

## Section C Recreational Use Assessment

### Introduction

The following assessment examines the recreational uses of the Youghiogheny River corridor. The information presented documents present uses of the corridor and provides a basis for projecting use patterns in the future. The assessment is divided into two major sections. The first section looks at whitewater boating, the dominant recreational activity on the river segment between Sang Run and the town of Friendsville. The second section provides a compilation of relevant information regarding the wide variety of other recreational uses of the river corridor.

### Whitewater Boating on the Upper Youghiogheny

This study utilized several procedures and data sources to document whitewater boating activity between Sang Run and Friendsville, Maryland. Study personnel counted the numbers of boats and people using the river on 46 sampling days during the course of the study (26 days between August 15 and October 14, 1988 and 20 days between April 14 and August 11, 1989). These field counts were recorded at 15 minute intervals on forms designed to identify patterns of boating use as well as total numbers of river users (see Appendix 3). On each sampled day, study personnel made field observations from the Sang Run bridge, a location from which all boats entering the whitewater segment of the river can be observed. Personnel arrived at the bridge prior to the arrival of the hydropower water release and remained at the bridge until the water receded to below a navigable level (approximately 1.7 on the Sang Run gauge under low natural flow). During the 1989 season, when natural flows were generally higher, personnel remained at the bridge until the hydropower release had passed Sang Run, as indicated by a drop of at least .3 feet on the Sang Run gauge. Thus, it is likely that all boaters using the river on the sampled days were recorded in the field counts.

Records of the numbers of customers served by the various commercial outfitters operating on the Youghiogheny were used to identify seasonal patterns of river use. These records also were used to establish an historical perspective on whitewater boating on the Upper Youghiogheny. Finally, information gathered through surveys of recreational boaters provided some additional insights into the demand for whitewater boating. A complete description of boaters using the river, including their backgrounds, perceptions, attitudes and preferences, is presented in Section G, Visitor Survey Results.

### Field Observations of Whitewater Boating

Several different types of boats are used to run the Upper Youghiogheny between Sang Run and Friendsville. Inflatable boats using the river include 4-person rafts and duckies (essentially inflatable kayaks used by a single individual). Hard boats using the river include kayaks and, to a much lesser extent, canoes. Hard boats and duckies always carried one person. All of the inflatable rafts observed were 4-person rafts; however, the number of passengers observed in these rafts ranged from one to five.

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A wide range of boating densities were found during the study year, August 15, 1988 - August 15, 1989. During the late summer and fall of 1988, the *total number of boats* using the river on any given day ranged from 13 to 117, with an average of 49.4 (Table C-1). Inflatable rafts and kayaks were observed on every sampled day, while duckies and canoes were seen only about half of the time. Canoes and duckies also were much less numerous than rafts and kayaks on those days when they were on the river.

Table C-1. Summary of Boat Counts on the Upper Youghiogheny River

August 15 - October 14, 1988

Boat Type	% of days Present	Number of Boats		Number of People	
		Range	Average	Range	Average
Inflatable Raft	100%	2-41	17.1	7-150	57.7
Duckie	46%	0-8	1.4	0-8	1.4
Kayak	100%	1-89	29.9	1-89	29.9
Canoe	50%	0-5	1.0	0-5	1.0
TOTAL		13-117	49.4	25-191	90.0

April 14 - August 11, 1989

Boat Type	% of days Present	Number of Boats		Number of People	
		Range	Average	Range	Average
Inflatable Raft	90%	0-32	16.5	0-118	59.6
Duckie	10%	0-2	.2	0-2	.2
Kayak	90%	0-46	16.1	0-46	16.1
Canoe	15%	0-4	.3	0-4	.3
TOTAL		0-67	33.1	0-141	76.1

The number of *rafts* using the river during the 1988 sampling period ranged from 2 to 41, and averaged about 17 per day. The number of *kayaks* ranged between 1 and 89, with an average of 30 per day. In terms of the number of people, however, rafters were the dominant user group. The total number of rafters ranged from 7 to 150, and averaged 57.7. Thus, during 1988, rafters accounted for 64 percent of all river users, kayakers accounted for 33 percent, and the remaining 2-3 percent included individuals using canoes and duckies.

In 1989, the number of rafts using the river remained about the same as during late summer and fall of 1988, but the numbers of kayakers and canoe and duckie users were much lower than in 1988. This finding may reflect a seasonal pattern in which kayak use of the Upper Yough increases later in the year, or it may have

resulted from the particular river conditions that occurred this year. It is likely that the number of kayakers on the Upper Youghiogheny was lower in 1989 because many kayakers diverted their efforts to other rivers, either to avoid high water levels on the Upper Yough or to take advantage of navigable flow levels on other rivers that often are not navigable after the spring runoff has ended. Whatever the reason for the decrease, kayak, duckie and canoe users accounted for only 22 percent of the whitewater boaters during 1989, compared to nearly 36 percent during 1988.

### Commercial Rafting Use

Focusing more specifically on commercial rafting use, Table C-2 provides a summary of rafting use patterns during the sampling period. While most of the observed rafts carried four passengers, it was also common to find rafts with fewer passengers. On nearly every sampling day, some rafts were observed with two or three passengers. Collectively, these 2- and 3-person rafts accounted for nearly 30 percent of all rafters during 1988 and about 20 percent during 1989. Occasionally, rafts carrying five passengers or just a single individual were observed.

Assuming that each raft contained one guide and the other passengers were customers of the outfitters, the number of commercial customers ranged from 0 to 109, with an average of 40.6 during 1988 and 42.8 during 1989. The true numbers of customers actually were slightly lower than this because there were some private rafters using the river (see page C-9 for further discussion of the estimated numbers of private and commercial rafters). Both the number of rafts and the number of rafters were remarkably similar during the 1988 and 1989 sampling periods.

Looking more specifically at the total number of rafts using the river, Table C-3 reports the daily total numbers of rafts and rafters observed during the 1988 and 1989 sampling periods. In both years, the number of raft customers was almost always below the limit of 72 specified in the 1989 regulations. For the majority of days during both years, there were 48 or fewer total customers.

We also attempted to count the number of companies operating trips on the river on any given day (Table C-4). Only once out of twenty-six days during 1988 could we identify more than six different companies. During 1988 we observed two or fewer companies on 42% of the days, and not more than four companies on 69% of the sampled days.

During the spring and summer of 1989, there were generally more companies operating on the Upper Yough on any given day than in 1988. This year we observed more than four separate companies 70 percent of the days and more than six companies 40 percent of the time. This difference may reflect the fact that the companies are more likely to run trips earlier in the year (several companies appear to stop running the Upper Yough by early fall), or it may reflect some borrowing of customers between companies, as is allowed under the 1989 regulations. Even with this increase in the number of companies on the river during 1989, however, the general pattern was that only about half of the ten permitted companies actually ran river trips on any given day. Thus it is not surprising that the number of customers generally was considerably lower than the limit of 72 imposed in the 1989 regulations.

Table C-2. Patterns of Commercial Boat Use on the Upper Youghiogheny

August 15 - October 14, 1988

Boat Type	% of days Present	Number of Boats		Number of Rafter	
		Range	Average	Range	Average
5-Person Raft	12%	0-1	.1	0-5	.6
4-Person Raft	92%	0-32	10.0	0-128	40.0
3-Person Raft	96%	0-6	3.5	0-18	10.4
2-Person Raft	81%	0-8	3.2	0-16	6.5
1-Person Raft	27%	0-1	.3	0-1	.3
All Rafts	100%	2-41	17.1	7-150	57.5
Guides				2-41	17.1
Total Customers				5-109	40.6

April 14 - August 11, 1989

Boat Type	% of days Present	Number of Boats		Number of Rafter	
		Range	Average	Range	Average
5-Person Raft	15%	0-1	.2	0-5	.8
4-Person Raft	90%	0-25	11.2	0-100	45.0
3-Person Raft	90%	0-8	3.3	0-24	10.1
2-Person Raft	75%	0-4	1.8	0-8	3.5
1-Person Raft	15%	0-3	.3	0-3	.3
All Rafts	90%	0-32	16.5	0-118	59.6
Guides				0-32	16.5
Total Customers				0-86	42.8

Table C-3. Numbers of Rafts and Customers Using the Upper Youghiogheny River per Day During 1988 and 1989

	1988	1989
<b>Number of Rafts</b>		
0-8	23%	20%
9-16	31%	15%
17-24	23%	55%
>24	23%	10%
<b>Number of Customers</b>		
0-24	31%	20%
25-48	27%	35%
49-72	35%	40%
>72	8%	5%

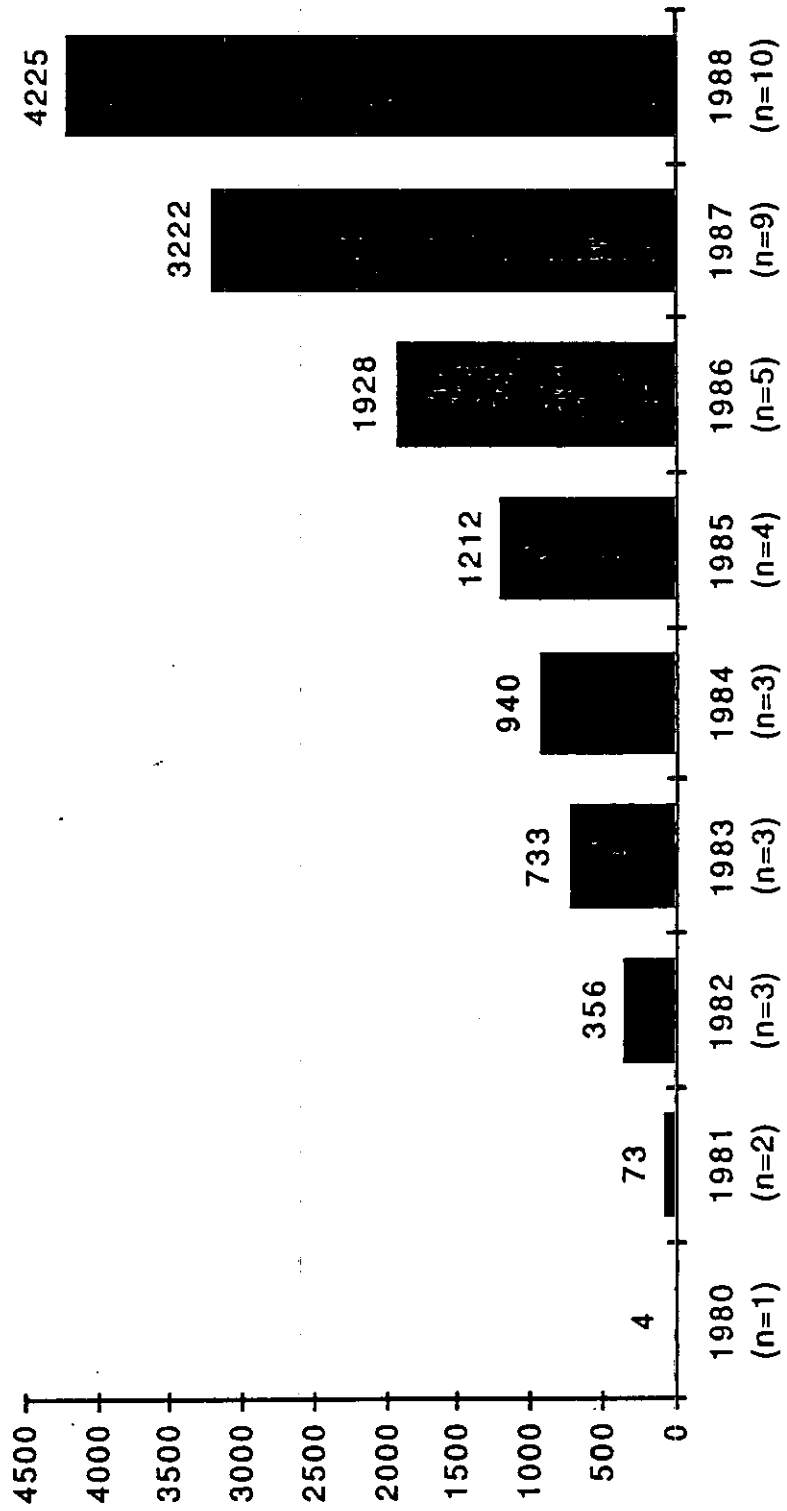
Table C-4. Number of Commercial Companies Operating on the Upper Youghiogheny River per Day During 1988 and 1989

Number of Companies Running Trips	1988	1989
0-2	42%	15%
3-4	27%	15%
5-6	27%	30%
>6	4%	40%

#### Historical Use Patterns

The following analysis of commercial boating use on the Youghiogheny is based on the numbers of customers reported by commercial outfitters to the Maryland Department of Natural Resources. These use records indicate that commercial boating use has grown steadily and dramatically since the beginning of commercial outfitting on the Upper Youghiogheny in 1980 (Figure C-1). The number of companies operating on the river has increased from two to ten and the number of customers increased from only 73 in 1981 to over 4,000 in 1988. The most dramatic increases in both the number of companies and customers have occurred in the past few years. The annual percentage increase in the number of customers over the past three years was 59 percent, 67 percent and 31 percent, respectively.

