Arizona Game and Fish Department

Statewide Fish Management Team

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Glossary of Terms

Adaptive Management: is a process of optimal decision making, with an aim to reducing uncertainty over time via system monitoring. Decision making maximizes one or more resource objectives and accrues information needed to improve future management objectives.

Bluesheet Review: the process the Department uses to route a document to appropriate work units for review.

Georeferenced: information in a database or spreadsheet that is associated with a specific geographical location; often reported in Universal Transverse Mercator (UTM) coordinates, Latitude and Longitude, or Township, Range, Section.

Geomorphologic Change: changes in stream elevation, gradient, substrate, etc.

Nonnative: defined as not occurring naturally in the State.

Sport Fish: defined as "aquatic, gill breathing, vertebrate animals, bearing paired fins, and having material value for sport or recreation" (50 CFR 80.5).

Watershed: a geographical area that collects and drains water (primarily surface flow, but also including groundwater) into a series of drainages that increase in size and stream order.

Glossary of Acronyms

AGFD: Arizona Game and Fish Department
AUD: Angler Use Day
CMPG: Core Management Planning Group
CWCS: Comprehensive Wildlife Conservation Strategy (also known as the "State Wildlife Action Plan" or SWAP)
ESA: Endangered Species Act
GAP: Gap Analysis Project
GIS: Geographic Information System
HDMS: Heritage Data Management System
LCR: Little Colorado River
LCRB: Lower Colorado River Basin
MEDT: Management Emphasis Descriptor Tool
NFCT: Native Fish Conservation Team
SCAS: Statewide Conservation Agreement and Strategy for six species of chubs and suckers in Arizona
SGCN: Species of Greatest Conservation Need, as identified in the CWCS
SFMT: Statewide Fisheries Management Team
SHA: Safe Harbor Agreement
T/E/C/P: Threatened, Endangered, Candidate, and Proposed for ESA-listing species
UofA: University of Arizona
USFWS: U.S. Fish and Wildlife Service
USGS: U.S. Geological Service
UTM: Universal Transverse Mercator, a methodology for locating locations on maps
WSFR: Wildlife and Sport Fish Restoration Program (formally Federal Aid USFWS)
WFMP: Watershed-based Fish Management Process

Executive Summary

The mission of the Team was to provide a framework and decision-making guidance by which the Department can make watershed-based, fisheries management emphasis decisions that balance the dual mandates for sport fish opportunities and native fish conservation. This was accomplished by holding nine meetings and multiple sub-team meetings, during which the existing *Integrated Fisheries Management Plan for the Little Colorado River Watershed* (LCR Integrated Plan; Young et. al. 2001) and other resources were assessed to develop a decision-making tool that uses defensible, repeatable criteria to determine management emphasis for aquatic resources for State waters.

The Watershed-based Fish Management Process (WFMP) provides a systematic, data-driven process that accommodates socio-political concerns, includes public involvement, and facilitates the development of fisheries management plans at various scales. It includes mechanisms to identify critical linkages (e.g., management plans, policies, regulations, databases) that influence criteria for deciding *management emphasis* for a delineated *management unit*, and serves to assist with evaluation of ESA status change proposals, and is useful in supporting sport fish stocking activities pursuant to the Charter. The WFMP defines existing and desired management emphasis categories and allows for more specific prescriptions under those categories as appropriate. Emphasis designations are derived from analysis and comparison of current and potential sport fish and native fish conservation opportunities. Recommendations of management emphasis designations are only derived after an analysis of the Department's goal to manage for no net loss to angler/sport fish opportunities occurs. When reductions to sport fishing opportunities will occur in one management unit due to a management decision, the WFMP requires compensation of lost Angler Use Days (AUDs) in another management unit. Final decision-making authority rests at the Director's level or Commission when deemed appropriate.

The Team has made several recommendations, including:

- Incorporate the report's process into the Fisheries Methods Protocol, and provide training on use of Team's report process to appropriate staff;
- Develop a statewide fisheries database (building from the LCR database) U:\Fisheries Branch\Fish Collection Database\Watershed Unit Databases);
- Hire a designated statewide fishery database/GIS manager to facilitate application of the WFMP;
- Use the Team report and implement it for watershed planning across the state, starting with the Upper Verde River Watershed (see implementation plan pg. 30);
- Apply report process at the largest scale that resources allow;
- Fisheries and Nongame Branch Chiefs make recommendations on priority watersheds and align resources, based on Section 7 consultations;
- Ensure that watershed plans are aligned with the 3-tier planning process, and incorporated into operational and implementation plans;
- Conduct a statistically-valid statewide angler use survey (e.g., Pringle 2004) and repeat every five years; and

- WMD backup and maintain the U:\Drive folder of relevant Team resource fisheries management file created by the Team.
- Finalize MEDT database structure

The team developed a recommended implementation plan for use of the WFMP in the Verde River Watershed. This effort will be used as an evaluation and feedback for the WFMP, which will allow for adaptive management of the process. The team further recommends that, in conjunction with ongoing ESA Section 7 consultation for the sport fish stocking program, the Department determine which watersheds are the priority for further use of the WFMP and ensure adequate resources are provided to use the WFMP in priority watersheds.

Introduction and Background Information

In 1995, Arizona Game and Fish Department (AGFD or Department) personnel began conceptualizing a management approach integrating sport fish and native fish management over a geographically meaningful scale. Both the integration of sport fish and native fish management, and the watershed scale at which management was envisioned, were departures from existing management approaches which did not always attempt to determine best management emphasis for a management area. In 2001, the Department finalized development of two approaches with slightly different goals.

The *Integrated Fisheries Management Plan for the Little Colorado River Watershed* (LCR Integrated Plan; Young et. al. 2001) is the culmination of a collaborative effort by Department staff representing fisheries management interests within Arizona. It was envisioned that the LCR Integrated Plan would be used to create a management plan to provide fisheries personnel with a practical decision-making tool. The plan provides site-specific (reach-level) management recommendations needed to meet the Department's native fish and sport fish mandates. In addition, the recommendations were intended to provide guidance to land management agencies and others operating in areas that correspond to Department management reaches. The plan took just under three years to write, and almost two years to finalize.

An alternative conceptual approach was developed to use watershed management tools to work at different scales, so that conflicts between native and nonnative fishes could be addressed, as well as habitat restoration and protection. The outcome of this effort was the report, *Fisheries and Watershed Management in Arizona: Looking into the Future* (Watershed Plan; Allison and Kubly 2001). The Watershed Plan assumed the Department would be cooperating with private landowners and government entities to improve quantity and quality of habitat for fishes. Since the Department manages non-fish wildlife in the same areas, the plan also addressed other species as management targets.

Since 2001, efforts have been underway to move this continually evolving process to the Verde River Watershed. Department funding was provided in 2005, but was tied to the University of Arizona (UofA) for support of a graduate student to refine processes and approaches for a Verde River effort. A graduate student is completing her 2nd year on the

project, but due to the nature of the graduate degree process, progress is slow. At the same time, an aquatic Gap Analysis Project (GAP) was launched by U.S. Geological Service (USGS) to examine the current level of aquatic biodiversity within a system and identify gaps in distribution and protection of aquatic species. The Lower Colorado River Basin (LCRB) Aquatic GAP was initiated in 2004 as a one-year feasibility study to gather existing datasets, and to evaluate stakeholder interest in participating in the development and use of Aquatic LCRB GAP products. The LCRB GAP effort is now in its second phase to develop species distributions and predictive models for the Verde River Watershed. The GAP products, when completed, can be used to inform a management decision scheme for the Department and/or UofA on behalf of the Department.

The Department is undertaking ESA Section 7 consultation of its sport fish stocking program for one year. The proposed action for the current consultation will be to continue stocking only those localities with those species that have been previously approved by the Wildlife and Sport Fish Restoration Program (WSFR; formally Federal Aid USFWS). Under the current proposed action, no new species or locations will be stocked with nonnative sport fish. Those stocking actions will be eligible for July 1, 2008 through June 30, 2009. Beginning in July 2008, the Department will undertake a program-wide Biological Evaluation of the entire Statewide and Urban Fisheries Stocking Program to be completed by June 30, 2009. This comprehensive approach will need to address all federally-listed elements (T/E/C/P and critical habitat) and proposed actions funded by WSFR, and may include reasonable and prudent alternatives and conservation measures to offset impacts of the action. To be able to articulate management direction for both native fish recovery and sport fish stocking priorities is advantageous for successful consultation.

Completion of current efforts by UofA is not expected until late 2008, with actual implementation as early as fall, 2008. The Aquatic GAP effort will provide data we can use, but does not provide the management process/product needed. Further, the alternative approach identified conceptually in Allison and Kubly (2001) is likely to be time and cost intensive and remains unapplied.

The Department's need to move forward with management activities in the Verde River Watershed and elsewhere, and aggressive Section 7 consultation process and timeframe, necessitates a need to move forward with an achievable process to make fish management decisions across a meaningful landscape--using data from, but independent of, current efforts. An approach similar to LCR Integrated Plan appears to be the most promising methodology from a Time/Cost/Value perspective and can be accomplished within the proposed six month timeframe.

Methodology

The team was chartered (Appendix A) in November 2007. After completing Just-In-Time Team training, the Team held nine meetings. To maximize productivity while accommodating the needs of Team members traveling from outside the Phoenix

metropolitan area, all but the first were two-day meetings. For these meetings, the Team generally met from 10 am to 5 pm on the first day, and from 8 am to 3 pm on the second day. Meetings were held on the following dates in 2008:

- January 11
- January 29–30
- February 13–14
- February 28–29
- April 2–3

The Team used the following Total Quality tools:

- Brainstorming
- Flow-charting the decision-making process
- Data-gathering from qualified specialists who use similar decision-making processes
- Developing and following ground rules
- Keeping Team notes
- Preparing a written agenda
- Scribing
- Developing a Gantt chart of tasks the Team needed to accomplish to fulfill its charter (Appendix B)
- Zoomerang surveys of its members
- Forming sub-teams to perform tasks between meetings*

*Sub-teams were formed to work on assigned tasks between the formal meetings. Depending on the tasks, the sub-teams were established as either cross-functional (e.g., sport fish and native fish conservation personnel), or primarily single emphasis groups (e.g., all sport fish or all native fish conservation).

Data Gathering and Analysis

Due to the nature of this project, little data were collected or analyzed. Potential data sources were identified that could or should be used in the future implementation of the process developed by this Team. Examples of watersheds, their fish diversity and distribution, existing fishery indices and other info were used in evaluating applicability of our developed process in the real world.

The Team began its work with a thorough review of the LCR Integrated Plan; including a lengthy discussion of reasons why the approach followed in the 2001 report was not extended to other watersheds in the State. The members familiar with the process from 2001 identified potential reasons for stagnation of the watershed fish management approach and potential strategies to minimize similar obstacles. Some of the identified causes and strategies were:

- Reason: Lacked an adaptive management component

Strategy: Implement annual monitoring

- Reason: Lacked a champion
  Strategies: Have a process owner; Have an implementation plan that creates ownership; Ensure continued commitment

- Reason: Lack of consensus and disagreement among work units
  Strategy: SFMT assembled to develop consensus

- Reason: Management units were not defined, or the definition did not fully address the issues and created a conflict
  Strategies: Define management units; Create a tool that goes through the process of identifying management units and coordinating management between units

- Reason: The LCR Integrated Plan did not allow for assigning value due to the presence of native fish in a reach, and management opportunities were missed
  Strategy: Add a step to the LCR Integrated Plan flowchart to allow changes to management designations; Offer clear direction for priorities along with flexible implementation

- Reason: Lack of implementation
  Strategy: Regular reviews; update data, re-evaluate our decisions, and review the tool

- Reason: Specific data sources were not always defined
  Strategies: Go electronic; be specific; use data that will be available or require few resources to generate

- Reason: Flow charts are fish-only
  Strategies: Add other species into the process, where data are available; Consider adding species when a decision needs to be made; Add a fifth element to the flowchart

These reasons led the Team to begin the process with a review of the existing processes in the LCR Integrated Plan. The Team's conclusion was that the LCR Integrated Plan process was time and labor intensive, and came with some significant detractors and controversy within the agency (Allison and Kubly 2001). Financial and institutional support for the identified approach was not evident.

The next major activity undertaken by the Team was to review the process steps in the LCR Integrated Plan and evaluate their applicability and usefulness in our process. Some significant thought and effort went into describing, defining and categorizing potential management unit designations to be used in the process. The following definitions from the Team Charter were considered, but later modified for assigning a management emphasis to a management unit (Appendix C):

A) Sport Fish Opportunity

1. Nonnative sport fish
2. Native sport fish
3. Mixed assemblage with sport fish (native or nonnative) emphasis

B) Native Fish Conservation
1. Mixed assemblage native fish conservation emphasis
2. Native fish recovery
3. Native fish conservation

C) Undetermined or lack of data

D) No emphasis

The seven process steps identified in the LCR Integrated Plan were assigned to two groups for evaluation of applicability to our process. An eighth step, Adaptive Management, was developed by the Team and included for discussion and evaluation.

