cc: Board 7123104

Management Plan

for

Conestee Falls Lakes

Prepared by:
DeepSouth Pond Management

Introduction

Management of sport fish ponds in the southeastern U.S. is based on the ideas and research of H.S. Swingle and E.V. Smith, founders of the fisheries management program at Auburn University. Deep South Pond Management combines these principles with the latest and most innovative management techniques to provide quality pond management. The fact is that every pond, if its purpose is to provide and maintain quality fishing, needs ongoing management measures, if it is to remain productive. Our management service provides, not a one time fix, but ongoing measures to insure quality fishing. There are many options when it comes to managing your fish pond. A lot is based on what you as the pond owner wants. If its trophy bass, monster bream, or a nice balanced mix of both; it's all within reach, and fortunately modern pond management is flexible enough to fine tune a pond to precisely fit the goals of the pond owner.

Deep South Pond Management visited the four lakes at Conestee Falls in June 2004 in order to construct a comprehensive management plan for the lakes. Representative samples of fish were collected by electrofishing, to determine the condition of balance between predator and prey. Assessments of physical and chemical characteristics of the pond, along with our electrofishing sample, provided us with the valuable data necessary to develop this plan.

The goal of this plan is to create balanced population conditions within the lakes. The following report and management plan details and explains our management recommendations with the following goals in mind:

- -create conditions favorable for production of quality size (16-20") and trophy size (>20") largemouth bass.
- -create conditions favorable for production of quality size (7-10") bluegill and shellcracker.

It is important to note that quality fishing is not accomplished overnight. Please keep in mind that the specific recommendations that we make are not several one time inputs but rather a collection of ongoing management techniques that will establish and maintain long term quality fishing. We emphasize to all of our clients that proper pond management is a continual process. Each recommendation is important to the program as a whole. Feel free to contact us and further dicuss any questions or ideas you may have.

Population Assessment

The fish populations in Conestee Lakes were sampled with standard boat mounted electrofishing equipment. The lakes contain several species including Largemouth Bass (*Micropterus salmoides)*, Bluegill (*Lepomis macrochirus)*, Shellcracker (*Lepomis microlophus*), Channel Catfish (Ictalurus punctatus), Black Crappie (Pomoxis nigromaculatus), and Rainbow Trout (Salmo gairdneri). Lake Atagahi also has an existing Yellow perch population.

Ponds and the animals the support are governed by a predator – prey relationship. The interactions of predator and prey are characterized by a concept we refer to as "balance." Suitable balance is characterized by a healthy distribution of both predator and prey over a wide range of age and size classes. In order to asses the relative balance of Conestee's Lakes, we must first define which species are predators and which are prey. Currently largemouth bass are functioning as the main predator in all lakes at Conestee (along with crappie and the larger trout), and bluegill, shellcracker, and yellow perch are the main prey species.

At this point in the report I typically will go in to detail on the populations of each and every lake, (and I will cover each lake later in the report), but due to the similarities of each lake in terms of species composition and fertility, I will refer to them all here. The fish populations in all four lakes are extremely healthy considering the lack of fertility. Fertility will always be the limiting factor as far as fish production is concerned in the Conestee Lakes. I know the people of Conestee love the clear water and do not like the idea of fertilizing the lakes, but once again, let me mention a little on the benefits of increasing fertility through fertilizing. Fertilization dramatically increases fish growth and yields by up to 3 – 4 times. A clear pond means little food, slow growth, and fewer fish. The primary purpose of regular applications of fertilizer into sportfish ponds is to promote the growth of tiny aquatic plants, called phytoplankton. The phytoplankton community represents the very base of the food chain in ponds and is a direct result of the level of fertility. The higher the level of fertility, the more abundant the natural food items for aquatic insects and fish, and the healthier and more productive the fish population can become. In effect, pond fertility limits both the number and average size of the fish present. Infertile ponds typically demonstrate low levels of plankton production throughout the year, including the critical spawning and growing season. In effect, this limits the amount of food available to the small insects and larvae, which are the next link in the food chain. The "ripple effect" of low fertility is felt far up the food chain, all the way to the primary predator, the largemouth bass. In other words, without fertilizing, and the resulting increase in food availability, all four lakes are supporting as