Figure C-1  
Total Number of Commercial Customers Reported Annually (1985-1988)



n = Number of Companies Reporting

Growth in whitewater boating on the Upper Yough has paralleled increases in boating on other eastern rivers during recent years. Brown (1984) suggests that the location of virtually all major eastern whitewater rivers within a few hours drive of major metropolitan areas, coupled with growing public interest in whitewater recreation, will likely result in increasing use pressure on eastern rivers for at least the next ten years. User responses to the visitor surveys employed in this study shed some light on the river use levels that may be expected in the future. Nearly three-fourths (72%) of the commercial rafters interviewed reported that they were on their first trip on the Upper Youghiogheny. This suggests that there is a relatively high annual rate of influx of new river users. Conversely, 72 percent of the sampled rafters indicated that they planned to return to run the Upper Yough again next year. Twenty-eight percent of the kayakers sampled at the river were newcomers to the Upper Youghiogheny. Nearly all (94%) of the kayakers sampled, however, reported that they intended to run the river during the next season. A high rate of newcomers, coupled with a high rate of return by experienced boaters, suggests that both rafting and kayaking use levels will continue to increase.

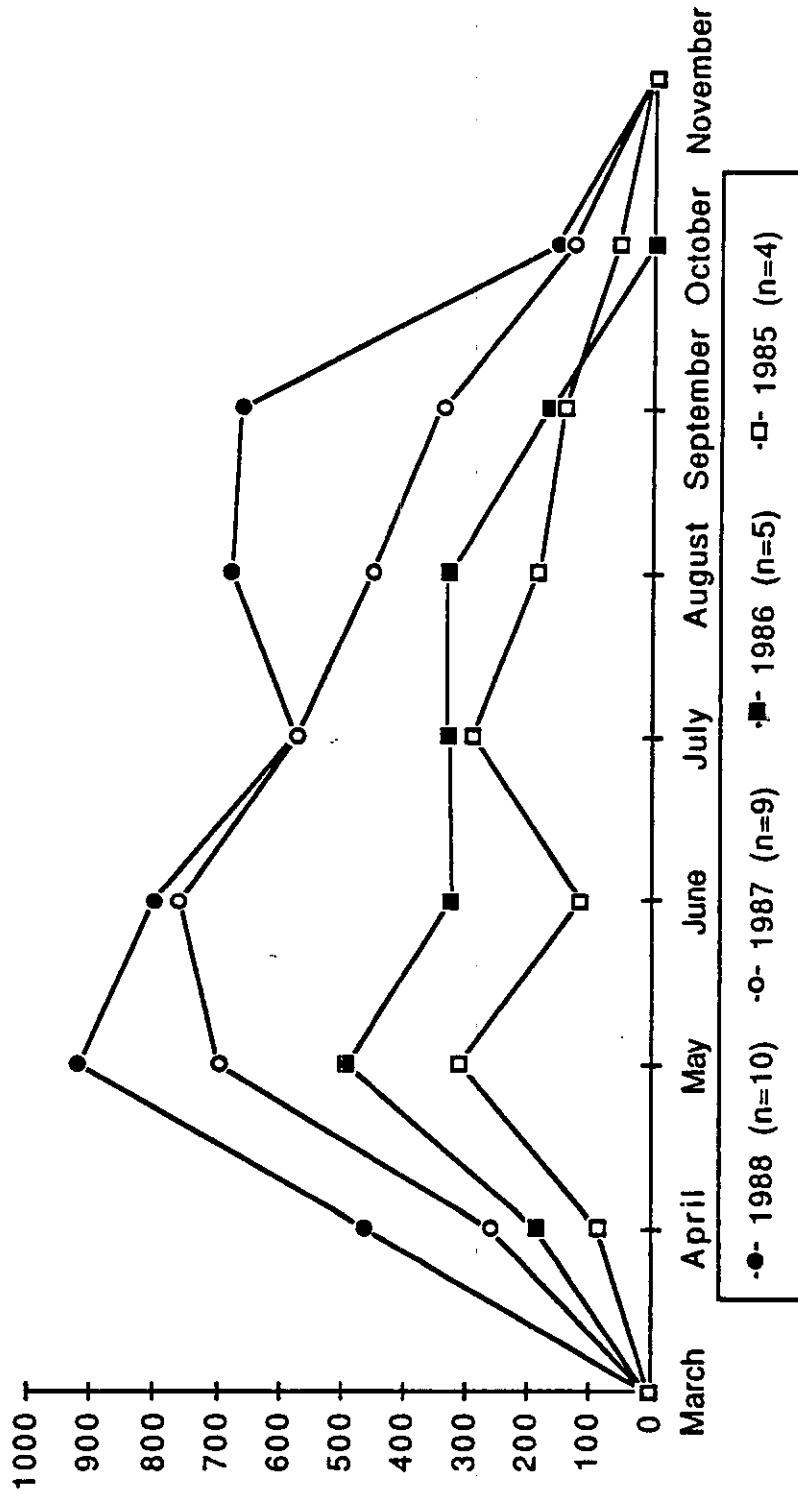
Several factors probably account for the fact that use levels in 1989 did *not* increase as might have been expected from the trend evident in Figure C-1. Primary among these factors are the high water levels that occurred during 1989 and the restrictions on commercial boating activity that went into effect this season. High water conditions affected kayaking and, to a lesser extent, rafting on the Upper Youghiogheny by diverting some users to other less demanding rivers. The new whitewater boating regulations restrict commercial rafting activity and thus served to reduce the number of rafters that would have used the river if use had been unregulated as in the past.

Figure C-2 demonstrates that use levels have increased throughout the boating season since 1985. The months of May and June have typically been the highest use period, with use declining each month as the season went on. The lower use levels typically reported for July and August are most likely a function of limited water availability, while the dropoffs during September and later in the season probably reflect declining demand for boating as the weather becomes colder and the days shorter. During 1988, however, the numbers of customers during August and September were nearly as high as during June. This unusual pattern is probably a function of the drought conditions that occurred during the summer of 1988.

#### Estimating Total Whitewater Boating Use

There is no single source of information available to answer the question: How many people went whitewater boating on the Upper Youghiogheny during any particular year? It is possible, however, to estimate total yearly boating use for 1988 from the combination of data sources used in this study. The major sources of data used for this estimation include reports of the number of customers served by the commercial outfitters operating on the river and patterns of boating use as identified through field observations by study personnel during late summer and fall, 1988. The field observations include counts of the numbers of boats and boaters of different types seen using the river on 26 sampled days between August 15 and October 14, 1988.

Figure C-2  
Number of Commercial Customers Reported by Month



n = Number of Companies Reporting



Total use estimations are based on the following assumptions and use patterns:

- 1) Total boating use includes individuals using inflatable rafts and those using kayaks and other craft (mostly duckies and canoes). As shown earlier, during the 1988 field observation period, rafters accounted for 64% of all people on the river and the other boaters represented 36% of all boaters.
- 2) According to the information reported by the commercial outfitters, 4,225 customers were served on whitewater boating trips during 1988. We assume this information is accurate. This number is *not* the total number of rafters using the river, however, because rafters also include guides and private (non-commercial) groups. To expand the number of customers to the total number of rafters, we assumed that private rafters represent 10 percent of all people using rafts (based on a comparison of outfitter data and field observations), commercial river trips have one guide per raft, and private rafters were more likely to have fewer people per raft. Taking all of these factors into account, the 57.7 rafters seen on the average sampled day would be comprised of an average of 5.8 private boaters, 14 guides and 37.9 customers. Thus, customers represent 66 percent of all rafters. Expanding this to the 1988 season, 4,225 customers translates into 6,401 total rafters using the river.
- 3) Since rafters represented 64 percent of all river users, the estimated 6,401 rafters during 1988 can be expanded to a total of 10,002 total river users for the season. The difference of 3,601 users is an estimate of the number of people using other craft during 1988, most of which were kayakers.
- 4) It is important to note that this estimation process assumes that the use patterns observed in late summer and fall are representative of those for the entire boating season. Data collection during spring and summer, 1989 found that rafters made up 78 percent of all river users during this period (as opposed to 64 percent during late summer and fall, 1988). Since this difference between years may be largely attributable to the higher water levels found during 1989, we have not used the 1989 field counts to adjust the use estimates for 1988.

Rounding the above numbers off to reasonable levels, our best estimates of total use levels for 1988 are 10,000 total users, 6,400 of whom were rafters and the remaining 3,600 were users of single-person craft, most of which were kayaks. It is not possible at this time to estimate the total boating use for 1989 because the season is not over and outfitter reports of the number of customers served are not yet available.

### Summary

Whitewater boating on the Upper Youghiogheny was observed during two distinct sampling periods, August 15 - October 14, 1988 and April 14 to August 11, 1989. The *total number of boats* on the river on any given day ranged from zero to 117, and averaged 49 during 1988 and 33 during 1989. The number of *rafts* on the river was nearly identical during 1988 and 1989 (average = 17 per day each year). The major difference between years was much smaller numbers of kayakers during 1989, which probably resulted largely from the higher water levels present in 1989.

The number of raft customers (average = 41 in 1988 and 43 in 1989) was usually well below the limit of 72 imposed in the newly-enacted whitewater boating regulations. For the majority of days during both 1988 and 1989, there were 48 or fewer commercial customers on the river.

Records submitted by all commercial outfitters indicated that commercial rafting has grown steadily and dramatically since the beginning of commercial outfitting on the Upper Yough in 1980. Use trends on other eastern rivers and results of our visitor surveys suggest that boating use levels on the Upper Youghiogh- eny will continue to increase. The lack of growth in rafting use between 1988 and 1989 is likely attributable to the whitewater boating regulations that took effect at the beginning of the 1989 season, along with the higher water levels that diverted some rafters to other rivers.

Total whitewater boating use during 1988 was estimated from a combination of data sources used in this study. Approximately 10,000 boaters ran the Upper Youghiogh- eny during 1988, 6,400 of whom were rafters and 3,600 were users of single-person craft (mostly kayaks). This estimate was needed to identify the economic impact of boating on the Upper Yough (Section F of this report) and for developing recommendations for management.

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### Other Recreational Uses of the Youghiogh- eny River Corridor

This section of the report provides an assessment of the other recreational uses of the Youghiogh- eny River corridor and vicinity. A variety of data sources were used to document current recreational use of the Youghiogh- eny River area and estimate the potential growth of outdoor recreation in the area. This assessment considers recreational activity both in the river corridor and that associated with Deep Creek Lake and the surrounding area which is likely to have an influence on Youghiogh- eny River use.

Very little information is available regarding the extent and nature of recreational activity in the Youghiogh- eny River corridor outside that which occurs in and around Swallow Falls State Park, Herrington Manor State Park, and Deep Creek Lake State Park. The Maryland Department of State Planning has inventoried outdoor recreation facilities in Garrett County and estimated visitor use and demand for outdoor recreation activities occurring in the county (MDSP 1979).

