CO 81647
John	Box 2004 8148	Creekside Ct.	RWS Co	81602
Wanda	26105	City Rd 214	New Castle	81697
Wanda	909 22 Rd	Grand Jet	CO	81505
John	0130	West DR	Silt	CO 81652
Don	2358	Ridgeway	CT. GJ.	CO 81503
Mary	548	28 3/4 Rd	GJ.	CO 81503
Bill	596	Creekside	CT G. J.	CO 81503
Becky	3191	F 1/2 Rd	G. J.	CO 81504
Tom	3238	Lakeside Dr	G J	CO 81506





Hall, Pitts & Associates  
CONSULTING ENGINEERS

June 3, 1996



U.S. Fish and Wildlife Service  
Fisheries and Federal Aid  
P.O. Box 25486, DFC  
Denver, CO 80225

Attention: Mr. Mike Stempel, Assistant Regional Director

SUBJECT: Comments on Draft "Environmental Assessment for Procedures of Stocking of Nonnative Fish Species in the Upper Colorado River Basin," April 30, 1996

Dear Mike:

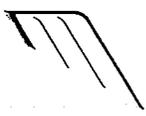
Upper Basin water users continue to be concerned about the impacts of the nonnative species on recovery of endangered fish in the Upper Colorado River Basin. Recovery cannot be achieved in the Upper Basin without substantially reducing, if not eliminating, adverse impacts of nonnative fish on endangered fish (Tyus and Saunders, 1996). Data from the standardized monitoring program indicates that nonnative fish dominate the critical habitat of the endangered species, and frequently account for 90 to 99 percent of the numbers of fish and biomass of the rivers of the Upper Basin. The Recovery Program (USFWS, 1987) requires that "stocking of nonnative species will be confined to areas where the absence of potential conflict with endangered fishes can be demonstrated." The EA states (p.27) "...continued stocking of non-native fish, even those already established in the Basin, adversely affects the native fish species." The draft report "Nonnative Fishes in the Natural Ecosystem and a strategic plan for nonnatives in the Upper Colorado River Basin" shows that endangered fish biologists rated the Colorado River from the Grand Valley Diversion to the confluence with the Green River as the section of river with the highest concern for interactions among endangered species and nonnative species (Table 4, p.74). Control of nonnative species in the 15-mile reach is critical, regardless of the level of flows that can be attained for this reach. Clearly, there is little point in proceeding with habitat improvement measures unless the nonnative species problem is eliminated as an impediment to recovery.

We support the purpose of the nonnative stocking procedures, i.e., to reduce, minimize, or

To Mike Stempel

June 3, 1996

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eliminate impacts of nonnative fish on endangered fish species. With respect to the alternatives presented in the EA, it is clear that "no action alternative" is unacceptable. It would continue unregulated stocking of warm water species in private or publicly owned ponds in the floodplain. The no action alternative could only be interpreted by the U.S. Fish and Wildlife Service as an activity that results in an impermissible taking of endangered species under Sections 9 and 10 of the Endangered Species Act, and would lead to federal regulation of stocking in the entire 100-year floodplain. To issue an incidental take permit pursuant to Section 10, USFWS must find that the chosen alternative would not appreciably reduce the likelihood of survival and recovery of endangered fish in the wild. We do not think it is acceptable either to continue unregulated stocking or for stocking in the floodplain to become a matter of intense federal regulation.

Water users are concerned about the introduction of large numbers of trout directly into endangered species critical habitat during flood periods as would occur under all of the alternatives. We do not believe that this is an acceptable part of the alternatives, as it would result in adverse impacts on endangered fish populations. We question whether the EA demonstrates "the absence of potential conflict" from stocking of trout.

Although Alternatives 4 and 5 improve conditions relative to the no action option, Table 9 indicates that nonnatives would continue to adversely impact endangered fish, and we question, therefore, whether Alternatives 4 and 5 will meet the purposes of the procedures. USFWS should recognize that continued stocking of nonnative fish will, in fact, compromise the Recovery Program's ability to achieve the currently defined recovery goal of self-sustaining populations of endangered fish, and USFWS should be prepared to reassess and redefine "recovery" if stocking is allowed to continue.

As opposed to any of the alternatives evaluated, our preference is for an alternative that would 1) largely eliminate the impacts of nonnative fishes from ponds, 2) would provide incentives for landowners to participate in the recovery of endangered species, 3) establish much needed "grow out ponds" for maturing young endangered fish to a size where they could survive in the Upper Basin environment, and 4) replenish the stocks of endangered fish to the point where recovery is actually achievable. This alternative should include the following elements:

1. Ponds in the 50-year floodplain would be leased from landowners by the Recovery Program to provide grow out habitat for endangered fish species.
2. Nonnative fish will be removed from those ponds in the most efficient manner possible that avoids negative impacts to endangered species.
3. Ponds would be restocked with young endangered fishes, taken from Upper Basin brood stocks to ensure maintenance of genetic diversity.

To Mike Stempel  
June 3, 1996  
Page 3



4. Through pond flooding, the endangered fish would be released to the system to replenish existing stocks of endangered fish and ensure recovery. Some of the ponds could be used as managed grow out facilities with the fish being harvested for stocking when they are large enough to survive in the wild, and before they are sexually mature. In other words, the Program would not have to wait for a flood for these stocks of endangered fish to replenish endangered fishes in the river.

5. The states should remove limits on taking by fishermen of all nonnative species in critical habitat, including both the rivers and the ponds, and allow commercial harvesting of nonnative species in critical habitat.

We believe that this approach is far superior to any of the alternatives listed in the EA. Implementation of this proposal would result in more grow out ponds at lower cost than could be achieved by other alternatives, such as construction of new grow out ponds.

We request that the documents on the attached list be made part of the record of decision on the environmental assessment.

If you have any questions about our proposal, please do not hesitate to contact me.

Sincerely,



Tom Pitts  
Upper Basin Water Users Representative

Attachment to Upper Basin water users' comments on Draft Environmental Assessment for Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin, April 30, 1996.

The following items should be incorporated into the record of the decision on this environmental assessment:

1. Harold N. Tyus and James F. Saunders "Nonnative Fishes and Natural Ecosystems and a Strategic Plan for Control of Nonnatives in the Upper Colorado River Basin," Draft Report. April 29, 1996 cooperative agreement number 14-48-0006-95-923 U.S. Fish and Wildlife Service.
2. *Palila v. Hawaii Department of Land and Natural Resources*, 471, F.Supp. 985, 639 F.2d 495 (9th Cir. 1981), and 852 F. 2d 1106, 1108-09 (9th Cir. 1988).
3. *Sierra Club v. Clark*, 755 F. 2d 608, 612 (8th Cir. 1984).
4. *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon, et al.*, 115 S.Ct. 2407 (1995).

# UNITED SPORTSMEN'S COUNCIL OF COLORADO

PO BOX 31244, AURORA, COLORADO 80041

MAY 29, 1996



MIKE STEMPEL  
US FISH & WILDLIFE SERVICE  
PO BOX 25486  
DENVER, COLORADO 80225

RE: DRAFT ENVIRONMENTAL ASSESSMENT FOR PROCEDURES FOR  
STOCKING NONNATIVE FISH SPECIES IN THE UPPER COLORADO  
RIVER BASIN

DEAR MR. STEMPEL,

PLEASE BE ADVISED THAT IT IS THE POSITION OF THE UNITED SPORTSMEN'S COUNCIL OF COLORADO THAT THE DRAFT ENVIRONMENTAL ASSESSMENT FOR PROCEDURES FOR STOCKING NONNATIVE FISH SPECIES IN THE UPPER COLORADO RIVER BASIN IS INADEQUATE TO ALLOW A DETERMINATION THAT THE PROPOSED STOCKING PROCEDURES ARE A FEASIBLE AND VIABLE ALTERNATIVE FOR THE PROTECTION AND RECOVERY OF THE LISTED NATIVE AQUATIC SPECIES IN THE UPPER COLORADO RIVER BASIN.

