

# ARKANSAS GAME AND FISH COMMISSION



## TROUT MANAGEMENT PLAN

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## Arkansas Trout Management Plan

Trout management in Arkansas consists of exploiting coldwater habitats to mitigate the loss of native warmwater fish species, and to create recreational angling opportunities. These coldwater habitats include tailwaters below some hydropower dams, deep reservoirs, spring-fed streams and lakes, and seasonal, wintertime coldwater. By taking advantage of these coldwater habitats, trout management has become very diverse, challenging, and has created a very popular world-class trout fishery in Arkansas. As a result, several world record catches have occurred in Arkansas. The current world record brown trout of 40 lbs, 4 oz from the Greers Ferry Tailwater, has stood since 1992.

Fishing, in general, is very important to Arkansas. In 2001, total expenditures by all anglers in Arkansas were estimated at \$445,778,000 (USFWS 2003). The trout fishery plays a major role in fishing popularity and economic importance. Eleven to 15 % of resident anglers fish for trout in Arkansas (USFWS 1996; Responsive Management 2000). Additionally, 43 to 52% of non-resident anglers fish for trout in Arkansas and overall trout angling makes up 17% of all angler days in Arkansas (Responsive Management 2000; USFWS 2001). According to a 1994 trout angler survey, trout fishing in Arkansas, at that time, generated over 133 million dollars in economic value (Rider 1994). While fishing license sales have slowed over the past several years, trout permit sales have generally continued to increase over time. In the fiscal year 2001-2002, 159,665 trout permits were sold.

The Arkansas Game and Fish Commission is responsible for the management of all fish and wildlife resources including the trout fishery. According to Willis and Murphy (1996) a “fishery” is defined as a system composed of three interacting components:

1. Habitat – the environment in which an organism lives.
2. Biota – the living organisms in an ecosystem, including the fish, plankton, aquatic insects, birds, and mammals.
3. Humans – the people that are both users of the fishery resource and competitors for the water.

Nowhere is the definition better exemplified than by the Arkansas trout fishery. The trout, their habitats, and the people that fish for trout and utilize the water for other purposes, are as diverse as any recreational fishery can be, and the fishery is ever changing. This diversity of fish, habitats, and people, make Arkansas trout management challenging and dynamic.

## **PURPOSE**

A plan must be put into place that sets the tone for the future management of this resource. The Arkansas Game and Fish Commission (AGFC) has not used long-term, strategic planning to manage trout and the purpose of this document is to produce such a plan. This plan identifies the key issues and concerns with trout fisheries in Arkansas and develops goals, objectives, and strategies to address these issues for the near and distant future. The audience and anticipated participants in this plan include all stakeholders in Arkansas' trout fisheries. This includes trout anglers, various governmental agencies, business owners, riparian landowners, special interest angling organizations, etc. The overall goal is to produce a plan that addresses the wise management of trout resources while taking into consideration all stakeholders in partnership.

Generally, this plan sets out to change and improve upon trout management in Arkansas in a number of ways including:

- Include the public stakeholders in the management process.
- Put equal emphasis on information from anglers, fish biology, and habitat.
- Reduce conflict among user groups.
- Improve organization of trout management efforts.
- Improve communication regarding trout management.
- Be more scientific and standardized with data collection.
- Improve trout fishing.

## **SCOPE**

This plan covers all bodies of water where trout are managed in Arkansas, all species of trout present in Arkansas, and all Arkansas Game and Fish Commission Fisheries programs and entities that are involved with managing trout. In addition, this plan will address the possible expansion of trout fishing opportunities in Arkansas.

Presently, five species of trout are present in Arkansas: rainbow trout, brown trout, cutthroat trout, brook trout, and lake trout. Trout management involving one or more of these species presently occurs in at least 16 different bodies of water in Arkansas, not including recent additions of seasonal trout fishing in the Urban Fishing Program, Community Fishing Program, and fishing derbies.

## **PLAN DEVELOPMENT**

Several other state trout management plans were reviewed as part of the creation of this plan. Many elements of these plans were similar but the format differed a great deal among the plans reviewed. This Arkansas plan follows the format used by the California Department of Fish and Game.

This plan is part of a strategic planning process that addresses high priority issues in a goal-objective-strategy format, but does not give specific detail about implementation. For example, if more data is needed to address a particular issue or problem, this plan might have an objective that says data will be gathered, but not give the details of how the study will be designed to gather the data. More specific design will come in a subsequent implementation plan.

This strategic planning process will be carried out in four phases over time, in a cyclic fashion.

1. Strategic Plan: Identifies issues, goals, objectives, and strategies for the overall trout management program.
2. Implementation Plan: Uses the ideas set forth in the strategic plan to develop specific management plans for each trout water, as needed, and to create the new elements of the program as approved.
3. Implementation: Begin management actions set forth in Implementation plan.
4. Monitoring / Evaluation: Evaluates success of implementation based on achievement of objectives. This is continuous throughout the planning process.

This plan is built on the premise of stakeholder participation and feedback. Input from stakeholders must be considered as part of the information needed to develop specific management plans in the Implementation Plan phase for any given trout water.

## CURRENT PROGRAM

### Trout Management Areas

Anglers were probably catching trout in the Spring River by the early 1900's that were stocked or escaped from a fish farm that was located at Mammoth Spring. By the 1930s, trout from the Mammoth Spring National Fish Hatchery were stocked in Spring River. During the 1940s through the mid 1960s most of the trout habitat in the state was created by impoundments constructed in the White River System. Undoubtedly some of the finest smallmouth bass, warmwater streams in the country were either destroyed or drastically affected by the coldwater environments created by these dams. However, the impoundments on the White River created coldwater habitat below Beaver Dam (1965), in the depths of Bull Shoals Lake, and below Bull Shoals Dam (1951). Norfolk Dam (1941) created coldwater in the last 5 miles of the North Fork of the White River, and Greers Ferry Dam (1964) changed much of the Little Red River into a trout fishery. Narrows Dam (1950) created trout fishing in the Lower Little Missouri River. On the Ouachita River, Blakely (1953), Rimmel (1924), and Carpenter (1932) dams resulted in the eventual seasonal stocking of Lakes Ouachita, Hamilton, and Catherine. Trout have also been stocked in Blanchard Springs Lake since the late 1940s.

For years, Arkansas Game and Fish Commission (AGFC) District Fisheries Biologists handled trout management on the local level. The first Trout Biologist was hired in 1985, which was the official beginning of the AGFC Trout Program as a statewide management program. Since then, the Trout Biologist has handled all trout management in the state.

**Table 1. Projected total number of trout stocked in each trout management area in Arkansas for 2004**

LOCATION	Brown Trout	Brook Trout	Cutthroat Trout	Rainbow Trout Total	Total Trout
Beaver TW	10,000	6,000	20,000	121,710	157,710
Bull Shoals TW	100,000	12,000	75,006	1,032,475	1,219,481
Norfolk TW	10,000	12,000	25,000	92,295	139,295
Greers Ferry TW		10,000	11,494	327,805	349,299
Narrows TW				76,615	76,615
Rimmel TW				12,300	12,300
Spring River	10,000		3,500	140,895	154,395
Upper Little MO				13,550	13,550
Blanchard Spring				17,460	17,460
Bull Shoals Lake				30,000	30,000
Lake Hamilton				34,620	34,620
Lake Catherine				38,610	38,610
<b>Total trout</b>	130,000	40,000	135,000	1,938,335	2,243,335

**Table 2. Other trout management areas in Arkansas.**

<b>LOCATION</b>	<b>SPECIES</b>	<b>MANAGEMENT STYLE (S)</b>	<b># STOCKED ANNUALLY</b>
Greers Ferry Reservoir	Lake trout	Wild trout ?	Not stocked
Spavinaw Creek (Benton County)	Rainbow trout Brown trout	Wild trout Put-and-grow	Not currently stocked
Dry Run Creek (Baxter County)	Rainbow trout Brown trout Brook trout Cutthroat trout	Wild trout	Not stocked
Collins Creek (Cleburne County)	Rainbow trout Brook trout	Wild trout	Not stocked
Withrow Spring State Park	Rainbow trout	Put-and-take	450
Urban / Community Fishing Program: Amons Lake Mountain Home	Rainbow trout	Put-and-take	1500
Rock Creek Boyle Park Little Rock	Rainbow trout	Put-and-take	6,000
Boyle Park Pond Little Rock	Rainbow trout	Put-and-take	3,600
Kiwanis/Holt Park Pond Little Rock	Rainbow trout	Put-and-take	1,000
MacArthur Park Pond Little Rock	Rainbow trout	Put-and-take	2,000
Otter Creek Park Pond Little Rock	Rainbow trout	Put-and-take	1,800
Lake Atalanta Rogers	Rainbow trout	Put-and-take	13,600
Cabot Community Pond Cabot	Rainbow trout	Put-and-take	2,400
Pine Bluff Regional Park Pond Pine Bluff	Rainbow trout	Put-and-take	1,000
Murphy Park Pond Springdale	Rainbow trout	Put-and-take	2,400

## Trout Management Programs

AGFC currently manages trout fisheries via one or more of the following programs or agency entities.