This county information can not be directly applied to the Youghiogh- eny River area, however, because there are many locations throughout the county where boating, hiking, camping, fishing, hunting, and other recreational activities occur. Further, activity specific data were not updated for the 1990 Maryland Open Space Plan. Thus, the data provided in the 1979 Plan, while the most recent available, are considerably dated and probably do not give a true picture of current recreational activity participation in Garrett County. There has been considerable recreational and tourism development in the Deep Creek Lake area during the past 10 years which has significantly altered use in that area so as to render the MDSP (1979) data of little value. As a result of the severe limitations of the MDSP (1979) data, we did not utilize it for this assessment of recreational activity in the Youghiogh- eny River corridor.

A recent recreational carrying capacity study of the Deep Creek Lake area (URDC-1988) provides in depth information about boating, camping, and other recreational activities in the lake area. The degree to which use of the Deep Creek Lake area influences use of the Youghiogh- eny River is not established in the study. Undoubtedly, there are some relationships between lake use, state park use, and recreational activity on

the River. The present study did not specifically examine these relationships. However, by using information from the sources cited above, our boating and landowner surveys, fishing surveys conducted by Fedler (1989a; 1989b), and other available information, a general understanding of recreational use of the Youghiogheny River area was developed and is presented below.

#### Outdoor Recreation Facilities in Garrett County

The Maryland Department of State Planning estimated the number or amount of various types of outdoor recreation facilities in Garrett County as part of their statewide outdoor recreation plan (MDSP 1979). The Department of Natural Resources publishes annual acreage reports summarizing the supply of state-owned land by type of area (e.g., state park, state forest) and county (MDNR 1989). Several of the types of facilities inventoried support activities found within the Youghiogheny River or Deep Creek Lake areas. Outdoor recreation facilities and their size or number are shown in Table C-5. The county contains significant acreages of state park land, state forest, and state natural areas which all support hiking and camping activities. The state operates about 20% of the developed campsites in the county, all of which are located at the state parks in the county.

Table C-5. Outdoor Recreation Facilities in Garrett County

Facility Type	State	Federal	Other	Total
Park (acres)	3,199	-	-	3,199
Forest (acres)	67,776	-	-	67,776
Fish Management Area (acres)	113	-	-	113
Wildlife Management Area (acres)	1,763			1,763
Boating (acres)	474	654	352	1,480
Bicycling (miles)	867	-	123	990
Camping (sites)	245	-	808	1,053
Fishing (acres)	474	654	352	1,480
Fishing (shore miles)	31	15	7	53
Hiking (miles)	867	-	123	990
Hunting (acres)	73,771	-	1,290	75,061
Nature Trails (miles)	867	-	121	988
ORV Trails (miles)	867	-	121	988
Picnicking (# tables)	937	4	263	1,204

Source: 1979 Maryland Outdoor Recreation and Open Space Plan and MDNR Acreage Report (July, 1989)

The state also provides most of the facilities for biking, hiking, hunting, picnicking, nature trail walking, and off-road vehicle (ORV) trails. The federal government controls about half of the water acreage for boating and fishing principally in the Youghiogheny River Reservoir.

An interesting deficiency appears in the miles of shoreline available for fishing. Apparently, shoreline access to Deep Creek Lake is about all that is available to anglers in the county. With several major fishing streams, such as the Youghiogheny River, Savage River, Bear Creek, Casselman River, and others in the county, a greater number of miles of shoreline access would be expected. However, the extensive private property ownership along most of the fishing streams and general lack of public shoreline easements makes angling access very limited.

#### State Park Camping and Day-Use Visitation

Three Maryland state parks are located within or near the Youghiogheny River corridor. Swallow Falls State Park is located at the southern end of the river corridor. West of Swallow Falls is Herrington Manor State Park and on the east side of Deep Creek Lake is Deep Creek Lake State Park. Day-use of these parks has grown markedly since 1980, while overnight camping has remained relatively stable (Tables C-6 and C-7). At Deep Creek Lake State Park, both day use and overnight camping appear to have leveled off during recent years. This may be due to the fact that the park campgrounds typically are at full capacity during the weekends from mid-June through Labor Day. The growth that has occurred has generally been during weekdays during this period and in the spring and fall seasons.

Table C-6. Day-Use and Overnight Camping Use at Deep Creek Lake State Park: 1980-1988

Year	Overnight Camping	Day Use
1980	25,683	39,823
1981	26,371	89,823
1982	28,104	76,509
1983	28,446	78,587
1984	26,865	90,689
1985	23,764	86,006
1986	27,238	90,749
1987	27,096	95,182
1988	27,083	95,273

Source: Use data provided by Deep Creek Lake State Park

Camping use at Swallow Falls and Herrington Manor State Parks has also remained relatively constant since 1985 (Table C-7). Some fluctuations in use, notably the decline in camping from 1987 to 1988 at Swallow Falls, have occurred. However, over the four year period, use levels changed little as summer weekend use was at or near capacity. Day use statistics for the two parks were not available, nor were camping use statistics prior to 1985. Prior to 1985, camping and day use statistics were combined into one overall use figure.

Table C-7. Overnight Camping Use at Swallow Falls and Herrington Manor State Parks: 1985-1988

Year	Swallow Falls	Herrington Manor
1985	10,926	13,901
1986	12,980	15,159
1987	12,002	13,532
1988	8,523	15,382

Source: Use Data Provided by Swallow Falls and Herrington Manor State Parks

The extent to which visitors to these state parks use the Youghiogheny River is unknown. Hiking along the river and fishing downstream from the falls are among the most popular activities at Swallow Falls State Park. Some whitewater boaters probably stay overnight in state park campgrounds, but the number of these boaters is unknown. Results of our visitor surveys showed that many boaters (30 % of rafters and 47% of kayakers) do use campgrounds, and about half of the money spent on camping accommodations is spent within Garrett County.

The Urban Research and Development Corporation (URDC 1988) has estimated that the demand for camping will increase 31 percent between 1988 and 1993. Current camping levels at the three state parks already exceed the URDC estimates for 1993. The projected growth in camping demand in the Youghiogheny River and Deep Creek Lake areas may be constrained in the future by facility limitations. With state campgrounds at or near capacity during popular summer months and full on weekends, growth will be limited to off-season and weekday opportunities. The Maryland Department of Natural Resources has no plans at the present time to expand camping facilities at any of the three state parks.

#### Fishing Activity in the Corridor

Freshwater fishing activity throughout the state of Maryland has generally been undocumented until recently. Fedler (1989a; 1989b) conducted two surveys to identify angler demand for trout and warmwater fishing in Maryland. In both studies, fishing licenses were sampled and selected anglers were sent a mail survey

to determine 1987 fishing locations and the number of trips to each location. For purposes of the present study anglers in the surveys who fished in the Youghiogheny River or its tributaries and Deep Creek Lake were identified. Estimates were made for both the number of anglers fishing these areas and the number of trips they made.

The number of anglers and total trips for trout fishing and trout and warmwater fishing from the two studies is shown in Table C-8. Angling on the Youghiogheny River and its tributaries, identified in the study as Muddy Creek and Bear Creek, totalled over 6,800 trout anglers and 9,500 combined trout and warmwater anglers during 1987. These anglers made over 69,000 trout fishing trips to the Yough and its tributaries during 1987 and an additional 28,000 trips to fish for warmwater species. The majority of this fishing occurs on Muddy Creek and Bear Creek.

Table C-8. Number of Anglers and Trips Made to the Youghiogheny River and Tributaries, and Deep Creek Lake During 1987

Type of Fishing	Youghiogheny River and Tributaries	Deep Creek Lake
Trout		
Number of Anglers	6,810	1,682
Number of Trips	69,870	17,626
Trout and Warmwater		
Number of Anglers	9,522	12,240
Number of Trips	97,696	137,700

Source: Fedler (1989a; 1989b) unpublished data

Deep Creek Lake trout anglers numbered nearly 1,700 during 1987. However, most of the angling on the lake is for warmwater species which is reflective of the 12,240 trout and warmwater anglers reporting having fished there. There were over 17,000 trout fishing trips made to the lake during 1987 and an additional 120,000 trips for warmwater angling.

Documentation of angling locations along the Youghiogheny River has not been undertaken by any resource management agency in Maryland. However, interviews with knowledgeable area resource management personnel (Riley 1989; Bachman 1989) provided some understanding of the more popular fishing locations along the Yough and their relative magnitudes of use. In general, much of the angling pressure on the Yough is focused in the Swallow Falls State Park (SFSP) area where river access is plentiful. Rainbow trout are stocked twice during the spring at the park. Opening days draw hundreds of anglers. During the remainder of the year, particularly during the summer, an average of 20-25 anglers can be found fishing during weekdays.

Weekend fishing pressure is significantly higher than weekday use during spring and summer months. Fishing activity does not extend much beyond the northern boundary of the park because of poor streamside access. A few dedicated anglers willing to wade the river can be found fishing downstream from the park.

Little fishing activity occurs downstream from the park to Hoyes Run except that by anglers wading from the park, as noted above, and by riparian property owners and friends. Limited access is available on private property at Hoyes Run. Fishing activity below Hoyes Run is again limited by lack of public access to the river. Anglers do have access to the river at the Natural Lands Trust property near the Sang Run bridge, however relatively little fishing activity is thought to occur in this area. Our observations during boater interview periods generally confirm this notion.

Angling activity between Sang Run and Friendsville is again limited by the absence of public access. Some anglers do walk up-river from Friendsville to fish but their numbers are not known.

#### **Hunting Activity in the Corridor**

Extensive hunting occurs within and adjoining the Youghiogheny River Scenic and Wild River Corridor. As with fishing, there is little specific information on hunting activity in the area but knowledgeable resource management personnel (Golden 1989; Riley 1989) have provided information useful in making a qualitative assessment.

White-tailed deer and wild turkey are the two primary species hunted in the corridor and surrounding lands. Deer are very abundant and turkey are plentiful due to high quality habitat. Some grouse and squirrel hunting also occurs in the corridor area but hunting for these species is relatively minor compared to that for deer and turkey.

Deer hunting pressure in the corridor is quite high on opening weekends. During this time, over 100 parked vehicles have been observed on the short stretch of road between Swallow Falls State Park and Herrington Manor State Park where hunters accessed the state forest to hunt deer. Several hunting clubs and individuals lease private land along the Youghiogheny River for deer and turkey hunting. Landowners and their families also use their own land extensively for hunting.

Black bear are growing in abundance throughout Garrett County and along the river corridor as well. The Maryland Wildlife Administration anticipates that a limited black bear season may be opened within the next five years (Golden 1989).

#### **Other Wildlife-Related Activity in the Corridor**

There are two other wildlife-related activities of note occurring in the corridor. At the present time there is extensive beaver trapping along the river and its tributaries. Beaver populations have grown considerably over the past several years along the Yough and particularly in the tributaries.

Two new species have been introduced into the Youghiogheny River watershed in the past 20 years. Fishers were introduced into the area in 1969 and have flourished and populated the Youghiogheny River drainage. They have spread their range into West Virginia and Pennsylvania as well.

In 1987, river otters were introduced to the Youghiogheny River in the Millers Run and Mt. Nebo area. Wildlife Administration biologists report that the five otters released have survived for two years and appear to be doing well. Establishment of these two species and the variety of wildlife currently existing in the corridor could provide the basis for increased wildlife viewing and photography activity.

#### Boating Activity in the Upper Corridor

Limited boating activity occurs in the upper portion of the Youghiogheny River from Swallow Falls State Park down to Sang Run. Numerous kayakers use the Swallow Falls area during periods of high water to run the falls. Some limited rafting also occurs during high water and is limited to the falls area. In the spring, some canoeing is undertaken on this upper section of the river but again the actual amount is unknown.

#### Activity Demand At Deep Creek Lake

Urban Research and Development Corporation (1988) recently completed a recreational carrying capacity study of Deep Creek Lake for the Maryland Forest, Parks, and Wildlife Service. In part of this study, URDC estimated current demand for various outdoor recreation activities commonly undertaken in the lake area and estimated the demand for the same activities during 1993. Table C-9 summarizes the current and future demand for the eight activities examined.