IT IS THE POSITION OF THE UNITED SPORTSMEN'S COUNCIL THAT A FULL ENVIRONMENTAL IMPACT STATEMENT MUST BE PREPARED IN ORDER TO PROVIDE SUFFICIENT INFORMATION FOR A DETERMINATION AS TO THE FEASIBILITY AND VIABILITY OF STOCKING PROCEDURES IN THE PROTECTION AND RECOVERY OF THE LISTED NATIVE SPECIES IN THE UPPER COLORADO RIVER BASIN.

PLEASE PROVIDE THE UNITED SPORTSMEN'S COUNCIL WITH A COMPLETE OUTLINE AND TIMEFRAME FOR ACTIONS ON THE DRAFT EA AND THE APPEALS PROCESS FOR DECISIONS.

THE CONTENTION ON PAGE 33, ITEM G, OF THE DRAFT ENVIRONMENTAL ASSESSMENT, THAT NO IMPACTS WILL OCCUR, "BECAUSE THESE ARE ONLY PROCEDURES TO REGULATE STOCKING AND NOT AN ON-THE-GROUND ACTIVITY" IS AN INAPPROPRIATE INTERPRETATION. THE PROPOSED STOCKING PROCEDURES REQUIRE SPECIFIC ACTIONS AND DO HAVE INDIVIDUAL AND CUMULATIVE INTERDISCIPLINARY IMPACTS THAT MUST BE IDENTIFIED AND EVALUATED TO MEET NEPA REQUIREMENTS. THIS CAN ONLY BE ACCOMPLISHED WITH A FULL ENVIRONMENTAL IMPACT STATEMENT.



"Dedicated to Protecting  
the interests of the Sportsman"

**OFFICERS:**

JERRY HART  
RESIDENT

RAY SMITH  
1ST VICE PRESIDENT

D. WOOD  
2ND VICE PRESIDENT

ED ROBINSON  
SECRETARY-TREASURER

**DIRECTORS:**

**TERM EXPIRES 1986:**

JEFF DON

MERV MARTIN

MARY MILLER

GARY PRILL

JAY SMITH

**TERM EXPIRES 1987:**

ART HUNTER

WAYNE LOCKBURNER

ED ROBINSON

RON STEEN

R. D. WOOD

**TERM EXPIRES 1988:**

JUDY ANDERSON

KATHY DELIE

FRED HAMBLIN

JERRY HART

SCOTT LIMMER

**EX-OFFICIO**

LARRY BAKER

BARRY BOWMAN

DON BRAND

RONALD KARRON

CLIFF MALMQUIST

DOUGLAS MILLER

JAMES SMITH

LARRY STROHL



# UNITED SPORTSMEN'S COUNCIL OF COLORADO

PO BOX 31244. AURORA, COLORADO 80041

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PRESIDENT

RAY SMITH  
1ST VICE PRESIDENT

R. D. WOOD  
2ND VICE PRESIDENT

ED ROBINSON  
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LARRY STROHL

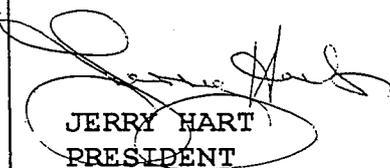
THE DRAFT ENVIRONMENTAL ASSESSMENT FAILS TO EVALUATE AND QUANTIFY ON A SPECIES BY SPECIES BASIS THE POTENTIAL ADVERSE IMPACTS ON LISTED NATIVE FISH SPECIES. ALL NONNATIVE FISH SPECIES ARE IMPLIED TO HAVE EQUAL AND SIGNIFICANT ADVERSE IMPACTS ON THE LISTED NATIVE SPECIES. AN EXCLUSION IS ALLOWED FOR SALMONIDS EVEN THOUGH THE VALDEZ AND RYEL STUDY CLEARLY INDICATES THAT SALMONIDS CAN ADVERSELY IMPACT PROTECTION AND RECOVERY. THE FAILURE TO PROVIDE AN ADEQUATE EVALUATION OF POTENTIAL IMPACTS IN THE DRAFT ENVIRONMENTAL ASSESSMENT CLEARLY INDICATES THAT THE STOCKING RESTRICTIONS ON ALL NONNATIVE FISH SPECIES AND THE EXCLUSION OF SALMONIDS FROM RESTRICTIONS IS AN ARBITRARY AND CAPRICIOUS DECISION.

THE DRAFT ENVIRONMENTAL ASSESSMENT STOCKING PROCEDURES AND ALL ALTERNATIVES ALLOW THE EXISTING ALTERATION AND DEGRADATION OF HABITAT OF THE LISTED NATIVE SPECIES TO BE MAINTAINED AND WOULD ALLOW ADDITIONAL ALTERATION AND DEGRADATION OF THAT HABITAT. STOCKING RESTRICTIONS AND "PERIODIC" FLOW RELEASES WILL NOT RECREATE WATER TEMPERATURES OR THE TURBIDITY REQUIRED FOR OPTIMUM HABITAT FOR THE LISTED NATIVE SPECIES. STOCKING RESTRICTIONS ADOPTED TO "POTENTIALLY PROTECT AND ENHANCE" RECOVERY MUST BE EVALUATED IN A FULL ENVIRONMENTAL IMPACT STATEMENT TO ALLOW A DETERMINATION OF THE FEASIBILITY AND VIABILITY OF THAT ACTION TO ACTUALLY ACCOMPLISH THE REQUIREMENTS OF THE ENDANGERED SPECIES ACT.

AN ENVIRONMENTAL ASSESSMENT IS NOT ADEQUATE TO COMPLY WITH REQUIREMENTS OF THE ENDANGERED SPECIES ACT AND THE NEPA PROCESS, THEREFORE A FULL ENVIRONMENTAL IMPACT STATEMENT MUST BE PREPARED.

THE TIMEFRAME AND THE PUBLIC NOTIFICATION PROCESS PROVIDED FOR PUBLIC INPUT ON THE DRAFT ENVIRONMENTAL ASSESSMENT WAS NOT ADEQUATE AND THE QUESTION OF COMPLAINTS MUST BE ADDRESSED.

VERY TRULY YOURS,

  
JERRY HART  
PRESIDENT

CC:



# Western Slope Environmental Resource Council

5/27/96

Mike Stentel  
US Fish & Wildlife Service  
Box 25486  
Denver, CO 80225



Dear Mr. Stentel,

This letter constitutes the comments of the Western Slope Environmental Resource Council on the U.S. Fish and Wildlife Services' Draft Environmental Assessment for Procedures For Stocking Of Nonnative Fish Species In The Upper Colorado River Basin.

WSERC is a grassroots citizen's group based in Delta County and dedicated to preserving and enhancing the environment and quality of life in Delta County and the Western Slope of Colorado. We currently have 200 members, many of whom use the Gunnison and Colorado rivers for fishing, rafting and other recreation.

WSERC has followed and sometimes participated in the Colorado River endangered fish recovery project for several years. We strongly support recovery of our native fish heritage and overall environmental health of our rivers. Someday we hope to once again enjoy a unique fishery in the lower Gunnison and Colorado — and we visualize a successful recovery project as part of the environmental and economic base of this region.

With this in mind, we strongly support Alternative 3, to protect the full 100-year floodplain, for stocking procedures. We believe that this alternative would result in the most progress for the recovery program, and help speed the psychological transition our region needs to make from exotic sport fishing to a native fishery base. Furthermore, this alternative would best preserve the work already done to mechanically remove nonnatives from critical habitat in the mainstems. Only protecting the 10-year floodplain, even with berms is inadequate, dangerous and potentially more expensive (if you have to start all over again).

After reviewing the floodplain maps, there seems to be little difference in elevations between the 50-year and 100-year floodplain. Once increased native populations, in all life stages, can be documented, then phasing in less restrictive control measures can be considered.

P.O. Box 1612, Paonia, Colo. 81428

Phone & Fax (970) 527-5307

WSERC@infozone.org

WSERC@rmi.com

We also want to join with the High Country Citizen's Alliance in asking for consideration of another provision for all proposed alternatives. *That is to prohibit the stocking, in the whole basin, of those species identified as posing the most threat to varying life stages of native species:* northern pike, tiger muskie, common carp, red shiner, black bullhead, wiper, green sunfish, yellow perch, walleye, and white crappie. We also ask for the prohibition of stocking all nonnative species which have not already been identified in the basin.

