

A Survey of Catfish Management in the United States and Canada

By Paul H. Michaletz and Joe G. Dillard

ABSTRACT

We surveyed resource agencies in the United States and Canada to assess the status of the management of catfish species [primarily channel catfish (*Ictalurus punctatus*), blue catfish (*I. furcatus*), and flathead catfish (*Pylodictis olivaris*)]. Thirty-two of the fifty-three agencies we surveyed considered catfish to be either moderately or highly important to anglers. Twenty-eight states allowed commercial fishing in selected waters. Catfish populations were managed primarily by creel limits and gear restrictions, and less frequently by size limits. Put-grow-take fisheries for channel catfish were popular in small impoundments, and most catfish stockings were associated with these fisheries. Managers most commonly used gill nets and electrofishing to sample catfishes and used catch-per-unit effort, size structure, and creel information to evaluate catfish populations. Major constraints to the management of catfishes included (1) low priority or angler interest, (2) inadequate habitat, (3) inadequate data, and (4) inadequate sampling. A shortage of catfish for stocking also was a major constraint for small impoundments. Although catfish provide important fisheries throughout a wide geographical area, most resource agencies reported they do not intensively manage catfish populations, although put-grow-take and put-take fisheries in small impoundments were notable exceptions.

Catfishes (Ictaluridae) are receiving increasing attention from North American anglers and biologists. For example, hundreds of biologists and anglers met 22–25 June 1998 at the First International Ictalurid Symposium to discuss the biology and management of catfishes. In a 1996 nationwide survey, 26% of respondents indicated they fished for catfish, which extrapolates to 7.4 million catfish anglers in the United States (USDI and USDC 1997).

In the fall and winter of 1997–1998, we surveyed fisheries resource agencies from all 50 states, the District of Columbia, and 2 Canadian provinces (Manitoba and Ontario) where catfish fisheries were known to occur. We obtained a 100% response ($N=53$) after some follow-up phone calls were made. Our objectives were to assess the importance of catfish fisheries and the status of their management. Specifically, we hoped to benefit our agency—the Missouri Department of Conservation—and others by learning how most agencies managed their catfish populations. We are aware of two previous national surveys directed toward catfish management. Vanderford (1984) conducted a survey of

channel catfish (*Ictalurus punctatus*) managers in the United States. He solicited information on the importance, sampling, regulations, stocking, and population dynamics of channel catfish. Marshall (1991) requested information on sportfishing regulations and stocking of channel catfish. When appropriate, we compared our findings with these two surveys.

We sent a written survey containing 10 questions to a catfish “expert” within each resource agency along with a cover letter containing survey instructions. The “experts” had been previously identified by administrators within each agency during our initial communications with them. In the survey, waterbodies were divided into three categories: (1) small impoundments, (2) reservoirs, and (3) streams and rivers. *Small impoundments* were defined as small, state-owned or community-owned waters less than 202 hectares (500 acres) in surface area. *Reservoirs* were defined as large waterbodies managed by the U.S. Corps of Engineers or private power companies. We instructed respondents to include small natural lakes in the small-impoundment category and large natural lakes in the reservoir category. We were primarily interested in management pertaining to channel catfish, blue catfish (*Ictalurus furcatus*), and flathead catfish (*Pylodictis olivaris*), and asked questions about these species. We also included an “other” category for species-specific questions. In all cases, species in the “other” category consisted of bullheads (*Ameiurus* spp.) and white catfish (*A. catus*). For most questions, respondents were asked to check all answers that applied. Thus,

Paul H. Michaletz is a fisheries research biologist for the Missouri Department of Conservation, 1110 South College Avenue, Columbia, MO 65201; 573/882-9880, ext. 3254; michap@mail.conservaion.state.mo.us. Joe G. Dillard, previously fisheries research supervisor for Missouri Department of Conservation, is now director of the Missouri Watershed Information Network at the University of Missouri; dillardj@missouri.edu.



many questions had multiple answers from single respondents. A space for comments also was included for each question. Comments were useful in interpreting answers and gaining further insight into management practices. Below, we grouped questions and responses into five topics.

Importance of catfishes

How would you rank the importance of catfish to anglers in your state?