Table C-9. Estimated Recreation Demand Generated by the 1988 and 1993 Population of the Deep Creek Lake Watershed

Activity	Occasions Demanded		Percent Change
	1988	1993	
Camping	30,543	39,879	30.6
Cross Country Skiing	292	381	30.6
Fishing	89,354	116,666	30.6
Hunting	42,230	55,138	30.6
Motorboating	77,432	101,100	30.6
Sailing	17,632	23,022	30.6
Swimming (beach)	66,361	86,645	30.6
Waterskiing	40,007	52,236	30.6

Source: URDC, 1988: Appendix H



Participation in seven of the eight activities examined by URDC was quite extensive. Overnight camping estimates for 1988 were similar to the actual number of campers reported by the staff at Deep Creek Lake State Park (Table C-6).

Estimates of fishing activity by the URDC fall considerably short of current use estimates made by Fedler (1989a; 1989b). This is most likely due to the lack of consideration given by URDC to seasonal resident and tourist fishing activity that occurs in the area. Demand for fishing should continue to grow. This growth will come from increases in tourism and Department of Natural Resources fisheries enhancement programs for the Youghiogheny River and Deep Creek Lake. Angling along the Upper Yough will increase to the extent that riparian lands acquired by the DNR are made accessible to the public.

As would be expected, hunting, motorboating, beach swimming, and waterskiing all received heavy participation in the lake region. URDC projected that the number of occasions demanded for each of the eight activities in the year 1993 would increase by about 30% over 1988 levels (Table C-9). This increase was based on the assumption that the population of the lake region would increase by 30% and that activity participation rates per capita would remain the same as those for 1988. The validity of these two assumptions can be debated but, regardless of their accuracy, the lake region population is expected to continue to grow as is visitation from out-of-county residents. Both of these latter two factors should continue to drive the demand for outdoor recreation activities in the lake region. While most recreational activity will likely continue to be concentrated at Deep Creek Lake, it is reasonable to assume that some of the growth in tourism will spill over to the Youghiogheny River and will contribute to the demand for river recreation.

#### **Recreational Use of Youghiogheny River Lands by Owners**

A final component of this recreation assessment was to estimate the extent to which private landowners used their property for outdoor recreation activities. To gain this information, Youghiogheny River corridor landowners were sent mail surveys to obtain their views on river problems and management. The survey also asked the landowners to estimate the number of days they used their land for various outdoor recreation activities. A full description of the landowner survey methodology and results can be found in Section H of this report. A summary of the outdoor recreation activity reported by private landowners is shown in Table C-10. The majority of the landowners used their property for some recreational purposes. About 60 percent of the landowners reported using their land for fun and enjoyment. Half said that they used their land for hunting and 44 percent indicated that they fished on their property. Relatively few landowners used their land for boating, ATV use, camping, or snowmobiling.

There was a wide range in the number of days that riparian lands were used for any single activity. For example, some resident landowners reported using their property for fun and enjoyment all 365 days of the year. One property owner boated 180 days during the previous year. Some property owners were avid hunters and anglers. Those relatively few landowners who did participate generally spent relatively few days camping, snowmobiling, or using ATV's on their property.

Table C-10. Number of Days Youghioghney River Landowners Used Their Land for Recreational Activities

Activity	Percent of Landowners	Mean Number of Days	Range
Fun and Enjoyment	58	62	0-365
Hunting	50	14	0-90
Fishing	44	14	0-150
Camping	17	2	0-45
ATV Use	17	14	0-360
Boating	11	11	0-180
Snowmobiling	8	1	0-10

### Summary

Relatively little information exists about the extent and nature of recreational activities occurring in the Youghioghney River corridor. Camping is one popular activity that is concentrated in three state parks located within or near the river corridor and at other public and private areas. With campgrounds typically full on summer weekends, the amount of overnight camping in these parks has remained quite consistent since 1985. Growth in the numbers of campers during weekdays and during spring or fall may contribute to the growth of whitewater boating in the future.

Estimates from surveys of Maryland fishing license holders reveal that nearly 10,000 anglers fished the Upper Yough or its tributaries during 1987. Much of this angling takes place on Muddy Creek and Bear Creek and on the Youghioghney near Swallow Falls State Park. Relatively little fishing occurs downstream from the park because of limited public access to the river. Angling along the river can be expected to increase if public access is provided to additional riparian lands that are acquired by the state.

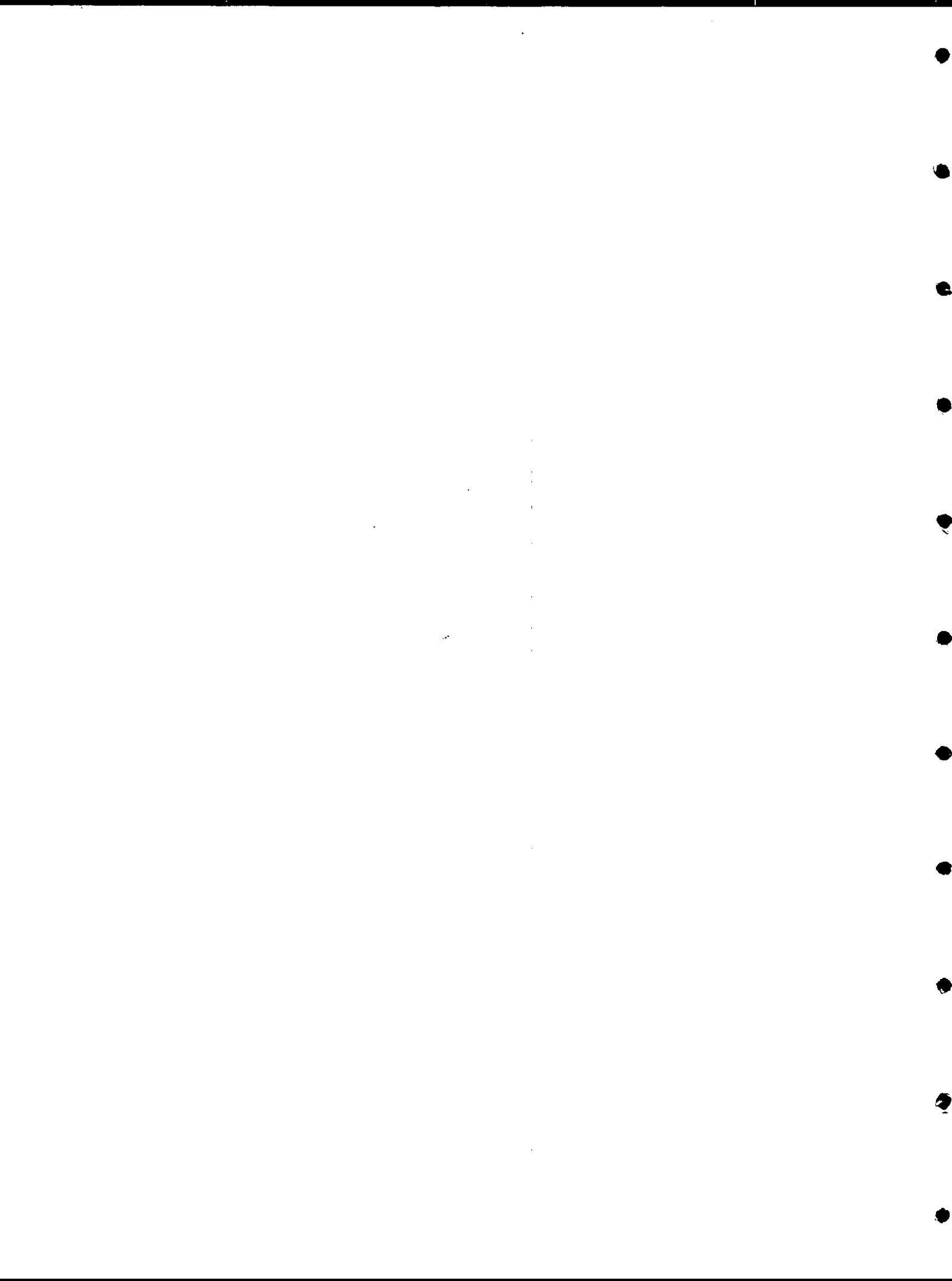
White-tailed deer and wild turkey are the two primary targets of hunters in the river corridor. Hunting occurs on state forest lands and private lands leased by hunting clubs and individuals. About half of the riparian landowners hunt on their own property. As in the case of fishing, any additional public lands opened to hunting can be expected to attract numerous hunters, especially on opening weekends.

Activity demand projections by URDC (1988) show increased participation across all outdoor recreation activities in the future. Whether or not their underlying assumptions of county population growth and rates of participation are correct, recent development in the Deep Creek Lake region and state park visitation data both indicate that greater numbers of people will reside in and visit the area during the years to come. Since one of the main attractions of the area is the opportunity for participation in outdoor recreation activities, the demand for most activities should continue to increase. The attractiveness of the Deep Creek Lake region as a desirable vacation area will be further enhanced with the completion of Highway 48 and improvements to several secondary roads.

Future growth in outdoor recreation activity participation in the Youghiogheny River corridor will be influenced by the amount of new access developed within the corridor. With a vast majority of lands within the corridor being held by private landowners and the Pennsylvania Electric Company, public access to the river and riparian land areas is highly limited. Without additional public access, recreational use of the river will remain much like it is today.

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## Section D

### Emergency Services Assessment

The purpose of this assessment is to identify processes for managing emergencies involving the persons using and the natural environment comprising the Upper Youghiogheny River corridor. *Emergency* is defined as any sudden or unexpected event requiring immediate action. Medical and rescue emergencies are those where the situation puts the survival of the individual in question. Fire emergencies are those where uncontrolled burning threatens the character and quality of resources or property. In general, emergency services are provided via institutionalized delivery systems.

The term *emergency services* refers to the services provided between the notification that an emergency exists and the accomplishment of appropriate actions to minimize the threat posed by the emergency. In the case of medical emergencies, accomplishment of appropriate action is the treatment of the emergency victim(s) at a medical care facility (e.g. hospital); for rescue emergencies, the removal of victim(s) from sites of threat; and for fire emergencies the control and suppression of the burning. *Emergency management*, whether involving persons or the environment, may be accomplished by two means: through prevention of emergency situations and through implementation of appropriate procedures when prevention fails.

The following discussion will examine both of these means from the perspectives of personal and environmental emergencies. Although the bulk of this assessment is devoted to implementation of procedures for situations where prevention has failed, MDNR should give equal consideration to both of these aspects in the development of its river management plan.

### Prevention of Emergencies

Most of the property which constitutes the Upper Youghiogheny River corridor is privately owned, and private ownership implies limited access and private use. These limitations of access and use preclude MDNR from the responsibility for management of many of the activities undertaken by persons within the corridor.

However, concomitant to its responsibilities for preserving the wild nature of the Upper Youghiogheny, the Maryland Department of Natural Resources has responsibility for preserving the safety of persons involved in activity using the publicly owned resources of the corridor. These resources include public lands and the Youghiogheny River itself. Thus, the range of activities undertaken on public lands within the corridor and on the river fall under MDNR jurisdiction. The combination of the land-locked character of much of the public land within the corridor and the rights of private property owners against trespass imply that MDNR should focus on access to the corridor via the river in issues related to prevention of emergencies.

### Personal Safety Emergencies

The groups known to access the corridor via the river include private and commercial boaters, and to an extent, prevention of emergencies involving these persons has been addressed in MDNR regulations governing commercial whitewater operations on the Upper Yough (MDNR, 1989). These regulations seek to assure that only qualified outfitters and guides conduct persons down the river, that the numbers of commercial craft and customers on the river do not exceed an upper limit, that the ratio of qualified guides to customers never falls below 1:3, that commercial customers are informed of the risks associated with recreational boating on the section of the Upper Youghiogheny between Sang Run and Friendsville, that commercial craft are adequate to the demands of the Upper Youghiogheny River, and that commercial customers are appropriately equipped and outfitted to avoid personal injury.

The regulations, however, fail to address three important issues relevant to the prevention of personal safety emergencies on the Upper Youghiogheny River.