We also question the rationale for allowing trout to be stocked throughout the range of the native species. All introduced species, if not predators, compete for habitat. In addition, the presence of grass carp is troubling. They are used to control vegetation. Excessive vegetation is an indicator of eutrophication. The use of grass carp to treat the symptom of nonpoint source pollution is a way to forego the need to address the cause. We do not support this approach and ask for an examination of the wisdom of permitting the stocking of grass carp.

As important as the decision of choosing a preferred alternative is the need to reach consensus with the states on these procedures. The Colorado Division of Wildlife has been very resistant to modifying their priority to aggressively expand the introduction of more sport fish species. Only recently has there been an acknowledgment of their responsibility to address the needs of native species. We encourage the Service to work closely with the new Director of the Division to facilitate the adoption, by the Wildlife Commission, of the preferred alternative chosen, based on this environmental assessment.

Thank you for the opportunity to comment and share our concerns.

Sincerely,

  
Steve Hinchman, staff

Western Slope Environmental Resource Council



Mr. Mike Stemple MS 60140  
U.S. Fish & Wildlife Service  
P.O. Box 25486  
Denver Federal Center  
Denver, CO 80225

5/24/96

Dear Mike:

The Colorado Sportsmen Wildlife Fund is in favor of **Alternative 4** as outlined in the draft Environmental Assessment for Procedures for Stocking of Nonnative Fish Species in the Upper Colorado River Basin. Alternative 4 is the only alternative that will preserve the warm water fisheries that the CSWF depends on to implement our **Pathways to Fishing** program. We will educate up to 1000 kids in our first year about aquatic ecology, fish biology and fisherman ethics. Also, the berming of ponds to eliminate them from the 50 year flood plain will stop the escape of nonnative fish and keep endangered fish from entering the ponds.

Alternatives 1, 2, and 3 do meet Executive Order 12962's provisions for multiple use of aquatic resources, including recreational fishing. Any one of these alternatives will eliminate all warm water fishing in the Grand Valley. There is no reason for implementation of these alternatives because Alternative 4 will accomplish the goal of protecting endangered fish.

I hope the Fish and Wildlife Service will work with sportsmen as stakeholders to recover the native fish while preserving the warm water fisheries that are so important to our community.

Sincerely,

Lynn M. Ensley  
Executive Director  
Colorado Sportsmen Wildlife Fund







# EAGLE CLAW® Quality fishing tackle

WRIGHT & MCGILL CO. / 4245 E. 46TH AVE. / DENVER, CO 80216-0011 U.S.A. / 303-321-1481 / FAX: 303-321-4750

May 29, 1996



Mr. Mike Stampel  
U.S. Fish & Wildlife Service  
PO Box 24486  
Denver, CO 80225

Dear Mike:

I would like to comment on the "Draft Environmental Assessment for Procedures for Stocking Non-native Fish Species in the Upper Colorado River Basin."

My comments will be brief:

I represent the Wright & McGill Co./Eagle Claw and the American Sportfishing Association.

This issue appears to be dragging on forever! It is beyond reason that the USFWS, working with the State agencies, cannot proceed towards a balanced solution.

We would favor Alternative 4 in the draft which allows a reasonable stocking program for non-native fish.

Please incorporate our comments into the process. Thank you.

Sincerely yours,

WRIGHT & MCGILL CO.

*Bill Miller*

William A. Miller  
Vice-Chairman/Treasurer and  
Chairman of the Board of ASA

CALIFORNIA

# B.A.S.S. CHAPTER FEDERATION

AFFILIATE NATIONAL



B.A.S.S. FEDERATION

751 MELVA AVE., OAKDALE, CA 95361

(209) 847-3272

May 29, 1996

Mr. Mike Stemple  
U.S. Fish and Wildlife Service  
P.O. Box 25486  
Denver, CO 80225

RE: Draft Environmental Assessment for Procedures for  
Stocking Nonnative Fish Species in the Upper Colorado River  
Basin.

Dear Mr. Stempel:

The California B.A.S.S. Federation represents members of  
the Bass Anglers Sportsman Society in California. Our  
purposes are to promote recreational fishing opportunities  
for youth, enhance Black Bass fishing through conservation  
and habitat work and encourage recreational bass fishing in  
the state.

We have reviewed the proposals as outlined in the Draft  
Environmental Assessment and feel that we can support  
Alternative A to promote our purpose of enhancing  
recreational fishing. Alternative 4 would be a second  
though less favorable choice.

Although we do support the recovery process of the four  
endangered species in the Colorado River system, we do not  
support the recovery to the detriment of the recreational  
fishing opportunities.

Thank you for allowing our comments on the proposal.

Sincerely,

A handwritten signature in cursive script that reads 'Jackie Temple'.

Jackie Temple  
Conservation/Environmental Director  
California B.A.S.S. Federation



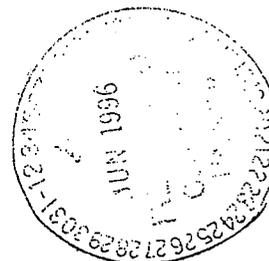
*Striving to preserve the future of fishing through conservation, youth, and public awareness*



*UTAH B.A.S.S. State Federation*  
AFFILIATE NATIONAL B.A.S.S. FEDERATION

May 27, 1996

Mr. George Sommers  
Mr. Mathew D. Madsen Jr.  
Utah State B.A.S.S. State Federation  
3460 Scott Circle  
Salt Lake City, UT 84115



Mr. Mike Stempel  
U.S. Fish and Wildlife Service  
PO Box 25486  
Denver, CO 80225

Re: Draft Environmental Assessment for Procedures for Stocking  
Nonnative Fish Species in the Upper Colorado River Basin.

Dear Mr. Stempel;

We have been given the task of conveying to you and the review board the views of the Utah B.A.S.S. Federation regarding the proposals now being reviewed, which will govern the stocking and management of Nonnative game fish in the Upper Basin of the Colorado River.

The Utah B.A.S.S. Federation represents members of the Bass Anglers Sportsman Society in Utah and Western Colorado. While the focus of the Federation is on enhancement of fishing opportunities for Largemouth and Smallmouth Bass, we recognize the need for comprehensive and diverse management of all water resources. We also believe that the respective State Divisions of Wildlife in the Upper Colorado Basin, have a mandate from their respective State Legislatures to maintain and enhance the aquatic environment within the borders of each respective state in a manner that will provide the angling and non-angling public the greatest possible number of choices regarding the use of the state's aquatic resources.

With this mandate in mind and after reviewing the proposals as outlined in the Draft Environmental Assessment, we feel that the only positions that the Utah B.A.S.S. Federation can and will support are the No Action Alternative and/or Alternative 4. Our first choice would be the No Action Alternative, which would allow the respective State Divisions of Wildlife "total discretion" regarding the stocking and management of warmwater fish in rivers and floodplain habitat in the upper basin."

*Dedicated to the realistic conservation of  
our water resources*

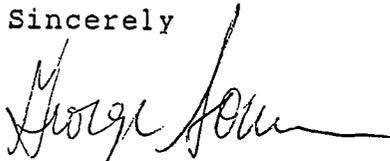
While more restrictive, we feel that Alternative 4 would be an acceptable second choice. This proposal would allow the respective states to manage the aquatic resources within their borders and Maintain the mandates to the public.

We understand that the underlying purpose of these proposals and the driving force, is the recovery of the four endangered species in the Colorado river system. While we support the recovery process, we do not support recovery at all cost, regardless of consequences to other gamefish populations and uses of the River, including recreational, agricultural, and commercial.

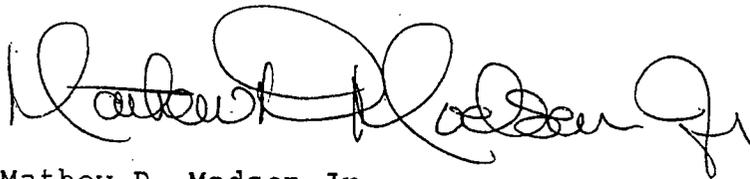
We also recognize that any proposal adopted in Colorado, will set precedent for all other future proposals regarding the recovery of endangered species, not only the Colorado River Basin, but also on other Western rivers, most notably the Columbia River drainage in the Northwest. We are not willing to allow such restrictive regulations to be implemented on the Colorado, that will later be used as the basis for even more restrictive regulations and uses on the Colorado and other Western rivers.