1. **Coldwater Hatcheries:** Trout production and distribution for Arkansas trout fisheries is provided by two federal trout hatcheries and four AGFC grow-out facilities. The Norfolk National Fish Hatchery (NFNFH) is located below Norfolk Dam and Greers Ferry National Fish Hatchery (GFNFH) is below Greers Ferry Dam. The NFNFH produces over 403,000 pounds of trout for distribution in public waters including: 382,000 pounds of eleven-inch rainbow trout (706,500 fish), 10,830 pounds of six-inch brown trout (130,000 fish), and 10,470 pounds of six-inch cutthroat trout (125,000 fish). The NFNFH stocks the Bull Shoals, Norfolk, Greers Ferry, and Beaver Tailwaters, plus the Spring River and Blanchard Spring. The GFNFH produces over 110,000 pounds of trout (rainbow and brook trout) for the Little Red River and the South Arkansas trout waters. This includes 107,390 pounds of eleven-inch rainbow trout (198,665 rainbows) and 3,500 pounds of six-inch brook trout (40,000 fish).

The Spring River State Fish Hatchery (SRSFH) current production is over 435,900 pounds of trout annually. The SRSFH is responsible for raising fish for distribution into the Bull Shoals and Greers Ferry Tailwaters, Spring River, Blanchard Spring, the South Arkansas trout waters and the urban seasonal trout ponds in Little Rock. The hatchery stocks over 786,000, 11-inch rainbow trout (425,000 pounds) and 60,000, 8" cutthroat trout (10,900 pounds) into Arkansas trout streams. Currently, the SRSFH is in the construction phase of an expansion that will increase fish production capability an additional 200,000 pounds.

The Pot Shoals Net Pens produce rainbow and cutthroat trout during the winter and spring months for distribution to the Bull Shoals, Norfolk, Beaver, and Greers Ferry Tailwaters, plus Bull Shoals Lake. Annual production at Pot Shoals is 131,600 pounds including 118,000 pounds of 11" rainbow trout (217,000 fish) and 13,600 pounds of 8" cutthroat trout (75,000 fish). The Norfolk NFH provides rainbow trout for growout at the Pot Shoals Net Pen Operation.

The Jim Collins Net Pens currently produce over 49,000 pounds (91,300 fish) of 11" rainbow trout, in cooperation with the Greers Ferry National Fish Hatchery, for distribution in the winter and spring months to the South Arkansas trout waters which include: the Narrows Tailwater, Lake Catherine below Carpenter Dam, Lake Hamilton below Blakely Dam, Albert Pike Recreation Area, Rempel Dam Tailwater and the Upper Little Missouri River.

The Lake Wilhelmina Caged Net Pen Operation cultures 11-inch rainbow trout (28,000 pounds/51,400 fish). These trout are distributed among the South Arkansas trout waters. The Greers Ferry NFH and the Spring River SFH provide fish for growout at the Lake Wilhelmina Cages.

The Coldwater Coordinator in the Fisheries Division handles all trout production and coordination. The Coldwater Coordinator reports to the Chief of Fisheries.

2. **Trout Management Program:** This program is responsible for oversight, coordination, planning, and conducting all trout management in Arkansas, including monitoring and research. The Trout Biologist, who reports to the Fisheries Division Coldwater Coordinator, supervises the program. Additional program personnel currently include two Assistant Trout Biologists, a Creel Technician, a Stocking Raft Technician, and a temporary, part-time bio-technician.
3. **Fisheries Management Section:** The Fisheries Management Section of the Fisheries Division plays a vital role in trout management. District Fisheries Biologists are housed in this section and they report to the Assistant Chief of Fisheries Management. The District Biologists handle all fisheries management in public waters in their respective counties. They assist the Trout Biologists with trout management and handle much of the fieldwork for trout management by following trout program protocol.
4. **Aquatic Habitat Program:** This is a new program created specifically to rehabilitate physical habitat in trout waters, and it focuses on the upper White River System tailwaters. This program stabilizes eroding streambanks and creates fish cover habitat in the stream channel. The Aquatic Habitat Coordinator who reports to the Coldwater Coordinator supervises the program. Program personnel also include a technician, who operates the heavy equipment (excavators, loaders, etc). Much of the work is also done with contractors and partnership funding with Army Corps of Engineers.
5. **Minimum Flow:** Although not an official program, this area of effort has taken on an individual status. The effort is to acquire adequate flow from upper White River System dams during periods of non-generation. This effort requires a great deal of coordination, communication, and political involvement. The Assistant Chief of Fisheries Management supervises this program.
6. **Urban Fishing Program:** This is a new Fisheries Division Program created to enhance fishing opportunities for cities in Arkansas, and to recruit new anglers. As part of this effort, trout were stocked in three Little Rock city park ponds and one creek during the winter of 2002-2003 with much success. Trout stocking in this program will likely increase with time as this program expands around the state. Currently, trout in this program are managed under put-and-take techniques and regulated with a 3 trout per day creel limit. Trout are stocked from November through March. The Urban Fishing Biologist who reports to the Chief of Fisheries supervises this program.

7. **Aquatic Education Program:** This is a program geared toward angling education and recruiting new anglers. One component of this program sponsors fishing derbies for youths. Trout are beginning to be used during cool / cold weather months for fishing derbies. This program also has four mobile aquariums that are on display events around the state year-round. Trout are sometimes displayed for these events. The Aquatic Education Program Coordinator who reports to the Chief of Fisheries supervises this program.
8. **Enforcement:** The Enforcement Division of AGFC handles all enforcement of trout fishing regulations and boating law on Arkansas trout waters. Enforcement officers use uniformed officer patrols, undercover officer patrols, and covert operations to enforce regulations. Currently, no enforcement officers are dedicated solely to trout water enforcement, but rather, enforcement officers are assigned to a specific county and they handle all fish and wildlife enforcement in that county which may include trout waters. Enforcement personnel also meet with groups when invited to discuss trout regulation enforcement. All county enforcement officers answer to their respective regional supervisors who answer to the Chief of Enforcement.
9. **Access Area Construction and Maintenance:** At least 47 official access areas currently exist on trout waters in Arkansas and most are maintained or co-maintained by AGFC. New areas are being added all the time, and maintenance and improvement on existing access areas is constant. Currently, all construction and maintenance of access areas, signs, etc., is handled by the Regional Area Maintenance Coordinators. These coordinators work in the Operational Services Division and report to the Chief of Construction, Engineering and Real Estate.