1. While they imply a minimum required level of skill in whitewater boating for trip leaders and guides,<sup>1</sup> they do not specify any minimum level of experience on the Upper Youghiogheny for whitewater guides.
2. They do not adequately address the minimum level of skill required of private boaters (both rafters and kayakers) intending to travel the length of the Upper Youghiogheny from Sang Run to Friendsville.
3. The regulations do not respond to varying levels of risk associated with varying water levels.

Navigation of the Upper Youghiogheny requires high levels of whitewater boating skill and familiarity with the technical demands of the conditions prevailing at the water level on any given day. Because private kayakers and rafters do not generally assume specific responsibility for the safety of other boaters when using the corridor, deficiencies of skill or familiarity among these boaters tend to place only single individuals at risk. Each commercial guide, however, is responsible for bringing him- or herself and up to three other boaters safely through the corridor. Despite provisions of the regulations stipulating that "customer[s] should have previous whitewater experience before participating in a commercial whitewater trip on the Youghiogheny Wild River" (MDNR, 1989, 08.15.04.04B (4)), guides sometimes find themselves conducting trips for boaters with little or no previous whitewater experience. Since the level of risk associated with navigating the Upper Youghiogheny is likely to be related to a guide's skill on whitewater generally and on the Upper Youghiogheny River at the water level of the particular trip specifically, it is incumbent upon MDNR to establish criteria whereby the sufficiency of guides' experience and skill for safely conducting passengers down the Upper Youghiogheny can be established. Such criteria for commercial whitewater guides are in place on West Virginia's Gauley, Cheat, New and other rivers:

A trip guide must have made a minimum of ten trips on a river or rivers of comparable or higher American Whitewater Affiliation class rating to the river portion to be guided, of which three trips were on the river portion to be guided . . . and must have a thorough knowledge of the area traversed (WVCWAB, 1987, p. 6).

Less challenging rivers, such as Pennsylvania's Lehigh, while regulated by that state's Department of Environmental Resources, have no experiential requirements for whitewater guides, although personal characteristics of "maturity, judgement, and ability to react when in contact or control of large groups of persons in emergency situations" are demanded (CPDER, 1986, p. 3).

Recognition of the need for increasingly skilled guides under conditions of rising water levels has also been addressed by West Virginia whitewater administrative rules:

For commercial whitewater operations on . . . [Class V rivers, it may be required that] a trip guide attest that he has made a minimum of three trips on the [particular] River when the river flow equalled or exceeded 1,000 cubic feet per second (WVCWAB, 1987, p. 6).

No such provisions are in place on Pennsylvania rivers regulated by the Department of Environmental Resources.

Another concern with respect to the role of whitewater guides in the prevention of emergencies relates to trip leaders. Provisions of MDNR regulations of commercial whitewater boating on the Upper Youghiogheny River are inadequate as compared with the regulations of nearby states in that they do not specify any criteria for establishing adequate levels of experience for group leaders. Guides who act as trip leaders in Pennsylvania's Lehigh Gorge are limited to "those . . . [with] at least one year experience under similar conditions" and satisfying all other requirements of whitewater guides (CPDER, 1986, p. 4). West Virginia regulations (WVCWAB, 1987, p. 6) describing those who qualify to be trip leaders on the Gauley, Cheat and New Rivers (all more similar to the Upper Youghiogheny than is the Lehigh River) are more stringent. These regulations require that trip leaders have completed instruction in "safety and emergency procedures, . . . have a thorough knowledge of the area traversed, . . . be knowledgeable and capable of giving a suitable orientation talk to passengers on such subjects as personal flotation devices and safety" as well as:

Have made a minimum of twenty trips on a river or rivers of comparable or higher American Whitewater Affiliation class rating to the river portion to be guided, of which six trips were on the river portion to be guided.

To some extent, the qualities demanded by nearby states are deemed a function of age as reflected in West Virginia's requirements for commercial trip leaders (at least 20 years of age) and whitewater guides (at least 18 years of age). In Pennsylvania's Lehigh Gorge, commercial trip leaders must be at least 18 years of age and whitewater guides at least 16 years of age. MDNR's Upper Youghiogheny River guide requirements conform to the ranges established by nearby states; however, as already noted, no provisions have been made for trip leaders.

### Threats to the Natural Environment

Portions of the Annotated Code of Maryland related to the wild and scenic designation of the Upper Youghiogheny River corridor limit uses of privately-owned property, and thereby, limit willful creation of both emergency and non-emergency threats to the natural character of the corridor. At the same time, current whitewater boating regulations prohibit activities which are likely to result in willful emergency or non-emer-

agency threats to the natural environment. As relates to commercial activities, this is accomplished by requiring that land use regulations are followed and by making each permitted outfitter responsible for environmental quality by prohibiting the discarding of refuse, open fires, and removal of plant life.

Although law and regulation can do little to limit many of the circumstances from which natural environmental emergencies arise (emergencies arising from acts of nature such as earthquakes, tornados and other severe weather, and flooding are beyond the scope of this assessment), fires, of both natural and human origin, represent emergencies the prevention of which can be addressed through planning.

To a certain extent, the regulations governing whitewater boating on the Upper Youghiogheny address prevention of fire emergencies of human origin by prohibiting the "... build[ing], kindl[ing], or hav[ing of] an open fire within the Youghiogheny river scenic corridor" (MDNR, 1989, 08.15.04.07A) by commercial boaters. Maryland's Department of Natural Resources: Forest, Parks and Wildlife - Cooperative Forest Management unit (MFPWS) addresses fire prevention in its implementation of the Garrett Project, Special Fire Problem: Youghiogheny River Fire Plan. This plan identifies the need for MFPWS personnel to interact with land owners and commercial outfitters and to place fire danger warning signs at the Sang Run Upper Youghiogheny River access area. It appears that no further actions are needed to improve the process of natural resource fire prevention in the corridor.

#### Recommendations

The following recommendations are offered to address the specific weaknesses of MDNR regulations pertaining to prevention of emergencies in the Upper Youghiogheny River corridor.

**Experience of Commercial Guides.** Establishment of trip leader requirements based on skill, experience and maturity are highly recommended. At the same time, it is strongly recommended that MDNR implement criteria requiring each commercial guide to have *sufficient experience on the Upper Youghiogheny River* to qualify him/her as a Youghiogheny River guide. As required in the current regulations, this certification should be signed by the outfitter who will employ the particular guide during the term of the registration and be submitted with the annual application for registration as a Youghiogheny whitewater guide (MDNR, 1989).

Following the precedent set by West Virginia's regulations, *sufficient experience* should be defined in terms of a minimum number of training trips conducted by experienced Youghiogheny River guides at varying water levels. Specifically, it is recommended that trip guides must have made a minimum of ten trips on rivers of comparable or higher AWA class rating, at least three of which were on the Upper Youghiogheny. Trip leaders should have made at least twenty trips on comparable rivers and six trips on the Upper Yough. Finally, in light of the increased risk associated with running the river at higher water levels, trip guides should be required to attest that they have made a minimum of three trips on the river when the river flow was equal to or higher than the conditions for the particular trip to be guided.



**Installation of Warning Signs.** At present, the emphasis of MDNR regulation of boating in the Youghiogheny River corridor is on commercial operations. Outfitters are required to alert commercial boaters of the nature of the risks and hazards associated with navigation of the Youghiogheny. This is done through outfitters' brochures and release forms signed by customers before their river trips. However, no process has been implemented to alert private boaters (kayakers and private rafters) of hazards including the "extremely difficult, long and very violent rapids with highly congested routes; rescue conditions [which] are difficult; significant hazard to life in the event of a mishap; [and the need for] previous whitewater experience before participating in a . . . whitewater trip on the Youghiogheny Wild River" (MDNR, 1989, 08.15.04.04C). It is recommended that warning signs similar to those in place on West Virginia's New River be prominently erected along the road on either side of the Sang Run access area as well as at known private boater launch areas. The signs should conform to the restrictions of the Youghiogheny Wild River legislation and regulations. If such signs are deemed inconsistent with current regulations, MDNR should seek exemption to the regulations in the interests of public safety.

As suggested above, variations in the degree of risk to persons boating on the Upper Youghiogheny are strongly related to variations in water level, among other factors (see Section B for further discussion of this issue). Small increases in the water level (as measured on the gauge at the Sang Run bridge) can result in significant increases in the technical difficulty of boating on the river. Commercial outfitters recognize the subtleties of these variations in level, and many have established their own upper limits for conducting commercial trips down the Upper Youghiogheny. (Field observations have found these to range from 2.5 to 3.0 feet as measured on the Sang Run bridge gauge). Most kayakers also are aware of the increasing risks of higher water levels and many stay off of the river when it is above their own safe level. To date, use of the river at higher water levels has been self-regulated. This is true for other nearby rivers as well. Thus, it does not appear necessary to define an upper limit for water level on the Upper Youghiogheny. Closing the river at some designated level would unnecessarily restrict the activity of those who are willing and able to accept the challenge. MDNR should, however, take steps to assure that all potential river users are aware of the risks associated with higher water. This can be done by explaining the increased risk associated with higher water on all warning signs posted at the river.

Warning signs installed at put-in points on the Upper Youghiogheny should include the following information:

**WARNING: CLASS V RIVER**

**THE UPPER YOUGHIOGHENY RIVER BELOW THIS POINT  
CONTAINS MANY STEEP, CONGESTED RAPIDS  
REQUIRING EXPERT SKILLS AND LOCAL KNOWLEDGE.**

**WATER LEVELS CAN RISE SUDDENLY AND  
UNEXPECTEDLY DUE TO UPSTREAM HYDROPOWER  
RELEASES.**

**SMALL INCREASES ON THE BRIDGE GAUGE  
REPRESENT SUBSTANTIAL INCREASES IN  
WATER VOLUME AND LEVEL OF DIFFICULTY.  
A READING OF 2.4 FEET INDICATES TWICE  
THE WATER VOLUME AS 1.9 FEET. THE  
WATER VOLUME AT 2.8 FEET IS THREE  
TIMES GREATER THAN THE FLOW AT 1.9 FEET.**

### **Implementation of Emergency Procedures**

This section of the assessment examines the character and limitations of emergency services implementation in the Upper Youghiogheny River corridor. Due to limitations of information and system structure, the service area examined in the assessment of medical and rescue services is Maryland EMS Region I (refer to Figure D-1), with emphasis on Garrett County generally and the area described as the Upper Youghiogheny River recreational boating corridor specifically. The emergency fire services (EFS) assessment focuses directly on the Upper Youghiogheny River corridor.