Catfishes were most important to anglers in the midwestern and southern United States (Figure 1), which corresponds to the geographical range of the three catfish species with the most recreational importance (Pflieger 1997). Not surprisingly, Vanderford (1984) and Marshall (1991) reported similar findings regarding the importance of channel catfish. Sixteen respondents (30%) ranked catfishes as highly important, sixteen (30%) as moderately important, and twenty-one (40%) as of low importance. Sixteen states indicated that they used statewide angler surveys to determine the relative importance of catfishes to sportfishing.

In addition to sport fisheries, do you have commercial fisheries for catfishes in your state?

Commercial fisheries for catfishes existed in 28 states. However, 17 states indicated that these fisheries were limited to a few specific waters such as large rivers (including the Mississippi River), certain portions of the Great Lakes, and/or some large reservoirs. Commercial fisheries were most common in streams and rivers, and least common in small impoundments (Figure 2A).

Do you have self-sustaining populations and fisheries?

All but four agencies reported having self-sustaining populations of either channel catfish, blue catfish, flathead catfish, or a combination of these species. Alaska does not have any freshwater catfish species. Maine, Rhode Island, and New Hampshire only have self-sustaining populations of bullheads and white catfish. Self-sustaining populations of channel catfish were more widely distributed than those of blue catfish or flathead catfish (Figure 2B), likely because of their broader geographic range (Pflieger 1997). Self-sustaining populations of the three major catfish species were more common in reservoirs, streams, and rivers than they were in small impoundments. Vanderford (1984) found that channel catfish reproduced in waters of all states except Alaska and the far northeastern states; he also found that most reproduction occurred in large rivers and reservoirs. Predation by largemouth bass (*Micropterus salmoides*) and other predators frequently restricted or eliminated natural recruitment of catfishes in small impoundments (Marzolf 1957; Krummrich and Heidinger 1973; Storck and Newman 1988).

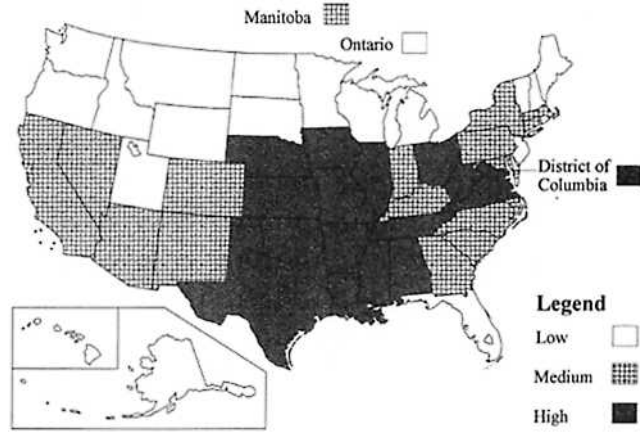


Figure 1 shows the importance (low, medium, or high) of catfishes to anglers of the United States and Canada.

