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

Colorado Division of Wildlife
Utah Division of Wildlife Resources
Wyoming Game and Fish Department
U.S. Fish and Wildlife Service

U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
DENVER, COLORADO

September 5, 1996

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COOPERATIVE AGREEMENT
for
IMPLEMENTATION OF PROCEDURES
FOR STOCKING OF NONNATIVE
FISH SPECIES IN THE
UPPER COLORADO RIVER BASIN

NOV – 6 1996

1. Purpose. The razorback sucker, bonytail, humpback chub, and Colorado squawfish are considered "endangered" under the Endangered Species Act. The "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin" was developed to recover these fish and was implemented via a Cooperative Agreement between the Secretary of the Interior, Governors of Colorado, Utah, and Wyoming and the Administrator of Western Area Power Administration on January 21-22, 1988. One of five elements of the Recovery Program includes control or management of nonnative fishes and sportfishing.

The "Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin" have been developed cooperatively between the Fish and Wildlife Service and the States of Colorado, Utah, and Wyoming. The purpose of the Procedures is to ensure that all future stocking of nonnative fish will be consistent with recovery of the endangered fishes within the Upper Colorado River Basin. The Procedures fulfill the requirement established in the Recovery Program for the States and the Service to "develop procedures, including studies, for reviewing and for resolving disagreements with any proposed [fish] introductions into the Upper Basin".

The Fish and Wildlife Service issued a policy on June 3, 1996, for conserving species listed under the Endangered Species Act while providing for and enhancing recreational fisheries opportunities. The joint Stocking Procedures between the States of Colorado, Wyoming, and Utah work to minimize conflicts between recreational fisheries and the Endangered Species Act. The procedures will help to enhance existing fisheries, provide for additional future recreational fishing, and contribute to the recovery of the endangered Colorado River fishes.

The parties hereto agree to participate in and implement the stocking procedures as provided for in the document "Procedures for Stocking of Nonnative Fish Species in the Upper Colorado River Basin", dated September 5, 1996.

2. Involved parties.

Colorado Division of Wildlife
6060 Broadway
Denver, CO 80216

Utah Division of Wildlife Resources
1594 West North Temple
Salt Lake City, UT 84114

Wyoming Game & Fish Department
5400 Bishop Blvd.
Cheyenne, WY 82002

U.S. Fish and Wildlife Service
134 Union Blvd.
Lakewood, CO 80228

3. Geographic Scope. These Procedures and this Cooperative Agreement apply only to the Upper Colorado River Basin above Glen Canyon Dam, excluding the San Juan Subbasin. The San Juan River basin was not included because it is being covered under a separate recovery effort.

4. Term. This Cooperative Agreement shall remain in effect through the life of the Recovery Program, unless terminated per paragraph 5.

5. Amendment. This Cooperative Agreement and the Procedures may be extended, amended, or terminated by agreement of the parties, or any party may withdraw from this Cooperative Agreement upon written notice to the other parties and the Recovery Program.

6. Authorities and Responsibilities.

A. States: Will ensure that all State and private stocking of nonnative fishes in the Upper Colorado River Basin are in compliance with the Procedures. This will include, but not be limited to, enacting/clarifying appropriate regulations for stocking of public and private waters.

B. Fish and Wildlife Service: Will ensure that all stocking from federal hatcheries is in compliance with Stocking Procedures for the Upper Colorado River Basin and provide up to 40,000 catchable rainbow trout annually for stocking into public floodplain ponds.

C. Recovery Program: Will serve as a funding mechanism for components of the Procedures that contribute directly to the recovery of the endangered fishes. The Recovery Program will facilitate coordination of pond stocking and reclamation proposals with flooded bottomlands restoration and propagation plans. This is expected to include the use of some reclaimed ponds for rearing of endangered fishes as specified in the flooded bottomland and propagation programs.

7. No Delegation or Abrogation. All parties to this Cooperative Agreement recognize that they each have statutory responsibilities that cannot be delegated, and that this Cooperative Agreement does not and is not intended to abrogate any of their statutory responsibilities.

8. Consistency with Applicable Law. This Cooperative Agreement is subject to and is intended to be consistent with all applicable State and Federal laws and interstate agreements.