We appreciate the oppourtunity to comment on the current proposals and will continue to follow the process very closely.

Sincerely



George Sommers  
President, Utah B.A.S.S. Federation



Mathew D. Madsen Jr.  
Conservation/Environmental Director  
Utah B.A.S.S. Federation

# HIGH COUNTRY CITIZENS' ALLIANCE



5/24/96

Mike Stentel  
US Fish & Wildlife Service  
Box 25486  
Denver, CO 80225

Dear Mike,

We have reviewed the Draft Environmental Assessment for PROCEDURES FOR STOCKING OF NONNATIVE FISH SPECIES IN THE UPPER COLORADO RIVER BASIN and thank you for this opportunity to comment on it. We have been following the Recovery Program in the Upper Colorado River Basin for over 4 years and are very supportive of its goals and the Service's efforts to implement the RIPRAP. Our support is not based on the freedom it offers water users and developers to continue developing Colorado River Compact allocations, but instead, because it recognizes that human activities have disrupted aquatic ecosystems, weakening their sustainability and reducing biodiversity. We do understand, though, the importance of allowing continued water development, as an incentive, to maintain the support and participation of water users and states.

It is frustrating to watch how slowly the water users and the Colorado Water Conservation Board have accepted and implemented strategic plans to recover the listed fish. To overcome their reluctance to take action without assurances of success, we suggest the service continue to take an adaptive management approach. When requiring certain control measures, the Service needs to emphasize its willingness to be flexible if full implementation does not achieve the intended results.

With this in mind, we encourage the Service to choose Alternative 3; protecting the 100-year floodplain, for stocking procedures. We would prefer that the Service take a more radical step and cease all stocking of nonnative fish until evidence of progress is actually documented by increased populations of native species. Practically speaking, we realize this course of action is not available to the Service because of resistance from sport fishing interests. The other restraint is President Clinton's Executive Order 12962, signed in June, 1995, which directs federal agencies to support increased recreational fishing opportunities and minimize conflicts between recreational fisheries and the Endangered Species Act. Without a doubt, this makes the mission of the Recovery Program more challenging.

The reason we prefer the most restrictive approach, Alternative 3, is to achieve the greatest progress, most expediently. This measure would most enhance the apparent positive results from the efforts to mechanically remove nonnatives from critical habitat in the mainstems by trapping and electrofishing. By only protecting the 10-year floodplain, even with berms, could undue the efforts to remove the nonnatives too easily. After reviewing the floodplain maps, there seems to be little difference in elevations between the 50-year and 100-year

P.O. BOX 1066, CRESTED BUTTE, COLORADO 81224, 303/349-7104

floodplain. Once increased native populations, in all life stages, can be documented, then phasing in less restrictive control measures can be considered.

We also ask for consideration of adding another common feature to all alternatives. That is to prohibit the stocking, in the whole basin, of those species identified as posing the most threat to varying life stages of native species: northern pike, tiger muskie, common carp, red shiner, black bullhead, wiper, green sunfish, yellow perch, walleye, and white crappie. We also ask for the prohibition of stocking all nonnative species which have not already been identified to inhabit the basin.

We ask for an explanation of the rationale for the policy to allow trout to be stocked throughout the range of the native species. The four fishes subject of the Recovery Program are all warm water fish. Trout are a cold water fish. All introduced specie, if not predators, compete for habitat.

The presence of grass carp is troubling. They are used to control vegetation. Excessive vegetation is an indicator of eutrofication. The use of grass carp to treat the symptom of nonpoint source pollution is a way to forego the need to address the cause. We do not support this approach and ask for an examination of the wisdom of permitting the stocking of grass carp.

As important as the decision of choosing a preferred alternative is the need to reach consensus with the states on these procedures. The Colorado Division of Wildlife has been very resistant to modifying their priority to aggressively expand the introduction of more sport fish species. Only recently has there been an acknowledgment of their responsibility to address the needs of native species. We encourage the Service to work closely with the new Director of the Division to facilitate the adoption, by the Wildlife Commission, of the preferred alternative chosen, based on this environmental assessment.

Once again, we express our gratitude for the opportunity to offer our comments and share our concerns with the Service.

Sincerely,



Steve Glazer, Board member



445 W. Gunnison • Grand Junction, CO 81505 • (970) 242-8165

May 30, 1996

Mr. Stemple:

This letter is in response to the Environmental Assessment for procedures for stocking of non-native fish species in the Upper Colorado River Basin.

I guess to begin, I should tell you that I am the fishing department manager at Gene Taylors Sporting Goods in Grand Junction, Colorado. I have worked for Mr. Taylor for 16 years and have been the department manager for 11 years.

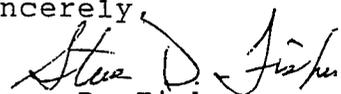
There seems to be a concern on the part of the fishing license buying sportsman as to why there is so much time, effort and money being put into saving the squawfish that is considered a trash fish to these people.

I don't mean for this to be or to sound sarcastic, but I can honestly tell you that in my 16 years at Gene Taylors I have never had anyone ever ask me where they could catch squawfish. Almost everyday people are asking about crappie, bass and walleye. It seems a shame to destroy something that is established and wanted for the sake of something that the fishing public could care less about. I am sure that the environmental groups are a major force in the final decision on what is done. I would guess that there are very few of these people that are fishing license holders and probably even less that know what a squawfish even look like.

I realize that because of the time, effort and resources that have already been committed to this project you cannot just leave things as they already are.

Of the four alternatives outlined in the draft of the Environmental Assessment, I would strongly urge you to consider Alternative Number 4. The warm water species in the ponds and lakes along the Colorado River are a wonderful resource that fishermen enjoy immensely. Please do not take this away from us by using Alternative 1, 2, or 3.

Sincerely,

  
Steve D. Fisher  
Gene Taylors Sporting Goods



Personal Delivery

June 3, 1996

Mike Stempel  
U.S. Fish and Wildlife Service  
P.O. Box 25486  
Denver, Colorado 80225



Dear Mike,

Thank you for this opportunity to submit the comments of Colorado Wildlife Federation on the Draft Environmental Assessment for Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin.

The five alternatives presented in the draft EA have been reviewed by the board of directors of the Colorado Wildlife Federation. They came to a recommendation at their board meeting on May 18, 1996. The board's discussion reaffirmed CWF's historical concern for the protection of critical habitat in the Upper Colorado. CWF remains concerned about the potential damage stocking nonnative fish may cause to the recovery of endangered fishes.

Consistent with our previous resolutions, the board chose to support alternative 2, with one important modification. Board members would support this option if it removed reliance on screening to keep the nonnative fish out of protected waters. They did not feel that there should be a hydrologic connection, even if screening was in place, between protected waters and any areas that would be stocked with nonnative fish between the 50-year floodplain and the 100-year floodplain.

The primary alternatives considered by CWF were alternative 2 and alternative 3 (the latter would confine stocking of fish except trout to above the 100-year floodplain). In essence, CWF's board focused on what was needed to protect the critical habitat area. They did not feel that screening should be relied upon to prevent undesired introduction of nonnative fish into connecting waters anywhere within the 100-year floodplain in critical habitat reaches. The board vote indicated satisfaction with modifying alternative 2 in order to accomplish this objective.

Again, thank you for this opportunity for CWF to provide input. Please feel free to contact me directly if you would like to discuss these comments in detail.

Sincerely,

A handwritten signature in cursive script that reads "Diane Gansauer".

Diane Gansauer  
Executive Director



M E M O R A N D U M

to: Mike Stemple  
USFWS  
P.O. Box 25486  
Denver, CO 80225

from: David Smuin  
1179 Santa Clara Avenue  
Grand Junction, CO 81503

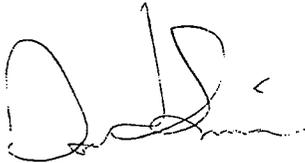
subject: Environmental Assessment on non-native fish stocking in the Upper Colorado River Basin

date: May 28, 1996

Dear Mike,

I have reviewed the Environmental Assessment for the stocking of non-native fish in the upper Colorado River Basin. As a sportsman and a person concerned about the environment, I favor alternative four of the proposal. I feel that this proposal offers the Division of Wildlife a chance to actively manage warmwater fisheries while still being able to control the affects of the warmwater fish on the threatened and endangered fish in the river.