1. Gathering and georeferencing of fisheries data from the LCR watershed;
2. Determination of angler and native fish needs in the LCR watershed;
3. Watershed analysis and development of habitat suitability models;
4. Management unit delineation;
5. Determination of management emphasis and initial management recommendations;
6. Intra and inter-unit conflict resolution;
7. Evaluation, internal and external review, and implementation; and
8. Adaptive management.

In conjunction with the evaluation of these eight steps, the Team reviewed the existing flowchart process from the LCR Integrated Plan, assessed its utility and applicability, and created a modified process approach. This modified approach is presented as a recommendation in this report.

The Team developed a U:\Drive folder containing all relevant files, currently located at U:\Teams - Active Teams\Statewide Fish Mgmt Team. This folder will eventually be moved to U:\Teams - Currently in Implementation.

In addition, the Charter directed the Team to develop implementation strategies or guidance consistent with the Commission's direction for No Net Loss of sport fish opportunity, and it was determined that the decision-making tool would need to evaluate and compensate when necessary for changes in AUDs within a watershed and developed guidance for implementation of the tool (Appendix D).

Benchmarking is a business practice that examines or evaluates a process against a known best practice or industry leader for that process. This is typically done to adopt that best practice or an aspect of it for improved performance within the process.

As part of the development of the LCR Integrated Plan, the authors attempted to benchmark with other states to see how watershed-based fishery management was being implemented. No responses were received.

To truly "benchmark" for a process that prioritizes waters for fisheries emphasis it was necessary to find a "best practice" example. Fisheries and wildlife management agency processes are typically not evaluated in the same way that businesses are. Therefore, it is very difficult to uncover a "best practice" example from which to benchmark. However, it is useful to simply compare ways other states prioritize their waters into fishery emphasis. Nevada and California face similar issues concerning sportfish and native species, and they geographically share some of the same watersheds with Arizona. Calls were placed to those states to see if they had a process for making fisheries management emphasis decisions. The issues of non-native sport fish, native sport fish and native fish are fairly unique to the desert Southwest. Contacts with the New Mexico Department of Game and Fish also indicated that they currently do not use a standardized prioritizing process. Nevada and California currently do not use a formalized process to prioritize their State waters into area of fisheries emphasis. All three neighboring states use a case-by-case or water-by-water evaluation process to guide management decisions.

An internet search of "watershed-based fishery management plan" was conducted. As expected, many states were doing some form of watershed planning. Most efforts have been conducted by watershed associations, municipalities or generalized groups. In all cases, the "Watershed Association"-type plans did not provide a decision-making framework in which to prioritize fishery or wildlife resources. There were several cases of fish and wildlife agencies planning for wildlife on a watershed-scale. Examples from Vermont, Minnesota and the National Oceanic and Atmospheric Administration were evaluated.

This Team's charter directed the group to design "a framework and decision-making guidance by which the Department can make watershed-based, fisheries management emphasis that balances the dual mandates for sport fish opportunities and native fish conservation." Though none of the examples of watershed-scale wildlife planning were directly comparable to our vision and direction, some valuable information was gathered that could be used in building our process. Notable points were:

1. All the plans had extensive public and stakeholder involvement at various stages in their development.
2. All the plans expressed the need to collect and store the most recent data possible.
3. All expressed the need for evaluation and modification of the plan as necessary.

Decision Making Process - Watershed-based Fish Management Process

Direction for the Department's Sport Fish and Nongame and Endangered Wildlife subprograms found in the 2012 Strategic Plan supports a balanced approach to maintaining and enhancing sport fishing opportunity while simultaneously managing for the conservation and restoration of Arizona's native aquatic wildlife resources. The Sport Fish Program's goals identified in the FY 08/09 Operational Plan include the charge to

"Maintain, manage, and enhance the quality, abundance, availability, and diversity of sport fishing opportunities while contributing to the recovery of Arizona's native fishes." Recognizing this charge, the objectives of both programs are management approaches that provide a framework and decision-making guidance by which the Department can make watershed-based, fisheries management emphasis decisions that balance the dual mandates for sport fish opportunities and native fish conservation. This has proven to be necessary where conflicts between sport fish and native aquatic species, combined with changes in habitat parameters, have created conditions that threaten the persistence of native aquatic populations. The Department intends that this process should aid in the development of management prescriptions that maximize opportunities for both sport fishing and native fish conservation, with an end result that furthers the goals of these dual mandates both at watershed and statewide levels.

The process is designed to create fisheries management plans for management units within a watershed. The process has four goals: 1) To reduce current and future potential conflicts between native fish management and nonnative sport fish management; 2) To provide an integrated management strategy whereby all fish management activities within the watershed work toward meeting long-term fisheries and other Department goals for the watershed/project area; 3) To proactively manage toward and improve the status of native fish within the watershed/project area, promoting delisting of currently ESA listed species, and preventing the need for future federal listings; and 4) To proactively manage toward sport fish opportunity and angler use within a watershed consistent with the Department's goal of no net loss and providing the ability to provide future opportunity for angler recruitment.

To achieve these goals, a variety of fish species may be managed for within the watershed or project area. These fish can be broadly categorized into sport fish (including some native game species) and native fish species. With three exceptions (roundtail chub, Apache trout, and Gila trout), sport fish in Arizona are nonnative. Because nonnative sport fish and native fish have different management objectives, they should be examined using different criteria, and where necessary, managed in geographically discrete areas.

Fish management actions are implemented to achieve management goals for target species or a suite of species. The specific type of management action may be delineated by various parameters, such as habitat type, land ownership and the physio-chemical properties of the waters being managed. Given these variables and the logistical limits inherent to management programs, a body of water with a homogeneous set of parameters constitutes a logical geographic unit on which to apply a set of management actions. Following this reasoning, this process will divide waters into management units within the project area (typically a watershed). Each management unit will ultimately be assigned a desired management emphasis (i.e., native fish conservation, sport fish opportunity, or both objectives). Using a specific set of criteria, this decision process and tool will help determine the desired management emphasis for each management unit. Further, the process will help to identify appropriate mitigation necessary to compensate for impacts to angler and native fish conservation opportunities.

The text below defines methods to arrive at consistent, data-driven and defensible desired management emphases for management units within and across watersheds, which are presented in flowcharts in Appendices C and D. This process constitutes the Watershed-based Fish Management Process (WFMP).

STEP 1: IDENTIFY THE CORE MANAGEMENT PLANNING GROUP

For this process, a Core Management Planning Group (CMPG) will be identified and selected by the Department. CMPG members will be approved by the Fisheries and Nongame Branch Chiefs and appropriate Regional Supervisors to ensure priorities are being addressed and appropriate resources are made available. The CMPG will typically be led by Regional fisheries personnel, and may include personnel and resources from additional Department work units (Nongame, Fisheries, Research, and Habitat Branch representatives; GIS analyst) and personnel from other agencies (e.g., USFWS), when appropriate. The CMPG should not be larger than 8-10 people, depending on the scope of the effort.

Once the Department has identified and selected the CMPG, these project personnel will follow the WFMP to help determine the appropriate fisheries management for management units being evaluated. The CMPG is responsible for running the process.

STEP 2: BEGIN DECISION MAKING PROCESS

This step consists of the following: Delineation of Management Units; Gathering and Georeferencing Fisheries Data; Identification of Current Fishery; and Determination of Native Fish and Angler Needs, which need to occur prior to determining the Desired Management Emphasis step for management units. These may be carried out concurrently, but independent of one another and step 2d. may continue while conducting steps 4a.-f.

Step 2a: Management Unit Delineation

"Management unit" is any unit of water for which the Department desires to determine a management emphasis category. This is intended to be applicable at any scale, however, management units should be assessed at larger scales before examining narrower scales to ensure adequate watershed relationships and impacts are considered and to determine the most appropriate unit to be applied in the WFMP. Management units are delineated in order to provide fisheries managers and land management agency personnel with the relevant, site specific management actions needed for the effective, on the ground management of a desired fish species assemblage. As such, "management unit" applies only to aquatic habitats.

Streams or portions of streams are designated a management unit if they meet one of the following conditions:

1. The channel is documented as being perennial or intermittent (generally included in the GIS cover: AGFD Perennial Intermittent Coverage), and therefore, is believed to hold potential for fisheries management.

2. Although not included in the AGFD Perennial and Intermittent GIS cover, there is reason to believe that all or a portion of the channel may be perennial (based on fisheries survey data, knowledge of CMPG members, personal communication with people familiar with the channel in question, USGS 7.5' topographic map blue lines indicating potentially perennial channels, and/or proximity and topographic similarity to known perennial channels).

Step 2b: Gathering and Georeferencing Fisheries Data

The CMPG will compile fish occurrence and habitat assessment data from existing databases both within and outside the Department. As a starting point, data assemblage and georeferencing should be conducted on as broad of an area as feasible (i.e., within a watershed) to identify potential conflicts as management units are defined. Such data, if available, should include current fish species assemblage (e.g., presence/absence, population trends, etc.); species status (threatened, endangered, or candidate); whether a conservation agreement for species exists; presence of critical habitat; physiochemical and geomorphic conditions; land ownership; angler use days; and/or "uniqueness" of angling opportunity.

Many of the databases and information sources listed below (and described in detail in Appendix E) have limitations or have not been updated in years. Absent a statewide georeferenced database, the following may be used as a partial list of resources:

- Stocking Database
- Museum Database
- Fish Collection Database
- Notes Database
- Management Action Database
- Statewide Angler Survey
- Heritage Data Management System
- Run Wild
- Department Regional Databases
- Environmental Monitoring and Assessment Program
- SONFISHES
- Nongame Technical Reports
- Research Data and Reports
- Sportfish Technical Reports
- Fish Mapping Spreadsheet

Step 2c: Identification of Current Fishery Values

For each management unit, the CMPG will use the information obtained from previous steps to determine Current Fish Assemblage, Current Recovery/Conservation Category, and Current Angling Category. Specific parameters assessed will include species and

critical habitat occurrence, angler use, and species status. This information will provide baseline data for conservation and angling status and will then be used in step 6 of the WFMP. This allows the CMPG to compare the current and desired management emphasis, evaluate potential impacts resulting from a change in management emphasis, and determine the appropriate emphasis.

Current Fish Assemblage

Using the data sources identified above, determine the Current Fish Assemblage within the management unit. The Current Fish Assemblage should include a list of the species known to occur in the management unit, as well as other relevant information such as indices of species abundance, population health and fitness, origin, management purpose of the species if one exists, and population trends.

Current Recovery/Conservation Category

Using the data sources identified above and in species recovery plans and conservation agreements (Appendix F), determine the Current Recovery/Conservation Category. A value of *High* is given to units presently containing threatened, endangered, candidate, proposed (T/E/C/P), or other native aquatic species with a signed conservation agreement, and/or the presence of critical habitat. The Team defined "presently containing" as collection records since 1980, which is consistent with SONFISHES data for recent occurrences, unless more recent data show otherwise. This does not include units where the only T/E/C/P species are managed for a primary purpose other than conservation (including, but not limited to: Apache trout stocked for recreation, Gila topminnow and desert pupfish stocked under a SHA for mosquito control). A value of *Medium* is given to management units containing other natives with multiple age classes. A value of *Low* is given to management units where natives are rare, non-sustainable, or not present, or a result of a non-conservation stocking.

Current Angling Category

Using the data sources identified above, determine the Current Angling Category. A value of *High* is given to management units containing 2000+ angler use days (AUDs). A value of *Medium* is given to management units containing 500 to 1999 AUDs. A value of *Low* is given to management units containing less than 500 AUDs. Presence of a unique sport fishing opportunity will upgrade the designation to the next higher category. Factors that would justify a unique rating as a fishery are: more than one hour travel from another fishery, having unique fish species or special regulations, or having unusually large fish.

Step 2d: Determination of Native Fish and Angler Needs

The CMPG will evaluate information from existing plans, databases, and other sources in order to determine the desired locations and numbers of populations for each species of native fish and angler opportunities in the watershed.

It is imperative to determine the number of populations required for recovery or conservation of native fish communities. Because information crucial to making such determinations (habitat use for instance) is incomplete or missing for a number of native

fish species, it may be necessary to assemble a Native Fishes Conservation Team (NFCT) ad-hoc work group to help determine native fish needs.

A concurrent analysis of the needs and desires of anglers within the watershed is also necessary to determine the Department's angler goals for the watershed. This analysis includes the goals of providing for fishing recruitment and retention, and applying management consistent with the Department's goal of no net loss to angler/sport fish opportunities (Appendix D). These desires may include opportunities to fish for a specific species or size class of fish, fishing at a special location, or fishing from boats. This information can be gathered from statewide fisheries surveys, angler roundtable meetings, or other angler group meetings.