9. Funding Commitments. All funding commitments made by the Program are subject to approval of Congress and the Recovery Program. Funding commitments made by the States are subject to their normal approval process and funds being available. Funding commitments by the Service are subject to Congressional appropriations.

- The Recovery Program will fund commitments under this agreement subject to mutually acceptable cost sharing agreements.
- States will supply matching contributions, if any, in the form of cash and/or in-kind services including personnel, field equipment, supplies, etc.
- Implementation of some actions identified within these procedures are dependent upon scopes-of-work and funding approval by the Recovery Program. It is not the intent of the Procedures to require funding and implementation by the States and the Service without financial support of the Recovery Program. The Recovery Program will share the financial burden for activities associated with nonnative fish control.

Ralph Morgenweck
Regional Director, Region 6
Fish and Wildlife Service

John Mumma
Director
Colorado Division of Wildlife

Robert Valentine
Director
Utah Division of Wildlife Resources

John Baughman
Director
Wyoming Game & Fish Department

Department of the Interior
U.S. Fish and Wildlife Service

FINDING OF NO SIGNIFICANT IMPACT

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

In accordance with the National Environmental Policy Act of 1969, as amended, and the Council on Environment Quality's regulations for Implementing the Procedural Provisions of the national Environmental Policy Act (40 CFR Part 1500-1508), the Fish and Wildlife Service has determined that an Environmental Impact Statement is not required to enter into a cooperative agreement with the States of Colorado, Utah, and Wyoming, to implement stocking procedures. The Service has determined that their participation in the stocking procedures as analyzed in the attached environmental assessment does not constitute a major Federal action having a significant effect on the human environment. Impacts were evaluated using the best available data and assumptions. The following is a summary of impacts:

1. Aquatic Biological Resources: The stocking procedures will reduce the escapement of nonnative fishes into the rivers of the Colorado River Basin.

2. Recreation: The stocking procedures will increase recreational fishing opportunities above existing levels while providing increased protection for the endangered fishes. This includes 7 reservoirs with existing Lake Management Plans, and adding routine stocking for Corn Lake, Connected Lakes, Duke Lake, Juniata Reservoir, and Jerry Creek Reservoir. Additionally, all isolated public waters above the 50-year floodplain can be routinely stocked.

3. Recovery of Endangered Fishes: The stocking procedures will greatly reduce the escapement of nonnative fishes into critical habitat of the endangered fishes. This action will help to facilitate their recovery.

4. Economy and Human Environment: Limits on stocking of warmwater fishes in floodplain ponds will have some impact on the aquaculture industry. However, because most warmwater species reproduce in private ponds, annual stocking has not been required. Trout may still be stocked in any floodplain ponds and rivers above critical habitat. Largemouth bass, black crappie, bluegill, and triploid grass carp can be routinely stocked above the 50-year floodplain. These represent, other than trout, the most often stocked fish supplied by the aquaculture industry. Private ponds below the 50-year floodplain that are bermed and screened also can be stocked with these species.

The Service distributed the draft environmental assessment to various sportfishing, environmental, and water user interests. Three public meetings were held to receive public comment.

Terry Terrell
Regional Director
U.S. Fish and Wildlife Service
Denver, Colorado

10/10/96
Date

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PREFACE

These procedures were developed cooperatively with the U.S. Fish and Wildlife Service and the States of Colorado, Utah, and Wyoming, based on an evaluation of various alternatives analyzed in the "Draft Environmental Assessment for Procedures for Stocking of Nonnative Fish Species in the Upper Colorado River Basin."

The Interim Procedures were implemented on a trial basis during the spring, summer, and fall of 1994 by application to Lake Management Plans (i.e., stocking proposals) that were developed for 12 ponds and reservoirs by the Colorado Division of Wildlife. A Review Team composed of biologists from the Service and the fish and wildlife agencies in Colorado, Utah, and Wyoming reviewed the Lake Management Plans, evaluated the Interim Procedures, and considered comments that were solicited from the public in mid-December, 1994. On January 31, 1995, the Region 6, Regional Director of the U.S. Fish and Wildlife Service and the Director of the Colorado Division of Wildlife met and discussed further options to allow the stocking of nonsalmonid, nonnative fishes in the 50-year floodplain. The proposed conditions were distributed to participants on various Recovery Program committees and to interested parties on March 6, 1995. On April 24-25, 1995, three independent biologists (i.e., not employed by the agencies represented on the Review Team) met with the Review Team to discuss the biological merits of the proposed conditions.