Thank you for the opportunity to review and comment on this proposal.





-721 Second Avenue  
Salt Lake City  
Utah 84103

May 31, 1996

Mike Stempel  
U.S. F & W. S.  
P.O. Box 25486  
Denver, Colorado 80225

Mike -

Read the Draft EA for Procedures for Stocking  
Non-native fish species - - -

As an amphibian biologist, stocking of any  
fish is deleterious to amphibians and is  
one of the main causes of decline of amphibians  
in the Sierra Nevada. On top of fish  
stocking, the escape of live bait as <sup>spotted</sup> cray fish  
and minnows likewise causes declines in  
amphibians. And the use of live salamanders  
is not in any interest of any amphibians. Of  
course, if you are only concern with native  
fish, these comments are for your information  
only. I myself am interested in <sup>native</sup> aquatic biodiversity -

Sincerely  
Peter Hovingh



# STATE OF COLORADO

## Colorado Water Conservation Board Department of Natural Resources

721 State Centennial Building  
1313 Sherman Street  
Denver, Colorado 80203  
Phone (303) 866-3441  
FAX (303) 866-4474



Roy Romer  
Governor

James S. Lochhead  
Executive Director, DNR

Daries C. Lile, P.E.  
Director, CWCS

May 30, 1996

Mike Stempel  
U.S. Fish & Wildlife Service  
P.O. Box 25486, DFC  
Denver, Colorado 80225

Subject: Review and Comment on the "Draft Environmental Assessment for Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin"

Dear Mr. Stempel:

Thank you for the opportunity to review and comment on the above mentioned document. It is our belief that a process for controlling nonnative stocking procedures needs to get started, and it is now appropriate to take a moderate step in reducing nonnative species populations in the Upper Colorado River Basin.

In our view, the central issue raised by the nonnative stocking procedures is the frequency with which we expect nonnative sportfish will be able to escape from ponds into critical habitat for endangered fish. Clearly, balance must be struck between increasing protection for the endangered native fishes while keeping adverse impacts to recreation opportunities as small as possible.

We identify the no-federal action alternative as the only unacceptable alternative, since each of the other alternatives provides various measures of control regarding increased protection for endangered fish recovery opportunities. Choosing among the remaining five alternatives, however, requires professional biological expertise and policy judgement concerning the balance between environmental preservation and recreational opportunities, both areas in which we will defer to the Colorado Wildlife Commission.

Following the outcome of the recent Public Meetings, we support the Colorado Division of Wildlife position of preferring Alternative 4 which recognizes endangered fish recovery needs as well as the importance of minimizing impacts to recreational opportunities. We suggest that a monitoring program of two to five years be implemented and analyzed to determine the success of the chosen alternative. Continuation or revision of the procedures to control nonnative fishes should be reevaluated on the basis of these analyses.

Again, we appreciate this opportunity to comment on the Draft Environmental Assessment for Procedures for Stocking Nonnative Fishes in the Upper Colorado River Basin. Please don't hesitate to contact Peter Evans or Sue Uppendahl at (303) 866-3441 if you have any questions or need further clarification.

Sincerely,

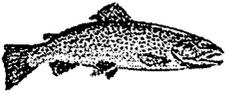


Daries C. Lile  
Director

cc: John Hamill  
Gene Jencsok  
Eddie Kochman  
Tom Nesler  
Pat Martinez  
Tom Pitts  
Robert Wigington



COLORADO FISHING FEDERATION



*the Angler's Voice*



May 30, 1996

Mike Stemple  
U.S. Fish & Wildlife Service  
Denver, CO.

Subject: Nonnative Stocking procedures

Dear Sir,

As a Director for the Colorado Fishing Federation, representing the views and best wishes of our members, and after review of the draft Environmental Assessment (EA) for the procedures to nonnative stocking in the Upper Colorado River Basin, we would like our comments considered and entered into the records.

It is clear that the disappearance of the 4 native species is due to the loss of habitat as a result of the development of water. Just as clear is the fact that the habitat will never return to its natural state. Without recovery of the habitat, the 4 native species will remain endangered. The recovery program identified 5 principal elements to avoid jeopardizing the existence of the endangered species. None of these elements identifies the recovery of the lost habitat. As stated in the EA (page 3), "the purpose of the Endangered Species Act of 1973, is to provide a means to conserve the ecosystems upon which endangered and threatened species depend." In this case, it is clear that conserving the ecosystem is not enough to recover the endangered species. Also stated in the EA (page 3) "The purpose of the Recovery Program is to recover the endangered fishes while providing for existing and new water development to proceed in the Upper Basin in compliance with the Endangered Species Act." Further stated in the EA (page 24) "Without the Recovery Program continuing to make sufficient progress towards recovery, billions of dollars of water development and subsequent economic growth could be impacted." It is obvious that the importance of the recovery program is no longer focused on the recovery of the endangered species, but in fact, it is clearly designed to allow the development of water.

The allowance of existing and new water development offers the very real possibility of further habitat loss and the impossibility of recovery of the endangered species. Millions of dollars have already been spent and millions more are available for this recovery program. As taxpayers we protest this waste, as sportsmen dedicated to protecting and preserving our natural resources, we see this program for what it really is, and we do not support this "water development" recovery program.

The predictable failures of this recovery program have surfaced and the powers that be, having irresponsibly spent millions of dollars and intending to spend even more millions, have now focused on the issue of nonnative stocking. Sportsmen, business leaders, and the community as a whole, are now being asked to sacrifice as a result of these failures with the implementation of the procedures for nonnative species.

Delta, Colorado  
May 29 1996

Mike, Stemple  
U.S.F.W.S.  
P.O. Box 25486  
Denver, Colo. 80225

Mike:

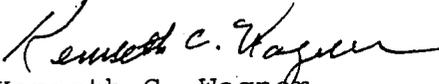
For the record as a Western slope sports man and fisherman I do not agree with the stocking proposal of not stocking any warm water sport fish in lakes and ponds within the 50 year flood plain of the Colorado river drainage.

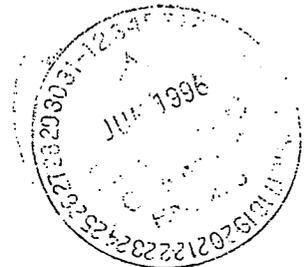
Further more ; I do not agree with the removal of warm water sport fish in these lakes ,ponds or streams unless they are salvaged and replanted where they won't compete with endangered species.

Let me assure you that as a retired Wildlife Officer I hope to see the recovery of the endangered species in the Colorado river but I do not agree with the methods you propose.

I am sorry at this time I have too many other commitments to take the time to write you my comments and suggestions on these proposals I will do so in the next 10 to 14 days.

Sincerley,

  
Kenneth C. Wagner  
616 Veinte Dr.  
Delta, Colo. 81416





After reviewing the "no action" and five other alternative recovery plans the CBF would like to present the following comments. First, the "no action" plan and alternative 3 are simply opposite extremes without much empirical relevance. Obviously, some action must be taken to help preserve endangered species, "no action" will almost certainly seal their doom. Alternative 3 ignores important information available in the citations used in the formulation of the EA and sister publications assembled by the U. S. Fish and Wildlife Service (USFWS) (i.e. Tyus, Aquatic Ecosystem Recovery Plan for Mainstream Rivers of the Colorado River Basin, USFWS, 1996; and Tyus and Saunders, Nonnative Fishes in Native Ecosystems, USFWS, 1996). It proposes an unwarranted 100 year flood plain restriction and more significantly prohibits stocking on some connected reservoirs without regard to proposed screening measures or the specific nonnative species in question. In fact throughout the EA nonnative species are grouped together in rather arbitrary ways. Why are largemouth bass, channel catfish and triploid grass carp, among other species, all managed as if they posed the identical threat to native or endangered species? Finally, treating all nonnatives the same completely ignores the present state of the ecosystems in question and risks the possibility of actually harming these ecosystems. "No action" and alternative 3 are proposals created in a political vacuum and are biologically unfounded.