STEP 3: MANAGEMENT UNIT REFINEMENT AND DATA SUMMARY PREPARATION

All of the descriptive information from unit summaries will be entered into a georeferenced database. Following the above data gathering, it is important to reevaluate the original management unit delineations. Modifications to the unit boundary may be warranted according to one or more of the criteria listed below that could have management implications:

- Areas of change in fish species occurrence
- Areas of significant change in maximum and/or minimum water temperature or other water quality parameters
- Areas of significant change in habitat condition (quality)
- Areas of change in habitat type (lake vs. stream, perennial vs. ephemeral or intermittent)
- Areas of significant change in flow regime (natural vs. modified hydrograph), water rights, or water use
- Areas of significant geomorphologic change (stream elevation, gradient, substrate, etc.)
- Areas of change in stream order
- Locations of current or potential future barriers/hindrances to upstream and/or downstream fish movement
- Areas delineated in species recovery plans or other wildlife/habitat management plans
- Current or known future land ownership boundaries
- Land use boundaries
- Areas of uncertain status, where more in-depth data analysis/collection is needed
- New GIS layers and associated databases were created for both stream and lake management units

STEP 4: DESIRED MANAGEMENT EMPHASIS PROCESS

The process described within this section was developed to determine the desired management emphasis that balances the sport fish opportunities and native fish conservation for management units. The process incorporates steps (4A-G), which should

be carried out by the CMPG, either simultaneously or sequentially (Appendix G: Decision Making Process - Desired Management Emphasis; and Appendix H: Step 4 Details - Decision Making Process - Desired Management Emphasis):

A. Management Authority and Access
B. Unit Conservation Potential
C. Unit Angler Potential
D. Desired Management Emphasis
E. Intra- and Inter-Unit Compatibility and Conflict Resolution
F. Team's Recommended Emphasis and Plan

Step 4a: Management Authority and Access
Project personnel will determine the Department's ability to exercise management actions within the management unit. Department authority and access can typically occur on State, Federal, Commission, or Private-owned lands where there is a history of commitment to conservation or a Memorandum of Understanding.

For this step in the process, ask the question, "Based on land status, does the Department have management authority to effectively manage for a given management unit?"
• If Yes, proceed to Step 4b.
• If No, identify the Current Fishery Values and proceed to Step 5. (Note: if it is determined that the management unit may currently provide high or medium sport fish opportunity or native fish conservation, seek to work with the landowner in order to implement future management actions). Examples are Tribal Lands or National Parks.

Step 4b: Unit Conservation Potential
Project personnel will determine the unit conservation potential for the management unit (*High, Medium, Low*) based on the scoring criteria in the Unit Conservation Potential Table (Appendix I). The purpose of the scoring criteria is to prioritize areas needed to protect, restore, preserve and maintain native aquatic species as part of the natural diversity of Arizona and to provide opportunities for the public to enjoy native aquatic species without detriment to those resources. Native aquatic species are those species listed by the Department in the Comprehensive Wildlife Conservation Strategy (CWCS) Species of Greatest Conservation Need (SGCN).

For the management unit a point value is assigned for each of the five conservation element categories: Current Native Aquatic Species Composition, Potential to Meet Existing Goals and Objectives, NFCT Conservation Value, Potential to Alleviate Threats, and Potential Level of Contribution. A point value for each of these five categories is given and totaled to determine final score and the conservation need (*High* = 11-15 points, *Medium* = 6-10 points, and *Low* = 0-5 points).

<u>Current Native Aquatic Species Composition</u>
This is defined as the assemblage of native aquatic species present within a management unit.

- A score of "3" is given to units presently containing threatened, endangered, candidate, proposed (T/E/C/P), or other native aquatic species with a signed conservation agreement, and/or the presence of critical habitat. This does not include units where the only T/E/C/P species are managed for a primary purpose other than conservation (including, but not limited to: Apache trout stocked for recreation, Gila topminnow and desert pupfish stocked under a SHA for mosquito control).
- A score of "2" is given to areas with the presence of any non-listed native aquatic species that are abundant or sustainable but do not have signed conservation agreements.
- A score of "1" is given to areas where non-listed native species are present but are rare in abundance and considered unsustainable, and includes non-conservation stocking for Gila topminnow and Apache trout.
- A score of "0" is given to areas where no native aquatic species are present.

Potential to Meet Existing Goals and Objectives

This is the potential for a management unit to meet goals and objectives in existing documents.

- A score of "3" is given to management units that support recovery plans or signed conservation agreements (Appendix F), and meet Department goals and objectives.
- A score of "2" is given to management units that meet goals in other Department-signed plans or stakeholder's goals and objectives in planning documents and is supported by the Department.
- A score of "1" will be given to management units that meet stakeholder's goals and objectives in planning documents, but are not supported by the Department.
- A score of "0" is given to management units that do not meet any stakeholder's goals or objectives.

NFCT Conservation Value

The NFCT conservation value will be determined (*High* = 3, *Medium* = 2, *Low* = 1, *No Potential* = 0) for each management unit by appropriate regional or ad hoc NFCT working groups according to a ranking scheme that will be developed by the statewide group to maintain consistency. NFCT serves Arizona as a group of experts, assisting agencies with enhanced conservation, standardization, effectiveness, and efficiency in conservation-related management and activities for aquatic species within Arizona. This function will be codified in the NFCT Charter and/or other NFCT guidance documents as needed to ensure this can be completed without unnecessary delay to the overall process.

Potential to Alleviate Threats

This is the potential to address and ameliorate the five listing factors in accordance with the ESA within management units: The present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; the inadequacy of existing regulatory mechanisms; or other natural or manmade factors affecting its continued existence.

- A score of "3" will be given to management units secured or having the potential to be secured from threats or through mitigation.
- A score of "2" will be given to management units where conservation actions still contribute to recovery and conservation in the presence of a threat.
- A score of "1" will be given to management units where recovery and conservation actions are less feasible in the presence of a threat.
- A score of "0" will be given to management units with irreversible threats.

Potential Level of Contribution

This is the potential to ensure the conservation of self-sustaining native aquatic species throughout Arizona.

- A score of "3" will be given to managements units that currently secure existing historical populations at wild sites.
- A score of "2" will be given to management units that have the potential to reestablish populations within historical range at a wild site.
- A score of "1" will be given to management units that secure or reestablish refuge populations.
- A score of "0" will be given to management units that do not and will not contribute to conservation.

Table 1. Unit Conservation Potential

To obtain Unit Conservation Score, use total score of 5 elements:
High = total score of 11 to 15 pts
Medium = total score of 6 to 10 pts
Low = total score of 0 to 5 pts

Conservation Element	Element Qualities	Points
Current Native Aquatic Species Composition	T/E/C/P, conservation agreement or critical habitat species present (see note below), excluding non-conservation stockings	3
	Non-listed native species without signed agreements; abundant and sustainable populations	2
	Non-listed native present but rare or non-sustainable; or, non-conservation stocking	1
	No native aquatic species	0
Potential to Meet Existing Goals and Objectives	High (support recovery plans or signed conservation agreements and meets Department goals and objectives)	3
	Medium (meets goals in other Department-signed plan or Department-supported stakeholder plan)	2
	Low (meets stakeholder's goals and objectives in planning documents, but are not supported by the Department)	1
	No currently identified goals or objectives	0
NFCT Conservation Value (NFCT will develop a ranking scheme)	High	3
	Medium	2
	Low	1
	No potential	0
Potential to Alleviate Threats	High (secured from threats or threats can be mitigated)	3
	Medium (conservation actions still valuable in the presence of threat)	2
	Low (less feasible conservation actions in the presence of threats)	1
	Irreversible threats or threats cannot be mitigated	0
Potential Level of Contribution	Secure a historical population at a wild site	3
	Reestablishing within historical range at a wild site	2
	Refuge population	1
	None	0

The Team defined "presently containing" as collection records since 1980, which is consistent with SONFISHES data for recent occurrences, unless more recent data show otherwise. Some T/E/C/P species are managed for a primary purpose other than conservation (including, but not limited to: Apache trout stocked for recreation, Gila topminnow and desert pupfish stocked under a SHA for mosquito control).

Step 4c: Unit Angler Potential

Project personnel will determine the angling potential for the management unit (*High, Medium, Low*). Angler potential will be defined based on existing angler use and modified based on potential fishery improvements and/or whether it is a unique fishery.

Potential Angling Days

This is a rating (*High*, *Medium* or *Low*) based on current angling days corrected for any improvements that will be implemented within the next five years. In almost all instances it will be a rating based on current angling days with:

1) High ≥ 2000 angler days/year
2) Medium 500 to 1999 angler days /year
3) Low ≤ 499 angler days/year

These values would be obtained from the most recent statewide survey of Arizona anglers (Pringle 2004), or from recent creel surveys. Almost all *High* and *Medium* values will be included in the statewide survey. Waters with lower use will probably not be in this report; angler use for those waters will be obtained from expert opinion or local expertise.

Fishery Improvement

The values may need to be corrected when there are plans within the next five years to increase angling days in a lake or stream. If new activities are planned, managers would evaluate the increase in angler days from these activities to determine if sport fish values would increase. For instance, if there were 1000 angler days in a water and a new road was constructed that would increase use to 2500 angler days, we would move the sport fish value from *Medium* to *High*. The following are activities that could increase angler days:

1) Increase access and/or facilities
2) Add new species
3) Change regulations
4) Improve habitat
5) Renovate to remove undesirable species
6) Initiate or increase stockings
7) Conduct outreach

To remain objective, the value would only change if the improvements were feasible, cost effective, and included in current plans to improve fishing. Most of the activities that would increase angler days are not cost effective. Therefore, the values for angler days would only increase if there were a good chance that the activities would be

implemented. If feasibility were *High*, regional managers would evaluate the new activities and predict angler days and a new Unit Angler Potential. If feasibility were *Low*, the current angler use would be used to determine Unit Angle Potential. The following are the definitions for *High* and *Low* feasibility:

1) *High* feasibility is reasonably obtained, currently planned, and scheduled for within five years
2) *Low* feasibility would have a longer framework than five years

Unique Fisheries

While the number of angling days is the single best measure of angling value, there is a need to incorporate fisheries that are rare and unique that is likely to hold a higher value to anglers. If regional managers considered a fishery unique, it could be raised to the next highest category. For example, a catch and release wild Apache trout fishery with 1000 angling days could be increased from *Medium* to *High*.

The intention with the unique fishery designation is only to use it in rare cases. Waters should only be designated unique in rare instances (e.g., when looking at the Black River drainage, only 15% of the waters were designated unique). Some things to consider when designating a fishery unique are:

1) Only fishery within one-hour travel. This would be unique because it would be hard to replace.
2) Fishery with unique species such as grayling.
3) Fishery that has larger fish. Fishery should be able to produce fish in the preferred size class or larger. An example would be an 18 inch trout or longer.
4) Fishery with special regulations to provide a unique experience for anglers.

Step 4d: Desired Management Emphasis

Once management units are evaluated for both conservation and angler potential, the CMPG will determine preliminary desired management emphasis designations. They are categorized as: Sport Fish Recreation, Native Fish Conservation, Undetermined by Lack of Data, and No Emphasis. The project personnel will compare the relative values of unit conservation potential and unit angler potential to each other; the higher of the two will determine the desired management emphasis. For example, if a unit rated *Low* for conservation potential and *Medium* for angler potential, that Unit would be designated a Sport Fish Recreation emphasis. When values are the same for both unit conservation potential and unit angler potential (i.e., *High*/*High*), they are further examined in step 4E to evaluate both intra- and inter-unit compatibility and conflicts, and to determine final desired management emphasis.

Management units which receive a *Low* value for both the unit conservation potential and the unit angler potential may receive a management unit emphasis of Undetermined by Lack of Data or No Emphasis if these units have not been managed for either in the past. If data are lacking and resources permit, these units should be surveyed. If suitable habitat is found, they should be given a management emphasis, as they may be useful for

conflict resolution or mitigation. If the units are not suitable for a management action, the No Emphasis category would be used.

The desired management emphasis will be designated using the Management Emphasis Descriptor Tool (MEDT). The MEDT is currently a MS-Excel spreadsheet that utilizes menus and user input to describe primary and secondary management emphasis in fourteen fields. The MEDT will be linked to a georeferenced database that can be queried to track mitigation issues such as no net loss or fish populations and stocking records. The MEDT fields are described below, and the draft MS-Excel spreadsheet with dropdown menus is depicted in Appendix J.

Table 2. Management Emphasis Descriptor Tool

Cell:	Description:
Management Unit	User inputs name of Management Unit
Unit Conservation Potential	High, Medium, Low
Unit Angler Potential	High, Medium, Low
Primary Management Emphasis	Breaks down emphasis into four categories (Sport Fish Recreation, Native Fish Conservation, Undetermined, or None)
Primary Desired Species	Provides a drop-down list of species desired
Primary Management Objective	Provides a drop-down list of prescriptions (Sport fish blue ribbon, Sport fish basic yield, Sport fish native, Sport fish warm-water self-sustaining, Native fish self-sustaining, Native fish refugia, or Native fish management-sustained)
Stocking Approach	Provides a drop-down list of stocking options (Intensively stocked, Opportunistic stocking, or Stocked as needed)
Management Needs	Provides a drop-down list of specific needs to manage a unit for the desired condition (Habitat improvement - user must specify, Suppression - user must specify, Renovation, Barrier construction, or Survey inventory)
Secondary Management Emphasis	Breaks down emphasis into four categories (Sport Fish Recreation, Native Fish Conservation, Undetermined, or None)
Secondary Desired Species	Provides a drop-down list of species desired
Secondary Management Objective	Provides a drop-down list of prescriptions (Sport fish blue ribbon, Sport fish basic yield, Sport fish native, Sport fish warm-water self-sustaining, Native fish self-sustaining, Native fish refugia, or Native fish management-sustained)
Management Priority	High, Medium, or Low
Georeference	User inputs the UTM bounds of the Management Unit

Step 4e: Intra- and Inter-Unit Compatibility and Conflict Resolution

Intra-unit

When resolving intra-unit conflicts between equal values for sport fish or native fish conservation management emphasis within a management unit, the CMPG must consider the following:

- Will the management emphasis determination require mitigation due to negative impacts to either native fish conservation or sport fish opportunity?