Public meetings were held: 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. Stocking procedures being considered at that time were discussed and comments accepted. Additional alternative versions of the Procedures were prepared to address concerns identified during this early public review process.

A draft environmental assessment was released to the public for comment on April 30, 1996. This assessment evaluated a "no action" alternative and five action alternatives. Public meetings were held: May 21, 1996, in Grand Junction, Colorado; May 22, 1996, in Denver, Colorado; and May 23, 1996, in Craig, Colorado. The various alternatives were presented and public comment accepted. Written comments on the draft environmental assessment were due June 3, 1996. The final environmental assessment was published ?????.

The Fish and Wildlife Service issued a policy on June 3, 1996, for conserving species listed under the Endangered Species Act while providing for and enhancing recreational fisheries opportunities. The joint Stocking Procedures between the States of Colorado, Wyoming, and Utah work to minimize conflicts between recreational fisheries and the Endangered Species Act. The procedures will help to enhance existing fisheries, provide for additional future recreational fishing, and contribute to the recovery of the endangered Colorado River fishes.

PROCEDURES FOR STOCKING NONNATIVE FISH SPECIES in the UPPER COLORADO RIVER BASIN

I. BACKGROUND

The razorback sucker, bonytail, humpback chub, and Colorado squawfish are considered "endangered" under the Endangered Species Act (ESA). The "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin" (Recovery Program; U.S. Fish and Wildlife Service 1987) was developed to recover these fish. One of five elements of the Recovery Program includes control or management of nonnative fishes and sportfishing.

The "Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin" (Procedures) have been developed as a cooperative effort between the U.S. Fish and Wildlife Service (Service) and the States of Colorado, Utah, and Wyoming (States). The purpose of the Procedures is to ensure that all future stocking of nonnative fish will be consistent with recovery of the endangered fishes within the Upper Colorado River Basin (Upper Basin; Figure 1). The San Juan River basin was not included because it is being covered under a separate recovery effort.

The Procedures fulfill the requirement established in the Recovery Program for the States and the Service to "develop procedures, including studies, for reviewing and for resolving disagreements with any proposed [fish] introductions into the upper basin" (U.S. Fish and Wildlife Service 1987).

II. GENERAL INTENT OF THE PROCEDURES

1. The general intent of these procedures is to reduce the potential for negative impacts on the endangered fishes in the Upper Colorado River Basin (Upper Basin) and to ensure that their recovery is not inhibited by controlling stocking and escapement of stocked nonnative fishes.

