

# Small Impoundment Management in the Southeastern United States

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*Abstract:* Mail questionnaires and telephone interviews were used to determine the importance of small impoundments and management strategies for small impoundments in the southeastern United States. Responses showed that small impoundments were highly valued by managing agencies in most states. Small impoundments open to the public were typically managed by state fish and wildlife agencies, whereas several agencies participated in the management of private small impoundments. In some states, the Cooperative Extension Service and the Natural Resource Conservation Service were more involved than fish and wildlife agencies in the management of small private impoundments. General management practices were found to be similar among the southeastern states, although specific recommendations varied geographically.

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Small impoundments ("ponds," defined as <202 ha; Anderson 1976), including farm ponds, contribute to the sport fishery resources in many areas of the United

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States. Anderson et al. (1978) reported that ponds contributed up to 30% of the total surface water in midwestern states. Lopinot (1978) reported midwest ponds received an average of 63 fishing trips per year. Jones and Hoyer (1982) reported angler harvests as high as 212 kg/ha in Iowa ponds. Surveys have shown that ponds supported approximately 40% of the fishing pressure in Georgia (Hess 1978), while ponds and small lakes annually accounted for more than 23 million fishing recreation days (35% of the total) in Texas (Inman 1984).

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## **Methods**

To better understand the importance of small impoundments, the Small Impoundments Committee of the Southern Division, American Fisheries Society, mailed questionnaires to fish and wildlife agencies in the southeastern states. In 1987, the survey was directed towards state Fish and Wildlife (F&W) agencies. In 1989, surveys were sent to other potentially involved agencies including the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS, the USDA Forest Service (USFS), the U.S. Department of the Interior Fish and Wildlife Service (USFWS), and the USDA Cooperative Extension Service (CES). To obtain more complete and up-to-date information, telephone interviews were conducted in 1997 to follow-up the questionnaires and to interview other agencies involved in small impoundment management.

## **Results and Discussion**

### **Management Responsibility**

Respondents indicated that management responsibility for southeastern small impoundments was distributed among a variety of governmental agencies, including F&W, the NRCS, the USFS, the USFWS, and the CES. In general, public small impoundments were managed by the F&W, USFS, or USFWS, whereas private small impoundments were managed with technical guidance from the NRCS or the CES. In states where public assistance was limited, private consultants played an important role in small impoundment management.

### **Importance of Small Impoundments**

The major benefit of small impoundments was to provide recreational fishing opportunities in areas where larger lakes or reservoirs were not available. Also, small impoundments were valued because they were believed to reduce fishing pressure on larger public waters, in part because most anglers don't have the types of boats needed to access larger public waters. In addition, proximity to the angler's home was an im-

**Table 1.** Total number of small impoundments and percent of budget and hours spent on small impoundments as reported by state fish and wildlife (F&W), natural resources conservation service (NRCS), and Cooperative Extensive Service (CES) agencies in the Southeastern United States.

State	Total <i>N</i>	F&W		NRCS		CES	
		Budget	Hours	Budget	Hours	Budget	Hours
AL	50,000	18	18	1	1	<1	<1
AR	110,490	25	25	1	1	<0.5	<0.5
FL	100,000	N/A <sup>a</sup>	N/A	N/A	N/A	<1	<1
GA	70,000	10	14	1	5	9	11
KY	100,250	10	10	N/A	N/A	<1	<1
LA	35,000	<1	<1	<1	<1	<5	<5
MS	39,000	7	8	N/A	N/A	<1	<1
MO	300,110	7	8	<5	15	<1	<1
NC	100,000	30	30	N/A	N/A	1	4
OK	215,000	25	25	N/A	N/A	<1	<1
SC	60,000	5	3	N/A	N/A	<1	<2
TN	200,000	4	N/A	15	5	<1	<1
TX	840,500	0	0	<1	<1	<1	<6
VA	75,182	<1	<1	<1	<1	<1	<2
WV	6,000	0	<1	N/A	N/A	N/A	N/A

a. N/A = Not available: unavailable or not reported.

portant consideration. Eleven of the 15 fisheries agencies in the Southeastern states placed high value on their state's small impoundments. Some agencies committed as much as 30% of their budget to stocking and management of small impoundments.