## **Fisheries Management Techniques**

Generally, trout management in Arkansas falls into one of the following management techniques:

- 1. Put-and-Take Fisheries:** In Arkansas, this technique is used to create trout fisheries where natural reproduction is non-existent or inadequate to sustain the fishery, where trout can only survive seasonally, and where trout can survive but not grow. Put-and-take fisheries rely on hatchery production and stocking of catchable size rainbow trout (*Oncorhynchus mykiss*) only. As of 2002, all catchable rainbow trout average 11 inches in length at the time of stocking. Catchable trout in put-and-take fisheries are meant to be highly exploited by anglers, and therefore, numbers stocked should be only enough to support good catch rates and maximize harvest efficiency. Only creel limits are used to regulate put-and-take fisheries. Currently, the statewide creel limit is 5 trout per day. The vast majority of Arkansas trout fishing is managed using this put-and-take approach.
- 2. Put-and-Grow Fisheries:** In Arkansas, this technique is used to create larger, quality sized trout in waters that are suitable for trout growth and survival, but where reproduction is limited or non-existent. Trout for put-and-grow management are stocked as fingerlings at an average size of 6 inches, and protected by minimum length limits. Three species of trout are currently used in the management technique; brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), and cutthroat trout (*Oncorhynchus clarki*). Brown trout and cutthroat trout are protected under a 16-inch minimum length limit statewide. Brook trout are protected by a 14-inch minimum length limit statewide. This management technique is used wherever these three species are stocked in Arkansas.

Another form of put-and-grow management began in the mid-1990's in Arkansas. Catch-and-Release Areas (originally called "Trophy Areas") were created on each of the White River System tailwaters. These areas were specifically created with the goal of creating quality size (16-inch) rainbow trout, which are otherwise managed only under put-and-take conditions. These areas are generally one mile or less in length and only single barbless hook, artificial lures are allowed. One such area exists on the Beaver Tailwater and the Norfolk Tailwater, two on the Greers Ferry Tailwater, and four on the Bull Shoals Tailwater.

Three wadeable streams also are currently managed under a catch-and-release regulation, Dry Run Creek, Collins Creek and Spavinaw Creek. Dry Run Creek and Collins Creek rely on coldwater associated with hatchery water supply, or effluent. Both are regulated to promote youth fishing and Dry Run Creek is also open to mobility impaired licensed anglers.

- 3. Wild Trout (self-sustaining) Fisheries:** Under current management, wild reproduction occurs in some trout waters in Arkansas with varying degrees of success. Wild reproduction can be limited by several factors in Arkansas including flow regime, water temperature, water quality, habitat, domesticated hatchery strains of trout, and conflicting management techniques.

Wild trout management is often mixed with put-and-grow trout management, and no formal wild trout management program exists. Regulations used for wild trout management in Arkansas include catch-and-release, seasonal catch-and-release, and spawning area seasonal fishing closures. Catch-and-release regulations specifically geared toward protecting wild trout are currently in use in upper Spavinaw Creek and Collins Creek. Seasonal catch-and-release regulations for protecting large, spawning trout are being used in upper Bull Shoals Tailwater and at Cow Shoals on the Greers Ferry Tailwater. Seasonal fishing closure areas are also used to protect large, spawning trout at Bull Shoals Dam, and at night during the spawning season at Cow Shoals on the Greers Ferry Tailwater.

Most wild trout production in Arkansas exists in brown trout populations in the White River System tailwaters. The Greers Ferry Tailwater harbors the only totally wild brown trout population. In this tailwater, brown trout reproduction is so high that this population is being regulated with a 16 to 21 inch slot limit in an attempt to decrease numbers of young brown trout in the stream.

Substantial brown trout reproduction also occurs in the upper Bull Shoals Tailwater and a wild population exists in the upper reaches. Because brown trout reproduction is limited in the lower reaches of the Bull Shoals Tailwater, this population is supplemented with annual brown trout fingerling stocking downstream of Wildcat Shoals.

Until recently, the only documented wild rainbow trout population in Arkansas was in upper Spavinaw Creek, a privately owned spring creek in Benton County. This population is currently protected under catch-and-release only regulations though no formal agreement exists with the landowners for angler access. Wild rainbow trout have been increasing in recent years in the Norfork and upper Bull Shoals Tailwaters Catch-and-Release Areas. These rainbows seem to be produced in the catch and release areas, where they are protected from harvest, during low-water years when water quality is best, and flow is more stable in these tailwaters.

A new wild trout fishery was created in 2002. Collins Creek, a tributary to Greers Ferry Tailwater was changed into a coldwater stream by piping water to it from the hatchery water supply pipe at the base of Greers Ferry Dam. The stream was immediately inhabited by young-of-the-year rainbow and brook trout. This is the first and only documented wild brook trout population in Arkansas.

A wild population of lake trout (*Salvelinus namaycush*) may exist in Greers Ferry Reservoir. This species was stocked in the reservoir in the 1980's. Since then no stocking has occurred but anglers occasionally catch lake trout of all sizes. No population data or formal management exists for this fishery.

## **OVERALL TROUT MANAGEMENT PROGRAM GOALS AND OBJECTIVES**

### **MISSION STATEMENT:**

**Provide a quality trout fishery through science-based management, stocking, habitat renovation, and partnerships with public stakeholders.**

### ***GOAL #1 Manage Arkansas trout fisheries for all stakeholders.***

**Objective 1.1** Foster a positive relationship with all stakeholders through communication, education, and cooperation.

**Objective 1.2** Seek and utilize partnership funding for trout management.

**Objective 1.3** Expand trout fishing opportunities to more people and more areas of Arkansas.

**Objective 1.4** Provide public access to Arkansas trout fisheries.

### ***GOAL #2 Gather scientific information to manage Arkansas trout fisheries.***

**Objective 2.1** Standardize biological monitoring for trout waters, focusing on species composition, relative abundance, reproduction, recruitment, growth, survival, and exploitation.

**Objective 2.2** Gather data from trout anglers regarding angler characteristics, specialization, satisfaction, desires, demographics, and associated economics.

**Objective 2.3** Conduct creel surveys on trout waters that measure angler pressure, success, catch rates, harvest rates, and relate to angler satisfaction.

**Objective 2.4** Procure funding and / or personnel for conducting surveys.

**Objective 2.5** Create a central Geographical Information System (GIS) database that links data from all monitoring to trout waters.

**Objective 2.6** Increase priorities for conducting academic research and create a plan for annual funding for research on trout waters.

**Objective 2.7** Use scientific survey techniques to gather information as needed from other stakeholders such as business owners, and landowners.

***GOAL #3 Renovate and protect flow, water quality, and physical habitat to provide optimum conditions for trout survival, growth, and reproduction.***

**Objective 3.1** Acquire and wisely use adequate minimum flow reallocation from White River System reservoirs.

**Objective 3.2** Improve and maintain water quality to meet Arkansas state standards in “trout waters”.

**Objective 3.3** Improve scientific approach to physical habitat renovation.

**Objective 3.4** Work with stakeholders to protect streambanks and riparian areas on trout streams.

***GOAL #4 Manage each trout water individually.***

**Objective 4.1** Create individual, specific management plans for each trout water.

**Objective 4.2** Redesign the trout regulation process using the specific trout water management plan format.

**Objective 4.3** Develop specific management plans to establish goals, strategies, and priorities for put-and-take, put-and-grow, and wild trout management for each trout water.

**Objective 4.4** Produce and stock adequate numbers, sizes, and strains of trout to meet management goals in management plans.

**Objective 4.5** Manage for a wild trout fishery where possible as identified in management plans.

**Objective 4.6** Manage for trout species diversity where possible based on management plans.

## JUSTIFICATION AND STRATEGIES FOR GOALS AND OBJECTIVES

### *GOAL #1 Manage Arkansas trout fisheries for all stakeholders.*

#### **Objective 1.1 Foster a positive relationship with all stakeholders through communication, education, and cooperation.**

AGFC trout management actions are often not understood or are simply not known by the stakeholders. What information is exchanged among the stakeholders is often wrong or exaggerated and in the form of a rumor. Sometimes these rumors go so far as to thwart or alter AGFC management activities and therefore can have a tremendous impact on personnel and efficiency. These problems mainly are due to a lack of communication with stakeholders on the part of AGFC. AGFC must make greater effort to inform and educate the stakeholders about trout management activities. Interested stakeholders should be able to find information easily and trust the information is accurate.