2. The Procedures categorize all nonnative fish stocking in the Upper Basin into four sections:

   A. When stocking is acceptable on a routine basis (see Section IV.).

   B. When stocking will be reviewed on a case-by-case basis (see Section V.).

   C. When stocking proposals involve introductions of new fish species into the Upper Basin (see Section VI).

   D. When stocking of nonnative fishes in the Upper Colorado River Basin is unacceptable (see Section VII).

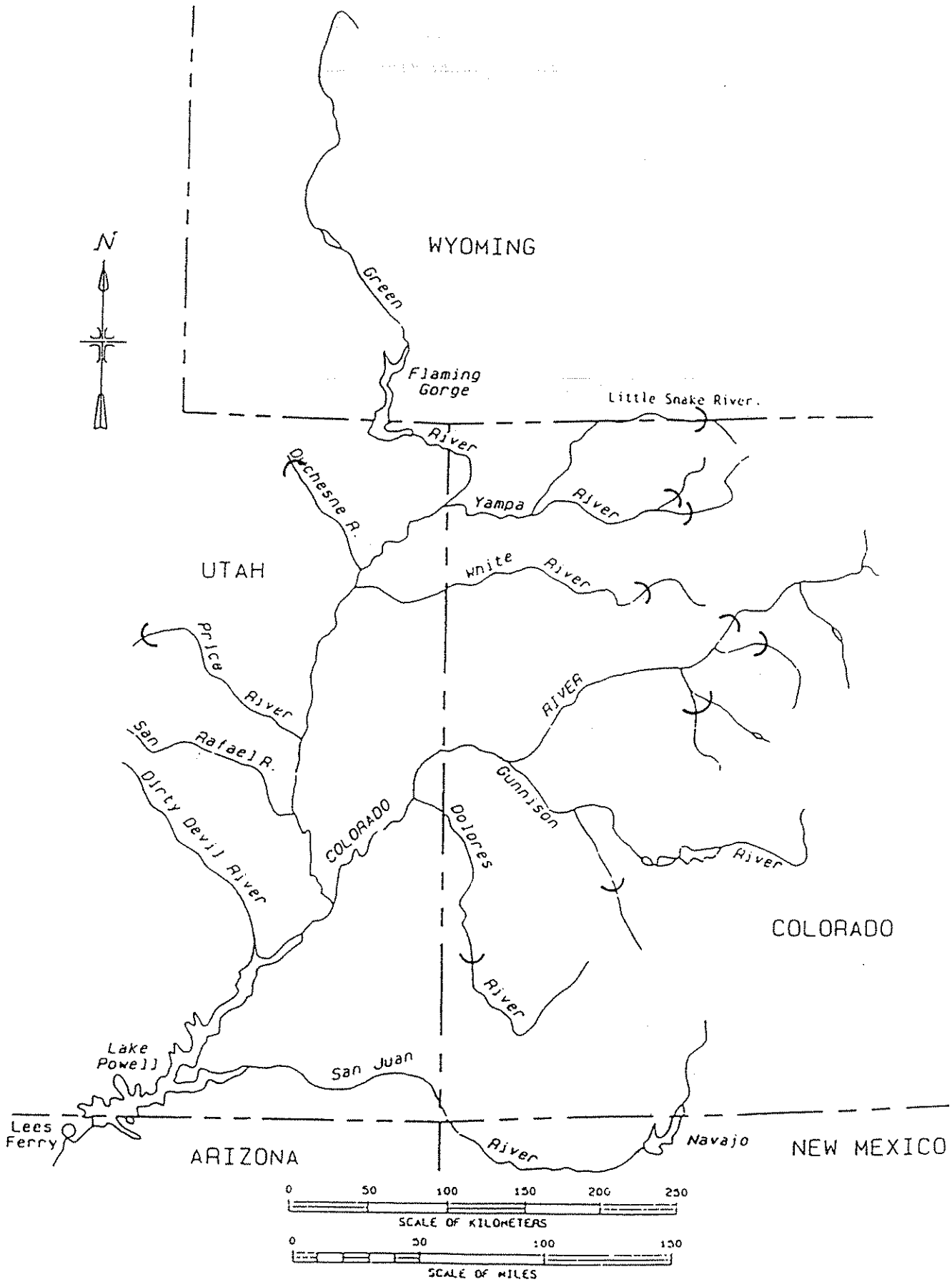

Figure 1. Approximate location of 6500-foot elevation above mean sea level on tributaries within the upper Colorado River basin (see Appendix D for township/range descriptions).

III. PRINCIPLES RELATED TO THE PROCEDURES

1. The Procedures are intended to meet the spirit of the Recovery Program:

   - o The goal of the Recovery Program is to recover the four endangered Colorado River fishes by establishing naturally self-sustaining populations and protecting the habitat upon which they depend. The Procedures are intended to support this goal while allowing nonnative fish stocking for recreational fishing and private aquaculture, provided that such stocking is compatible with recovery of the endangered Colorado River fishes.

   - o Implementation of these Procedures will contribute to fulfilling the intent for the Recovery Program to serve as the "reasonable and prudent alternative" for certain types of water development in the Upper Basin (U.S. Fish and Wildlife Service 1996).

   - o The Recovery Program directs that "stocking of nonnative species will be confined to areas where the absence of potential conflict with rare or endangered species can be demonstrated."

     The Procedures provide guidance for stocking of nonnative fishes in the Upper Basin that is consistent with recovery efforts for the endangered Colorado River fishes. They are intended as a way to integrate recreational fishery management with ongoing recovery efforts for the endangered fishes.

2. These Procedures will be implemented by a Cooperative Agreement between 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.

3. 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 through administration of the Endangered Species Act, including enforcement of section 9 "take" violations.