Alternative 1 is not well presented. From what we can decipher it appears to mirror alternative 3 in only allowing some stocking in isolated waters outside the 100 year floodplain.

Alternatives 2,4, and 5 all have features that seem workable especially if blended together. If one of these alone had to be chosen, alternative 5, with an added provision for diking opportunity, would probably be it. Part of the problem with all the alternatives lies in the floodplain designation. Floodplain designations are determined according to physical parameters, not biological pertinence. Not all areas within a floodplain are going to be equal with respect to usage by endangered species. How far do squawfish range from the main channel in a flood? Do they use ponds within the floodplain on a regular basis? Is the location of the pond in the floodplain significant? Overall, the 10 year floodplain contains all the relevant habitat. In critical habitat areas this floodplain area should be the focus of the most intensive management. If ponds within these areas are used by native species for spawning then diking of these ponds and others of similar description should be prohibited. Diking should be allowed for those ponds that are unlikely to be used on a regular basis by endangered species even if they fall within the 10 year floodplain.

Stocking procedures and regulations need to be broken down on a species by species basis. If the consensus of biologists, and the data concurs, then we would expect channel catfish, red shiners, northern pike, common carp, green sunfish, fathead minnows, tiger muskie and white crappie stocking to be completely prohibited in the Colorado River Basin. In the specific areas where bass are a problem they should be stringently managed. Smallmouth bass escape from Elkhead Reservoir has been common, and poses a predatory

threat to some native species. However, there is no evidence of a self-propagating smallmouth population in the Yampa River. This suggests that the smallmouth population here can be controlled by minimizing or preventing escapement from reservoirs. Screening should work since bass eggs and larva will not encounter suitable habitat in which to grow and develop even if they do escape. Monitoring of this situation should provide the information necessary to decide if more stringent measures are required.

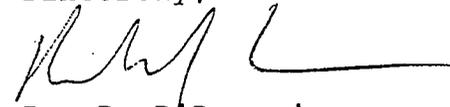
McPhee Reservoir is an example where the stocking of some species poses little threat to endangered species. Neither smallmouth nor largemouth bass have been shown to escape with any significant frequency and they have been determined to have virtually no success in surviving the Delores River habitat. This is a case where a connected river system management program should avoid the arbitrary grouping of nonnative species in favor of a species by species management program supported by available data.

Largemouth bass may have relatively little but significant overlap with some endangered species in the Colorado River Basin. Where the largemouth is deemed to be a threat they should be removed, eradicated and/or monitored. There seems to be some concern that seeding of bass into critical habitat will continue to occur if bass are allowed in other areas or ponds in the river basin. Largemouths do not adapt well (if at all) to riparian or riverine habitats and pose little threat as such. Seeding from pond to pond could occur during flooding episodes, but the best available evidence for this comes from lowland river systems like the Missouri. Stocking of bass could be restricted to ponds diked to FEMA specifications. This situation could be monitored closely. If seeding seems to be occurring then corresponding steps should be taken to minimize or prevent it.

Thankyou for the opportunity to provide input into this difficult and important program. Preservation of natural ecosystems should be a top priority for all of us. We fear that habitat change and destruction, along with water flow manipulations has all but sealed the fate of many of the endangered species in the Colorado River Basin. However, this project deserves the dedicated efforts of all government agencies and conservation groups. Some level of success is certainly achievable and valuable lessons will be learned along the way. Please keep us informed as to the progress of the recovery plan process.

Jim Bliss  
President, CBF  
2713 Garden Drive  
Ft. Collins, CO.  
80526

Sincerely,

  
Dr. R. DiDomenico  
Conservation Director, CBF  
Univ. of Colorado  
EPO Biology CB 334  
Boulder, CO. 80309



**B.A.S.S., Inc.**

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**BRUCE SHUPP**

CONSERVATION AND RESOURCE DIRECTOR

May 29, 1996

Mr. Mike Stempel  
U.S. Fish and Wildlife Service  
P.O. Box 25486  
Denver, CO 80225



Dear Mr. Stempel,

B.A.S.S., Inc. is pleased to provide our recommendations and comments regarding the Environmental Assessment (EA) for "Procedures for Stocking of Non-Native Fish Species in the Upper Colorado River Basin". Our comments are concise. However, we will be glad to discuss our views with you in more detail upon request.

1. The EA is very thorough. We commend you for your professionalism, patience and persistence.
2. There is no need to proceed with a full-blown Environmental Impact Statement (EIS). You have sufficiently analyzed the situation and have provided adequate time for debate, discussion and input.

In fact, in proportion to the ecosystem risks involved, you may have already over-analyzed. Moving on with the EIS would be placing process before function. It is decision time! Spend time and resources on actions not further analysis.

3. We endorse Alternative #4. It provides for continuation of recreational fishing while protecting against routine escapement risks.
4. Alternative #4 is consistent with the June 1995 Presidential Executive Order which wisely calls for achieving balance between recreational fishing and endangered fish restoration.
5. As with any intensive and expensive species recovery action, you should define and monitor progress toward the success objectives and milestones. How much? For how long? At what cost? To achieve what gains? These are fair questions. Americans are willing to invest in recovering species, but not forever and not for excessive cost. This type of common-sense analysis and approach will be critical to maintain future support for the Endangered Species Act.
6. Operational planning should clearly establish objectives and describe the schedule for events dealing with reclamation of ponds - - - public and private. The public must know what to expect and when.

Sincerely,

  
Bruce Shupp

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Mr. Mike Stemple  
U.S. Fish & Wildlife Service  
P.O. Box 25486  
Denver Federal Center  
Denver, CO 80225



Dear Mike:

The Western Colorado Bass Anglers is in favor of Alternative 4 as outlined in the draft Environmental Assessment for procedures for stocking of nonnative fish in the upper Colorado River Basin. We feel that Alternative 4 will not only preserve the warm water fisheries that are much needed for recreation but will also protect and accomplish your goal of recovery for the endangered fishes.

As a club we are involved in the Pathways to Fishing program implemented in conjunction with the Colorado Division of Wildlife and the Colorado Sportsmen Wildlife Fund. These waters are critical for use in this program.

With approximately 70% of the ponds in the valley located within the 10 year flood plane we feel it is critical to dike the ponds when possible whereby moving some ponds from the 10 year to 50 year and still retain the ability to be managed as a warm water fisheries or could move a pond out of the 50 year and reduce the cost of reclaiming.

If the ponds are to be managed under Alternative 4 we are in strong opposition to fish kill. If whenever possible the ponds where pumped and all desirable fishes recovered and transported to a manageable location this would certainly be the best option. As I am sure you are aware the opportunity for warm water sport fishing is extremely limited and the conservation of this resource is critical.

We look forward to working with the Fish and Wildlife in recovery of the endangered fish and the preservation of our warm water sport fish.

Sincerely,

Lindsey B. Jackson  
President  
Western Colorado Bass Anglers

2194 McKinley Drive \* Grand Junction, CO 81503

STATE OF COLORADO  
Roy Romer, Governor  
DEPARTMENT OF NATURAL RESOURCES  
**DIVISION OF WILDLIFE**

AN EQUAL OPPORTUNITY EMPLOYER

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For Wildlife  
For People

**FAX TRANSMITTAL**

TO: Henry Maddux

FROM: Pat Martinez

NUMBER OF PAGES ATTACHED: 4

COMMENTS/SPECIAL INSTRUCTIONS: 1st 2 pgs are the EA letter CDOW sent to Stempel; 2nd 2 pgs are info I sent to Knox for Eddie for Commission. The 2nd item may be changed.