- Will the management emphasis determination result in conflicts with inter-unit compatibility?

Inter-unit

Once a preliminary management emphasis is determined, the CMPG will evaluate inter-unit compatibility among proximal management units in order to identify potential conflicts between native fish conservation and sport fish opportunities in the watershed. Because management units are often interconnected and do not function independently of one another, it is possible that fishes occurring in one management unit will interact with fishes in other management units resulting in competition, hybridization, or direct predation. The objective, therefore, is to examine the potential interactions of management units, adjacent or otherwise, that may affect or be affected by actions taken in each management unit.

To evaluate inter-unit compatibility and successfully navigate conflict resolution, project personnel should use a variety of information and reference materials collected during previous steps to create a large format GIS map of the watershed with all management units to be evaluated. The map should include, but not be limited to:

- Rivers, streams, ponds, reservoirs, springs, tanks (including intermittent and interrupted)
- Pertinent information from Step 2B: Gathering and Georeferencing Fisheries Data
- Pertinent information from Step 2C: Identification of Current Fishery Values (species presence, federal listing and critical habitat designations, AUDs, etc.)
- Point localities for other aquatic species of concern (e.g., ranid frogs, gartersnakes, mud turtles, salamanders, springsnails, and freshwater mussels)
- Locations of fish barriers (natural and man-made)
- Land ownership, roads, and towns

Additional data and information presented in tabular or narrative form may include:

- The 2001 Statewide Angler Survey (Pringle 2004), which includes the sum of AUDs statewide and a table of AUD sums within each watershed
- The most recent creel data
- A list of aquatic federally-listed, candidate, and proposed species, each with:
    - Sum of and names of occupied recovery streams or sites
    - Sum of and names of planned recovery streams or sites
    - Designated critical habitat

- Input from species experts regarding species compatibility—which proposed or existing species cannot coexist within a management unit

Once the data and maps have been compiled and reviewed, project personnel will explicitly identify Desired Management Emphasis conflicts among management units within the watershed. Further, project personnel will identify the issues leading to the potential conflicts with as much specificity as possible.

Will the desired management emphasis avoid, minimize, and mitigate actions necessary to compensate for negative impacts to native fish conservation or sport fish opportunities (e.g., no net loss) in a management unit? In each instance, but especially with inter-unit conflict resolution, it may be necessary to alter the desired management emphasis for more than one management unit in order to enhance the compatibility among management units and to mitigate for negative impacts to other management units that.

For resolution of inter-unit conflicts, first re-evaluate any preliminary intra-unit management emphasis decisions to determine if compatibility or conflict issues can be resolved.

Effective conflict resolution will rely on the critical evaluation of numerous resources including the references and tools identified in this step, management unit boundary delineations, current native fish conservation and sport fish opportunities in the management unit, and overall native fish and angler objectives for the watershed (and perhaps the state). Utilizing these resources should help to answer questions such as:

- What are the underlying conflicts?
- For what native or sport fish species might mitigation actions be required?
- Is it more appropriate to mitigate for losses to native fish conservation or sport fish opportunities?
- What are feasible and appropriate mitigating actions?
- Are there opportunities in nearby units or watersheds to mitigate for the loss of native fish conservation or sport fish opportunities?
- What are the locations, costs, and timeframes associated with mitigation?

By answering these and other questions related to management unit conflicts, project personnel will be able to determine the most appropriate desired management emphasis for the management unit and other management units in the watershed. Further, through this conflict resolution process, the CMPG should identify appropriate mitigation measures (Appendix D.), along with their potential locations, timeframes, costs, and other metrics associated with implementation.

Step 4f: Team's Final Recommended Emphasis and Plan

The CMPG provides a draft report with recommendations for action and implementation. The Recommendation Report will identify the proposed actions, scale, scope, timelines, conflicts or controversy, the resulting impacts to "no net loss" angling opportunities (Appendix D.) and native fish conservation efforts and identify appropriate mitigation

measures. It should also document the results of each step and identify data needs (e.g., creel and species distribution data, etc.); identify funding and other resource needs, contain management unit prescriptions, and incorporate data and decisions into a GIS cover/database.

STEP 5: INTERNAL AND EXTERNAL PEER REVIEW

The CMPG will submit the recommendation report through the Department's Bluesheet Review or other review process in order to provide affected Department staff (Field Operation; Habitat; Nongame; Research; Fisheries Programs; etc.) the opportunity to comment and recommend changes to the management prescriptions described. The CMPG may need to seek approval to begin public review, as appropriate, through a Branch Chief and/or Regional Supervisor, or Executive Staff, and notify the Commission. This step (and Step 7) should identify and evaluate where possible the impacts to other Department processes.

After internal recommendations are adopted by the Department, the CMPG will submit a revised Recommendation Report for external peer review by the USFWS and affected federal land management agencies. The CMPG will consider and incorporate external comments to the extent practicable or provide justification for rejecting recommendations, based on the best available data and professional judgment.

STEP 6: PUBLIC REVIEW AND COMMENT

The Department-approved watershed recommendation report is provided to state, federal, municipal partners, non-government organizations (including watershed groups), and the public for review. The recommendations report is made available online and advertised on the Department website's "Call for Comments" page and by press release. The length of public comment period should be determined by the scale, scope, and interest of the proposed actions, especially when known impacts to sport fishing opportunity or native fish conservation will occur, however a period of 30 days should be used as a standard minimum when the evaluation is for a large watershed. The CMPG then responds to or addresses public comments on the report.

STEP 7: FINAL DESIRED MANAGEMENT RECOMMENDATION REPORT AND APPROVAL

The recommendation report (revised as needed to address comments) is approved by the Department's Executive Staff and/or Director. This report will have the final management emphasis for units within that watershed/project area. Depending on the scale, scope, and controversy of the proposed actions, especially when known impacts to sport fishing opportunity or native fish conservation will occur, the Department will determine if the implementation of the report requires Commission action.

STEP 8: DEVELOP IMPLEMENTATION PLAN AND RESOURCE ALLOCATION

This step identifies project implementation details, such as planned actions, schedules, timelines, and identification of process owner, necessary to complete all steps as described in the plan. The CMPG leader and affected work unit managers will ensure that the planned actions, funding and other resource needs are incorporated into the appropriate biennial operational and budget planning cycles.

STEP 9: IMPLEMENTATION

The CMPG leader and affected work unit managers will ensure that the planned actions, funding and other resource needs or assignments are incorporated into the appropriate annual implementation plans and job statements and that annual budgets are loaded appropriately.

STEP 10: MONITORING AND ADAPTIVE MANAGEMENT

Monitoring and adaptive management will be key components following implementation to evaluate the effectiveness of actions carried out under the plan, and for making adjustments where plan objectives are not being met. Monitoring has three components that will need to be adequately addressed by the CMPG in the plan as follows:

1. Database maintenance – The CMPG will identify databases that need to be created, updated, and maintained, and the resource allocation needs for this purpose. Emphasis should be to create a user interface that is easy to use and standardized (using drop down menus). Databases should be made available via the Internet if possible, for all necessary Department staff, and other agencies and the public, where appropriate.

2. Resource monitoring – The CMPG will define what sampling will be implemented and will identify a sampling schedule and the protocols to be used to evaluate plan effectiveness. Sampling designs should be sufficient to answer management questions defined in the plan. For example, "What is the relative stock density of smallmouth bass in the management unit?" or "What is the population trend of spikedace in the management unit?" Monitoring should be conducted on an annual basis, if possible, and data entered into appropriated databases. Angler use data, using sampling such as creel or mail surveys, should be acquired according to existing protocols on a schedule sufficient to evaluate plan effectiveness and entered into appropriate databases.

3. Action/Effect monitoring – When complete, the CMPG will make the plan, including desired management emphases and specific prescriptions, available to the public online. The CMPG will include a section in the report that defines a specific review schedule for evaluating plan effectiveness.

Using the information gathered during monitoring, the CMPG will use an Adaptive Management-type of approach to evaluate the Decision Making Process and prescription implementation. The goals of this approach are to adjust and improve: 1) the Decision

Making Process and 2) the prescription in management units considered unsuccessful by the Department.

First, after utilizing the Decision Making Process, the CMPG will review and identify successes and challenges revealed along the way. This analysis should illustrate the steps and components deemed critical to the success of the process, as well as those that were inefficient, ineffective, or failed to meet the objective. The Department's Executive Staff will then have the ability to provide process revision guidance to succeeding CMPGs based on the successes and challenges encountered by previous CMPGs. As a result, the Decision Making Process will become increasingly improved and fine-tuned with each successive CMPG watershed evaluation.

Second, for the watershed or other specified management area that was evaluated using the Decision Making Process, the CMPG will determine an acceptable time interval to formally review the implementation effectiveness for management units and incorporate adaptive management accordingly. The formal review will evaluate the successes and challenges associated with implementing the Desired Management Emphases and prescriptions within the watershed. Management units will be evaluated in order to identify important factors that contributed to or detracted from the successful implementation of management prescriptions. Factors to consider should include how well the implementation met the plan's native fish conservation and angling objectives, what resource or land management issues resulted from the implementation period, pre- and post-implementation ESA section 7 conflicts, new listings or species occurrence, and new angler use data. Through the evaluation, the CMPG will identify those management units having substantial unresolved issues, and reapply Steps 4 through 10 of the Decision Making Process to those management units, as necessary. By reapplying the Decision Making Process to management units that failed to meet planned objectives or include unresolved conflicts, revised prescription and implementation planning will be better adapted to meet those unexpected or changing conditions that have affected or will affect management units.

Recommendations

1. Create a statewide fishery GIS/database manager position[1].

2. Implement the Decision Making Process for watershed planning across the state, starting with the Verde River Watershed Fisheries Development Implementation Plan (as described below).

3. Incorporate the Decision Making Process into the Department's Fisheries Methods Protocol manual, and provide training on use of Team's report process to appropriate staff.

4. Develop a statewide fishery database and provide for consistent entry of survey data (building from the LCR database) U:\Fisheries Branch\Fish Collection Database\Watershed Unit Databases).

5. Prioritize watersheds and align resources based on Section 7 sport fish stocking consultations.

6. Ensure all resulting watershed plans are aligned with the 3-tier planning process, including incorporation into operational, implementation, and budget plans.

7. Conduct a statistically-valid statewide angler use survey (i.e., Pringle 2004) and repeat every five years.

8. Backup and maintain the U:\Drive folder of relevant Team resource fisheries management files created by the Team.

9. Finalize the Management Emphasis Descriptor Tool database structure.

10. Develop a 5 to 6 year schedule for WFMP implementation based upon the results of the ongoing Section 7 Consultation on the Department's Sportfish program.

11. Initiate Commission action to revise and update Commission policy DOM A2.24 regarding the Department's goals for managing sportfishing opportunity.

[1] The GIS/database position is critical to successful implementation of the Decision Making Process and the development and implementation of an integral aquatic component for the statewide geospatial planning system envisioned by the agency. The position will facilitate application of WFMP process, develop databases, tables, and layers for use in decision support modeling to address sportfish stocking Section 7 consultations, population growth, watershed management, aquatic habitat fragmentation and connectivity, invasive aquatic species, climate change, aquatic species and habitat modeling and other critical challenges. Three alternatives to facilitate/implement this activity are described below:

1. Direct hire of a GIS/database specialist with wildlife / fisheries expertise solely for this purpose. This would allow implementation to begin within 2 months of approval and establishment of funding. Estimated cost (WSIII) is $75,000/year. The position would be 100% dedicated to the development and implementation of the database and GIS decision support and modeling tasks until all major watersheds in the state have been assessed using the WFMP.

2. Direct hire of a GIS/database specialist with wildlife / fisheries expertise who would have multiple GIS/database responsibilities targeting the agencies geospatial planning vision for the Department. This position would be tasked primarily with the aquatic database needs of the Department, but would have a portion of time allocated to work on other activities. This would allow implementation to begin within 2 months of approval and establishment of funding but would potentially slow the implementation of the process down dependant upon alternative work load.

3. Use of existing personnel to bridge the gap. Existing GIS/database personnel within Nongame and Habitat branches could be used to begin the process until such time as a position can be dedicated to the effort. Existing priorities/mandates would prevent immediate utilization of these personnel. Nongame personnel are working on the geospatial web-interface project and would be available for this project no sooner than October 2009. Habitat GIS is dedicated to the Transportation and Development project and would be available for shift to this project no sooner than beginning of the fiscal year. Neither position could take on the full duties of this position unless existing priorities were adjusted, and that is not recommended.

Alternatives #1 and #2 could be implemented early FY 2010 when funding is budgeted for expansion of GIS / geospatial planning capability.