4. The Service's participation in the stocking procedures will require that an Intra-Service section 7 consultation be completed. Berming and stocking within the 100-year floodplain may result in an adverse modification of critical habitat. These procedures attempt to minimize the adverse modification of critical habitat. The

section 7 consultation will be completed prior to signing of the Cooperative Agreement.

5. 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 a stocking proposal.

6. The Procedures provide adequate opportunity and time for review and input by the public, participants in the Recovery Program, and other interested parties.

7. Habitat and biological communities have been significantly altered in the Upper Basin. While it is difficult to fully assess and quantify, the loss of habitat and the adverse impacts of nonnative, warmwater fish species are both responsible for the decline of the endangered Colorado River fishes. It is not possible to definitively identify the relative contribution that each of these factors had to the endangerment of the fishes. In many cases, the proliferation of nonnative fishes was enhanced by habitat alteration, attempts to fulfill the demand for recreational fishing, and to fulfill project purposes for recreation. All factors should be considered to provide an ecosystem perspective in recovery efforts for the endangered fishes in the Upper Colorado River Basin.

8. The Service and States recognize that nonnative fish stocking is an important component of public and private recreational sport fisheries management and commercial aquaculture in the Upper Basin. As such, an important objective of these agencies is the establishment and maintenance of sport fisheries and aquaculture activities that do not conflict with recovery efforts for the endangered Colorado River fishes.

9. The States also have certain authorities for regulating/overseeing aquaculture activities and fish introductions by private landowners. The States will incorporate these Procedures into appropriate State regulations.

10. Flooded bottomland restoration is a priority within the Recovery Implementation Program. Beginning in FY-97, an acquisition coordinator will be contacting pond owners (along Green, Colorado, and Gunnison Rivers within critical habitat) to try and obtain easements agreements. The purpose of these easement agreements would be to compensate private land owners for allowing their floodplain properties to be used to benefit the endangered fishes. Ponds where an easement is obtained would have nonnative fishes removed. More specific criteria for obtaining and reclaiming ponds is being developed through the Program. Priorities for pond use will be integrated into the flooded bottomland and propagation components of the Program. Approved Program documents or future

updates to these documents will guide the use of floodplain ponds. These documents include: *Reconnaissance Inventory and Prioritization of Existing and Potential Bottomlands in the Upper Colorado River Basin 1993-1994* (Irving and Burdick 1995); *Levee Removal Strategic Plan* (Lentsch et al. 1996); *Genetics Management Guidelines* (Williamson and Wydoski (1994); *Genetics Management Plan* (Wydoski 1995) and annual propagation plans prepared in accordance with this plan; *Augmentation Plan for the Razorback Sucker in the Middle Green River 1996-1997* (Wydoski 1996); *Stocking Plan for Razorback Sucker in the Upper Colorado and Gunnison Rivers* (Burdick et al. 1995); and all future stocking plans prepared through the Program.

11. Ponds are considered to be outside a designated floodplain if they are naturally above the floodplain in question or if they lie in the floodplain in question but have FEMA approved dikes functionally separating the pond from the floodplain.

12. Concurrent with implementing these stocking procedures, the Recovery Program will conduct a peer-review study to evaluate the effectiveness of the Interagency Standardized Monitoring Program (ISMP) to detect changes in the survivability and/or abundance of routinely stocked fish. Unless the study demonstrates that the ISMP is effective for tracking nonnative fishes, a program would have to be implemented to do so. If it is determined, by peer review analysis by the respective State and the Service, that nonnative fish escapement is occurring from an approved location, then routine stocking of that species in that location would be discontinued. Subsequent stockings at that location would then require case-by-case review by the State wildlife agency and the Fish and Wildlife Service (until the escapement problems are corrected) to ensure that escapement has been adequately addressed.

IV. ROUTINE STOCKING OF NONNATIVE FISHES THAT ALREADY OCCUR AND ARE MANAGED IN THE UPPER COLORADO RIVER BASIN

1. Nonnative fish species that occur and are managed by stocking in the Upper Colorado River Basin can be routinely stocked (i.e., are not subject to procedures outlined in Section IX) in the locations/situations identified within this section. Stocking of nonnative fish species in these locations/situations are considered to be consistent with recovery of the endangered fishes. Explanations of the terms/acronyms are provided in Appendix B.