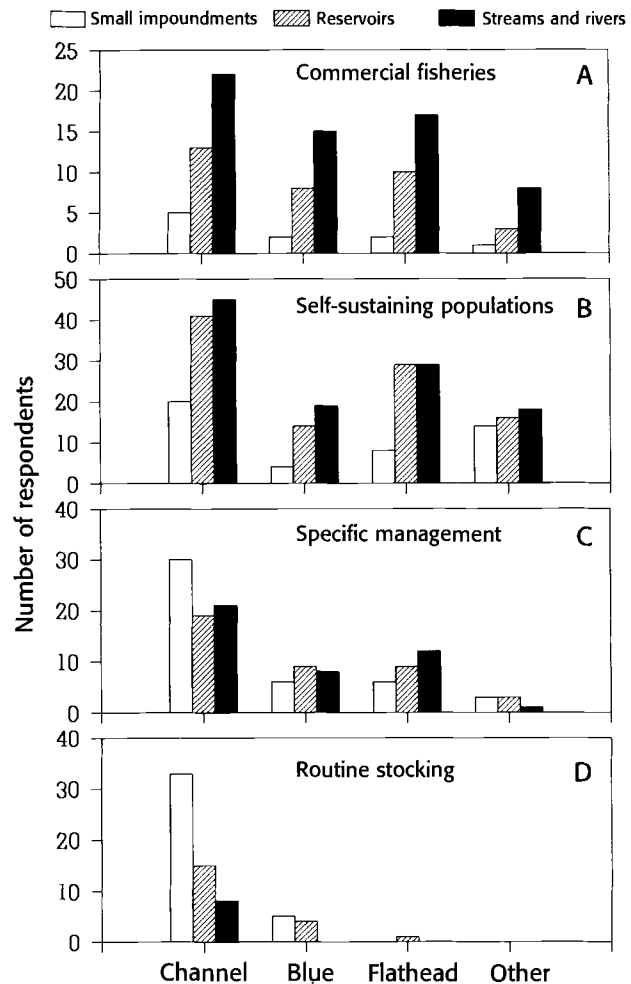


Figure 2 shows the presence of commercial fisheries (panel A), self-sustaining populations (panel B), specific management (panel C), and routine stocking (panel D) of channel catfish, blue catfish, flathead catfish, and other catfish species among small impoundments, reservoirs, and streams and rivers in the United States and Canada. The "other" species category includes bullheads and white catfish.

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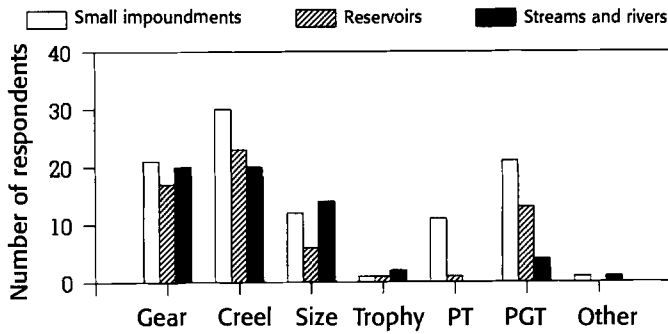


Figure 3 shows the methods of managing catfish populations in small impoundments, reservoirs, and streams and rivers in the United States and Canada. Methods include gear restrictions (Gear), creel limits (Creel), size limits (Size), trophy fishery (Trophy), put-take fishery (PT), put-grow-take fishery (PGT), and other (Other). The "other" category includes seasonal closures and feeding.

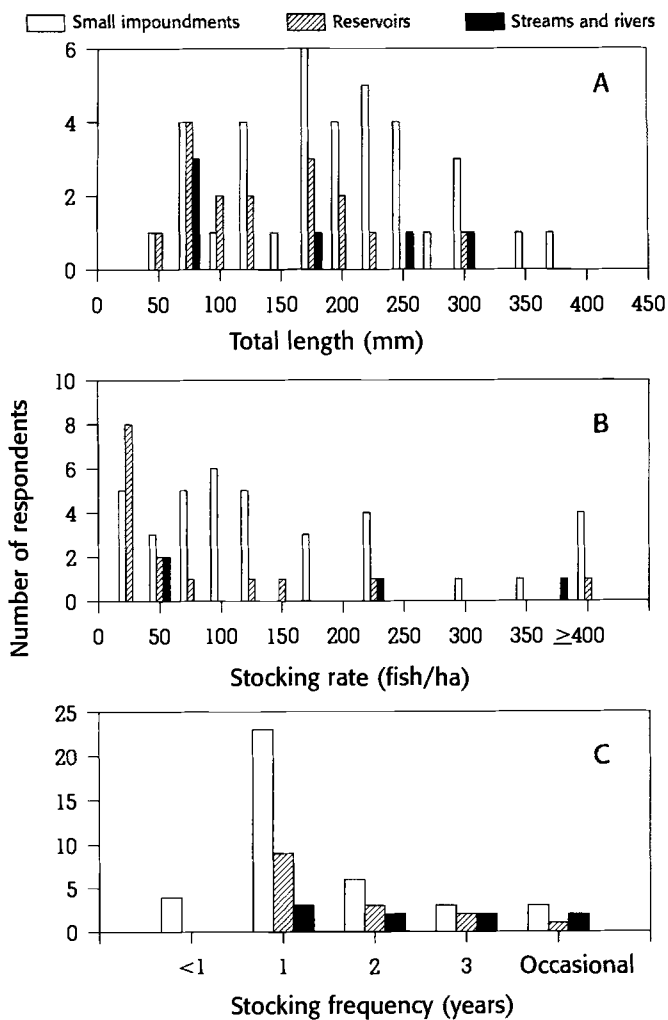


Figure 4 shows stocking size (panel A), stocking rate (panel B), and stocking frequency (panel C) for channel catfish in small impoundments, reservoirs, and streams and rivers in the United States. No stocking was reported in Canada or the District of Columbia. The numbers on the x-axis for panels A and B indicate the beginning of the size or rate class.