The following sections will describe traditional EMS (emergency medical services) and EFS as well as informal systems of rescue within the defined area. (EFS and EMS share common structures and facilities in Garrett County. Each assessment will, therefore, focus on similar basic components of manpower, training, communications, transportation or equipment, and facilities.) Factors generally constraining delivery of services in Garrett County and in the river corridor specifically are considered. This assessment also reviews the strengths and weaknesses of MDNR regulations governing commercial boating on the Upper Youghiogheny as

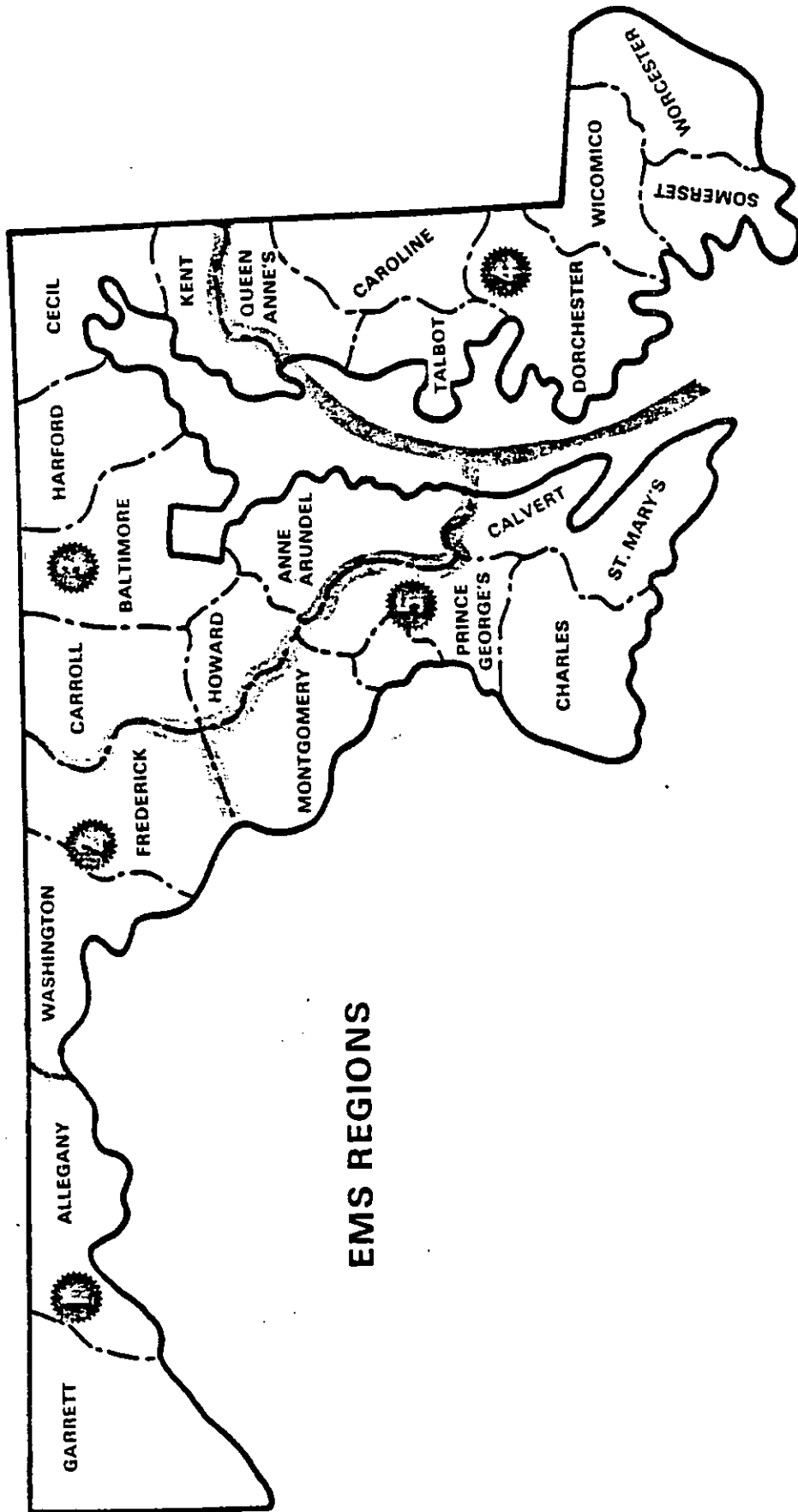


Figure D-1. Maryland EMS Regions including EMS Region 1: Garrett and Allegany Counties

they relate to limitations of emergency services delivery in the corridor. Finally, recommendations are offered to address the constraints of emergency services delivery within the corridor.

### **Medical and Rescue Services Assessment for Emergencies Involving Persons**

Only in cases where special circumstances make institutional delivery of services impossible do EMS and emergency rescue require separate consideration. Therefore, for the purposes of this discussion, unless a distinction is made between EMS and emergency rescue, EMS will refer to the institutionalized system of services delivery.

Emergency medical services (EMS) is concerned with services provided in three settings: mobile (services provided in transport vehicles by vehicle staff), ambulatory (services provided in emergency rooms and similar settings), and short-term inpatient (services provided in specialized care facilities (e.g. trauma units, general intensive care units of acute care hospitals). The basic components of an emergency medical services system are:

1. **Manpower:** the health professionals, allied health professionals and others with appropriate training and experience to provide a "safe degree of advanced life saving" (HSAWM,1980, 383) care,
2. **Training:** the provision of appropriate training, continuing education and certification to skills acquired for the delivery of EMS,
3. **Communications:** the network of equipment, linking personnel and facilities which enable EMS alert, dispatch and transport coordination,
4. **Transportation:** the ground, air and water vehicles and other transportation facilities which are properly equipped to meet the transportation and EMS characteristics of the service area, and
5. **Facilities:** the primary, acute and critical care units and their staffs which are equipped and staffed to meet the special needs of emergency medical stabilization, life support and treatment.

In the following paragraphs, the components of EMS for the service area including Garrett County and the Upper Youghiogheny River recreation boating corridor are examined in detail.

**Manpower.** The array of personnel involved in EMS delivery is wide, and includes first responders,<sup>2</sup> communicators,<sup>3</sup> EMTs,<sup>4</sup> emergency room RNs, paramedic and nurse mobile intensive care unit coordinators, physicians, and EMS administrative staff. Minimum compliance with federal guidelines demands that at least two emergency medical technicians crew each ambulance run. EMS manpower adequacy occurs where the numbers of all types of personnel are sufficient to provide coverage within the service area on a 24-hour, 7-day-a-week basis. Based on guidelines established by the Health Maintenance Organization Act of 1973 (P.L. 93-222), Region I, of which Garrett County represents roughly 50%, is underserved in all but the physician and RN components of EMS personnel (Table D-1).

Table D-1. EMS Manpower Assessment-Maryland EMS Region I

Manpower Category	Number		Percent Compliance
	Trained	Required	
Citizen CPR <sup>5</sup>	15,500	26,500	58%
1st Responder <sup>6</sup>	95	120	79%
EMT <sup>7</sup>	614	720	85%
CRT <sup>8</sup>	80	168	48%
ER Nurse	36	36	100%
ER Physician	10	10	100%

Source: HSAWM, 1980, p. 384.

**Training.** "Handling of patients without [the] appropriate skills or [with] lack of knowledge about what to do in an emergency may result in the victim becoming more seriously ill or may even result in fatality" (HSAWM, 1980, 419). Annual EMS training in Region I includes an average of sixty citizen CPR courses offered by the American Heart Association in cooperation with the American Red Cross. Local EMS providers indicate that no Advanced First Aid courses have been taught in Garrett County in at least the past five years (Spiers, 1989). These courses are designed to equip trainees with the skills necessary for the provision of basic life support until the arrival of more advanced life support as detailed in Table D-2.

Table D-2. Time Requirements and Objectives of Selected American Red Cross EMS Training Courses.

Course	Time Commitment	Objective
CPR <sup>9</sup>	4 to 8 hours	Prevention of deaths from cardiovascular disease, and breathing, choking, or respiratory emergencies.
Advanced First Aid	40 hours	Development of functional first aid capability for emergency care of the sick or injured.

In addition, EMS training is offered for first responders (police and public safety officials trained and equipped to a level defined in Maryland's Crash Injury Management Program), EMTs, called the backbone of basic EMS life support, CRTs, and advanced cardiac life support technicians by the Maryland Fire and Rescue

Institute and the Maryland Institute of Emergency Medical Services System. It is the responsibility of the Maryland Institute of Emergency Medical Services System to certify the skills of EMTs, and the Maryland Board of Medical Examiners to certify the skills of cardiac rescue technicians. Differences in skill levels between Advanced First Aid/citizen CPR certificate holders and EMTs and CRTs are related to the ability to perform critical emergency surgical procedures (i.e. tracheotomy), and the ability to administer medications and intravenous treatments as directed by physician radio direction.

The emergency medical skills training required of whitewater guides registered to operate on the rivers of nearby states includes American Red Cross Standard First Aid and American Red Cross CPR certification.<sup>10</sup> The Annotated Code of Maryland: 08.04.04.12(F) is somewhat more stringent, requiring a minimum EMS skill level for individuals registering as whitewater guides which is met if "... individual holds a CPR certificate, Red Cross Advanced First Aid certificate or equivalent."

The Maryland Institute of Emergency Medical Services System and the Region I EMS Council are also responsible for the presentation of programs and workshops to meet special EMS needs of the service area. It is recommended that the Maryland Department of Natural Resources in cooperation with Youghiogheny River outfitters contact the Maryland Institute of Emergency Medical Services System to establish a regular schedule of EMS training for guides and trip leaders. EMS training for this group should be offered not less often than once per year so that new guides and trip leaders may be continually trained and seasoned guides and trip leaders may receive re-certification of skills.

**Communications.** Minimum compliance with federal guidelines demands that an EMS communications system be comprised of radio communication for vehicle control and medical control and consultation. Effective EMS communication demands more:

1. a system to allow rapid request for aid (e.g. telephone 9-1-1 system) - a 9-1-1 system was implemented in Garrett County in 1978;
2. a system to allow response and control (e.g. central dispatch) - WMEMS Region I including Garrett County participates in the statewide EMS communications system which allows emergency vehicles and facilities to have communication with all other levels of the EMS communications network including transport vehicles, dispatch centers, resources centers, hospitals, specialty care centers and facilities in neighboring states which local EMS utilizes; and
3. a system to allow medical communication involved in patient care (e.g. EKG telemetry and remote physician direction).

The Maryland Emergency Medical Services Communication System enables both response and control and medical communications functions by establishing a network between central alarms, ambulances, hospitals, the systems communication center and medivac helicopters. This system has been completed to all counties of the state.

**Transportation.** Compliance with minimum federal guidelines requires that EMS transportation vehicles must meet "appropriate standards relating to the location, design, and performance and equipment and the operators and other personnel of such vehicles and facilities must meet appropriate training and experience requirements" (HSAWM, 1980, 389). These guidelines further stipulate that ambulance vehicles must be crewed by a minimum of two EMT trained personnel per run and that ambulances be located to permit a maximum 30 minute accurate response time in rural areas.<sup>11</sup>

Northern Garrett County, including the Upper Youghiogheny River recreational boating corridor, is served by two volunteer ambulance companies:

1. Henry Clay Ambulance Service with ambulances located at Marclaysburg, Pennsylvania (7 miles from Friendsville) and Farmington, Pennsylvania (15 miles from Friendsville), and
2. Northern Garrett County Rescue Squad with ambulances located at Grantsville, Maryland (15 miles from Friendsville), Accident, Maryland (6 miles from Friendsville), and, periodically,<sup>12</sup> at Friendsville, Maryland.

Northern Garrett County Rescue Squad responds first to emergency calls north of Deep Creek Lake, including the Youghiogheny River recreational boating corridor.

In addition, private ambulance services are provided by three local ambulance companies. In general, however, private ambulance companies provide transport services only and do not respond to EMS calls.

Northern Garrett County Rescue crews consist of a minimum of three persons, at least two trained to the minimum EMT-A level. Henry Clay crews also consist of three persons, at least two of whom are EMT-A trained. Since the advocated training for "individuals who arrive at the scene of [an injury] first and perform the initial patient stabilization" (HPCAM, 1976, 187) is the 81-hour Maryland Department of Transportation EMT-A course, nearly 100 % of local ambulance attendants likely to respond to medical emergencies in the Upper Youghiogheny River recreational boating corridor meet the qualification. Where cardiac rescue technicians or allied medical<sup>13</sup> personnel from the local medical establishment assist in an ambulance response to an emergency medical situation, their qualifications surpass the minimum training standards. The complement of vehicles and personnel attached to each of the volunteer companies is indicated in Table D-3.

Ambulance companies respond on a 24-hour basis and dispatch EMS crews within a matter of minutes as indicated in Table D-4.

Cooperative agency agreements related to responsibility for emergency response are in place between fire departments and ambulance services. Unless otherwise instructed, ambulance crews utilize the hospital nearest to the emergency.

Since transport of victims across state lines is common from Garrett County, a need exists for transport agreements for Maryland origin ambulances to transport across state lines to hospitals in West Virginia and Pennsylvania. Although reciprocity agreements currently exist with West Virginia, no such agreements are in place with Pennsylvania. Although it is neither the responsibility nor the province of MDNR to participate in

the reciprocal emergency transport agreement process, it is recommended that MDNR encourage Garrett County rescue services agencies to seek reciprocity agreements with Pennsylvania medical facilities.

Table D-3. Vehicle and Personnel Assessment of Ambulance Companies Serving the Area Around the Upper Youghiogheny River Recreational Boating Corridor

Ambulance Company	Number of KKK-A-1822 Vehicles <sup>14</sup>	Number of Trained Personnel				
		Total	Adv. CPR	EMT	CRT	Paramedics
Henry Clay Ambulance	2	18	0	17	0	1
Northern Garrett County Rescue	4	75	5	50	15	5

Source: Personal interviews with Beal, Bowser and Humbert: Northern Garrett County Rescue Squad and Henry Clay Ambulance Service.