2. Trout can be routinely stocked directly into riverine habitats upstream of critical habitat. Stocking of trout into private floodplain ponds is also allowed. Stocking of trout within riverine portions of critical habitat is not allowed under these procedures.

3. The following conditions apply to stocking of nonnative fishes within the 50-year floodplain[1]:

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.

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.

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[1] 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).

(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 (see Section X).

(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.

Black crappie/bluegill/largemouth bass: These species are not well adapted to riverine environment and do not appear to establish self-sustaining populations in rivers upon escapement. However, there is concern that these species will flourish in flooded bottomland habitats that are being reconnected with Upper Basin rivers.

Triploid grass carp: Grass carp have been introduced into the United States as a vegetation control. Only certified 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. Very few triploid grass carp have been captured in the river from past stocking in isolated ponds. Grass carp are not known to prey on other fishes, but can alter habitats of other fishes by changing vegetation. Because of the expense in obtaining these fish, stocking in areas where escapement is possible is highly unlikely.

4. 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.

Mosquitofish: Routine stocking of mosquitofish is restricted to isolated ponds and reservoirs outside the 50-year floodplain because they are aggressive omnivores that have been associated with negative impacts on native fish species in the American Southwest. Mosquitofish are currently common (as a result of stocking) in habitats used as nursery areas by endangered Colorado River fish.

5. 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.

Fathead minnow: Routine stocking restricted to waters outside of the 100-year floodplain with no connection to the river is based on

recent information that demonstrates competition between young-of-the-year Colorado squawfish and fathead minnow. The fathead minnow is also a predator that attacks fish larvae and tears the larvae into pieces. The fathead minnows then eat the pieces so that the gape of the mouth is not important in the size of the larvae that are consumed.

Channel catfish: This species has been introduced into the mainstem rivers, lakes, reservoirs, and ponds in the Upper Colorado River. Their diet includes other fishes and are considered a threat to the endangered 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).

6. 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.

V. CASE-BY-CASE STOCKING OF NONNATIVE FISHES THAT PRESENTLY OCCUR IN THE UPPER COLORADO RIVER BASIN

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.

1. Requests to stock nonnative fish species that are not prohibited in the Upper Basin in locations or situations not listed in Section IV will be evaluated on a case-by-case basis and will include the following 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.

VI. STOCKING OF NONNATIVE FISHES THAT DO NOT PRESENTLY OCCUR IN THE UPPER COLORADO RIVER BASIN

1. 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).

2. 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.

3. 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 24).

VII. LOCATIONS, SITUATIONS, AND SPECIES WHERE STOCKING OF NONNATIVE, WARMWATER FISH WOULD NOT BE ACCEPTABLE

1. 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.

2. Stocking of nonnative, nonsalmonid fish species in the 0- to 50-year floodplain is unacceptable, except as provided in Section IV.

3. 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 the minimum criteria in Section V and State and Service approval).

VIII. SPECIAL CASES

1. Channel catfish, mosquitofish, redside shiner, and smallmouth bass may be stocked in any water above Flaming Gorge Dam.

   Channel catfish: The Flaming Gorge outlet structure precludes virtually all warmwater fish escapement.

   Redside shiner: Currently used as forage in some Wyoming ponds above Flaming Gorge Dam. This species is not likely to pass through the reservoir environment and outlet structure because the deep reservoir release at Flaming Gorge Dam precludes virtually all escapement of warmwater fishes.

   Smallmouth bass: The same rationale was provided for redside shiner above Flaming Gorge Dam (i.e., outlet structure precludes virtually all warmwater fish escapement).

2. Lake Management Plans will be prepared for Jerry Creek Reservoir and Juniata Reservoir. After these plans are accepted (following criteria in Section V) by the Colorado Division of Wildlife and the Fish and Wildlife Service, these waters will be stocked on a routine basis.

3. Warmwater species may be stocked into standing waters (with Lake Management Plans approved by the State wildlife agency and the

Service) above existing reservoirs where a reproducing population of that species exist. This includes reservoirs up the Escalante arm of Lake Powell. In cases where escapement is occurring, the escapement will be addressed per Section IV.6.