The importance of small impoundments was reflected in agency budgets and staffing. State fish and wildlife agency budgets and work force assigned to management of small impoundments ranged from 0% to 30%, with a median of 8% (Table 1). In Texas and Virginia, management was limited to telephone consultations and written correspondence with pond owners. However, in Texas, visits were made as requested to community fishing lakes (public lakes <30 ha) and in Virginia, visits were made under special circumstances. The NRCS and the CES budgets and work force expenditures for small impoundment management ranged from <1% to 15%. (Table 1). In many instances, the degree to which these agencies were involved in small impoundment management was difficult to determine because of changing missions and budgets in different years. In many cases, efforts at NRCS and CES has shifted away from small impoundment management.

### Management Techniques

Although management responsibility varied greatly among the states, management of small impoundments was similar. Largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*) were the most commonly stocked sport fish species in southeastern states, followed by channel catfish (*Ictalurus punctatus*). Species such as black crappie (*Pomoxis nigromaculatus*), white crappie (*P. annularis*), and white perch (*Morone americana*) caused population balance problems or occurred in

older impoundments that had fish populations characteristic of local watersheds. Some species, such as golden shiner (*Notemigonus crysoleucas*) and fathead minnows (*Pimephales promelas*), were stocked as forage or entered ponds through live bait use. Threadfin shad (*D. petenense*) were stocked as forage in small impoundments for hybrid striped bass (*Morone saxatilis* × *Morone chrysops*) and largemouth bass. Undesirable species such as gizzard shad (*Dorosoma cepedianum*) entered as strays when sportfish were stocked.

All respondents recommended stocking new or reclaimed ponds with sunfish [either bluegill or a combination of bluegill and redear sunfish (*L. microlophus*)] in the fall, channel catfish in the fall or winter, and largemouth bass the following spring or early summer. Recommended stocking rates (N/ha) varied from 618–2,500 sunfish, 125–250 channel catfish, and 125–300 largemouth bass (Table 2). Typically, higher stocking rates were recommended for fertilized impoundments. Also, an increased interest in the use of sport fishes such as hybrid striped bass was reported. Several states reported concern that hybrid sunfish needed special management in order to provide acceptable sport fishes. Initially, stocked hybrid sunfish produced large individuals. However, the resultant offspring often produced undesirable fish sizes or harvests because of reversion to the parental genotype, particularly green sunfish.

Three southeastern states (Ark., Okla., and Tenn.) supplied private pond owners with fish at no cost, provided the pond was free of fish. Several states also required that the pond exceed a minimum size which varied from 0.1 – 0.4 ha, depending on the state. Five states (Ala., Ga., Ky., Md., and S.C.) that supplied pond owners with fish had standard stocking fees that ranged from \$25 –\$190 per ha. Seven states (Fla., La., Miss., N.C., Texas, Va., and W. Va.) required that pond owners purchase fish from private hatcheries.

Granular and/or liquid fertilizers were recommended in all states, with the exception of Maryland and Oklahoma. The most common types of fertilizers recommended were 20–20–5 (granular) and 10–34–0 (liquid). Two new types of fertilizer were utilized by small impoundment managers, a water-soluble powder (10–52–2) and a timed-release fertilizer (10–50–0). Fertilizer choices were made on the basis of availability, cost, and objective. The more expensive timed-release formulations were utilized to replace the required monthly applications of other forms of fertilizer. However, temperature-dependent release may result in different performance of timed-release fertilizers at different geographical locations. Ten of the states recommended liming ponds to correct low alkalinity (<20 mg/liter). In many cases, the lime requirement was determined after soil tests by the CES.

Summer balance checks were a regular part of management evaluation of public small impoundments in most states and were often provided to private pond owners upon request. Management recommendations were made on a case by case basis, and included total rotenone renovation, partial rotenone treatment, supplemental corrective stocking with advanced largemouth bass fingerlings, water quality adjustments (e.g., liming), fishing harvest adjustments, aquatic weed control, or winter draw-downs. Some states recommended regulations, including size and creel limits.