Some stakeholders complain we have too many complicated trout fishing regulations. They feel AGFC should simplify regulations and provide more education regarding regulations and enforcement of regulations. AGFC should thoroughly evaluate current regulations for effectiveness and need. Unnecessary regulations should be eliminated and remaining regulation code should be simplified as much as possible without compromising management goals.

“MORE ENFORCEMENT” is a constant complaint we hear from anglers and other stakeholders. Yet many recent problems have involved regulations and enforcement of regulations, especially involving outfitters and guides. Again, more communication, education, and cooperation should be exerted to help foster a positive relationship with all stakeholders, including outfitters and guides. AGFC should initiate actions that accomplish this while increasing enforcement of trout regulations. Given this effort of increased communication, education, cooperation, and regulation review, enforcement should be conducted with low tolerance.

Tourism associated with trout fishing is economically important to Arkansas. Efforts should continue to promote and market trout fishing to both Arkansas resident, and non-resident anglers. Non-resident anglers should also be educated about trout management, enforcement etc.

#### **Strategy 1.1.1**

#### **Create a new trout fishing guide orientation workshop that is required of any trout guide license buyer.**

Guides will be required to attend this workshop annually to validate a guide license and guide license fees will increase to accommodate costs of the course. This workshop will be structured to simply provide an annual forum for direct communication among guides, outfitters, and AGFC fisheries managers and

enforcement personnel. The workshop will focus on, but not be limited to, the following:

- Trout management and regulations.
- Regulation enforcement.
- Boating safety.
- Other ? – CPR, First-Aid, etc.

### **Strategy 1.1.2**

#### **Create new River Ranger positions and their associated outreach and education program.**

This strategy represents the ultimate solution to the problems involving enforcement, communication, and education. These River Rangers will be a high profile, constant fisheries presence and will focus on education, creel census and enforcement.

River Rangers will be recruited from the local area; trained in AGFC trout management, boating safety, CPR, and obtain certified expert witness training. They will give guidance on boating safety, angling techniques, river conditions, and will also conduct trout angling education workshops weekly at locations accessible to trout anglers such as Corps of Engineers (COE) parks on tailwaters, Bull Shoals Lake and Bull Shoals-White River State Park, etc. Workshops will cover trout angling techniques, boating safety, fishing regulations, etc.

These positions will also be used to conduct the angler and/or creel surveys discussed in Objectives 2.2 and 2.3 in this plan. Existing personnel will have their job duties expanded, when possible, to cover River Ranger and survey needs.

The number of part-time employees for these positions will be determined by the availability of extra labor funds to the Fisheries Division. It is recommended sufficient extra labor funding be available in the trout program to hire a river ranger for the major trout waters in the state.

River Ranger duties will be outlined and addressed in more detail in the specific tailwater plans.

### **Strategy 1.1.3**

#### **Work with partners to promote the Arkansas trout fishery to non-resident anglers and tourists.**

#### **Strategy 1.1.4**

##### **Distribute Trout Management Program newsletter quarterly to directly share information with stakeholders.**

Use this newsletter as a forum to directly share information with stakeholders on the mailing list. Expand the list to include anyone interested. Use e-mail as much as possible. Provide newsletter to individuals on mailing lists.

#### **Strategy 1.1.5**

##### **Develop an Internet web page for the Trout Management Program.**

Use this as a main forum for relaying information. Post all reports, newsletters, pictures, etc.

#### **Strategy 1.1.6**

##### **Continue to use local newspapers and outdoor writers to periodically update citizens on trout management activities.**

Look into addressing hot-topics, rumors, etc. by writing popular articles and articles for local newspapers and Arkansas Outdoors. Perhaps develop a monthly or quarterly column in local papers.

#### **Strategy 1.1.7**

##### **Continue to coordinate with Aquatic Education Program to use mobile aquariums for trout demonstration purposes.**

Develop an easy system to hold and handle display trout for the mobile aquariums, and increase the use of mobile aquariums for trout related activities. Perhaps create a refrigerated mobile aquarium for Trout Management Program use specifically.

#### **Strategy 1.1.8**

##### **Develop annual standard schedule for meeting with all interested angling groups to present Trout Management Program recent activities.**

Trout Management Program personnel periodically meet with interested groups as invited. Many of these groups are met with at least once per year, and some are not. The same information needs to be shared with all groups on a regular schedule.

**Strategy 1.1.9**

**Organize and re-write existing trout fishing regulations code to be easier to understand for both enforcement officers and anglers.**

Currently, at least seventeen different trout regulations apply to trout waters, or areas where trout are stocked. Some of these regulations overlap, some are confusing, and they are scattered around and mixed with other sport-fish regulations.

**Strategy 1.1.10**

**Continue to produce the Trout Fishing Guidebook each year.**

**Strategy 1.1.11**

**Standardize trout regulation signs at public accesses to allow for changing trout regulations.**

Currently, signs at different places in the state are not standardized and are inconsistent with respect to format, verbiage, and who is responsible for maintenance and updating. Consequently, signs exist with out-of-date regulations and some are in disrepair.

**Objective 1.2 Seek and utilize partnership funding for trout management.**

All aspects of modern fisheries management are expensive. Even though trout management is supported in Arkansas by sales of trout permits, funds are often the main limiting factor to getting work done. Any opportunity to increase funding for trout management should be welcomed and taken advantage of.

**Strategy 1.2.1**

**Accept / solicit any donations available of funds or manpower.**

Occasionally, groups concerned with trout management offer to donate manpower or funds to help with projects. This should be accepted and appreciated and those groups recognized. Trout managers should look for every opportunity to work with donating groups.

**Strategy 1.2.2**

**Acquire grant funding for trout management related projects.**

Work with any partners to acquire grant funding for trout management related projects.

### **Strategy 1.2.3**

#### **Continue to partner with other agencies using cost-share programs.**

AGFC has accomplished a great deal of trout related work with cost-share partnerships offered by other agencies such as ACOE. In recent history, ACOE cost-share partnerships have been used to renovate physical trout habitat in tailwaters, and to create Collins Creek.

### **Objective 1.3 Expand trout fishing opportunities to more people and more areas of Arkansas.**

AGFC Fisheries Division has focused a great deal of effort toward recruiting new anglers in an effort to reverse the trend of declining license sales. However, though fishing license sales have declined in recent years, trout permit sales generally continue to increase. This indicates that trout fishing remains popular and therefore can be used as an avenue to increase fishing license sales and to recruit new anglers.

Economically, trout fishing generates a great deal of money in local and state economies. Although economics are not mentioned in the AGFC agency mission statement, expanding trout fishing opportunities in Arkansas will help local economies.

AGFC has just started using trout in new programs such as the Urban / Community Fishing Program and Aquatic Education Program fishing derbies. AGFC needs to continue to expand the use of trout in these programs as well as expanding trout fishing in general to provide more opportunities to anglers, recruit anglers, and help the state and local economies.

### **Strategy 1.3.1**

#### **Promote the Urban Fishing Program and work with interested stakeholders to expand seasonal trout fishing opportunities in urban areas in Arkansas such as Little Rock, Conway, Fort Smith, Northwest Arkansas, Jonesboro, Texarkana, Pine Bluff, etc.**

### **Strategy 1.3.2**

#### **Work with small towns to create seasonal trout fishing in their communities such as ponds and streams in parks or in town. Example – Amon’s Lake in Mountain Home Soccer Park.**

### **Strategy 1.3.3**

#### **Identify public access streams for seasonal trout stocking.**

### **Strategy 1.3.4**

#### **Identify public access spring-creeks suitable for managing year-round trout fisheries.**

### **Strategy 1.3.5**

#### **Create protocols and incentives for working with private landowners to allow for seasonal and year-round trout management for public fishing on private streams.**

Spavinaw Creek is the flagship for this objective. A trout management plan exists for Spavinaw Creek, but it contains no system for working with private landowners to allow public fishing. As human populations expand, and trout permit sales continue to increase, the need for more fishing opportunities will become more pressing. Private water is the main source of “new” water to expand fishing opportunities. AGFC needs to work with partners to provide incentives (money and assistance) to landowners in exchange for easements, leases, and fishing rights.