Team: Statewide Fisheries Management Team				
Team Leaders: Eric Gardner and Rod Lucas				
Team Members: Andy Clark, Bill Stewart, Chris Cantrell, Codey Carter, Glen Knowles, Jeremy Voeltz, Dave Weedman, Troy Smith, Kelly Meyer, Kirk Young, Jeff Sorensen, and Jason Kline				
Recommendation #	**Recommendation**	**Person Responsible/Process Owner**	**Due Date**	**Status**
1	Create a statewide fishery GIS/database manager position.	WMD Assistant Director	TBD	
2	Implement the Decision Making Process for watershed planning across the state, starting with the Verde River Watershed Fisheries Development Implementation Plan (as described below).	Bob Broscheid, Kirk Young, Eric Gardner, Bob Posey, Ron Sieg, and Rod Lucas	Within 3 months of SFMT report approval and appointment of GIS/database position	
3	Incorporate the Decision Making Process be into the Department's Fisheries Methods Protocol manual, and provide training on use of Team's report process to appropriate staff.	Kirk Young	Within 3 months of SFMT report approval	
4	Develop a statewide fishery database and provide for consistent entry of survey data (building from the LCR database) U:\Fisheries Branch\Fish Collection Database\Watershed Unit Databases).	Kirk Young	Within 6 months of appointment of a statewide fishery GIS/database manager (Recommendation #4)	
5	Prioritize watersheds and align resources based on Section 7 sport fish stocking consultations.	Kirk Young and Eric Gardner	Within 3 months of completion of the ongoing Section 7 Consultation	

6	Ensure all resulting watershed plans are aligned with the 3-tier planning process, including incorporation into operational, implementation, and budget plans.	Kirk Young, Eric Gardner and appropriate Regional Supervisors	Beginning in FY 2010 and 2011 (phase priority watershed efforts into Operational Plan, Implementation plans and coinciding biennial budgets)	
7	Conduct a statistically-valid statewide angler use survey (i.e., Pringle 2004) and repeat every five years.	Kirk Young	FY 2012 & 2013 budget (this may need to occur earlier dependant upon outcome of Section 7 consultation, but would then require adjustments to 2010 & 2011 budget proposals)	
8	Backup and maintain the U:\Drive folder of relevant Team resource fisheries management files created by the Team.	Kirk Young	Within 30 days of approval of the SFMT report	
9	Finalize the Management Emphasis Descriptor Tool database structure.	Kirk Young	Within 90 days of SFMT report approval (needed for Verde River Watershed effort)	
10	Develop a 5 to 6 year schedule based upon the results of the ongoing Section 7 Consultation on the Department's Sportfish program.	Kirk Young	Begin within 3 months of end of Section 7 consultation	
11	Initiate Commission action to revise and update Commission policy DOM A2.24 regarding the Department's goals for managing sportfishing opportunity.	Kirk Young, Eric Gardner, WMHQ, FOHQ, and DOHQ	Continuous with implementation of the SFMT tool	

Implementation of the Watershed-based Fish Management Process (WFMP) for the Verde River Watershed.

Sep 1. Assemble the team

A CMPG would be assembled within 90 days of hiring a statewide fishery GIS/database manager. The Verde River Watershed is shared by Department Regions II, III and VI. This CMPG would be assembled by a Team Leader assigned by Executive Staff. For the Verde Watershed, Bob Posey the Region III Supervisor may be the Team Sponsor. Suggested participants include: Fisheries Program Managers from Region II, III, and/or VI (or the Nongame Specialist from Region VI), one Wildlife Manager from a Verde River district (suggest GF 384), one native fish biologist from Nongame Branch, one sportfish biologist from the Fisheries Branch, and one specialist from Habitat Branch. The SFMT report recommends the establishment of a fishery GIS/database manager position. The existence and incorporation of that position into the team as a GIS/database and project liaison is essential to application of WFMP process at a meaningful scale.

In addition, personnel from outside the agency may be invited to participate in the core management planning group if the Department determines that they are a critical partner, such as the USFWS and the USFS. Though a group of 9 or 10 individuals is very large, it is important to include partners and collaborators in a meaningful way on the CMPG.

Public Announcement of Department's intent to initiate the Process

Following an informational briefing to the Commission, a public announcement should be created by the team leader to formally announce that the Department will be creating watershed based fishery management plans for the state, starting with the Verde River. This announcement could be in the form of a press release and/or posted on the Department web site. Two public meetings could be held in Prescott and in Phoenix including a formal presentation to answer any concerns or questions that the public may have regarding the WFMP. The press release should be done in two consecutive Sunday additions of the Arizona Republic and the public meetings could take place on consecutive evenings. This effort would provide an overview of the process, identify how and where the public fits in (input to the process and review of draft plans). Public input will facilitate identification of customer needs and allow for adaptive management of the decision-making process prior to implementation on the Verde River Watershed

Run the Decision Making Process

The CMPG would then follow the decision-making process provided by the SFMT (and as adapted by the previous public outreach step), and make recommendations for changes to the process. It should take approximately 6-months to complete the process of assigning management emphasis for the Verde Watershed. Additional public and Department internal review will take a minimum of one month. In addition, the Executive Staff will need one month to properly review and choose to approve or provide further guidance on the Verde Watershed Plan.

Step 2
May be carried out concurrently, but independent of one another.

Step 2A: Delineate Management Units
The CMPG will follow methodology described in Step 2A of the SFMT report to delineate management units. While the Verde River Watershed is large and complex, many areas have already been assigned an informal management unit.

Step 2B: Assemble and georeference data
The CMPG will follow methodology described in Step 2B of the Statewide Fisheries Management Team Report to gather and georeference pertinent data. Recommended sources also include the USGS Verde River aquatic gap analysis and Ann Kretschmann's thesis work, as well as data gathered from Federal Agencies throughout the watershed. The information will be georeferenced, tabularized and sorted by use by CMPG by the GIS/database manager. The team will set a goal of one month to gather this data.

Step 2C: Identification of Current Fisheries Values
The CMPG will follow methodology described in Step 2C of the SFMT report. This can be accomplished in two 2-day meetings of the CMPG.

2D. Determination of native fish and angler needs
The CMPG will follow methodology described in Step 2D of the SFMT report. NFCT provides initial input for conservation value. Other partners such as the Verde River Watershed Council, and angler groups could also be consulted. This step will be initiated within two months of the team formation and can be occurring simultaneously with Step 2B.

3. Management Unit refinement and data summary preparation
The CMPG will follow methodology described in Step 3 of the SFMT report. Once georeferenced data has been collected and management units are designated, the team may elect to alter or adjust emphasis areas. A data summary may be prepared to assist the team in conflict resolution. This could take up to one month if an extensive summary is needed.

4A-G. Determine Desired Management Emphasis
The CMPG will follow methodology described in Steps 4A-G of the SFMT report. Because this part of the process is the compilation of all the previous steps, it may take the CMPG up to two months to complete.

5. Internal and external peer agency review
The CMPG will follow methodology described in Step 5 of the SFMT report. A wide array of Governmental and non-governmental agencies as well as Academia will be asked to review the proposed Verde Watershed Plan. This will take a two month period.

6. Public review and comment

The CMPG will follow methodology described in Step 6 of the SFMT report. Though Step 5 will involve many different people reviewing the proposed Plan, it will however be necessary to open the document up to a formal public review process involving at least one Public Meeting. The document will be available for review on-line on the Departments web site. Angler groups from around the state will also be asked to review and comment on the Plan. The document will be available for review for one month. Once the document is approved it will be available in a PDF format and available for down load from the Department web site.

7. Final Desired Management Recommendation report and approval

The CMPG will follow methodology described in Step 7 of the SFMT report and seek support and approval from Executive Staff. This step will address comments received in Steps 5 and 6 and may take three weeks or more.

8. Develop Implementation Plan and resource allocation

The CMPG will follow methodology described in Step 8 of the SFMT report. It is crucial to tie the fisheries management prescription to operational and implementation planning to institutionalize.

9. Implementation

The CMPG will work with Region and Branch work units to implement the plan. Guidance is included in Step 9 of the SFMT report.

10. Monitoring and Adaptive Management

The CMPG will work with Region and Branch work units to implement the plan. Guidance is included in Step 10 of the SFMT report.

Team: Statewide Fisheries Management Team				
Team Leaders: Eric Gardner and Rod Lucas				
Team Members: Andy Clark, Bill Stewart, Chris Cantrell, Codey Carter, Glen Knowles, Jeremy Voeltz, Dave Weedman, Troy Smith, Kelly Meyer, Kirk Young, Jeff Sorensen, and Jason Kline				
TASKS	**PROCESS OWNER**	**TIMEFRAME**	**AZGFD PERSONNEL NEEDED**	**EXTERNAL PERSONNEL NEEDED**
Assemble the team (include the following: fisheries personnel from R2, 3, and 6; regional personnel from nongame and habitat; GIS specialist; Fisheries and Nongame Branch reps; one field supervisor; possibly a WM)	Exec Staff	Within 90 days of SFMT plan approval	To assemble the team only a Regional fish pm (RIII or RII), Regional Supervisor(RIII or RVI), Nongame Branch Chief	Consideration should be given to assembling a smaller core group and in addition assembling a larger advisory group.
Conduct public outreach and scoping on the WFMP	Team Leader	Three weeks total, initiated not more than 3 months of team formation	4 people picked from the team by the team leader	Two representatives. One from FWS and one from PNF?
Run the decision-making process (steps 2-10 of the Fisheries Management Decision Making Process below)	Team	Within 6 months of outreach efforts	No more than 8 people from within the agency should be utilized. No more than 2 from any one Region. Recommend 304, 604, 234, one Verde WM (385, 384, 282, 692, 676 etc), Native fish specialist from either nongame or research branches, Habitat specialist either regional or from branch, and possibly a member from Development Branch.	No more than 4 from outside the agency. Recommend USFWS, PNF, TNF, Nature Conservancy.
2A. delineate management units	Team	Two day meeting of Team	Team	
2B. assemble and georeference data	Team	One month	Team	
2C. Identification of Current Fisheries Values (Angler Use Days and Current Conservation Categories)	Team	Two two-day meetings of team	Team	
2D. Determination of native fish and	Team,	Within two months of team	Team, Regional and Branch work	

angler needs *NFCT provides initial input for conservation value	Regional and Branch work units, NFCT, angling groups	formation	units, NFCT, angling groups	
3. Management Unit refinement and data summary preparation	Team	One month	Team	
4A-G. Determine Desired Management Emphasis	Team	One month	Team	
5. Internal and external peer review	Team sponsor or leader	Two months	Team sponsor or leader	
6. Public review and comment	Team	One month	Team	
7. Final Desired Management Recommendation report and approval	Team, Team leader, Exec Staff	Within 1 month of submission of report.	Team, Team leader, Exec Staff	
8. Develop Implementation Plan and resource allocation *Tie to operational planning to institutionalize	Team, team leader	By Cross Programs planning meeting (March); Work into Op Plans on cycle.	Team, team leader	
9. Implementation	Team, team leader, Regional and Branch work units	Begin per implementation schedule(s)	Team, team leader, Regional and Branch work units	
10. Monitoring and Adaptive Management	Team, team leader, Regional and Branch work units	Continuous	Team, team leader, Regional and Branch work units	

*Note: Advisory group could have angler group reps, more Forest Service contacts, BLM contacts, more USFWS contacts, and contacts from all municipalities in the watershed. In addition conservation groups like Southwest Center should be involved in an advisory group. Contact list used in Stillman Lake EA could be used and pick cross section of 25 to use as advisory group.

Literature Cited

Allison, L.J. and D.M. Kubly. 2001. Fisheries and watershed management in Arizona: looking into the future. Nongame and Endangered Wildlife Program Technical Report 169. Arizona Game and Fish Department, Phoenix, Arizona.

Pringle, T. 2004. Statewide survey of 2001 Arizona anglers. Fisheries Technical Report 03-01. Statewide Fisheries Investigations, Federal Aid Project F-7-M-46. Arizona Game and Fish Department, Phoenix Arizona.

Young, K.L., E. P. Lopez, and D.B. Dorum, editors. 2001. Integrated fisheries management plan for the Little Colorado River watershed. Nongame and Endangered Wildlife Program Technical Report 146. Arizona Game and Fish Department, Phoenix, Arizona.

Appendix A
Statewide Fisheries Management Team
Team Charter
(APPROVED FINAL: 11/02/07)

Sponsor:	Bob Broscheid, Assistant Director, Wildlife Management Division	
Team Leaders:	Eric Gardner, Nongame Branch Chief Rod Lucas, Regional Supervisor	
Team Members:	Kirk Young, *WMFS*	Kelly Meyer, *FOR1*
	Dave Weedman, *WMHB*	Andy Clark, *FOR3*
	Jeff Sorensen, *WMNG*	Jason Kline, *FOR5*
	Chris Cantrell, *WMNG*	Codey Carter, *WMRS*
	Bill Stewart, *WMRS*	Troy Smith, *FOR4*
	Guest Members:	Jeremy Voeltz, *FWSAZFRO*
		Glen Knowles, *FWSAESO*
Facilitator:	Julie Hammonds	
Co-Facilitator:	Tristanna Bickford	
Note Taker:	Jenniet Mlambo	
Date:	November 7, 2007	

Background

In 1995, Arizona Game and Fish Department (AGFD) personnel began conceptualizing a management approach integrating sport fish and native fish management over a geographically meaningful scale. Both the integration of sport fish and native fish management, and the watershed scale at which management was envisioned, were departures from existing approaches. Ultimately, the Team developed two approaches with slightly different goals.