**Table2.** Small impoundment stocking recommendations for Southeastern states.

State	Stocking rates (N/ha)								Stocking cost	Grass carp stocking	
	Unfertilized				Fertilized					Rates (N/ha)	
	BL <sup>a</sup>	RE	LM	CC	BL	RE	LM	CC		Min.	Max.
AL	927	309	124		1,853	618	247		\$99/ha	2	6
AR	791	198	247	247	988	247	247	494	Free	2	4
FL	494	124	247	247	865	371	247	247	Pond owner	4	12
GA	988	247	124	124	1,977	494	247	247	\$98-\$195/ha <sup>b</sup>	4	8
KY	741	247	297	124	988	247	297	124	\$61	3	8
LA	2,471		247		2,471		247		Pond owner	1	8
MD	2,471		247		2,471		247		\$25		
MS	865	371	124	124	865	371	124	124	Pond owner	4	4
NC	865	371	124	124	1,730	741	247	247	Pond owner	4	6
OK	1,236		247	247	1,236		247	247	Free	4	4
SC	927	309	124		1,853	618	247		\$98-\$195/ha <sup>c</sup>	2	8
TN	927	309	247	124	927	309	247	124	Free	2	6
TX	1,236	618	124	247	1,236	618	124	247	Pond owner		3
VA	865	371	124	124	741	494	494	124	Pond owner	3	6
WV	1,236		247		1,236		247		Pond Owner	2	8
AVG	1,136	316	193	173	1,429	739	250	223		3	7

a. BL = bluegill, RE = redear sunfish, LM = largemouth bass, CC = channel catfish.

b. \$288.96 per ha unfertilized/\$470.13 per ha fertilized or \$0.07/fisheries division.

c. \$235.07 per ha unfertilized/\$470.13 per ha fertilized.

Supplemental feeding with formulated feeds was recommended by 12 states, especially where catfish were present.

Overabundant aquatic vegetation was considered a major problem in small impoundments. The triploid grass carp (*Ctenopharyngodon idella*) was recommended by all southeastern states except Maryland, where they are illegal. Alabama, Arkansas, and Oklahoma allow the stocking of diploid grass carp. Grass carp stocking rates varied from 2.5 – 7.5 fish/ha (Table 2). Pond owners in all southeastern states were required to purchase grass carp from private suppliers. Other vegetation control methods included herbicides, algaecides, mechanical removal, drawdowns, and fertilization to establish phytoplankton blooms.

### Outreach Activities

Public small impoundments were intensively managed by state F&W agencies. However, state agency budget limitations often restricted management services offered to private impoundment owners. Most states offered case by case assistance to pond owners, usually in the form of a telephone conversation rather than a site visit. Some states had fish diagnostic services provided by CES, state F&W agencies, or the USFWS. Individual service was possible in areas near F&W offices, but site visits were becoming less common. In some states, the CES was providing increased service to private pond owners. At least 2 states (Texas and Va.) recommended private consultants for pond and small impoundment management. To provide needed small impoundment information to individual pond owners, most states routinely conducted pond management seminars or clinics. Ashley and Buff (1988) found that, when compared to individual site visits, seminars were a less expensive and equally effective means of providing general management information to North Carolina pondowners. However, certain problems that develop in ponds or lakes require visits by qualified fisheries personnel for case study and diagnosis.

Written materials are more important than ever for reaching small impoundment managers (Weigmann and Helfrich 1992). After telephone contact, peer-reviewed fact sheets or booklets describing management objectives and options were provided to interested small impoundment owners. All state F&W agencies in the southeastern United States, except West Virginia, had comprehensive pond management booklets or similar literature. West Virginia, however, had the fewest small impoundments, by far, of any of the southeastern states. Electronic information service was available in most states, particularly through the CES. Literature could be read or printed by accessing web pages posted by public or private fisheries specialists.

### Conclusion

Small impoundments constituted a highly valued resource for fisheries managers as well as anglers in the southeastern United States. Management of these impoundments consumed an average of 10% of the F&W agency budgets and about 11% of the personnel hours across the region. Small impoundments were extremely

valuable because they provide recreational fishing opportunities in areas remote from large public water bodies, and because they reduce fishing pressure on those impoundments.

The management of public small impoundments is largely the domain of state F&W agencies, these agencies are also involved, in varying degrees, along with the USFWS, NRCS, USFS, and CES, in the management of private small impoundments. The degree of involvement of these agencies in the management of small impoundments varied, but was indicative of the importance of these water bodies as a recreational resource in each state.

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