### **Strategy 1.3.6**

#### **Purchase land for the purpose of expanding public trout angling in partnership with Wildlife Management Area (WMA) expansion or expansion of Watchable Wildlife programs, etc.**

Justification for buying land to gain control of spring creeks or streams for fishing is perhaps difficult. However, if large enough tracts of land are available, coupling expanded fishing opportunities with other resource uses would be a positive, efficient way for AGFC to serve the people of Arkansas, especially in counties where AGFC efforts have been low. Small tracts with creeks could be managed for fishing along with small game hunting (rabbits, quail, etc.), bow hunting, permit hunting, or watchable wildlife in the form of a trail along the creek. Again, Spavinaw Creek in Benton County provides an example for this new approach to management.

### **Strategy 1.3.7**

#### **Use surplus trout production to supply trout to the fisheries mentioned above as needed.**

Surplus trout will be any trout production above required allocation to present trout waters. Trout stocking allocations will not be cut from any existing trout water for the purpose of stocking a new, expanded fishery. If stocking demands exceed production capabilities, expansion will be curtailed until opportunities are identified to expand production.

### **Strategy 1.3.8**

#### **Maintain native populations in stream fisheries.**

Trout are exotics and will not be introduced to a stream where a native population of organisms might experience severe negative impacts. Protocols will be developed with non-game biologists to properly evaluate potential impacts to existing populations in a stream being considered for trout management.

## **Objective 1.4 Provide public access to Arkansas trout fisheries.**

Angler access has always been a priority with AGFC. Anglers have a great deal of access to most of the state trout fisheries, yet more is needed. All of the tailwater trout fisheries experience high fishing pressure and crowded conditions often exist at public access sites. Many of the existing access sites were made possible through land and monetary donations from partnering stakeholders such as landowners, fishing clubs, conservation organizations, etc. Over time, more land is being bought and developed along trout fisheries and therefore, old, traditional access areas are being closed by new landowners. Opportunities to acquire more access will likely become more difficult with time.

### **Strategy 1.4.1**

#### **Maintain existing angler access to trout fisheries.**

At least 47 access sites exist on the major trout fisheries and most are owned and / or maintained by AGFC. Maintenance and improvements to these sites require a great deal of funding annually. Complaints have been received in the past few years about various problems with dis-repair at many of the AGFC sites. Adequate funding should be set aside annually to maintain existing sites.

### **Strategy 1.4.2**

#### **Identify access needs for trout waters in trout management plans.**

Objective 4.1 of this plan proposes a management plan be developed for each trout water in Arkansas. These plans should identify access needs in relation to trout management for that body of water such as locations and type of access needed – bank fishing, boat launching, walk-in, etc. Plans should also identify improvements and repairs needed for existing sites.

### **Strategy 1.4.3**

#### **Acquire more public access to trout fisheries as needed.**

Any opportunity to acquire public access to trout fisheries should be taken advantage of especially in areas lacking adequate access. Use AGFC funds and any other funds possible such as grants or cost-share programs with other agencies and organizations. Accept donations of land if acquisition is beneficial to anglers. Look for existing public land where more access could be developed.

***GOAL #2 Gather scientific information to manage Arkansas trout fisheries.***

**Objective 2.1 Standardize biological monitoring for trout waters, focusing on species composition, relative abundance, reproduction, recruitment, growth, survival, and exploitation.**

AGFC has always used some form of fish population sampling to gather data needed to properly manage the trout fisheries. However, fisheries sampling has never been standardized and each trout biologist has used somewhat different approaches to gathering population data. Methods must be standardized to examine spatial and temporal changes in the fishery.

Electrofishing (EF) is the only effective method for sampling trout in Arkansas' trout streams. Trout biologists have recently upgraded all EF equipment and set sampling protocols in an effort to be safe, efficient, and minimize trout injury.

**Strategy 2.1.1**

**Create standard sampling locations and methods for each tailwater fishery for generating species composition, relative abundance, and size structure.**

**Strategy 2.1.2**

**Continue to use special tagging studies to evaluate growth, survival, and exploitation.**

**Strategy 2.1.3**

**Develop protocols for evaluating reproductive success.**

**Objective 2.2 Gather data from trout anglers regarding angler characteristics, specialization, satisfaction, desires, demographics, and associated economics.**

AGFC will place new priority on gathering as much angler information as biological information. A standardized, chronological plan will be created to gather this information.

**Strategy 2.2.1**

**Create a standard phone or mail-out survey protocol for gathering general information from Arkansas trout permit holders.**

Trout permit buyers will be surveyed by a random sample design to gather information about who they are, where they go, what types of anglers they are, and associated economics. This survey will be standardized and repeated at least once every five years to track trends in anglers.

### **Strategy 2.2.2**

#### **Create a standardized plan to conduct on-water angler surveys to gather tailwater specific angler information about specific management issues.**

Anglers will be interviewed on-water during their fishing trips to get specific information about management issues such as put-and-take vs. put-and-grow management and associated regulations, stocking, habitat issues, etc.

### **Objective 2.3 Conduct creel surveys on trout waters that measure angler pressure, success, catch rates, harvest rates, and relate to angler satisfaction.**

Creel survey data is essential for put-and-take and put-and-grow trout management. Angling pressure, harvest, and catch rates are essential for setting stocking rates, evaluating regulations, and multi-species management.

### **Strategy 2.3.1**

#### **Standardize trout creel surveys and add angler satisfaction questions.**

AGFC has done a good job historically with creel survey design and surveys are somewhat standardized now. The format and analysis needs to be further standardized and specialized for the tailwater fisheries. Angler satisfaction needs to be incorporated to develop what is an acceptable catch rate for anglers. This will help in adjusting stocking rates without overstocking.

### **Strategy 2.3.2**

#### **Establish a rotation schedule to survey each trout water in sequence with individual trout water management plans.**

Currently, creel surveys are initiated somewhat as needed. A standard rotating system should be developed where each trout water is surveyed every five years or so. This rotation should coincide with biological studies and development of specific tailwater management plans. This standard rotating schedule will also help with budget planning.

### **Objective 2.4 Procure funding and/or personnel for conducting surveys.**

Additional survey work will require additional funding and personnel. This could be accomplished by combining existing and proposed positions. Some additional funding will be needed regardless, but the need can be decreased by efficiently using personnel.

**Strategy 2.4.1**  
**Expand duties of existing technicians.**

Currently, a creel survey technician and a stocking raft technician are dedicated to the White and Norfolk Tailwaters full time. Perhaps these positions could be promoted and expanded to cover additional survey needs and proposed River Ranger (Strategy 1.1.2) duties also. This would benefit current employees and decrease the need to hire new positions.

**Strategy 2.4.2**  
**Combine survey personnel needs with proposed River Ranger positions in Strategy 1.1.2.**

Strategy 1.1.2 of this plan proposes new positions called River Rangers that will be a constant presence on each tailwater fishery. These positions could also cover survey needs; and therefore, offset costs of hiring temporary labor currently used to conduct surveys.

**Objective 2.5 Create a central Geographical Information System (GIS) database that links data from all monitoring to trout waters.**

GIS may provide the means to help biologists link all databases together. If this can be accomplished, scientific analysis and reporting can be made more consistent across personnel and time. This will foster better communication within staff and with stakeholders.

**Objective 2.6 Increase priorities for conducting academic research and create a plan for annual funding for research on trout waters.**

Trout biologists have experienced great difficulty in acquiring approval and funding for special academic research projects, which are sorely needed. AGFC must make this a priority if the trout fishery is to be properly managed. A certain amount of money should be allotted annually to guarantee at least a minimum amount of research be conducted. Currently, research is needed on all trout tailwaters regarding trout diet and energetics, movement and mortality related to special regulation areas, trout age and growth analysis, wild trout limiting factors, etc.