Management

Are you managing specifically for catfishes in your state?

Thirty-five agencies (thirty-four states, one province) indicated they were managing specifically for catfishes, although eleven indicated that it was only in a few waters or only by creel limits. Most management effort was directed toward channel catfish in small impoundments (Figure 2C). Vanderford (1984) found that 31 states actively managed channel catfish compared to 34 states found in this study.

How are you managing catfish populations?

Catfish populations were managed mostly by creel limits and gear restrictions and less frequently by size limits (Figure 3). The use of creel limits and especially size limits has increased since the previous surveys. Both our survey and Marshall's (1991) found that 33 states had creel limits for catfish, which was higher than the 21 states reported by Vanderford (1984). The number of states with size limits on at least some waters increased from 2 (Vanderford 1984) to 10 (Marshall 1991) to 18 for this survey. Iowa reported a size limit for commercial anglers only. Manitoba had a maximum size limit of 610 mm (24 in) on channel catfish in the Red River.

Put-grow-take and put-take fisheries were popular, especially in small impoundments (Figure 3). Put-take fisheries primarily occurred in urban areas. Put-grow-take fisheries in small impoundments were present in at least three states where catfish were either not present or not managed in other waters.

Stocking

Do you routinely manage catfish populations by stocking (species, sizes, stocking rates, frequency)?

Channel catfish were much more commonly stocked than blue catfish and flathead catfish (Figure 2D). Thirty-three states reported stocking channel catfish compared to thirty-four states found by Vanderford (1984) and thirty-seven states reported by Marshall (1991). Channel catfish were most frequently stocked into small impoundments (Figure 2D), where self-sustaining populations were less common (Figure 2B). Five states stocked blue catfish into small impoundments, and three states stocked them into reservoirs. Mississippi routinely stocked flathead catfish fry into a nursery pond for release later into a reservoir.

Most states reported broad ranges in stocking size and stocking rate for a particular category of water. To summarize this information, we chose to use the midpoint of the range in either stocking size or stocking rate. Sometimes an agency would report different stocking sizes, stocking rates, or frequencies of stocking for different types of fisheries (i.e., put-take, put-grow-take) or different sizes of waterbodies (within the same category of water). In these cases, we reported the midpoint in these variables for each different type of fishery or size of waterbody. Thus, some respondents have more than one stocking size, stocking

rate, or frequency attributed to them within a particular category of water.

Channel catfish were stocked at a wide range of sizes, stocking rates, and frequencies within each category of water. Sizes ranged from approximately 50 mm (2 in) to more than 375 mm (15 in) total length (Figure 4A), and stocking rates ranged from approximately 25 fish/ha (10 fish/acre) to more than 400 fish/ha (160 fish/acre) (Figure 4B). Channel catfish were stocked as frequently as every two weeks to only occasionally (Figure 4C). Most channel catfish were stocked at sizes of 175–250 mm (7–10 in) in small impoundments, a size similar to that reported by Marshall (1991), probably to reduce their vulnerability to predation (Krummrich and Heidinger 1973; Storck and Newman 1988; Mestl and Maughan 1993). Larger fish were stocked into urban lakes to support put-take fisheries. Stocking size was usually smaller for reservoirs, streams, and rivers than for small impoundments (Figure 4A). Channel catfish were usually stocked at a rate of 25–125 fish/ha (10–50 fish/acre) annually in small impoundments, but rates were usually lower in reservoirs and rivers. Marshall (1991) found that channel catfish stocking rates ranged from 5 to 4,900 fish/ha (2–2,000 fish/acre) but were usually 25–250 fish/ha (10–100 fish/acre). Several states used different stocking frequencies depending on the type of

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fishery and expected angler harvest. For example, small urban impoundments with put-take fisheries were stocked much more frequently than rural impoundments receiving little fishing pressure.