The *Integrated Fisheries Management Plan for the Little Colorado River Watershed* (LCR Integrated Plan; et. al. 2001) is the culmination of a collaborative effort by Department staff representing fisheries management interests within Arizona. It was envisioned that the LCR Integrated Plan would be used to create a management plan to provide fisheries personnel with a practical decision-making tool. The plan provides site-specific (reach-level) management recommendations needed to meet AGFD's native fish and sport fish mandates. In addition, the recommendations were intended to provide guidance to land management agencies and others operating in areas that correspond to our management reaches. The plan took just under three years to write, and almost two years to finalize.

An alternative conceptual approach was developed to use watershed management tools to work at different scales, so that conflicts between native and non-native fishes could be

addressed, as well as habitat restoration and protection. The outcome of this effort was this report, *Fisheries and Watershed Management in Arizona: Looking into the Future* (Watershed Plan; Allison and Kubly 2001). The Watershed Plan assumes AGFD will be cooperating with private landowners and government entities to improve quantity and quality of habitat for fishes. Since AGFD manages non-fish wildlife in the same areas, the plan also addresses other species as management targets.

Since 2001, efforts have been underway to move this continually evolving process to the Verde River Watershed. Department funding was provided in 2005, but was tied to the University of Arizona for support of a graduate student to refine processes and approaches for a Verde River effort. A graduate student is completing her 2nd year on the project but due to the nature of the graduate degree process, progress is slow. At the same time, an aquatic Gap Analysis Project (GAP) was launched by U.S. Geological Service to examine the current level of aquatic biodiversity within a system and identify gaps in distribution and protection of aquatic species. The Lower Colorado River Basin (LCRB) Aquatic GAP was initiated in 2004 as a one-year feasibility study to gather existing datasets, and to evaluate stakeholder interest in participating in the development and use of Aquatic LCRB GAP products. The LCRB GAP effort is now in its second phase to develop species distributions and predictive models for the Verde River Watershed. The GAP products, when completed, can be used to inform a management decision scheme for the Department and/or UofA on behalf of the Department.

The Department is undertaking Section 7 consultation of its sport fish stocking program. The Consultation will be completed by June 30, 2008. To be able to articulate management direction for both native fish recovery and sport fish stocking priorities is supremely advantageous for the consultation.

Completion of current efforts by UofA is not expected until Summer of 2008, with actual implementation as late as fall 2008. The Aquatic GAP effort will provide data the Department can use, but does not provide a management process/product that meets all of the Department's needs. Further, the alternative approach identified conceptually in Allison and Kubly (2001) is likely to be time and cost intensive, and remains unapplied.

The Department's need to move forward with management activities in the Verde River Watershed and elsewhere, and our aggressive Section 7 consultation process and timeframe necessitates a need to move forward with an achievable process to make fish management decisions across a meaningful landscape—utilizing data from or independent of current efforts. An approach similar to Young and others (2001) appears to be the most promising methodology from a Time Cost Value perspective and can be accomplished within the proposed six month timeframe.

Mission

Provide a framework and decision-making guidance by which the Department can make watershed-based, fisheries management emphasis decisions that balance the dual mandates for sport fish opportunities and native fish conservation.

Objectives/Measures of Success

1. Hold first team meeting (JIT training on day 1, charter discussion, task assignments, etc. on day 2) and schedule other meeting dates (1 month from charter approval).

2. Assess the LCR Watershed decision-making or assessment tool plan process, modify as necessary, and create a specific decision process for use in the other watersheds. Benchmark with efforts by other states, agencies, if necessary. The decision tool should use defensible, repeatable criteria to determine management emphasis for aquatic resources for state waters. The tool should be data-driven, but also accommodate socio-political concerns, include public involvement, and facilitate the development of fisheries management plans at various scales—statewide, watershed, or distinct drainages. The assessment tool should include mechanisms to identify critical linkages (e.g., management plans, policies, regulations, databases) that influence criteria for deciding management emphasis and serve to assist with evaluation of ESA status change proposals, and be useful in supporting sport fish stocking activities.

3. Develop and define management emphasis categories to be used in the decision tool. Examples of areas of management emphasis are described by category (A, B, C, D) and may be further subdivided or modified as appropriate.

A) Sport fishing opportunity
- Non-native sport fish
- Native sport fish (e.g., Gila and Apache trout, roundtail chub)
- Mixed assemblage with sport fish emphasis (allows for stocking of non-natives to maintain or enhance angler opportunity)

B) Native fish conservation
- Mixed assemblage native fish conservation emphasis (denotes active stocking of natives, but not non-natives. The opposite of sport fish emphasis, e.g., Rainbow Trout and Humpback Chub in Grand Canyon National Park)
- Native fish recovery (native species only, manage to remove all non-natives)
- Native fish conservation with native sport fish allowance

C) Undetermined or lack of data

D) No emphasis

4. Develop implementation strategies or guidelines on how to best implement Commission direction on "no net loss" to angler/sport fish opportunities when attempting to balance sport fish and native fish management opportunities.

5. Develop an implementation plan for use of the decision tool in the Verde River Watershed. The implementation plan should include: the process owner; process timeframe with key elements that need to be accomplished; specific personnel needed; a process for internal and external review of the decision tool and subsequent fish management plan; outside agency personnel who will be asked to participate

Scope/Limits of Responsibility

The team may rely on limited assistance from: a GIS specialist, other sport fish and

nongame biologists (aquatic herps, invertebrates, or regional specialists), and other agency partners. Substantial time or resources commitments will require team sponsor approval.

Time Commitment

The team is authorized to commit up to 6 meeting days for the completion of this assignment, which is 4 months from the first meeting date. The team leader must notify the sponsor immediately if problems are encountered, and especially if additional time is required to complete the assignment. The team assignment is to be considered a high priority. If you anticipate difficulties with your work schedule, you should contact your immediate supervisor to have your workload adjusted.

Products/Deliverables

1. Produce a Gantt chart that identifies major milestones within a timeline.
2. The team will develop a complete report including:
    - Development of a new decision tool incorporating key elements identified in Objectives 2 and 3.
    - Provide implementation strategies or guidelines on how to best implement Commission direction on "no net loss" to angler/sport fish opportunities when attempting to balance sport fish and native fish management opportunities
    - Develop an implementation plan to guide implementation of the decision tool within the Verde River Watershed including key elements identified in Objective 5.
    - Team Cost Form, using the template which may be found on the Quality Management page of the Game and Fish intranet

Other

The Team Sponsor, Leader, and Facilitator will meet within two weeks of Charter approval for a scheduling and planning meeting.

The team will be scheduled to attend just-in-time training that will be customized to help prepare them for this assignment (part of first team meeting).

At its first meeting, the team will discuss the Team Charter, and the Team Sponsor and/or Leader will respond to any emergent issues or questions. Review and approve a draft Gantt chart.

Team ground rules will also be drafted at the first meeting and will be incorporated into the Team Charter.

A revised Team Charter, including the ground rules, and signed by all members will be forwarded to the Team Sponsor and the AGFD Manager of Quality and Organizational Development within 2 weeks of the first meeting.

At the beginning of the project, the team will identify measures of success for the project.

These should be quantifiable, whenever possible.

As appropriate, the team will use the Communication Matrix (found on the Quality Management page of the Game and Fish intranet) to keep interested and affected parties of the team's progress, plans, and recommendations being considered. However, the Team Leader should consult with the Team Sponsor about the timing of communicating recommendations before final approval is received from the Director.

After final approval is received from the Director, the team may be asked to make a presentation to Management Team during which they will distribute copies of their implementation matrix. (The outline for team presentations is available on the Quality Management page of the Game and Fish intranet.)

Copies to: Supervisors of Team Members, including Leader, Facilitator and Notetaker
AGFD Manager of Quality and Organizational Development

The team sponsor or Executive Staff may suggest additional deliverables not listed in this charter. At its first meeting, the team will review and discuss the team charter; the sponsor and leader will be available to respond to any issues or questions. Ground rules will also be drafted at the first meeting and will be incorporated into the team charter.

A revised team charter, based on team input, will be provided to team members and the team sponsor within one week of the first meeting. Members must keep their immediate supervisor informed of team activities. The team must complete a cost form.

Potential Resources

- Fish Mapping Exercise spreadsheet (with regional input compiled, April 2007)
- LCR Integrated Plan (native and sport fish recommendations)
- Pam Sponholtz's watershed database (with HUC #s, native fish records)
- AFDAM database (sport fish records and protocols for data collection)
- Fish Stocking Water Code database (fish stocking sites, Run Wild #s)
- 2007 Section 7 Sport Fish Stocking Proposal (recommendations and fish stocking sites)
- Run Wild system of identifying drainages
- Lower Colorado River waters database
- Aquatic GAP database / Verde Watershed draft plan (native and sport fish GIS covers)
- TNC GIS covers on native fish communities/species richness per drainage
- AGFD's Native Fish database (native fish records)
- HDMS (sensitive element aquatic wildlife records and GIS covers)
- SCAS spreadsheet on proposed projects (recommendations for suckers and chubs)
- CAP-FTP list of AGFD projects (Gila River Basin, immediate and next step actions)
- AGFC directive on "no net loss" angling/sport fish opportunities (date?)
- AGFC guidance/policy on stocking T&E aquatic wildlife (May 2007)

Ground Rules:

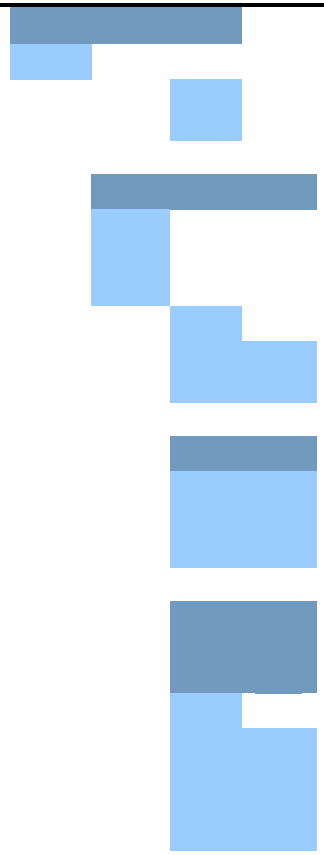
- Cell phones off or on silent
- Punctuality
- No side conservations
- Positive open dialogue
- Raise your hand (take turns)
- Don't interrupt / talk over each other
- Tell me if you're not okay – otherwise silence = consent
- If you miss a meeting, get a briefing but understand that the team won't revisit past decisions automatically
- No checking e-mail during the meeting
- Breaks approximately 10 minutes long every 1.5 hours / adjust for daily agenda

Position on team	Name	Signature
Sponsor:	Bob Broscheid, *WMHQ*	
Co-Leads:	Rod Lucas, *FOR 6*	
	Eric Gardner, *WMNG*	
Team Members:	Kirk Young, *WMFS*	
	Dave Weedman, *WMHB*	
	Jeff Sorensen, *WMNG*	
	Chris Cantrell, *WMNG*	
	Bill Stewart, *WMRS*	
	Kelly Meyer, *FOR1*	
	Andy Clark, *FOR3*	
	Jason Kline, *FOR5*	
	Codey Carter, *WMRS*	
	Troy Smith, *FOR4*	
	Jeremy Voeltz, *FWSAZFRO*	
	Glen Knowles, *FWSAESO*	
Note-Taker:	Jenniet Mlambo, *DOHQ*	
Facilitator:	Julie Hammonds, *IEIN*	
	Tristanna Bickford, *IEED*	