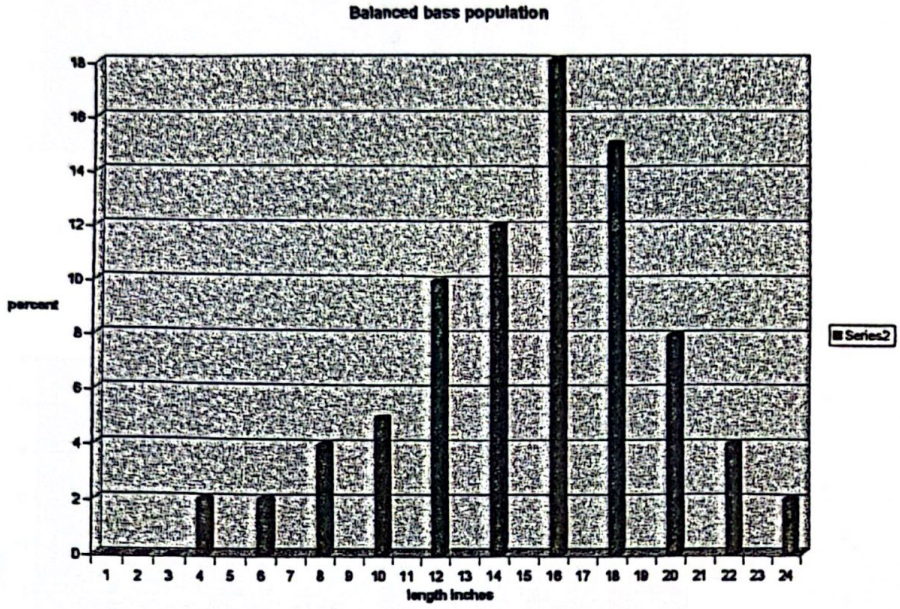
many fish as they will ever support. I think the key in the future will be aggressive harvest of the abundant largemouth bass population. (we will discuss harvest later).

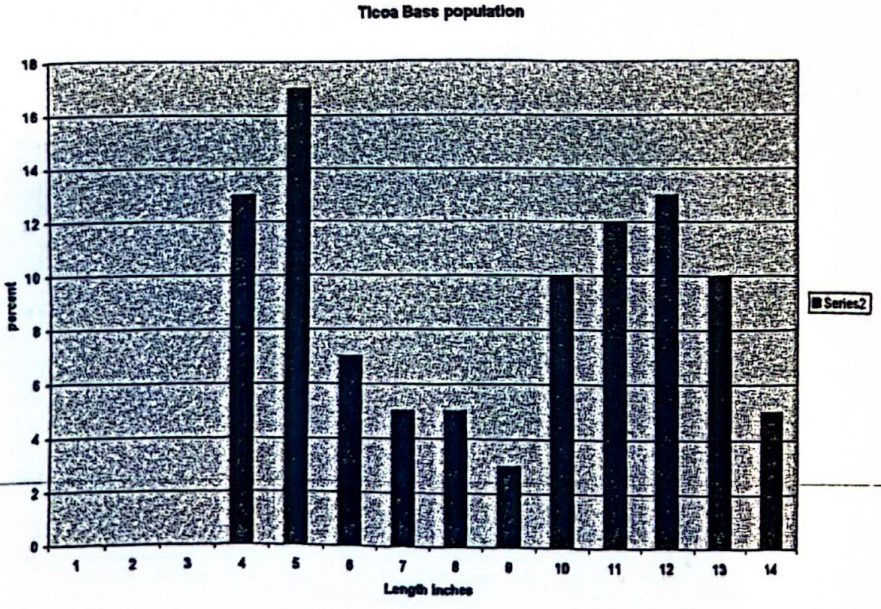
Our electrofishing survey showed that all four lakes are tending to function as predator-heavy or bass crowded systems. Bass crowded is an imbalanced condition that is common in bass/bluegill ponds and is characterized by large numbers of small skinny bass and relatively few bluegills. Classic population balance is defined by several parameters, not the least of which involves a 4-6: 1 ratio (by weight) of prey to predator. Presently, the abundance of predators (bass) nearly outweighs forage (bluegill, shellcracker) in all four lakes. Further, the key to maintaining balance in a bass/bluegill pond is maintaining a healthy distribution of sizes. If one size class or range becomes too abundant or lacking, a condition of imbalance results.