FAX OPERATOR: \_\_\_\_\_

PHONE NUMBER: 970-484-2836 X (from Denver--534-6538)

## STATE OF COLORADO

Roy Romer, Governor

DEPARTMENT OF NATURAL RESOURCES

## DIVISION OF WILDLIFE

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For Wildlife—  
For People

June 3, 1996

Mike Stempel  
U. S. Fish and Wildlife Service  
P.O. Box 25686  
Denver, CO 80225

Dear Mike:

The draft Environmental Assessment (EA) addressing the "Procedures for Stocking of Nonnative Fish Species in the Upper Colorado River Basin" should have provided interested parties with sufficient information to review and compare the five proposed action alternatives. The Colorado Division of Wildlife would like to reiterate its support for Alternative 4 which will facilitate compatibility between the management of native and nonnative fish resources. Further, I have provided comments on several specific points contained in the EA that could be incorporated during the finalization of a set of Stocking Procedures and the finalizing of the EA itself. We consider Alternative 3 to not represent a reasonable approach for either recovery of the endangered fish, or maintenance of recreational fishing opportunity.

- 1) Dikes constructed around some Division of Wildlife controlled ponds in the 10-year floodplain as proposed in Alternative 4 would preserve the option of continued management of approved warmwater sport fish in the Colorado and Gunnison river corridors. The other benefits identified in the EA also support this activity. In addition, a recent review of the pond inventory performed for the Recovery Program revealed that several ponds and municipal facilities lying within the 10-year floodplain were not breached by the high flows of the Colorado River in 1995, a flow event described as a 10- to 11-year flood event for river reaches encompassed by the Stocking Procedures. Thus, there exists precedent demonstrating that proper diking of ponds can effectively and reliably protect ponds located within the 10-year floodplain from direct connection with the river. Properly screening the outlet of a diked pond would further ensure containment of warmwater sport fish. Finally, the EA portrays Alternative 4 as proposing to dike ponds so that they would not be breached by a 10-year flood event. This minimal level of diking as described in the EA may diminish the perceived effectiveness of Alternative 4 in reducing the contribution of centrarchid sport fish to riverine habitat. As finalization of a set of Stocking Procedures proceeds, please modify this component of Alternative 4 to reflect that diking to a higher level would be recommended by the Division of Wildlife.

- 2) As you are aware, the Division of Wildlife plans to remove the existing populations of fish from two floodplain ponds in 1996. It is expected that finalized Stocking Procedures will stress pond reclamation as a priority action to minimize the addition of nonnative fishes to riverine habitats. As this reclamation proceeds and more ponds are scheduled or considered for reclamation, it will become necessary for the Service to identify specific ponds for inclusion in flooded bottomlands restoration efforts. Such clarification in advance of reclamation efforts would facilitate and expedite subsequent management actions which might include diking to functionally remove the pond from critical habitat, acquisition of a conservation easement, or breaching an existing berm or dike to facilitate spring flooding. This is particularly important for ponds situated on public lands which the public may anticipate or even expect restoration or development of warmwater sport fish populations for angling recreation following reclamation. Informing the public of the intended pond use following reclamation would "package" the reclamation effort in an overall strategy. As an example, 30 Road pond is scheduled for reclamation later this year. Following its reclamation, will the pond be reworked by the Service so that it functions as nursery habitat for endangered fishes or should the Division consider the diking option? Both actions could remain compatible with its waterfowl habitat and production purposes, but the public is currently uninformed about the next step. Coordination in similar situations will be required in the near future.
- 3) The allocation of "stocking credits" earned by reclaiming ponds in the 10-year floodplain versus the acreage proposed to be stocked in the 10- to 50-year floodplain as depicted in the Alternatives, particularly in Alternative 4, needs to be removed as part of the stocking procedures. This requirement is counterproductive to the whole process and has no real basis. It also would place an unfair burden on private ponds and actually could serve as a detriment to including private landowners into the Program.
- 4) Finally, Table #9, page 34, seems to serve no useful purpose and places Alternatives 4 and 5 in a vein that could be construed by some to be a negative for those two options. We suggest that this table simply be removed as an alternative.

The stocking of trout into public ponds within the 10-year floodplain may be a viable option. A portion of these trout should be provided by the Service. Costs to implement Alternative 4 are significant and must be a consideration in any final decision. Implementation costs should be defined for each Alternative.

Thank you for your efforts in the development of the Stocking Procedures. I remain hopeful that we will have Stocking Procedures ready for consideration by the Wildlife Commission by August 1996.

Sincerely,



Eddie Kochman  
State Aquatic Wildlife Manager

c: J. Mumma  
P. Evans  
W. Graul



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June 3, 1996

Henry Maddux  
U.S. Fish and Wildlife Service  
764 Horizon Drive South Annex A  
Grand Junction, CO 81506-3946

Dear Henry:

EDF has carefully considered the five non-native fish stocking alternatives and their potential impact on endangered native species in the Upper Colorado River Basin. The EA does not clearly identify the threats of each nonnative species nor does it show how the alternatives reduce or exacerbate these threats. In addition, it does not offer evidence for why certain species ought to be acceptable for stocking. With this in mind, we have organized our review into general comments, issues of concern for each alternative, and an assessment and comparison of each of the five alternatives based on their potential impact on the endangered fish.

### SECTION I--GENERAL COMMENTS

1. Prevention is invariably less expensive and less technically challenging than control. All efforts to prevent unnecessary stocking of non-natives should be taken, and stocking that does take place should be done with extreme care and concern.
2. Stocking of fish that can survive and reproduce in the river system (i.e. smallmouth bass, white crappie, northern pike) should be prohibited. These fish pose a tremendous threat to endangered native species.
3. Species that can survive but cannot reproduce can still persist and be problematic for a long time. These fish include: black crappie, bluegill and largemouth bass.
4. New species should not be introduced; existing species should not be allowed to increase their foothold.
5. All natural systems have fewer predators than prey, so larger predatory species such as pike, small and largemouth bass, tiger muskie and walleye can have tremendous negative impact, even in small numbers.

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## SECTION II-ISSUES OF CONCERN FOR EACH ALTERNATIVE

An analysis of the potential impact of non-native fish species and endangered fish is provided by John Hawkins from the Larval Fish Laboratory at CSU in Fort Collins. (See Attachment 1, Tables 1-3)

### *ALTERNATIVE 1:*

1. Under this alternative, channel catfish, largemouth bass, fathead minnow, and grass carp are to be stocked in un-bermed, isolated waters outside the 100-year floodplain. All of these species are considered a great threat to endangered native fish. Below is a species by species list which explains the potential threat posed by each fish:

**Channel Catfish:** This fish is of greatest concern, as it is abundant, widespread, and is very harmful to endangered fish. Its potential to establish within the riverine environment is high, and it is capable of reproducing within that environment as well. Of particular concern is the fact that Colorado squawfish prey on channel catfish and are believed to choke on their spines. Further stocking is therefore not advisable.

**Largemouth Bass:** Although currently few in number, these fish are capable of surviving in the riverine environment. Additionally, they might be capable of reproducing in off-channel habitats such as flooded bottomlands or ponds. Their potential to harm endangered fish is HIGH. They are also well known as chronic escapees.

**Fathead Minnow:** The potential for this species to establish itself within the riverine environment and harm endangered fish is HIGH. It is currently abundant and widespread. The Aquatic Nuisance Species Task Force (ANSTF) considers this species to be one of those that most frequently endangers native fish.

**Grass Carp:** Less of a concern, as its ability to both establish itself and harm endangered fish is LOW. However, it can survive the riverine environment, so any chronic escapement of this species could have a negative effect on endangered fish. Its potential to harm is similar to the common carp.

2. Smallmouth bass are to be stocked in the Strawberry Reservoir under this plan. This fish is considered to have great potential to harm, as it is capable of both reproducing within and surviving the riverine environment. In addition, it is an aggressive predator and is considered to have HIGH potential to harm endangered fish. Under this alternative, there is no screening plan to ensure that these fish do not escape from the Strawberry Reservoir.

3. Under this alternative, no fish are prohibited from stocking, but are under a "case by case" status. Many of these species are of serious concern to native endangered fish. Some of the more problematic include: northern pike (a very harmful species), common carp (high ability to establish, medium negative impact on endangered fish, very ubiquitous and abundant), red shiner (high ability to establish and reproduce in basin), and green sunfish (high ability to establish and reproduce in basin). These fish should be prohibited outright.