4. Warmwater gamefish that are removed from the river or other problem areas can be transplanted to waters already containing that species and where escapement is not likely possible as determined by the involved State and Fish and Wildlife Service or waters created as part of a fish removal plan (subject to the minimum criteria in Section V and State and Federal approval).

IX. STEPS IN THE REVIEW OF STOCKING PROPOSALS AND LAKE MANAGEMENT PLANS

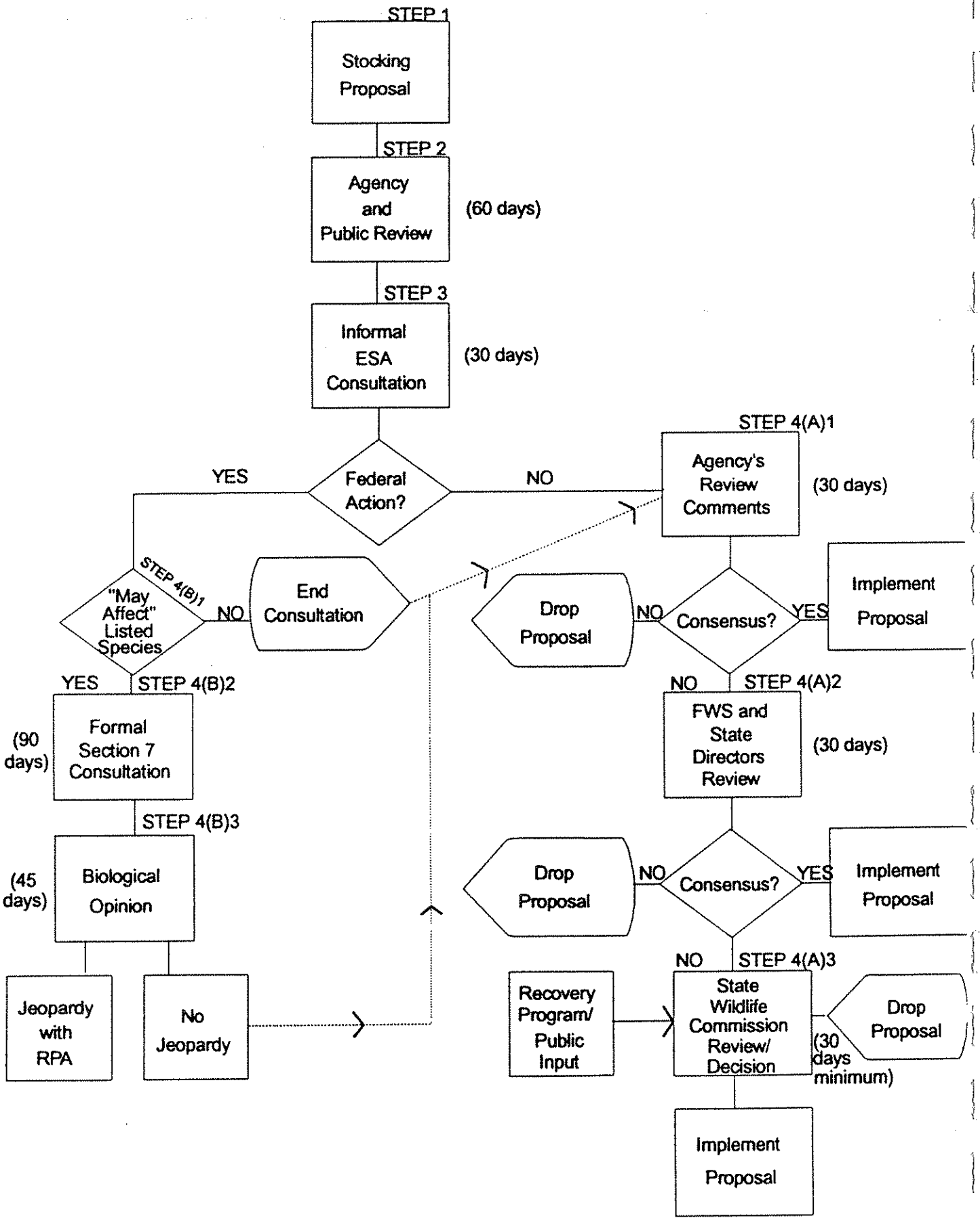
The steps or process for reviewing stocking proposals developed under Sections IV.3.A, IV.6, V, VI, and VIII.2, .3, and .4 of these Procedures are summarized in Figure 2 and are explained below:

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.