Table D-4. Time Between Receipt of Emergency Call and Ambulance Leaving Station of EMS Providers Serving Upper Youghiogheny River... Recreational Boating Corridor

	Dispatch Time <sup>15</sup>
Northern Garrett County Rescue Squad	
Grantsville location	5 minutes
Accident location	5 minutes
Friendsville location	5 minutes
Henry Clay Ambulance Service	
Marclaysburg location	10-15 minutes
Farmington location	1 minute

Source: Personal interviews with Beal, Bowser, and Humbert: Northern Garrett County Rescue Squad and Henry Clay Ambulance Service.

Supplementary to local ambulance services, and essential to meeting EMS demands of rural western Maryland, the Maryland State Police operate medivac helicopters stationed at Cumberland, Maryland, 44 miles from Oakland - the location of the acute care facility nearest the Upper Youghiogheny River recreational boating corridor and the most likely facility for EMS patient removal for advanced life support and stabilization. (A small Bell-Jet Ranger with the capability to transport up to two patients has recently been replaced with two larger helicopters. In addition to simple transport capability, these vehicles have the ability to lift a



victim from an emergency site by means of a lowered cable.) Interstate air transport, particularly to critical care centers in Pittsburgh, Pennsylvania, is accomplished via Life Flight stationed there.

Helipads have been constructed at the acute care facilities located in Oakland at Garrett Memorial Hospital, in Cumberland at both Cumberland Memorial Hospital and Sacred Heart Hospitals and in Hagerstown at Washington County Hospital.

EMS patients can be transported from Oakland to critical and specialized care facilities in Baltimore, Morgantown, Pittsburgh or Washington, D.C. within the recommended delivery time.<sup>16</sup>

The weaknesses of EMS helicopter removal of victims throughout Garrett County, including the Upper Youghiogheny River recreational boating corridor, are threefold:

1. The distance which the aircraft must travel to pick up a patient employs a significant proportion of the critical 60 minute period.
2. Weather conditions including high winds and thick, localized fog may prohibit landings but not take-off.
3. There are no facilities or areas available to allow landing of helicopters within the Youghiogheny corridor.<sup>17</sup>

Furthermore, not all of Garrett County is accessible by medivac helicopter, and Maryland "protocols determine that the medivac helicopters should fly only to designated specialty centers, not [to] trauma centers" (HSAWM, 1980, p. 386) as described in the next section.

**Facilities.** The Upper Youghiogheny River recreational boating corridor is located in the service area of Garrett Memorial Hospital, a general acute care facility. Garrett Memorial has been accredited by the Joint Commission on Accreditation of Hospitals and is a contracting participant in the Blue Cross Plan of Maryland.

Garrett Memorial is situated in Oakland, Maryland, 9 miles from the access to the whitewater sections at Sang Run, and 12 miles from the egress from the whitewater sections at Friendsville. The facility's services include an intensive cardiac care unit (although there is no cardiologist located in Garrett County), a blood bank, electroencephalography, and an emergency department. Garrett Memorial's emergency department is staffed around the clock by an emergency RN. Physicians are on call 24 hours per day. The facility is equipped to provide care for general emergency, trauma, spinal cord injuries, burn injuries and acute coronary conditions with varying levels of sophistication.

Hospitals in neighboring states routinely used for emergency life support and stabilization of Garrett County patients include those located at Meyersdale, Pennsylvania (25 miles from Friendsville), and Morgantown, West Virginia (41 miles from Friendsville).

As indicated, critical care capability in Garrett County, and therefore in the Upper Youghiogheny River recreational boating corridor and nearby is limited. Coronary patients can be adequately treated at the Oakland facility; however, in other emergency situations, and "when necessary to ensure the maximum

recovery of the patient, the EMS system ... provide[s] ... transfer of patients to facilities which offer definitive follow-up care and rehabilitation" (HSAWM, 1980, p. 404).

Local trauma care consists of the provision of basic resuscitation and life support. For those "cases which are beyond the capabilities of local facilities, such as severe ... trauma ... hospitals [outside the immediate area] are used" (HPCAM, 1972, p. 187). Patients are transferred to one of three regional trauma centers as indicated in Table D-5.

Table D-5. Location and Travel Distance of Regional Trauma Centers from Local Stabilization Site (Garrett Memorial Hospital, Oakland, Maryland)

Trauma Center	Location	Distance from GMH
Maryland Institute of Emergency Medical Service Systems	Baltimore	188 miles
West Virginia University Medical Center	Morgantown	41 miles
Washington County Hospital	Hagerstown	108 miles

Source: HSAWM, 1980, p. 398

A similar limited care situation exists with respect to specialty injury treatment capability. Patients are stabilized, provided with basic life support and transferred to specialty care facilities in Maryland and surrounding states (Table D-6).

Table D-6. Location and Travel Distance of Specialty Care Centers from Local Stabilization Site (Garrett Memorial Hospital, Oakland, Maryland)

Trauma Center	Location	Distance from GMH
<b><u>Burn Injuries</u></b>		
Baltimore City Hospital	Baltimore	188 miles
Mercy Hospital	Pittsburgh	106 miles
Western Pennsylvania Hospital	Pittsburgh	106 miles
<b><u>Spinal Cord Injuries</u></b>		
Maryland Institute of Emergency Medical Service Systems	Baltimore	188 miles
<b><u>Hand Injuries</u></b>		
Union Memorial Hospital	Baltimore	188 miles
<b><u>Eye Injuries</u></b>		
Georgetown University Hospital	Washington, D.C.	171 miles

Source: HSAWM, 1980, p. 398-401, 403.

### Factors Limiting Delivery of Traditional EMS

The Upper Youghiogheny River recreational boating corridor is located in Garrett County, Western Maryland EMS Region I. A number of characteristics of Garrett County limit the effectiveness of general EMS provision including terrain (Garrett County is characterized by numerous mountain ranges and the Appalachian plateau), size (the County EMS service area is 657 square miles), remoteness (Garrett County's population is sparsely distributed - an average 40 persons per square mile),<sup>18</sup> wilderness character (there is little to no access to particular portions of the County including the Youghiogheny River corridor), and the marginal condition of the majority of roads (the majority of Garrett County's roads are two-lane county or municipal maintenance routes. The only roads that provide access to the Youghiogheny River corridor are abandoned logging and mining trails which limit traditional motorized traffic to high-ground clearance, four-wheel drive vehicles.).

There are additional limitations affecting EMS delivery, particularly in the northwestern corner of Garrett County near the Youghiogheny River recreational boating corridor. First, emergency response time is potentially greater than the recognized 30 minute "critical period". Second, there is poor communication signal transmission such that ambulance companies "could have difficulty maintaining radio contact with medical communication and physical direction contacts" (HWAWM, 1980, 387) (In this respect, the narrow and deep Youghiogheny River valley is the most significantly affected region of Garrett County, although local rescue and fire personnel report successful communications from inside the corridor to the EMS transmitter facility at Friendsville via hand-held, very low frequency radios). Finally, an adequate number of voluntary personnel are not available at certain times of the day (especially between the weekday hours of 8 a.m. and 5 p.m.)

The Upper Youghiogheny River recreational boating corridor is a remote area, and emergencies occurring in such settings are differentiated from emergencies in other settings by additional problems related to two factors: communication and distance. The largely uninhabited and therefore undeveloped character of remote areas means that there are no simple means available for alerting public safety personnel of the nature and extent of an emergency. Making matters worse, in a remote area emergency, distance is a function of time: the time required for someone to go for help,<sup>19</sup> or the time required for someone to realize that something has gone wrong, to obtain help, to locate the emergency victim(s), to get the necessary assistance to the victim(s), and to evacuate the victim(s) from the emergency situation.

Those characteristics that generally limit EMS delivery in Garrett County (terrain, size, rural population and accessibility) are compounded by the special character of the river corridor. Specifically:

1. **Terrain:** the most extreme features of mountainous Garrett County characterize the Youghiogheny River course, a narrow winding valley descending between steep, tree shrouded walls. Assuming that EMS personnel could enter the corridor to provide care for emergency patients, the high, steep walls of the whitewater gorge would make EMS communications with dispatchers and/or remote medical personnel impossible.

2. **Size:** The Youghiogheny River whitewater boating corridor, while narrow and only 14 miles long, is nearly invisible from mountaintops and is, in some sections, impassible by helicopter, making search and rescue operations hazardous and lengthy. Furthermore, weather conditions may delay search or make efficient technological assistance (i.e. helicopter search efforts) impossible.<sup>20</sup>

As regards whitewater emergency evacuations in terrains similar to that of the Youghiogheny corridor, officials of the Lehigh (Pennsylvania) State Park recommend land-based versus air-transport as the "more efficient" (Young, 1989). Acceptance of Lehigh officials' assessment makes the issue of landing areas on ridge tops adjacent to the corridor moot. Thus, a scenario involving emergency evacuation of Upper Youghiogheny River accident victims via helicopter would most likely require both land-based rescue (evacuation from the river corridor to a transport location at or near Friendsville) and air removal from a suitable landing and take-off site (e.g. the Friendsville Elementary School grounds).

3. **Rural population, remote character, lack of roads:** The protected status of the Youghiogheny River as a wild river has helped to keep the corridor largely uninhabited. The few residential structures located within the corridor are situated well away from the river, offering little in the way of potential assistance or access to emergency sites within the corridor.
4. **Accessibility:** The river "highway" is traversable only so long as there is adequate water flow for navigation. Since adequacy of water flow is primarily a function of intermittent, timed releases from Deep Creek Lake, by the time an emergency has occurred and been communicated to the proper authorities, the water level is often too low to allow water access to the emergency site.

At the present time, emergencies occurring in the corridor are handled according to a protocol jointly developed by local emergency agencies (police, rescue squads and ambulance services) and representatives of the commercial outfitters operating on the Upper Youghiogheny. The agreement was accomplished after consideration of particular special features of the corridor, namely the lack of road access suitable for ambulance use, difficulty of foot access to the corridor for ambulance and rescue personnel with heavy or bulky equipment, and the late time of day at which emergency and rescue calls are generally received.

The USGS topographic map shows a road (apparently an abandoned mining road) that connects Friendsville to Kendall (the terminus of the Upper Youghiogheny whitewater section) on the west bank of the Upper Youghiogheny River, and an abandoned logging road connects Friendsville to a point below National Falls on the east bank of the river. Ambulances, however, cannot approach victims of accidents occurring within the corridor closer than the bridges at Sang Run or Friendsville (refer to Figure B-1, page B-2). The surface of the abandoned roads limits emergency rescue of victims on either side of the river to high-ground clearance, four-wheel drive vehicles. Although ambulances with such characteristics do exist, none is owned by Garrett County rescue squads. Neither, it is reported, are funds presently available for the procurement of such a vehicle (Speirs, 1989). (It should be noted that local rescue service providers are aware of the availability of grant funds for improvement and expansion of rural EMS facilities and equipment. The reasons given for failure to acquire these funds are administrative - too little time or expertise to allow completion of grant applications - as well as financial - too little money available for local match. MDNR administrative support

might eliminate the administrative roadblocks to upgrading, and MDNR may be able to offer recommendations for identifying a broader funding base for the provision of the local share if the intent is primarily to improve services in the event of commercial boating accidents in the corridor.)

The terrain of the corridor in question is steep, heavily wooded and difficult to traverse even for those who have explored it thoroughly. Since the privately owned status of most of the land in the corridor has limited exploration, search and rescue efforts require significant amounts of time to identify routes. The equipment necessary for cross-country travel and rappelling for search and for cross-country removal of victims (e.g. Stokes baskets) is not among that currently owned by local rescue squads. The number of trained emergency personnel available to cover the requirements of Garrett County is insufficient even under ordinary conditions. The time required for emergency personnel to explore and penetrate the territory, then locate, treat and remove emergency victims from the corridor is deemed unacceptably long. Although "access to most whitewater hazards is possible by four-wheel drive vehicle by way of property owned by [Richard] Coddington" (Christensen, 1989b), appropriate vehicles are not available to local rescue personnel who are the first to respond to calls for emergency assistance. Although MDNR maintains a four-wheel drive vehicle at the Youghiogheny River Manager's Office in the area of Swallow Falls/Herrington Manor State Park, it is not a rescue vehicle, nor should it be since the time between receipt of an emergency call and the arrival of this vehicle at access roads in Friendsville is time during which properly equipped local rescue personnel might already be at the scene. Rescue vehicles should be in the hands of those first responders who are most likely to be first at the scene.