#### ALTERNATIVE 2:

1. The same four species of concern listed under Alternative 1 (largemouth bass, channel catfish, fathead minnow and grass carp) are to be stocked in ponds in the 50-year floodplain under this plan. Two major issue of concern regarding this proposal are:
  - The adequacy of the planned berms, which would stand five feet above the OHWL, to isolate the ponds.
  - The adequacy of screens, especially for the largemouth bass, which is both a chronic escapee AND a high threat to endangered fish.
2. While this alternative does prohibit some of the more threatening non-native fish species, including northern pike, red shiner and green sunfish, many other threatening species are not included on the list and probably should be. Two species in particular include channel catfish and fathead minnow.

#### ALTERNATIVE 3:

Positive features of this alternative are the fact that it does not allow stocking in connected waters, regardless of proposed screening measures, it does not condone the use of artificial dikes to remove ponds from the 100-year floodplain of critical habitat, and it prohibits the stocking of a large number of fish.

Issues of concern include:

1. Stocking of smallmouth bass in Strawberry Reservoir: same concerns as those raised under Alternatives 1 and 2.
2. Effectiveness of berms in prohibiting the dispersal of largemouth bass, channel catfish, fathead minnow and grass carp from ponds within the 100-year floodplain.
3. Channel catfish and fathead minnow are not included in the list of prohibited fish species under this alternative. For the same reasons stated previously, these two species should be included on this list.

ALTERNATIVE 4:

1. The stocking of largemouth bass and black crappie in ponds outside the 10-year floodplain is of major concern. Both of these species has a high potential to harm endangered fish, and questions regarding the effectiveness of berms are once again raised.
2. Additionally, these fish are to be stocked within critical habitat areas, another area of serious concern.
3. Connected waters are to be stocked as well: these could also present a problem, as berms will be included only in waters below the 10-year floodplain, and not above it. The question regarding the adequacy of proposed screens for connected waters above the 10-year floodplain is once again raised. Largemouth bass and black crappie have a high ability to establish within the riverine environment and harm native endangered species. Stocking them in such conditions could be a serious threat to native fish.
4. Any species already established downstream could be established in standing waters upstream. No specification as to berming or screening or floodplain location is given for these stocking plans.
5. Routine stocking of largemouth bass, black crappie, channel catfish and fathead minnows in isolated waters five feet above OHWL without FEMA approved dikes is a concern.

ALTERNATIVE 5:

Because of its similarity to Alternative 4, issues of concern will not be replicated. All those stated under Alternative 4 are applicable here.

This alternative ranked slightly higher than Alternative 4 because of the fact that limitations placed on stocking within a specific floodplain have no exceptions.

**SECTION III--ASSESSMENT AND COMPARISON OF ALTERNATIVES**

Table 9 in the EA does not provide an adequate assessment of the different alternatives. We suggest utilizing the attached matrices which are much more explicit, uniform and consistent in assessing each alternative for its impact on native endangered fish. These matrices were created by Robert Wigington at The Nature Conservancy. *They do not address recreational, aquaculture, or water development impacts.*

Three different matrices were created for each of the five alternatives, making a total of 15 matrices. In addition, a summary matrix showing the numerical ranking of each of the five alternatives is included. (See Attachment 2 for all matrices) The three categories of matrices are:

1. *Full Assessment* (includes a total score which helps mark differences between alternatives)
2. Routine Stocking into *Isolated Ponds/Reservoirs* in the Floodplain
3. Routine Stocking into *Connected and Standing Waters/Escapement Monitoring*

The Full Assessment matrices summarize all 10 categories used during the rating process. However, the second two sets of matrices are included to more thoroughly explain the more complex categories. These categories include: 1) routine stocking in isolated ponds/reservoirs, 2) routine stocking in connected and standing waters, and 3) escapement monitoring.

Note: The below assessment is designed to provide only a relative comparison across alternatives.

**A thorough description of each of the 10 categories and the point system used during the scoring process follows.**

There are three "negative effects" categories and 7 "positive effects" categories. **Negative effects include:**

1. Current abundance and distribution
2. Potential to increase
3. Potential to harm

Points in these categories were assigned as follows:

- 16 = high
- 12 = medium or unknown
- 8 = low
- 4 = no known effect

The seven "positive effects" categories include:

1. **Species Prohibited = 50 points**

**2. Stocking to take place in isolated ponds/reservoirs in floodplain within critical habitat zone.**

10 = no routine stocking

8 = species to be stocked above the 100-year floodplain with no FEMA berm.

6 = species to be stocked in reaches greater than the 50-year floodplain with FEMA berm.

4 = species to be stocked between 100 and 50-year floodplains with no FEMA berm.

2 = species to be stocked below 10-year floodplain with FEMA berm.

**3. Stocking in isolated ponds/reservoirs in floodplain above critical habitat and below 6500 feet.**

10 = no routine stocking

8 = species to be stocked above the 100-year floodplain with no FEMA berm

6 = species to be stocked below the 100-year floodplain with FEMA berm.

4 = species to be stocked below the 50-year floodplain with FEMA berm.

2 = species to be stocked below the 50-year floodplain without FEMA berm.

**4. Stocking in isolated ponds/reservoirs in floodplain above critical habitat AND above 6500 feet.**

6 = species will not be routinely stocked above 6500 feet.

2 = species will be routinely stocked above 6500 feet.

**5. Stocking in connected ponds and reservoirs**

12 = no routine stocking of species

8 = species to be stocked above 50-year floodplain with DOW/FWS approval of screening or other containment.

6 = species to be stocked above and below 50-year floodplain with DOW/FWS approval of screening or other containment

2 = species to be stocked with DOW approval only.

**6. Stocking in standing waters**

10 = no routine stocking

8 = stocking in Lake Powell

4 = stocking in Strawberry and Flaming Gorge

2 = stocking above already occupied standing waters

## 7. Escapement monitoring.

6 = ISMP Tested/Modified

2 = Current ISMP/some case-by-case

High cumulative scores are more desirable than low cumulative scores. A ranking of the alternatives in these matrices, from best to worst, is:

1. Alternative 3
2. Alternative 2
3. Alternative 1
4. Alternative 5
5. Alternative 4
6. No Action

EDF is not prepared to endorse any of the alternatives presented by Fish and Wildlife. However, we do offer a comparative analysis of alternatives ranked according to the attached matrices and those ranked according to Table 9 in the EA.

Assigning numbers to the positive, negative and zero marks in Table 9 of the Draft Environmental Assessment allows us to rank the alternatives in order from best (#1) to worst (#5). The final ranking according to this table is:

1. Alternative 3
2. Alternative 1
3. Alternative 2
4. Alternative 5
5. Alternative 4
6. No Action

As mentioned previously, however, we do not feel that these marks provide an adequate assessment of the different alternatives. Specifically, no analysis concerning location of stocking proposals within the floodplain, no mention of the use of berms or screens, and no indication of proposed monitoring techniques are utilized.

While these findings are similar, the matrices are invaluable in terms of their overall assessment of each alternative. These matrices thoroughly analyze monitoring plans, locations of proposed stocking areas within various sections of the floodplain, the proposed use of berms and screens, and relationship between proposed stocking areas and critical habitat areas.

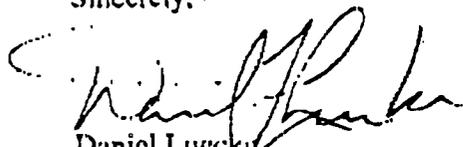
Beyond the EA's shortcomings with regard to the analysis of the alternatives and their endangered species impacts, we are also concerned with its failure to provide sufficient geographic and quantitative information for the reviewer to appreciate the differences between the 10-year, the 50-year and the 100-year flood plains -- a central distinguishing feature of the alternatives. While

the maps attached to the EA give some idea of where the 50 and 100-year flood plains are coincident and where they diverge, there is very little accompanying text to provide interpretation or analysis. Furthermore, there is no identifying designation of areas in which the ponds are to be found and there are no quantitative values given for the magnitude of the various floods. Without such information, the maps do not aid in the identification of the areas most likely to be directly or indirectly affected by the stocking alternatives.

In the last analysis, the EA does not give sufficient weight to the fundamental fact that these procedural options must have as their paramount objective the recovery of the endangered species.

Thank you for the opportunity to comment. If you have any questions or wish further clarification, please feel free to contact us.

Sincerely,



Daniel Lueck  
Regional Director



Hilary Culverwell  
EDF Intern

Attachments