Most of the bass sampled in all four lakes were in fair condition. This is not at all uncommon for an infertile bass crowded lake. The bass are thinner and slow growing simply because they don't have enough to eat. The largemouth bass is such an efficient predator that if not controlled (usually through harvesting), it will severely reduce its own food supply. Under these conditions the bass will grow slowly and will not reach their full growth potential. Under harvest of bass is most often the cause of lakes becoming bass crowded. In bass crowded lakes, despite their overabundance and poor condition, the adult bass spawn each year. These young of the year bass are able to survive their first year quite well, as they only require small insects and young bream to grow. Once they reach 9 – 10 inches however, they require a larger prey item to grow well. Because the availability of slightly larger bream is limited (due to low fertility and predation by bass), their growth rates decline dramatically and they demonstrate characteristics of stunting. Though they may reach 9 – 10 inches their first year of life, they grow very little in the next few years. The old idea of "throw him back and catch him when he gets bigger" is not sound advice in ponds. In a typical infertile lake, bass must be harvested at a rate of 10 – 15 lbs/acre/year to prevent overcrowding. If the bass population is not harvested sufficiently, the problem perpetuates itself, usually resulting in a less than quality bass fishery.

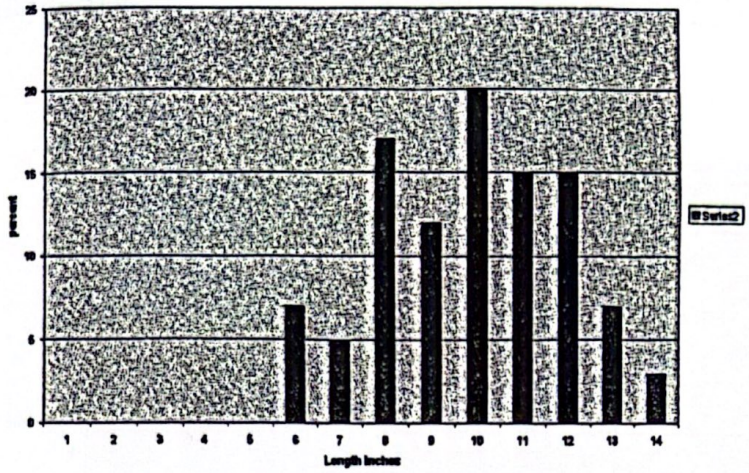
The bluegill populations in all four lakes also reflect the tendency towards bass crowdedness. In our sample, although the larger bream were fairly abundant, there were few bluegills in the 3 – 4 inch size range. This size range is very important in bass crowded systems because these sizes are the most needed. The majority of the bass sampled were in the 11 – 14 inch range. These bass require 3 – 5 inch bream in order to grow in to a quality sized 16" or larger individual. In a more balanced lake, there would be a more even distribution of bream across all size ranges. With the bluegill's reproductive success dampened due to no fertility, the majority of their fry is quickly consumed by the abundant bass population and few survive to reach sexual maturity. In the absence of 3 – 5 inch prey, the 11 – 14 inch bass are forced to feed on 1 – 2 inch bream. It takes as much energy to capture and consume a small prey item as the nutrient benefit it provides. Bass forced to feed on 1 – 2 inch prey will likely survive but will simply maintain their current condition and never reach quality size.