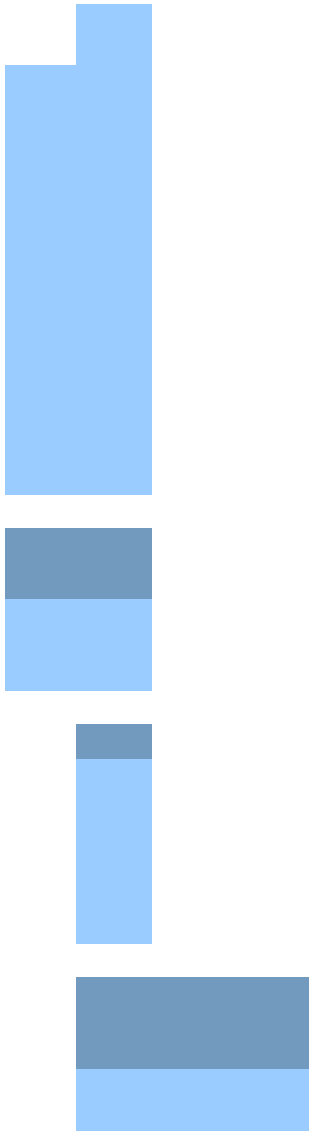
Appendix B

STATEWIDE FISHERIES MANAGEMENT TEAM
Gantt Chart
MAJOR MILESTONES AND TASKS TO REACH THEM

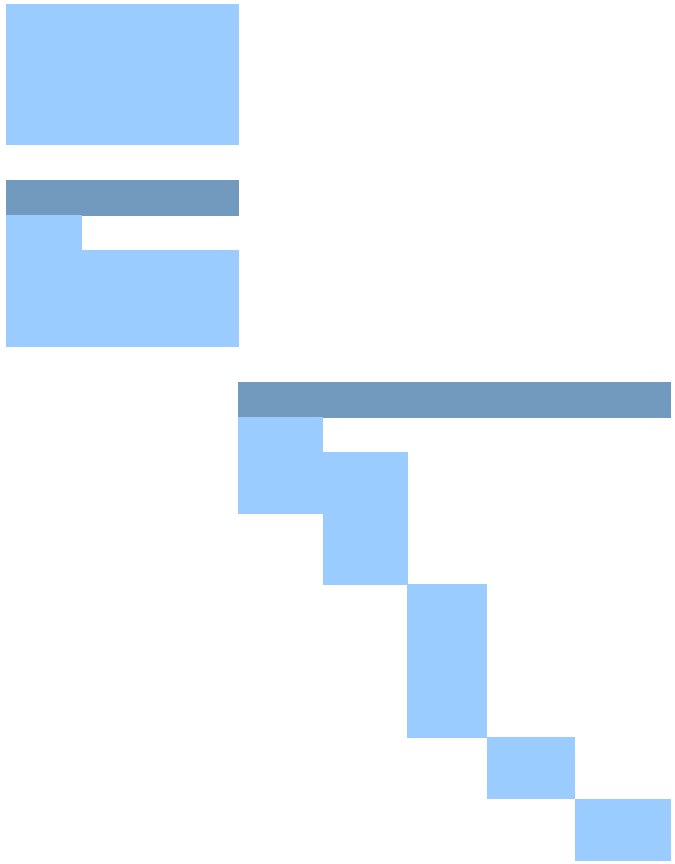
STATUS?	MILESTONES (BOLD TEXT) AND TASKS	DATE BEGUN	DATE ENDED
DONE	**Complete charter**	11/2/2007	1/18/2007
	Charter approval	11/2/2007	11/2/2007
	Send revised charter to sponsor and quality manager	1/11/2008	1/18/2008
ONGOING	**Train team, plan team meetings**	12/11/2007	2/14/2008
	Leaders and facilitator meet to plan the team's work	12/11/2007	12/11/2007
	Just in Time (JIT) team training	12/21/2007	12/21/2007
	Identify measures of success for the project	1/11/2008	1/11/2008
	Produce Gantt chart that identifies major milestones within a timeline	1/11/2008	2/14/2008
BEGUN	**Benchmark with other states**	1/31/2008	2/14/2008
	Review San Carlos Apache document	1/31/2008	2/14/2008
	Review other documents for prioritizing and decision-making	1/31/2008	2/14/2008
BEGUN	**Modify LCR Watershed plan process to create a specific decision tool for use in other watersheds throughout the state**	1/11/2008	2/29/2008
	Assess LCR Watershed plan and process	1/11/2008	1/11/2008
	Modify LCR flowcharts, developing defensible, repeatable criteria to determine management emphasis for aquatic resources for state waters	1/29/2008	2/29/2008



	Test modifications by running various scenarios	2/13/2008	2/29/2008
	Identify how to incorporate data, socio-political concerns, and public involvement into decisions made using the tool	1/11/2008	2/14/2008
	Build "scalability" into the tool, to facilitate its use for developing plans at various scales (statewide, watershed, drainage)	1/11/2008	2/14/2008
	Build mechanisms into the tool to identify critical linkages (such as management plans, policies, regulations, databases) that influence criteria for deciding management emphasis and assist with evaluation of ESA status change proposals	1/11/2008	2/14/2008
	Ensure that the tool supports sport fish stocking activities	1/11/2008	2/14/2008
BEGUN	**Develop and define management emphasis categories to use in the decision tool**	1/30/2008	2/14/2008
	Review management emphasis categories used in LCR, charter and from team efforts and determine which categories to use	1/30/2008	2/14/2008
BEGUN	**Implement "no net loss"**	2/14/2008	2/29/2008
	Discuss "no net loss" as it relates to draft decision-making tool and develop implementation strategies or guidelines to implement it	2/14/2008	2/29/2008
	Revise tool if needed to implement "no net loss"	2/14/2008	2/29/2008
BEGUN	**Develop an implementation plan for using the decision tool in the Verde River watershed**		
	Discuss process to use when implementing this tool	2/28/2008	4/3/2008



	Set a schedule for using the decision tool on the Verde River watershed	2/28/2008	4/3/2008
	Identify process owner	2/28/2008	4/3/2008
	Complete implementation matrix	2/28/2008	4/3/2008
BEGUN	**Draft team report**		
	Identify sections and authors	2/14/2008	2/29/2008
	Draft report	2/14/2008	4/2/2008
	Review and combine first drafts into one report	2/29/2008	4/3/2008
	Complete team report		
	Present early draft report to team sponsor		5/12/2008
	Present first draft report to Quality Council for comment		05/07/08
	Present revised draft report and responses to feedback to Quality Council		06/23/08
	Send revised draft report to Sponsor and Exec Staff with Quality Council review sheet		08/01/08
	Meet with Exec Staff to find out whether revisions are needed		08/15/08
	Present final draft to director for final approval		09/01/08
	Present approved report to Management Team		10/15/2008



Appendix C

Emphasis Designations and Categories that the Team Considered and Rejected

The emphasis for (A) Sport Fish and (B) Native Fish is further separated into categories. Categories allow managers to identify which areas still have sport fishing opportunities. Descriptions of these categories are given in Table 1.

Table 1. List of categories with their description by management emphasis.

Emphasis	Categories	Description
A. Sport Fish	1. Nonnative	Water has a high sport fish value, has either no or few natives, or native fishes are not reproducing/recruiting.
	2. Native Sport Fish	Water has a high sport fish value and primary focus. It is stocked with native sports fish when available and other sport fish when natives are not available. May have some native fishes present.
	3. Mixed Assemblage	Water has a higher sport fish value than a native fish value. May or may not be stocked. Will have some nonnative sport fish and some native fishes.
B. Native Fish	1. Mixed Assemblage	Water has a higher native fish value then a sport fish value. If stocked, it will be stocked with natives only. Will have both nonnative and native fishes present.
	2. Native Fish Conservation	Water has a high native fish value. Primary focus is native fishes; no angling use
	3. Native Fish Conservation with Sport Fishing	Water has a high native fish value. Primary focus is native fishes; there is some angling use or potential for use.
C. Undetermined	None	Water with no data.
D. None	No Emphasis	Water has low value for sport fish and native fish; or Department is not managing for sport fish or native fish.

Once the Team has identified the desired emphasis and category, some general guidelines on how these waters should be managed can be provided. A general guideline for prescriptions by categories is given in Table 2.

Table 2. Desired prescriptions by categories. There may be some exceptions to these prescriptions, but they should be documented.

Emphasis	Categories	Stockings	Removal of nonnatives	Angling allowed
A. Sport Fish	1. Nonnative	Native or nonnative	No	Yes
	2. Native Sport Fish	Native or nonnative, primary focus native	No	Yes
	3. Mixed Assemblage	Not often stocked, but can stock either	No	Yes
B. Native Fish	1. Mixed Assemblage	Native only	Yes or No	Yes
	2. Native Fish Conservation	Native only	Yes	No
	3. Native Fish Conservation with Sport Fishing	Native only	Yes	Yes
C. Undetermined	None	None	No	Yes
D. None	None			Yes

Appendix D

Sport Fishing Opportunity Guidance

The Charter directed the team to "develop implementation strategies or guidelines on how to best implement Commission direction on "no net loss" to angler/sport fish opportunities when attempting to balance sport fish and native fish management opportunities". Analysis by the Team determined that no official written Commission guidance existed on no net loss. However, Commission policy DOM A2.24, Wildlife Management Program Goal and Objective #6 states, "provide and promote fishing opportunities to sustain a minimum of 8,000,000 angler days per year by June 30, 1997. Although this policy has yet to be revised by the Commission, based on current data, we remain below 8,000,000 AUD's statewide. As such, it was determined the Department's goal to manage for no net loss is consistent with current Commission policy (A2.24).

For the purposes of using the process developed by the Statewide Fisheries Management Team in 2008 the following guidelines will be followed to maintain current levels of sport fishing opportunity:

- Sport fish are defined as "aquatic, gill breathing, vertebrate animals, bearing paired fins, and having material value for sport or recreation" (50 CFR 80.5).

- When a sport fishery is valued less than a native aquatic conservation value within a management unit, the loss of sport fishing opportunity will be compensated for by gain of an equal number of AUDs in another area or management unit. This opportunity will be created within the same watershed when possible. For this purpose, a watershed is defined as a six-digit-numbered area referenced on the USGS's Hydrological Unit Map. If this is not possible, the opportunity will be created within the same Department regional boundaries. Again, if this is not possible, the opportunity will be created somewhere within the State with extensive coordination between regional staff. If a net loss cannot be avoided, the Director will evaluate if the loss is acceptable by gauging the input from the public process leading to the recommendation and may take the information to the Commission at his discretion. The replacement opportunity will be initiated no more than two years following the loss to anglers.

Appendix E

List of Information Sources for Evaluating Statewide Fisheries

Stocking Database
The Department maintains a stocking records database. The database provides dates and general locations of sport fish stocking activities, providing numbers and average sizes of stocked fish by species. The information in this database dates back to 1933.
• Current location: U:\Fisheries Branch\Hatcheries\Stocking Records

Museum Database
The museum database was created as part of the LCR Integrated Plan. This database was created from fish collection records provided by the University of Michigan Museum of Zoology, the Museum of Southwestern Biology, the National Museum of Natural History, the Museum of Northern Arizona, Arizona Sate University Fish Collection, and the UofA Fish Collection. All records were georeferenced when sufficiently detailed site location information was provided. The database provides fish species occurrence information by species and collection date.
• Current location: unknown (mentioned in the LCR Integrated Plan)

Fish Collection Database
The Department maintains a set of georeferenced databases used to track the collection and distribution of fishes throughout the state. The data included within these databases come primarily from Department fisheries inventories and surveys, but also contains data from volunteer survey efforts and biologists outside of the Department. This database was initiated in 1984 and was originally used for tracking native fish surveys conducted by the Nongame Branch, Native Fish Program. It contains information on both sport fish and nongame fish collections, habitat parameters, survey methods and collection localities. The data contained within this database have not been collected within a systematic or rigorous data collection protocol. Additionally, very little data collected by the Department have been entered in the database since 2001.
• Current location: U:\Fisheries Branch\Fish Collection Database

Notes Database
The Notes Database is intended to provide managers with notes on events and conditions for specific geographic locations. This georeferenced database was created for the LCR Integrated Plan. The database contains information of past events and condition (i.e., fish kills, renovations, drought conditions, etc.) for specific geographic locations. The information primarily comes from Region I and II personnel field notes.
• Current location: unknown (mentioned in the LCR Integrated Plan).

Management Actions Database
The Management Actions Database contains the recommended fisheries management actions for the management units of the LCR Basin. This georeferenced database was created for the LCR Integrated Plan. The database lists management actions for all management units. It categorizes various types of management actions (i.e., fisheries

surveys, species repatriations, habitat improvement needs, etc.) and provides a mechanism to sort out those units that are considered to be high priority for implementation of any given type of action.
• Current location: U:\Fisheries Branch\Fish Collection Database\Watershed Unit Databases

Statewide Angler Survey (Pringle, 2001)
The angler survey questionnaire asked anglers to recall their 2001 activities by water body for trout and non-trout fishing. Also recorded was the number of fishing trips by water body. The report uses data from the questionnaire to present angler activity at a location specific scale. An advantage of this site-specific detail is that data can be grouped in various ways to meet fishery management needs, such as, Department regions or watersheds. The results provide valuable information with respect to relative fishing pressure (i.e., AUD), demographics, and economic values.
• Current location: U:\Fisheries Branch\Publications\Technical Reports

Heritage Data Management System (HDMS)
HDMS is a compilation of information describing the taxonomy, life history, habitat use, range of occurrence and protection status for each species of concern. These abstracts are a synthesis of multiple information sources and are useful to a variety of users.
• Current location: Contact Department's HDMS Project Coordinator, Habitat Branch and at www.azgfd.gov

Run Wild
Published in 1984, this report lists all naturally occurring perennial waters in the State of Arizona. Also includes references and listings of fishes for all streams where data are available. Information in this publication has been entered into a database and the coordinates georeferenced which can also be accessed.
Current Publication location: U:\Fisheries Branch\Publications\Miscellaneous
Current Database Location: U:\Fisheries Branch\Fish Collection Database\Run Wild database

AGFD Regional Databases
Each region maintains a database for data that are collected for surveys conducted within that region.
• Current location: Contact appropriate regional Fish Program Manager

Environmental Monitoring and Assessment Program (EMAP)
From 2000-2004, the Department, in cooperation with USGS and UofA, conducted stream surveys as part of the U.S. Environmental Protection Agency's Environmental Monitoring and Assessment Program—Western Pilot Surface Waters Project. Various waters throughout Arizona were sampled. Within each sub-reach, aquatic species were identified, counted, and checked for the presence of any external anomalies.
• Current location: Research Branch