**Strategy 2.6.1**  
**Create a prioritized list of research needs.**

**Strategy 2.6.2**  
**\$100,000 per year minimum should be added to the Trout Management Program budget for academic research.**

**Objective 2.7 Use scientific survey techniques to gather information as needed from other stakeholders such as business owners, and landowners.**

A great deal of the conflict in trout management occurs when other stakeholders besides anglers are affected. These resource users often have important opinions and sometimes resort to political means to combat AGFC efforts. Again, little effort is expended to educate and work with these stakeholders to achieve management goals. These users usually are not included in any surveys that have traditionally been geared toward anglers only. Scientific surveys should also be employed to capture the desires from these groups of stakeholders.

***GOAL #3 Renovate and protect flow, water quality, and physical habitat to provide optimum conditions for trout survival, growth, and reproduction.***

Trout are not native to Arkansas and their habitat requirements limit their distribution. AGFC must continue to maintain existing trout habitat since new trout habitat will be difficult to create or acquire. U.S. Army Corps of Engineers (ACOE) dams created most of Arkansas' existing trout habitat. Those same dams and their operation have continued to degrade water quality, thermal habitat, and physical habitat. This habitat degradation has had negative impacts on both reservoir and tailwaters fisheries. Flow regimes from these dams are often not conducive to healthy trout populations, or angling. Other habitat impacts to all trout waters in Arkansas include development and alteration of streambanks, land-use in watersheds, and water removal.

**Objective 3.1 Acquire and wisely use adequate minimum flow reallocation from White River System reservoirs.**

Using information collected from Goal #2, wisely manage reallocated water for downstream temperature stability; inundating more area for increased trout habitat, forage production, spawning, and fishing boat navigation.

**Strategy 3.1.1**

**Monitor tailwater flows and relate to water temperature, biological, habitat, and angler monitoring.**

If AGFC acquires reservoir water re-allocation for adequate minimum flow in the White River System tailwaters, the fishery must be monitored to effectively use allotted water in any given year. The monitoring required to effectively utilize re-allocated reservoir water should link other monitoring from other objectives to flow rates. Also, little is understood about how differing flow regimes affect the trout biology and habitat.

**Strategy 3.1.2**

**Acquire funding to complete the computer model of temperature and flow in Bull Shoals and Norfolk Tailwaters.**

**Objective 3.2. Improve and maintain water quality to meet state standards in "trout waters".**

Degraded reservoir water quality has created severe problems to both reservoir fisheries and the downstream tailwater trout fisheries below many dams in Arkansas, especially Bull Shoals and Norfolk. For over ten years, AGFC has been working with partners ACOE and Southwestern Power Administration (SWPA) to get all tailwaters up to state water quality standards. Poor water quality is probably the single most critical limiting

habitat factor to our trout fisheries. Poor water quality, especially low dissolved oxygen, inhibits growth, condition, health, and reproduction in trout. Extreme conditions in some years cause trout mortality. Improving water quality is critical to the continued success of Arkansas' trout fisheries.

### **Strategy 3.2.1**

#### **Develop common monitoring system and database for water quality data from trout waters.**

Work with partners to develop a common water quality monitoring system and database to share all information from sources such as Arkansas Department of Environmental Quality (ADEQ) and U.S. Geological Survey (USGS).

### **Strategy 3.2.2**

#### **Work with White River Dissolved Oxygen Committee Partners to improve water quality to meet state standards.**

Technologies have already been identified that can drastically improve water quality and in some cases, also provide adequate minimum flow. Agreements must be reached among committee partners and funding must be acquired to install technologies that will improve water quality.

### **Strategy 3.2.3**

#### **Document and research impacts to fishery from poor water quality.**

Continue to work with Fisheries Division Fish Pathologist to use "Fish Health Assessment" protocol to quantify trout health below Bull Shoals and Norfolk Dams. This protocol has documented diminished trout health during summer and fall periods of low dissolved oxygen releases from these dams.

Also, trout are not stocked when dissolved oxygen falls below 6 ppm in these tailwaters. In some years, trout are not stocked for months at a time which can have a negative impact to put-and-take trout fishing. Continue to document impacts to stocking.

## **Objective 3.3 Improve scientific approach to physical habitat renovation.**

Physical habitat in the streambed and along stream banks has degraded over time in many tailwater fisheries. AGFC Fisheries Division successfully renovated habitat in the Beaver Tailwater during the 1990's after flood releases from Beaver Dam scoured the tailwater early in the decade. Since then AGFC has become more active in physical habitat renovation in the Bull Shoals Tailwater and other tailwaters. In 2002, the Arkansas Game and Fish Commission voted to approve a \$3 increase in the price of a non-resident trout permit and the additional money generated was specifically designated for physical

habitat improvement on trout tailwaters. No actions were taken to require any habitat evaluation or planning.

A habitat inventory should be conducted that scientifically quantifies habitat variables throughout each tailwater. Further habitat renovation should be based on needs demonstrated with habitat inventory and fish population monitoring. When an area is selected for habitat renovation, a plan should be developed with management goals and protocols for evaluation.

### **Strategy 3.3.1**

#### **Inventory habitat using a fisheries standardized system that includes geomorphologic survey techniques.**

Little physical habitat information exists that quantifies physical habitat in the tailwater fisheries. A physical habitat inventory and evaluation should be conducted for each tailwater and a GIS database created from the information. Inventory should identify stream and soil geology and quantify substrate types such as gravel, cobble, bedrock, sand, etc. Streambank data should quantify bank angles, vegetation coverage and types, exposed soil, etc.

Physical habitat inventory should also measure stream geomorphology such as channel meander, slope, cross-sectional area, habitat types, etc.

### **Strategy 3.3.2**

#### **Contract with expert in river geomorphology to create a physical habitat renovation plan based on needs demonstrated in physical habitat inventory and fisheries data.**

Tailwater reaches in need of renovation could be identified from the information gathered by Strategy 3.3.1, using scientific methods. Based on these needs a renovation plan should be developed for each given tailwater by an expert in the field, through contract. Once a habitat renovation plan is developed it will be incorporated into specific tailwater management plans for public input.

### **Strategy 3.3.3**

#### **Designate funding for the development of habitat plans from the \$3 increase in non-resident trout permit sales.**

### **Strategy 3.3.4**

#### **Renovate physical habitat in areas identified in the physical habitat improvement plan.**

Currently, at least five projects are slated for habitat renovation on tailwaters and one other project is in progress. No further projects should be added without the above process. Once an area has been scientifically identified as in need of habitat renovation, and a plan developed, a project can then be initiated.

### **Strategy 3.3.5**

#### **Create a standardized monitoring plan and database for habitat renovation projects to be incorporated with habitat inventory database and biological databases.**

Once habitat renovation projects are completed they should be monitored to evaluate success. Protocols should be developed such as “photo-monitoring” to monitor individual habitat structures over time, to identify what structures achieve goals. A standardized procedure also needs to be developed to evaluate the effects on the fishery.

### **Objective 3.4 Work with stakeholders to protect streambanks and riparian areas on trout streams.**

Tailwater rivers below dams experience severe habitat degradation over time due to constant rise and fall of hydropower generation, the removal of a normal flood regime, and extreme floodwater releases. Generally, with time, the stream channel tends to down-cut near the dam. This down-cutting can cause excessive bank failure and bank erosion. As displaced sediments accumulate downstream, the channel tends to rise, become shallow, and widen, and this process also causes excessive bank erosion. Any disturbance to the streambank riparian area, such as clearing vegetation, will exacerbate the situation. Many landowners buy riverfront property on a trout stream, and then clear the trees and vegetation on the streambank to provide a view of the river and access. Without the vegetation or the right type of vegetation, bank failure and erosion often occur. Depending on the soil type, bank failure can be extreme.

### **Strategy 3.4.1**

#### **Work with local county officials and realtors to create and distribute information about streambank protection.**

Create an information packet to be distributed to new riverfront landowners through realtors, other county offices, enforcement officers, river rangers, etc.

### **Strategy 3.4.2**

#### **Hold public information workshops about streambank and riparian are protection.**

**Strategy 3.4.3**

**Work with Stream Team Program to stabilize damaged and eroding streambanks with interested landowners.**

Use the variety of technologies and funds available through the stream team program to help river front landowners with eroding streambanks.