Figure 2. Nonnative fish stocking review procedures.



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.

X. REPORTING

1. Annual reporting

A. Nonsalmonid, nonnative fish species that are stocked into the Upper Colorado River Basin, following these Procedures, must be reported to the Service (who will then forward a copy to the Recovery Program Director) by the respective wildlife agency no later than December 31st of the year in which the stocking occurs. The report will include all nonsalmonid, nonnative fishes stocked in routine stocking covered in Section IV and any waters approved after case-by-case review. The report will include the results of the annual inspection of screens and berms on both public and private waters, recommendations for addressing any problems noted or foreseeable problems, and actions taken or planned to correct these problems.

B. At a minimum, the reporting will include the following information on nonnative fish species that are stocked into the Upper Colorado River Basin:

(1). Species;

(2). Location;

(3). Number Stocked;

(4). Size of Fish Stocked (mean total length or numbers/pound);

(5). Criteria Used for Routine Stocking from Section IV or the written proposal submitted for case-by-case review.

2. Five-Year Review

A. Five years after implementation of these procedures, and every five years thereafter, a Program review will be conducted to determine:

(1). Adequacy of procedures to protect endangered fishes;

(2). Effects of procedures on private landowners;

(3). Effects on aquaculture industry;

(4). Impacts on warmwater fishing.

B. Once a Lake Management Plan or stocking proposal has been approved, it will be reviewed every 5 years thereafter and submitted to the Service by the respective State wildlife agency with the following determinations:

(1). Did the body of water reconnect with the river during the previous 5 years?

(2). Is escapement occurring?

(3). Recommendations for addressing escapement, if it is occurring.

If escapement has not occurred during the previous 5 years, modification of the stocking proposal or Lake Management Plan will not be required.

XI. MODIFICATIONS OF THESE PROCEDURES

The States of Colorado, Utah, and Wyoming or the Service can request a review or update of these Procedures at any time.

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APPENDIX A

FAMILY, SCIENTIFIC NAME, AND COMMON NAMES OF FISHES MENTIONED IN THESE PROCEDURES

Scientific Name	Common Name
Family	
Esox lucius	northern pike
Esox lucius X *Esox masquinongy*	tiger muskie
Cyprinidae (Minnows)	
Ctenopharyngodon idella	triploid grass carp
Cyprinus carpio	common carp
Gila cypha	humpback chub
Gila elegans	bonytail
Cyprinella lutrensis	red shiner
Pimephales promelas	fathead minnow
Ptychocheilus lucius	Colorado squawfish
Richardsonius balteatus	redside shiner
Catostomidae (Suckers)	
Xyrauchen texanus	razorback sucker
Ictaluridae (Catfishes)	
Ictalurus melas	black bullhead
Ictalurus natalis	yellow bullhead
Ictalurus punctatus	channel catfish
Pylodictis olivaris	flathead catfish
Poeiliidae (Livebearers)	
Gambusia affinis	mosquitofish
Percichthyidae (Temperate Basses)	
Morone chrysops X *Morone saxatilis*	wiper
Centrarchidae (Sunfishes)	
Lepomis cyanellus	green sunfish
Lepomis macrocheilus	bluegill
Micropterus dolomieui	smallmouth bass
Micropterus salmoides	largemouth bass
Pomoxis nigromaculatus	black crappie
Pomoxis annularis	white crappie

APPENDIX B
TERMS OR ACRONYMS USED IN THESE PROCEDURES

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 flood events.

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).

APPENDIX C

AMERICAN FISHERIES SOCIETY - INTRODUCTIONS OF AQUATIC SPECIES

APPENDIX C

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 watermil foil, 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 occurence (Taylor et al. 1984).

Spatial Alteration

Concommittant 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^{-1} 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 (Philipp 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 Hoffman 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 mistakes will be made or that legislation will be necessary to enforce an "attitude of caution." The following actions toward that end are recommended.

Table 1. Organisms cited in text.

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

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.

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APPENDIX D

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