Comparison of a Balanced Bass Population to the Bass Populations of Conestee Falls Lakes (Ticoa, Atagahi, Wanteska and Tiaroga)

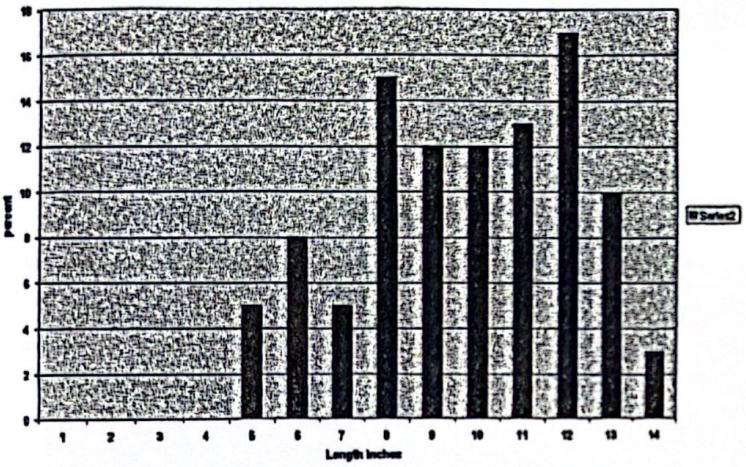




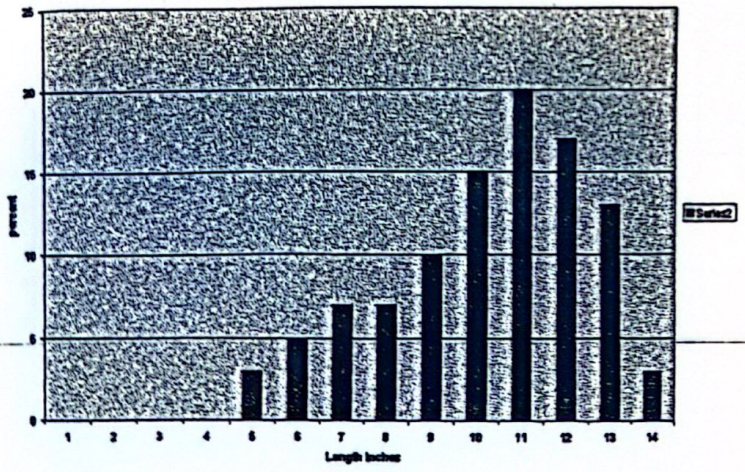
Atagahi Bass population