**Strategy 3.4.4**

**Work to acquire legislation that limits alteration of stable streambanks.**

## ***GOAL #4 Manage each trout water individually.***

AGFC has traditionally used “blanket management” with trout fisheries. For example, when a management technique worked in one place, it was then applied to another place, sometimes without thorough pre-evaluation.

One example has been with trout species diversity management. Experimental stockings of brook trout in Norfolk Tailwater were very successful as originally predicted. Based on this success, brook trout were introduced to the other three White River System tailwaters with varying success. The same history exists with cutthroat trout management. In some tailwaters the addition of these species may work in detriment to the existing rainbow and brown trout fishery.

Another example has been with brown trout management. A 16-inch minimum-length limit was found to improve the brown trout fishery in Beaver and Bull Shoals Tailwaters using common put-and-grow style management techniques. However, the subsequent application of this regulation to the Greers Ferry Tailwater worked against trophy brown trout management. In that tailwater brown trout reproduction and survival is prolific and the forage base is limited. By protecting brown trout to 16 inches in this setting, a dense population of small brown trout developed and growth-rates of all trout decreased. To remedy this, AGFC later changed to a 16 – 21 inch slot-limit on brown trout to try to allow and promote harvest of small brown trout to decrease population density and thereby improve growth rate.

Each trout water is different with respect to the natural carrying capacity, physical characteristics, and the type of anglers using that water, and these aspects of the fishery must be considered for efficient trout management. This is true whether management focuses on put-and-take, put-and-grow, or wild trout.

### **Objective 4.1 Create individual, specific management plans for each trout water.**

AGFC has never created management plans for any specific trout water. Although some specialized management tools have been applied in some cases, management has been fairly uniform for each body of water.

#### **Strategy 4.1.1**

**Use all scientific information from biological, angler, and habitat inventories, surveys, research, and monitoring to formulate specific management plans for each trout water.**

Specific trout water management plans will provide all history and background information, current information, and multiple options for management regarding regulations, stocking, habitat renovation, etc. Current information will be provided by all scientific monitoring set forth in Goal #2.

No management plan will suggest regulation changes without the following data, if possible (some trout waters will not require all of the following):

- Biological: Species composition, relative abundance, reproductive success / recruitment, growth rate, estimates of mortality and / or exploitation.
- Angler: Pressure, catch rates, harvest rates, harvest efficiency, and measures of angler attitudes, desires, satisfaction, etc.
- Habitat: Natural productivity, water quality, physical habitat.

These plans will contain management options for different styles of trout management including: put-and-take, put-and-grow, and wild trout. Plans will also identify needs and options for habitat management including: water quality, flow, physical fisheries habitat, and angler access. Plans will be developed for the following trout management areas in the implementation schedule. This list does not indicate order of planning or importance and is in alphabetical order:

- Beaver Tailwater
- Bull Shoals / Norfork Tailwater system
- Collins Creek
- Dry Run Creek
- Greers Ferry Tailwater
- Little Missouri River
  - o Albert Pike
  - o Narrows Tailwater
- Ouachita River System Tailwaters including:
  - o Blakley Mountain Tailwater / Lake Hamilton
  - o Carpenter Tailwater / Lake Catherine
  - o Rimmel Tailwater / Ouachita River
- Spavinaw Creek
- Spring River

#### **Strategy 4.1.2**

##### **Involve stakeholders in the management process through draft management plan review and comment and public workshops.**

Once the draft management plan with management options is produced, AGFC will provide the plan to any and all interested stakeholders within a 3-month comment period. During this public comment period, local public workshops will be held to present the plan and discuss public suggestions and concerns. It is in this process that management goals will be set and the appropriate management option(s) recommended.

The final plan with recommended management options will then be presented to the Commission for approval. No management plan will be considered by the Commission until public input has been sought to set management goals.

Once plan is approved, the implementation phase will begin, followed by monitoring and evaluation.

#### **Objective 4.2 Redesign the trout regulation process using the specific trout water management plan format.**

The present system of trout management, relative to how regulations are proposed, public comments accepted, and approved is no longer appropriate. The current process promotes controversy in that regulations are often proposed with little scientific information with no stated goals. The public is then asked to comment, with no effort or opportunity on the part of fisheries managers to educate the public as to why the regulation is proposed or needed. AGFC must use regulations as a management tool to reach a desired goal based on demonstrated scientific needs. This can all be handled much better through creating individual trout water management plans as laid out in the previous objective. No harvest or trout angling regulations should be created or changed outside of approved management plan.

##### **Strategy 4.2.1**

##### **Officially change the current process of establishing trout harvest regulations.**

The Commission will be asked to pass a resolution that trout regulations will not be recommended or considered outside of a specific trout water implementation plan. However, the Commission will retain all trout management related decision-making authority, and the ability to pass emergency regulations or other trout management changes, as needed.

##### **Strategy 4.2.2**

##### **Develop a new system and timeline where individual trout water management plans, which include regulation changes, are created and presented to the Commission for approval.**

The Commission will consider a trout management plan only when the Fisheries Division brings the plan forth. A rotating cycle will be developed for management plan development implementation, monitoring / evaluation and then revisiting the management plan for changes. For each trout water, a four-year cycle is likely the best schedule for management, but the first cycle may likely take five years in the following scenario. Once the Trout Program is comfortable with plan development, the first year and second in the following, will likely be combined:

First year	Public meetings and plan development
Second year	Plan approval by Commission
Third year	Plan implementation / monitoring and evaluation
Fourth year	Monitoring and evaluation
Fifth year	Public meetings / Commission approval

However, due to special situations with any given fishery at any given point in time, this management cycle may be offset or interrupted, and the plan revised. This cycle is meant to represent the possible target timeline but is not absolute. The Commission approval portion of this cycle will likely need to flow within the normal, present regulation cycle where the plan is presented to the Commission in June, approved in August of that year, and then changes in regulations are implemented the following January 1st.

Since some management areas will not require as much in depth work as others, it may be possible for the Fisheries Division to develop plans for four or more trout waters following the same management cycle at one time. An attempt will be made to create an implementation planning, rotating schedule immediately following the approval of this strategic plan.

**Objective 4.3 Develop specific management plans to establish goals, strategies, and priorities for put-and-take, put-and-grow, and wild trout management for each trout water.**

The most controversy in Arkansas trout management involves the management technique. Put-and-take trout management vs. put-and-grow trout management is often viewed as bait-fishing, harvest oriented anglers vs. fly-fishing, catch-and-release oriented anglers. The best way to handle this controversy is to scientifically survey anglers for their desires for trout management, then couple that information with biological and habitat information that dictates what that particular body of water is capable of. These management plans will offer management options that do just that. These options will then be presented for input from all stakeholders to help set goals for management. This process represents the ultimate goal of developing specific management plans – manage the trout fishery using a combination of the characteristics and needs of the fish, and the desires of the anglers.

**Objective 4.4 Produce and stock appropriate numbers, sizes, and strains of trout to meet management goals in management plans.**

Obviously, under current management and conditions, the Arkansas trout fishery is dependent on hatchery trout production and stocking for mitigation of lost, warmwater fisheries, as well as supporting recreational angling opportunity. Hatchery production at the federal and state level must be maintained. Trout stocking in any given trout water should operate efficiently to maximize adequate angler catch and harvest rates while not overstocking and thereby increasing non-angling related mortality and comprising growth rates.

Angling trends in some of Arkansas' put-and-take trout fisheries seem to be drifting away from traditional harvest oriented fishing and instead toward more "fish-for-fun", catch-and-release fishing. This complicates stocking in put-and-take style management that historically was geared toward supporting high harvest rates. Unharvested hatchery reared rainbow trout do not survive well in put-and-take conditions and therefore stocked trout that go unharvested suffer high mortality rates. Goals and criteria need to be set for managing this conflicting situation, and overstocking should be avoided.