Blue catfish were stocked at sizes, stocking rates, and frequencies similar to channel catfish. They were stocked into small impoundments at sizes ranging from 75 mm to 300 mm (3–12 in) and at rates of <12 fish/ha to 250 fish/ha (<5–100 fish/acre) mostly on an annual basis. In reservoirs, they were stocked at 50–300 mm (2–12 in) at rates of 2–250 fish/ha (1–100 fish/acre).

What are the purposes of stocking catfishes?

Catfishes were stocked for a wide variety of reasons, including establishing new populations, maintaining put-take and put-grow-take fisheries, supplementing existing populations, and controlling overabundant sunfish (*Lepomis* spp.) or bullhead populations (Figure 5). Stocking was most commonly associated with put-grow-take fisheries in small impoundments. Flathead catfish were sometimes used for predator control in small impoundments.

Population assessment

What methods do you use to sample, evaluate, or monitor your catfish populations?

A wide variety of methods were used to sample catfishes, but gillnetting and electrofishing were the most common

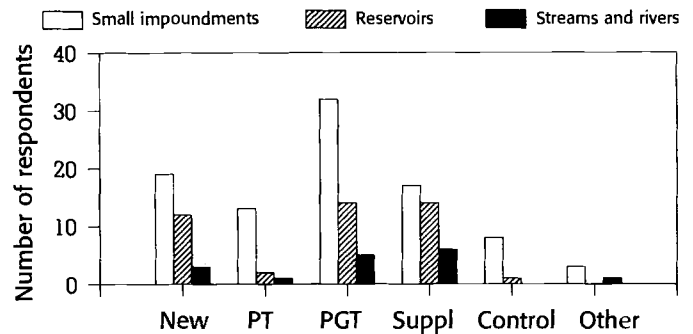


Figure 5 shows purposes for stocking catfishes into small impoundments, reservoirs, and streams and rivers in the United States. Categories are establishing a new population (New), put-take fishery (PT), put-grow-take fishery (PGT), supplemental stocking (Suppl), predator control (Control), and other (Other). The "other" category includes increasing fishing opportunities, developing trophy fishery, reestablishing populations, and determining contribution of stocked fish to the existing population.

(Figure 6). Gillnetting was used mainly in small impoundments and reservoirs, while electrofishing was used equally in all water categories. Hoop nets were used mostly in streams and rivers. Several agencies that did not conduct population sampling used creel information (included in "other" category). Seven respondents indicated that they collected catfishes during general fish surveys and did not specifically target catfishes. Vanderford (1984) found that respondents from only eight states reported they had found a satisfactory sampling method for channel catfish. The methods that these states reported varied widely, much like our survey results. It appears that effective sampling methods for catfishes remain elusive, especially for sampling in small impoundments and reservoirs where catches are often low and variable (Hanson 1986; Stevenson and Day 1986; Santucci et al. 1994).

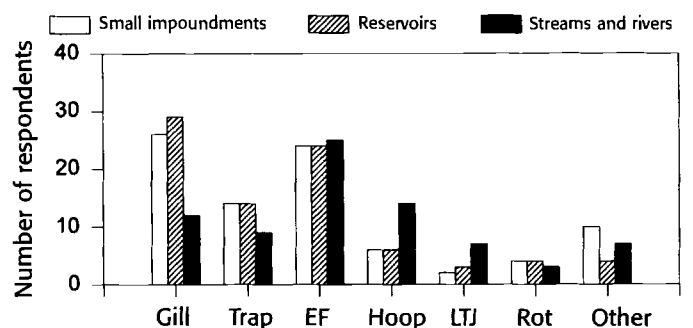


Figure 6 shows methods used to sample, evaluate, or monitor catfish populations in small impoundments, reservoirs, and streams and rivers in the United States and Canada. Methods are gillnetting (Gill); trap netting (Trap); electrofishing (EF); hoop netting (Hoop); limb, trot, or jug lining (LTI); using rotenone (Rot); and other (Other). The "other" category includes the use of creel data, catfish trapping, trawling, trammel netting, basket trapping, slat trapping, and angling.