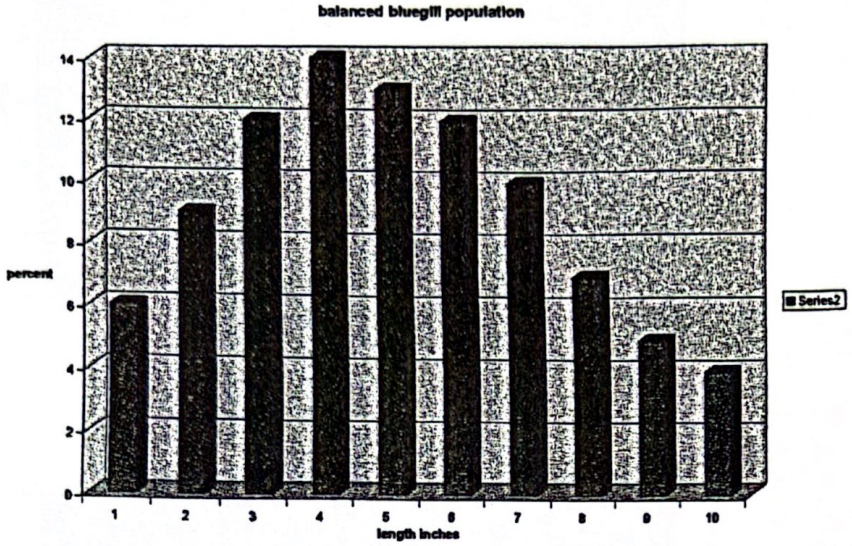
Wanaska Bass population

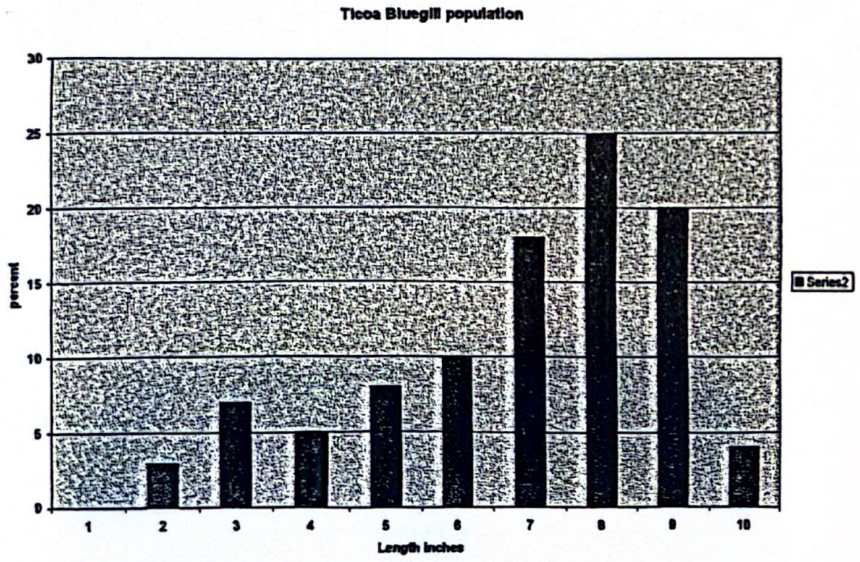


Tiaroga Bass population

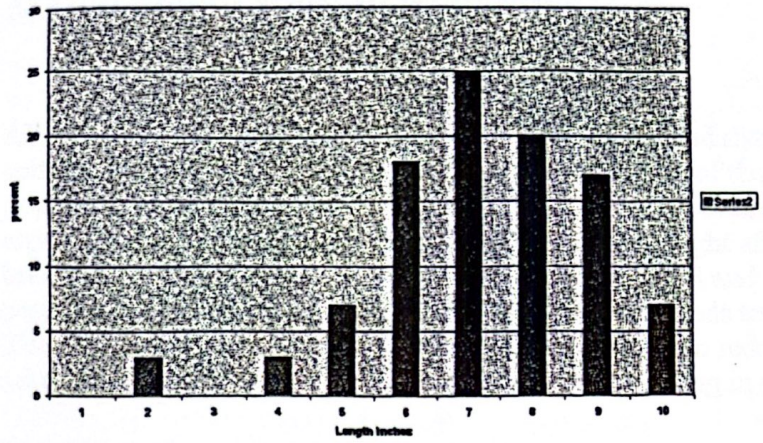


Comparison of a Balanced Bream Population to the Bream Populations of Conestee Falls Lakes