**Strategy 4.4.1**

**Maintain hatchery production at current levels until increased or decreased stocking needs dictate otherwise, based on science and management plans.**

**Strategy 4.4.2**

**Use biological and angler creel surveys to identify acceptable catch rates to satisfy anglers and support harvest.**

**Strategy 4.4.3**

**Stocking allocation changes should be identified in individual trout management plans as identified by scientific data, and changed only when plan is approved.**

**Strategy 4.4.4**

**Continue to use raft stocking on Bull Shoals and Norfolk Tailwaters by matching raft stocking rate to boat angling pressure rate.**

**Objective 4.5 Manage for a wild trout fishery where possible as identified in management plans.**

Wild trout ultimately represent a mitigated fishery in tailwaters. A wild trout population would be the closest replacement to the wild, native smallmouth bass and catfish that once existed in the White River System. Natural trout reproduction and rearing is also

much less expensive than hatchery production and stocking. For these reasons, wild trout should be managed for, whenever possible.

Historically, brown trout have been the most successful at sustaining their own numbers in Arkansas tailwater fisheries. Brown trout spawning and recruitment success ranges from a dense, totally wild population in the Greers Ferry Tailwater to little detected reproduction in the Beaver Tailwater. Wild rainbow trout are becoming more common in Norfork and Bull Shoals catch-and-release areas where rainbows have a chance to survive long enough to spawn and competition with stocked trout is somewhat lessened.

The most limiting factors to wild trout in tailwater fisheries are the flow regime (exposure or scouring of redds), water quality (low dissolved oxygen during egg development), physical habitat (lack of cover for young trout), and put-and-take trout management.

#### **Strategy 4.5.1**

##### **Further develop a system for monitoring reproductive success and recruitment as part of biological monitoring.**

Although wild trout are currently detected by fish population sampling, no formal plan is in place to monitor year class strength of wild trout in any trout water. This should be done as part of all monitoring set forth in Goal #2.

#### **Strategy 4.5.2**

##### **Identify trout waters and species to be managed for wild trout through the specific trout water management plan format.**

Use biological monitoring and research to determine where reproduction is occurring and to further determine what the limiting factors to reproduction are. Use appropriate management tools as needed for wild trout.

#### **Objective 4.6 Manage for trout species diversity where possible based on management plans.**

East meets west in Arkansas trout management where anglers have the potential to catch brook and cutthroat, and maybe even lake trout along with traditional brown and rainbow trout. Arkansas' multi-species trout management has become quite popular with most anglers. Anglers enjoy catching trout that they would have to otherwise travel to the eastern or western U.S. to catch. Apparently there is a great deal of angler value placed on the potential to catch another species, whether those species are actually caught or not. This is another reason Arkansas is at the forefront of trout fishing destinations for anglers. Biologists from other states often comment that their anglers want them to stock other trout species "...like Arkansas does".

Because of these values, AGFC should continue to manage multi-species where appropriate. However, future management efforts should fine tune this effort and only

manage for trout species diversity where survival is high, angler catch-rates are adequate, and there are no negative effects on brown and rainbow trout fisheries. Nowhere in the world do several species of trout occur together naturally, and this form of management is difficult.

**Strategy 4.6.1**

**Identify trout waters that are appropriate for multi-species trout management in specific trout water management plans.**

Use angler catch rates and biological monitoring to determine where survival is high and where trout are caught. Where survival and angler catch rates are low, discontinue multi-species management.

## DEFINITION OF TERMS RELATIVE TO THIS DOCUMENT:

<b>academic -</b>	referring to a university or college.
<b>angler -</b>	person using the resource by attempting to catch fish.
<b>bait-fishing -</b>	general term describing angling methods that attempt to catch fish using natural or live bait including, but not restricted to, worms, minnows, crickets, salmon eggs, “power baits”, etc.
<b>business owner -</b>	person earning money related to the trout fishery such as outfitters, guides, resort owners, bait shop owners, etc.
<b>carrying capacity -</b>	the total biomass (weight of organisms) that a body of water can support under natural conditions.
<b>catchable trout -</b>	trout stocked as adults that are immediately available for harvest. Currently in Arkansas, these are 10 to 11 inches average length when stocked.
<b>catch-and-release</b>	general term applied to the practice of recreational fishing without harvest. Fish are caught and immediately released alive back to the water.
<b>creel survey -</b>	an on-site survey designed to estimate angling effort, angling catch, and angling harvest from a sample of anglers.
<b>demographics -</b>	geographic information about humans, such as where they are from.
<b>down-cutting -</b>	the action of streambed elevation decreasing with time.
<b>electrofishing -</b>	common, non-lethal method used to capture fish for the purpose of acquiring fish population data.
<b>exotics -</b>	species that were not found in Arkansas without the aid of humans.
<b>exploitation –</b>	removal of fish from the population by humans, usually expressed as a percentage.
<b>fingerling trout -</b>	trout stocked as small, sub-adults, usually less than one year in age. Currently in Arkansas, these average 6 inches in length when stocked.
<b>fly-fishing -</b>	general term used to describe angling methods that use fly-rods and artificial “flies” to catch fish.

**Geographical Information System (GIS)** - an integrated system of computer software and hardware for storing and analyzing spatial data.

- geomorphology** - study of the physical aspects of stream channels such as width, depth, meander, gradient, flow velocity, etc.
- harvest** - the permanent removal of a fish from the body of water, by a human.
- landowner** - person owning property with trout water frontage or property relating to trout water.
- mitigation** - compensation for negative fishery impacts caused by damming of rivers
- native** - species that were naturally found in Arkansas.
- non-game** - species that are not commonly sought by hook-and-line anglers.
- physical habitat** - any submerged part of the stream channel or individual structure such as the streambed, streambanks, boulders, logs, etc.
- recruitment** - number of fish surviving to some defined age or size.
- riparian** - area adjacent to a stream channel including stream banks.
- slot limit** - a fishing harvest restriction that protects fish from harvest within a specified size range, but allows harvest of fish smaller and larger than the specified range. E.g., - a 16 to 21 inch slot limit would not allow fish between 16 and 21 inches in length to be harvested, but would allow harvest of fish less than 16 inches long or more than 21 inches long. Slot limits are common with put-and-grow fisheries management.
- stakeholder** – any person with interests or concerns in the trout fishery.
- strategic planning** – an adaptive management system used to “plan”, that identifies issues and problems, forms goals, objectives, and strategies to address the problem, implements strategies, and evaluates success at meeting objectives.
- tailwater** – a term used to describe a section of a river downstream of a dam, that is especially affected by the operation of the dam.

- trout water -** in Arkansas, this generally refers to anywhere that trout are managed, but is also specifically defined in regulation code as to bodies of water where a trout permit is required for fishing.
- user group -** a group of people with common interests and desires for the trout fishery.
- White River System -** the upper White River and its tributaries in Arkansas which includes the dams that create trout tailwaters – Beaver, Bull Shoals, Norfolk, and Greers Ferry.
- wild -** organism born in that body of water by natural reproduction.
- year-class strength -** fisheries term referring to a measure or index of how many individual fish are born in a given year, relative to other years.

## LITERATURE CITED

- Malvestuto, S. P. 1996. Sampling the recreational fishery. Pages 591-623 *in* B. R. Murphy and D. W. Willis, editors. Fisheries Techniques. American Fisheries Society, Bethesda, Maryland.
- Pollock, K. H., C. M. James, and T. L. Brown. 1994. Angler survey methods and their applications in fisheries management. American Fisheries Society Special Publication 25.
- Responsive Management. 2000. Arkansas resident anglers and non-resident anglers awareness of and attitudes toward fishing in Arkansas.
- Rider, L. L. 1994. Trout angler survey. Arkansas Game and Fish Commission Report.
- USFWS 1996. Trout fishing in the U.S. Report 91-5. Addendum to 1991 national fishing, hunting, wildlife-associated recreation. U.S. Dept. of Interior, U.S. Fish and Wildlife Service.
- USFWS 2003. 2001 national fishing, hunting, and wildlife associated recreation – Arkansas. U.S. Dept. of Interior, U.S. Fish and Wildlife Service.
- Willis, D. W. and B. R. Murphy. 1996. Planning for sampling. Chapter in “Fisheries Techniques”, B. R. Murphy and D. W. Willis, editors. American Fisheries Society, Bethesda, Maryland, USA. pp 1 – 15.