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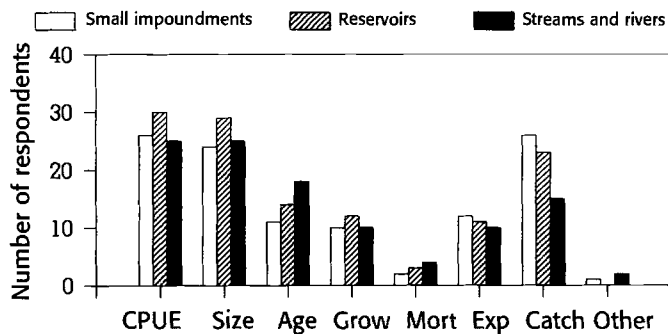


Figure 7 shows criteria used to evaluate catfish populations and fisheries in small impoundments, reservoirs, and streams and rivers in the United States and Canada. Criteria are catch-per-unit-effort for sampling gear (CPUE), size structure (Size), age structure (Age), growth rates (Grow), mortality rates (Mort), angler exploitation (Exp), angler catch or harvest rate (Catch), and other (Other). The "other" category includes population estimates, number or weight removed, body condition, and standing stock.

What criteria do you use to evaluate catfish populations and fisheries?

Catch-per-unit effort for sampling gear, size structure, and angler catch information were most typically used to evaluate catfish populations and fisheries (Figure 7). Catch-per-unit effort and size structure information are easily obtained from fish surveys and are frequently used to evaluate populations of many different fish species (Nielsen and Johnson 1983). Other parameters such as age structure, growth rates, and mortality are more difficult to determine and are not used as often. Ten agencies used creel information in lieu of population data to evaluate catfish fisheries.

Major constraints

What do you feel are the major constraints to the management of catfish in your state?

We categorized responses to this question into several broad groups (Table 1). The most common responses across all water categories were (1) low priority/angler interest,

Table 1 lists major constraints to the management of catfishes in North America among water categories.

Categories	Number of responses		
	Small impoundments	Reservoirs	Streams and rivers
Low priority/angler interest	11	16	12
Inadequate habitat	10	9	11
Inadequate sampling	4	4	4
Inadequate data	3	3	7
Inadequate supply of fish for stocking	8	2	0
Fiscal	5	2	1
Politics	1	3	1

(2) inadequate habitat, (3) inadequate sampling, or (4) inadequate data. A shortage of fish for stocking also was a major constraint for small impoundments. We did not include less-common responses (<3 responses for all water categories) in Table 1.


Summary

Catfishes provide important fisheries throughout a broad geographic range of North America. However, most resource agencies do not intensively manage catfish populations, except for put-grow-take and put-take fisheries in small impoundments. Catfish populations are difficult to sample and consequently are difficult to assess and manage. They are usually regulated by creel limits, gear restrictions, or not at all. However, the use of size limits has increased nine-fold since Vanderford's (1984) survey.

Many states invest heavily in stocking large channel catfish fingerlings into small impoundments to maintain put-grow-take or put-take fisheries. For example, in 1995 the Missouri Department of Conservation spent US\$95,000 to produce channel catfish for put-grow-take fisheries. An additional US\$99,000 was spent to purchase channel catfish from commercial sources for urban put-take fisheries. Despite the large investment of money and effort into stocking channel catfish in small impoundments, relatively little effort is directed toward evaluating and managing these fisheries. Again, this is likely due to a lack of adequate sampling methods or low agency interest.

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Management of catfish populations will continue to be problematic unless adequate sampling methods are found. It may be necessary to use creel information to assess catfish populations as several states have done. Unfortunately, creel information is expensive to obtain and is often difficult to collect for catfish species. Catfish anglers frequently fish at night, from shore, or with methods other than rod and reel and, thus, may not be included in standard creel surveys. In some cases, catfish anglers represent a relatively small percentage of the total angling population, making it difficult to collect sufficient information to precisely estimate creel statistics.

Our goal was to gather information that would be helpful to our agency and others in managing catfish populations. The survey results suggest that some important information gaps are hindering our abilities to effectively evaluate and manage catfish populations. We think that future studies on catfish should focus on identifying and developing effective sampling methods, criteria for assessing populations, criteria to determine stocking rates and frequency, and methods for obtaining creel information. 

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