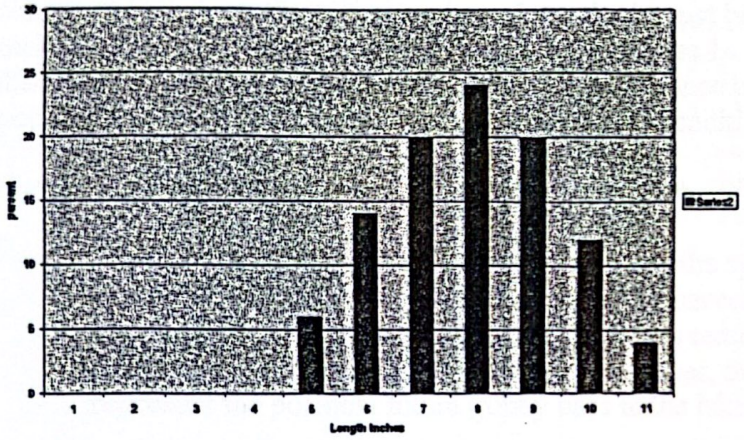




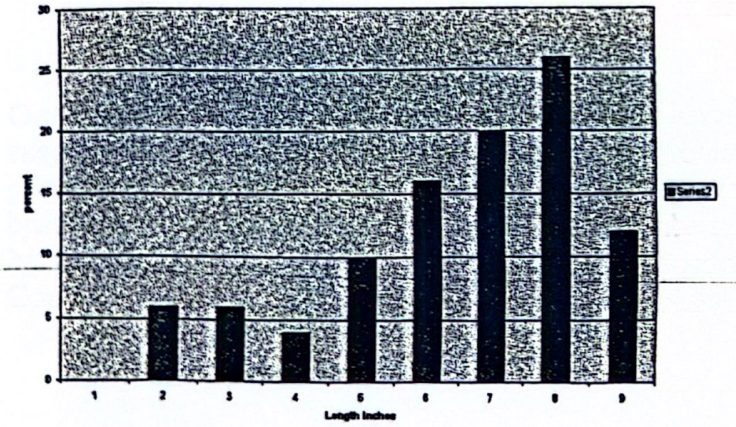
Atagahi bream population



Warteska Bream population



Tiaroga Bream population



Management Recommendations

All four lakes at Conestee Falls contain very healthy and dynamic fish populations, in spite of the fact that fertility is minimal. The structure of the predator and prey populations in the lakes is very similar, in that they all seem to be tending toward bass crowdedness. I know that trout are probably more sought after than largemouth bass and bream in the lakes, but there are some beautiful bluegill and shellcrackers in the lakes that could provide anglers a lot of fun, and bass harvest needs to be encouraged if possible. The management activities recommended will center on reducing the total number of adult predators and possibly some supplemental stocking in the future.

Fish Harvest

One of the keys to shifting the fish population toward a state of balance will be selective removal of largemouth bass. Largemouth bass, when present with bream as their primary source of forage, produce an annual surplus, which must be harvested in order to maintain balance. For all Conestee Lakes, harvest bass 14 inches or less at a rate of 10 lbs/acre/year. Harvesting at this rate will not only reduce predation on the bream population, it will also increase the growth rate and condition of the bass.

Harvesting largemouth bass can be accomplished by the following methods:

1. Hook and Line Harvest – Largemouth bass of the appropriate size should be removed whenever they are caught (up to the harvest goals). Try, if possible to keep records of the number and weight of bass removed during each fishing trip. Larger bass, those presently exceeding 14 inches, may be "protected", since these represent the potential future trophy bass in the lakes.

2. Electrofishing harvest – Electrofishing bass harvest is a particularly effective management tool for selectively removing largemouth bass. This method of harvest is useful in situations where hook and line harvest is inadequate. We will keep records ot the total number and weight of fish removed.

One important note is that bluegill and shellcracker harvest is strictly optional, not a requirement (as is bass harvest). It is not necessary to harvest a certain weight of bream per acre to maintain the predator/prey balance or to prevent bream overpopulation. The bass will more than adequately control bluegill numbers. Bream can certainly be harvested, however, given the current status of the bass populations in all lakes at Conestee, I recommend that you highly encourage bass harvest.

Supplemental Stocking

Larry had inquired about possibly stocking some crayfish at some point. I have some friends in Alabama who have been stocking crayfish for several years with success. I am sending some information on this, and will check with them on prices and past results of the stockings.

We found no shad during our electrofishing evaluation but I didn't really expect to as I figured the shad would be in deep water and thus be hard to shock. I did notice that the bass in Ticoa seemed to be in a bit better shape than those in the other lakes, hopefully the result of shad.

Another possible option would be intermediate (3 – 5") bluegill. Stocking these intermediate sized bream will accomplish several things. First, the intermediate bream are ideal forage for the abundant 11 – 14 inch bass; and these bass will respond to the introduction of the bream by feeding on some of them. Results will be observed in improved growth rates for the smaller bass. More importantly, the stocking of these intermediate bream will result in an increase in reproduction of bream within the lakes. These 3 – 5" bream are sexually mature and will begin reproducing as soon as they are introduced. Dramatically increasing the amount of bream reproduction in the lakes will ultimately lead to a flood of bluegill in the intermediate size range in future years.

Annual Maintenance

In addition to ongoing management, Conestee Falls lakes should be checked on a regular basis. Electrofishing is necessary to assess the effectiveness of the management programs. Regular checks will reveal the effectiveness of the harvest regimes and any supplemental stocking done in the future. Electrofishing on a regular basis is an integral part of our overall management program. It is necessary for us to stay on top of the lakes condition and make any needed changes in management recommendations.