SONFISHES
A georeferenced fish collection database comprised primarily of museum specimens and published articles.
• Current location: Arizona State University maintains this database

Nongame Technical Reports
The Nongame Branch maintains a collection of technical reports dating back to 1988.
• Current location: U:\Nongame Branch\NGTRs

Research Reports and Data
The Research Branch maintains databases and a collection of technical reports.
• Current location: Research Branch

Sportfish Technical Reports
The Fisheries Branch maintains a collection of technical reports.
• Current location: U:\Fisheries Branch\Publications\Technical Reports

Fish Mapping Spreadsheet
The Fish Mapping Spreadsheet provides information on known fish distribution for various bodies of water within the state of Arizona.
• Current location: U:\Teams - Active Teams\Statewide Fish Mgmt Team\Resources\Other potential Info

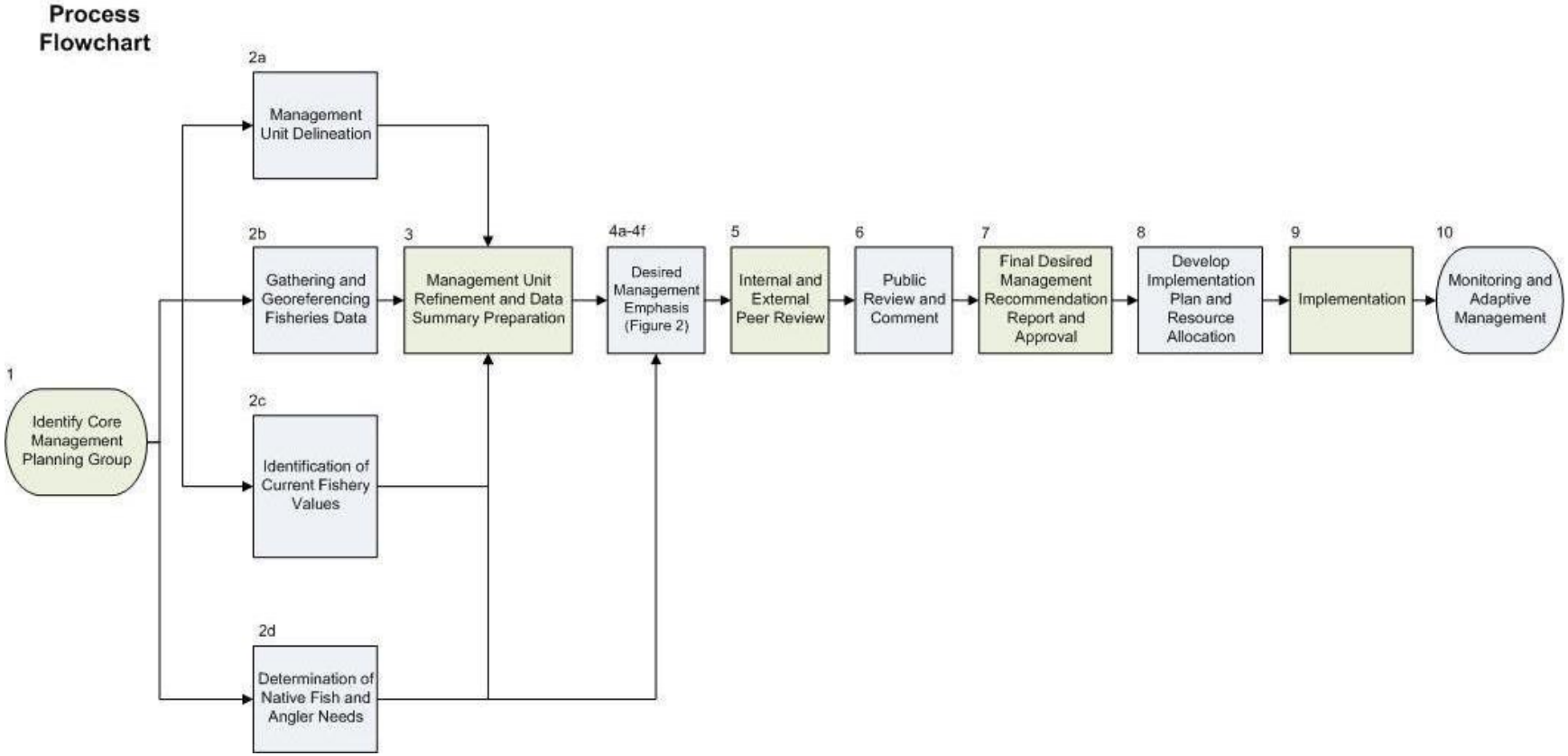
Appendix F

Recovery Plans and Conservation Agreements Related to Statewide Fishery Management

- Apache Trout Recovery Plan
- Bonytail Chub Recovery Goals
- Chiricahua Leopard Frog Recovery Plan
- Colorado Pikeminnow Recovery Goals
- Desert Pupfish Recovery Plan
- Flannelmouth Sucker, and Bluehead Sucker
- Gila Topminnow Recovery Plan
- Gila Trout Recovery Plan
- Humpback Chub Recovery Goals
- Topminnow and Pupfish Safe Harbor Agreement in Arizona
- Little Colorado Spinedace Recovery Plan
- Loach Minnow Recovery Plan
- Page Springsnail Candidate Conservation Agreement with Assurances
- Ramsey Canyon Leopard Frog Conservation Agreement
- Razorback Sucker Recovery Goals
- Sonora Chub Recovery Plan
- Sonora Tiger Salamander Recovery Plan
- Spikedace Recovery Plan
- State Conservation Agreement and Strategy for the Roundtail Chub, Headwater Chub, Flannelmouth Sucker, Little Colorado Sucker, Bluehead Sucker and Zuni Bluehead Sucker
- Three Species Rangewide Conservation Agreement for Roundtail Chub
- Virgin River Chub Recovery Plan
- Virgin Spinedace Conservation Agreement
- Woundfin Recovery Plan
- Yaqui Fishes Recovery Plan

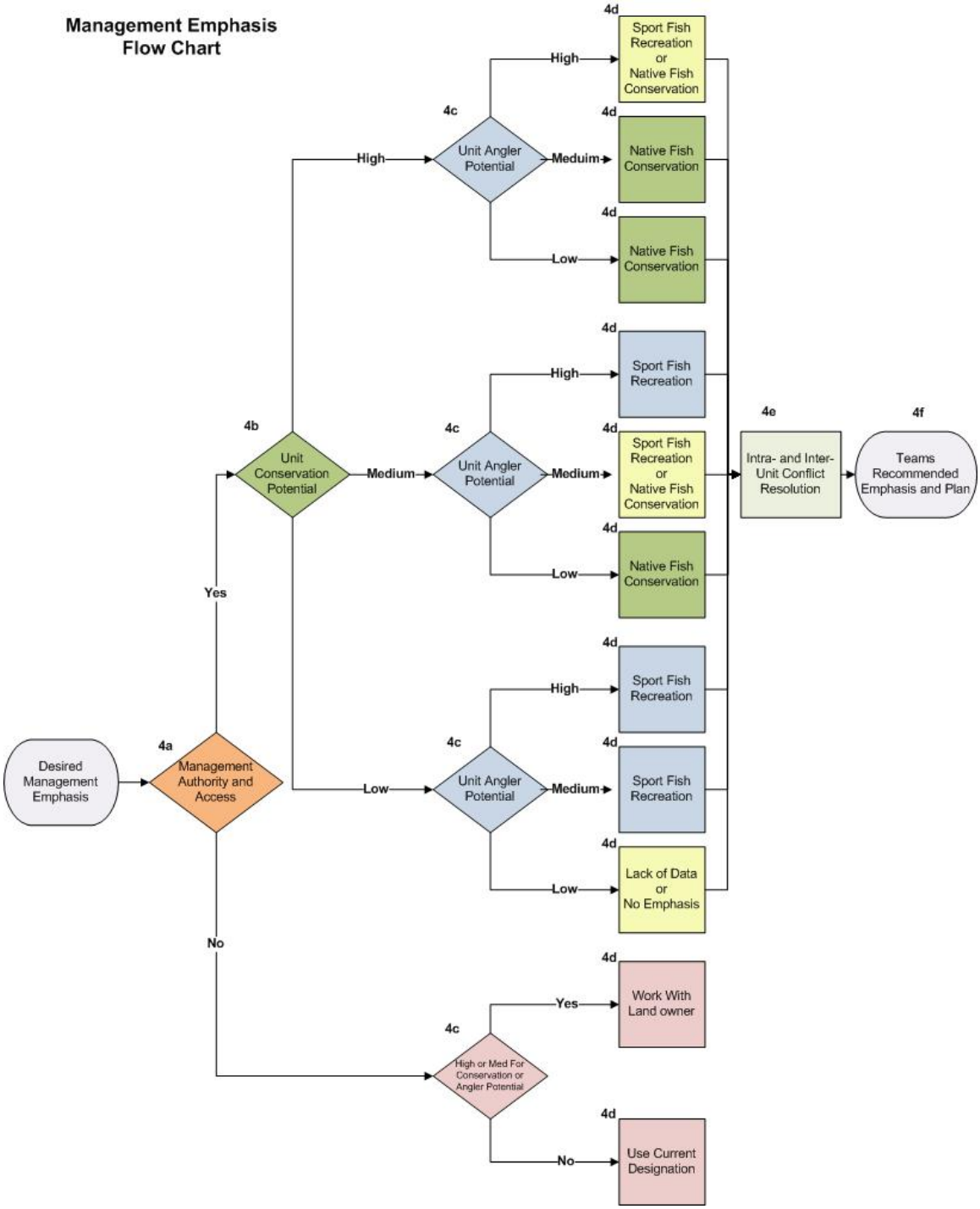
Appendix G

Decision Making Process - Desired Management Emphasis



Appendix H

Step 4 Details - Decision Making Process - Desired Management Emphasis



Appendix I

Unit Conservation Potential

To obtain Unit Conservation Score, use total score of 5 elements:
High = total score of 15 to 11 pts
Medium = total score of 10 to 6 pts
Low = total score of 5 to 0 pts

Conservation Element	Element Qualities	Points
Current Native Aquatic Species Composition	T/E/C/P, conservation agreement or critical habitat species present (see note below), excluding non-conservation stockings	3
	Non-listed native species without signed agreements; abundant and sustainable populations	2
	Non-listed native present but rare or non-sustainable or, non-conservation stocking	1
	No native aquatic species	0
Potential to Meet Existing Goals and Objectives	High (support recovery plans or signed conservation agreements and meet Department goals and objectives)	3
	Medium (meets goals in other Department signed plan or Department-supported stakeholder plan)	2
	Low (meet stakeholder's goals and objectives in planning documents, but are not indentified by the Department)	1
	No currently identified goals or objectives	0
NFCT Conservation Value (NFCT will develop a ranking scheme)	High	3
	Medium	2
	Low	1
	No potential	0
Potential to Alleviate Threats	High (secured from threats or threats can be mitigated)	3
	Medium (conservation actions still valuable in the presence of threat)	2
	Low (less feasible conservation actions in presence of threats)	1
	Irreversible threats or threats cannot be mitigated	0

Potential Level of Contribution	Secure a historic population at a wild site	3
	Reestablishing within historic range at a wild site	2
	Refuge population	1
	None	0

The Team defined "present" as collection records since 1980, unless more recent data shows otherwise. Some T/E/C/P species are managed for a primary purpose other than conservation (including, but not limited to: Apache trout stocked for recreation, Gila topminnow and desert pupfish stocked under a SHA for mosquito control).

Appendix J

Draft Management Emphasis Descriptor Tool:

MANAGEMENT UNIT EMPHASIS DESCRIPTOR - (DBASE or Excel)												
Management Unit	**Unit Conservation Potential**	**Unit Angler Potential**	**Primary Management Emphasis**	**Primary Desired Species**	**Primary Management Objecive**	**Stocking Approach**	**Management Needs**	**Secondary Management Empahsis**	**Secondary Desired Species**	**Secondary Management Objective**	**Management Priority**	**Georeference**
User inputs label Identifier	High	High	Sport Recreation	User inputs Species Codes	SF - blue ribbon	Intensively stocked	Habitat improvement -- Specify	Sport Recreation	User inputs Species Codes	SF - blue ribbon	High	User inputs UTMs of management unit
	Medium	Medium	Native Conservation		SF - basic yield	Opportunistically stocked	Suppression - Specific	Native Conservation		SF - basic yield	Medium	
	Low	Low	Undetermined		SF - Native	Stocked as needed	Renovation	Undetermined		SF - Native	Low	
			None		SF - ww self sustaining		Barrier construction	None		SF - ww self sustaining		
					NF - self sustaining		Survey inventory			NF - self sustaining		
					NF - refugia					NF - refugia		
					NF - Mgmt sustained					NF - Mgmt sustained		

Appendix K

Statewide Fisheries Management Team Cost				
Calculated on May 7, 2008				
Total Hours	Total Payroll	Travel Costs	Other Costs	Total Costs
1514.3 hrs	$39,914.89	$6772.78	$0	$46,687.67