Thanks for allowing us the opportunity to work with you guys and enjoy the beautiful scenery in and around Conestee Falls. There needs to be no major concerns on any of these lakes, as these are as good as any I've seen, considering fertility is zero. I am convinced that removing as many bass as possible out of all four lakes, will improve the condition of the bass, and increase bluegill numbers. I have not mentioned much on the trout or the yellow perch, but neither of these species are abundant enough to be considered main predator or prey species. Enjoy them when you catch them. I did mention possible supplemental stocking in the future, but I believe if we work on the structure of the existing fish populations through harvest, we will see improvement based on this alone. Thanks again, and if you have any questions or concerns, please give us a call.

Jamey Pound
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Deep South Pond Management

CONNESTEE LAKES

The four Connestee Lakes were created in 1972-3 by building dams across streams impounding water that reached maximum level in about a year. Since all but one of streams, Carson Creek that feeds Lake Atagahi, originates within the CFPOA property we have the opportunity to control water quality. The water clarity and purity of the lakes is unusually high for the southeast.

This brief report is a summation of a forty-seven page study commissioned by the CFPOA Board of Directors and prepared by Roger Bryan, Fishery Biologist, Fish and Wildlife Associates, Inc., Whittier, NC, Jan. 1992. The two accompanying tables were compiled from that study and other sources.

Methodology

Fish and Wildlife Associates established two sampling stations in each of the four lakes, at which they took monthly samples from April through September, 1991. Data collected included water clarity, pH, alkalinity, hardness, temperature and dissolved oxygen. Fish census data was obtained systematic sampling using seining, gill netting and electrofishing techniques each done in different months.

The study does not address the questions raised in the Burke memo except for brief mention of fish stocking practices, a topic on which the Fishing Club can provide more recent data.

Water Quality Summary

1. None of the lakes showed evidence of pollution.
2. pH values ranged from 6.1 to 7.4 which is normal for lakes in the southeast.
3. The alkalinity, total hardness, and conductivity levels are very low indicative of soft, infertile waters.
4. In summer the zone inhabited by fish is limited to the top 11 to 20 feet.
5. None of the lakes have suitable habitat for trout reproduction in summer.

Fisheries Summary

1. The fish population dominated by largemouth bass and bluegill is typical of small lakes in the southeast.
2. Bass appear to reproduce well but are limited in growth by a shortage of sunfish on which they feed.
3. Channel catfish thrive but do not reproduce well.
4. Overall the lakes have low productivity in numbers of fish and weight compared to the space available.
5. No undesirable species like sucker and carp were found.

Recommendations

1. All lakes could increase the number of brush hides in waters less than 15 feet deep.
2. Yellow perch and largemouth bass less than 12 inches long should be harvested.
3. Continue to protect 12 to 15 inch largemouth bass for breeding.
4. If catfish are to be encouraged, install hides and perhaps feeders.

George McDermott 2/27/03

CONNESTEE LAKES

TABLE A

Lake	Acreage 1	Max. depth 2	Elevation 3	Predominant fish 4	
				Number	Weight
Atagahi	80.6	59	2890	bluegill 79%	largemouth bass 59%
Ticoa	75	92	2810	bluegill 70%	largemouth bass 40%
Wanteska	45	62	2440	bluegill 51%	striped bass 64%
Tiaroga	31	32	2950	bluegill 83%	largemouth bass 72%

1. Inspection Report, National Dam Safety Program, Aug 79
2. Determined by Fishing Club using on board depth finders, 1997-8
3. Approximate height above mean sea level, USGS
4. Sample catches by Fish and Wildlife Associates, 1991 using seines, gill nets & electrofishing

TABLE B

Lake	Fish Habitat Zone 1	Light Penetration 1	Summer Thermocline 1	Main Source of Inflow
Atagahi	0-15'	8-14'	20'	Carson Creek
Ticoa	0-20'	9-18'	16' May - 27' Sep	Batson Creek
Wanteska	0-14'/32'	11-17'	18' May - 25' Sep	Lower Creek
Tiaroga	0-20'	8-12'	13' Apr - 28' Sep	Batson Creek

1. Fishery Assessment and Water Quality Analysis for Connestee Falls, Brevard, NC by Roger Bryan, Fishery Biologist, Fish and Wildlife Associates, Whittier, NC. Jan 1992
2. USGS, Brevard and Rosman quads

Compiled by George McDermott 2/27/03