The generally mid-day timing of dam releases and, therefore, the early afternoon launching of river trips and the problems of communication associated with the isolation of the corridor means that calls for assistance must come from individuals who have completed the run down the river. These individuals generally arrive in Friendsville in late afternoon or early evening. By that time of day, water levels have usually fallen too low to allow water access into the corridor and the already difficult search and rescue operations detailed above are made nearly impossible by darkness. Local rescue personnel are hampered in conducting nighttime searches by a lack of appropriate portable lighting.

To deal with these factors while striving to assure emergency victims of the most prompt treatment, the protocol developed creates a distinction between institutionalized emergency medical services and informal rescue services. Individual outfitters (considered informal rescue service providers in the case of corridor emergencies associated with commercial boating operations) are responsible for the removal of victims from the corridor itself. When necessary, first response treatments are provided by local public safety personnel (police and fire officials) at the point where victims are evacuated from the river corridor. Contact with public safety personnel at the point outside the river corridor represents the beginning of institutionalized EMS delivery for corridor emergencies. The process continues according to traditional protocols when, upon notification that an emergency victim is awaiting transportation, ambulance and rescue personnel are dispatched and the victim is introduced into the EMS system.

With the exception of a drowning fatality this past spring, EMS officials indicate that, to date, requests for emergency services from within the corridor are primarily accounted for by cases of stranding (due to dropping water levels) and hypothermia (resulting from immersion in cold water and/or exposure). However, injuries resulting from whitewater boating mishaps in the future may be expected to include trauma, near drowning (aspiration of fresh water), fractures, shock and severe bleeding. Except for stranded, non-injured boaters, each of these situations demands prompt first aid treatment and stabilization. Prompt rescue of victims to more general or acute care facilities is also necessary.

Furthermore, the special problems which remote area emergencies engender challenge emergency victims in several ways. These challenges, or threats, include the challenge to regain (or retain) mental control and solve the immediate problem; the challenge to care for injuries and mental stress; the challenge to sustain and protect the body until assistance arrives; and the challenge to signal both the condition and the location of the emergency so that problems of distance are minimized. These challenges are important considerations in the Upper Youghiogheny River recreational boating corridor, surrounded as it is by an EMS service area significantly limited by the natural and social characteristics of the region, and should form the core of concerns at which regulation of whitewater guide first-aid and rescue qualifications is aimed.

#### Assessment of MDNR Regulations

The regulations governing commercial whitewater boating in the Upper Youghiogheny River recreational boating corridor address several of the fundamental limitations of response to medical emergencies within the corridor. Specifically, the limitations of response time and the need for trained personnel to provide first aid treatment and stabilization are addressed by the provisions of subsections of Sections .04, .05, and .06. These regulations place trained first aid providers at the site of any emergency medical situation involving commercial boaters, thereby providing for immediate resuscitation and basic first aid. In this regard, MDNR's regulations are consistent with those of river management in nearby states. West Virginia's administrative rules governing the training requirements of whitewater guides on the Gauley, Cheat, New and other rivers are as follows:

Each . . . guide shall have a current standard first aid training certificate issued by the American Red Cross or equivalent . . . [and shall have received] instruct[ion] . . . in all applicable safety and emergency procedures (WVCWAB, 1987, p. 9).

On Pennsylvania's Lehigh River, first-aid requirements of whitewater guides are met if:

A minimum of one guide per trip [has] completed the advanced first aid course, or [its] approved equal, [been] qualified in CPR, and hold[s] currently validated certificates, and [if all] guides . . . have completed a basic first aid course and hold a currently validated certificate (CPDER, 1986, p. 3)

MDNR regulations fall within the range of first aid training required by Pennsylvania and West Virginia and to a large extent avoid the problems associated with requirements which are too vague. The single exception with respect to training requirements applies to CPR certifications: no particular level or length of training is

designated although the American Red Cross offers several variations as discussed earlier in this report. (Longer American Red Cross courses provide trainees adequate time to learn and practice the skills which are most likely to save lives in case of emergency). Recommendations aimed at standardizing guide training are offered in the next section.

MDNR's regulations allow a broad range of emergency preparedness conditions as pertains to supplies and equipment availability by leaving minimum first aid kit composition to the discretion of individual outfitters. Recommendations related to the need to assure commercial river users of a minimum level of first aid treatment based on standardized equipment are offered in the following section.

Even with the imposition of standardized first aid requirements, a need will remain for additional equipment which cannot be carried as a regular part of boating first aid gear. Discussions with river managers at Lehigh Gorge (Pennsylvania) indicate that DER has authorized outfitter erection of ten cache posts with backboards at locations determined by outfitter experience along the length of the river. No other specialized equipment is available at these posts, which are maintained jointly by outfitters and DER. Recommendations addressing the need for specialized equipment are offered in the next section of this report.

The informal organization of rescue efforts for emergencies occurring in the corridor suggests that individual rescue situations will be handled with varying degrees of promptness and efficiency. Prompt, efficient rescue requires some uniformity of response among those individuals involved in the operation. West Virginia's requirement that outfitters "instruct [guides] in all applicable safety and emergency procedures" suggests that outfitters must prepare a plan for dealing with emergencies (WVCWAB, 1987, p. 9). This notion is consistent with the view of wilderness rescue specialists that all forays into remote areas should be undertaken only after plans have been drafted for signaling emergencies, mounting rescues and dealing with associated threats until the emergency can be eliminated (Fear, 1973). A similar suggestion for appropriate commercial whitewater activity on the Upper Youghiogheny was offered by the American Whitewater Association's Safety Chairman (Walbridge, 1989). A discussion in the following section offers recommendations for the preparation of outfitter emergency plans.

Issues which are not addressed by the regulations, but which are of crucial importance in minimizing the risks associated with isolation and difficulties of communication are also considered in the next section of this assessment.

### **Recommendations**

The following recommendations are offered to address the specific weaknesses of EMS and rescue service delivery in the Upper Youghiogheny River corridor.

**Accessibility.** An abandoned logging road parallels the Upper Youghiogheny from Friendsville to a point just below National Falls. Although this road allows access to the corridor to foot traffic, it is privately owned and dwindles to hardly more than a trail at certain points so that vehicular access is extremely limited. In order to

improve the opportunity for emergency services delivery, it is recommended that MDNR seek agreements with landowners to allow access of emergency vehicles and manpower along this road when conditions warrant. Although improvement of the track to allow access of ambulance vehicles involves some trade-offs, it is recommended that MDNR negotiate with landowners for the improvement of the track adequate to allow 4-wheel drive vehicle access. Finally, none of the first responding companies is equipped with or has access to a four-wheel drive vehicle with adequate ground clearance to allow access into the area of the corridor. It is recommended that MDNR assist local volunteer emergency service providers in the procurement of at least one specialized rescue vehicle designed to access the trail paralleling the Upper Youghiogeny River.

**Terrain.** Often volunteer EMS and rescue providers can get within hailing distance of emergency situations but cannot reach victims due to steep slopes or broad chasms. It is recommended that MDNR act as a sponsoring agency for a training course involving cross-country rescue and rappelling and assist local volunteer emergency service providers in the procurement of specialized rescue equipment including rappelling harnesses, ropes and Stokes baskets for the removal of victims. The Wilderness Skills and Mountaineering course offered by the National Outdoor Leadership School (NOLS), located in Lander, Wyoming, is one good example of such specialized training. Quality river rescue training is also provided by the American Canoe Association, Outward Bound, the Nantahala Outdoor Center (Bryson City, North Carolina), and Rescue 3 (California). On the Upper Delaware River on the border between New York and Pennsylvania, the National Park Service has cooperated with commercial outfitters and local volunteers to bring in an individual from such organizations once a year for specialized training (Walbridge, 1989). Another alternative is to consult the library of the National Emergency Training Center located in Emmitsburg, Maryland or the National Association for Search and Rescue located in LaJolla, California for further information.

**Time of Day:** Since the combination of travel time down the river and late release times often results in nighttime search and rescue, it is recommended that MDNR assist local volunteer emergency service providers in the procurement of portable lighting designed specially for such operations.

**Communications.** Since the remoteness of the corridor creates extreme hazards to life and property resulting from the long time required to carry emergency calls by water or on foot, it is recommended that MDNR oversee the testing of the effectiveness of VHF transmission (especially of low-watt, hand-held repeaters). It is further recommended that MDNR seek exemption to regulations restricting outfitters' access to VHF band frequencies which are reserved for emergency calls in distress situations. Should these inquiries indicate that the relatively inexpensive, low-watt radio equipment has an effective range of at least the length of the corridor and that private, emergency distress calls can be transmitted over VHF bands, it is highly recommended that MDNR require all outfitters operating on the Upper Youghiogeny to carry a minimum of one radio per trip conducted down the river. Such a requirement would mitigate the limitations of time and distance which figure so heavily in the delivery of services along the river.



Implementation of a marker post system to allow radio communications, rescue personnel, and river users to standardized their references with respect to emergency situations may be considered. Since frequent river users know the names and characteristics of all major rapids and, therefore, generally know exactly where they are, the provision of corridor maps including rapids' names for study by rescue personnel would be as effective a means of standardizing references without the need for potentially unsightly exemptions to the Youghiogeny Wild River regulations.

**Guide Training.** It is recommended that individuals applying for permits as Youghiogeny River guides be required to document completion of the American Red Cross 6-hour CPR course. This course not only provides the skills most likely to be demanded by an emergency in the corridor, but provides each participant adequate time and practice to assimilate those skills. It is further recommended that MDNR, in cooperation with outfitters permitted for operation on the Upper Youghiogeny, act as a sponsoring agency for the annual provision of both the American Red Cross Certified Advanced First Aid and the 6-hour CPR course. The umbrella sponsorship of MDNR and the difficulties which guides report in finding certification courses elsewhere for such courses would help assure adequate numbers of participants to make courses worth offering locally even though many of the guides working for Upper Youghiogeny River outfitters reside at a distance from the area.

**First Aid Equipment.** MDNR's stipulation of a basic required item kit modeled after that demanded by the Pennsylvania Bureau of State Parks is recommended. Items in the first aid kit would, at minimum, include:

1 ea.	15" wide wire splint	1 ea.	scissors
1 ea.	10" wide wire splint	asst.	safety pins
3 ea.	40" x 60" triangular bandages	2 ea.	Kwik Kolds
5 ea.	4" x 4" gauze pads	3 ea.	ammonia inhalants
5 ea.	2" x 2" gauze pads	1 bottle	S.T. 37 Antiseptic
2 ea.	3" roll gauze	2 ea.	sanitary napkins
2 ea.	2" roll gauze	1 tube	zinc oxide
1 roll	1/2" adhesive tape	5 ea.	tongue depressors
1 roll	1" adhesive tape	5 ea.	Stingfoe Swabs
asst.	3/4" Band-aids	1 ea.	thermal space blanket
asst.	1" Band-aids	1 set	inflatable splints (full arm, half arm, full leg, half leg)
12 ea.	medium Butterfly closures		
1 ea.	knife		

The similarity of Upper Youghiogeny River corridor hazards to those upon which West Virginia's Department of Natural Resources Administrative Regulations 20-1 (1976, 7.06) are based suggests the following addition to first aid supplies carried by commercial whitewater trips:

2 anti-venom snake bite kits unless the outfitter or guide has obtained within the then current calendar year written confirmation from the nearest hospital that it maintains a supply of anti-venom and a copy of such confirmation has been filed with the [MDNR] as provided.

**Specialized Equipment.** Outfitters, guides and private kayakers concur that the provision of backboards at a limited number of known locations along the corridor is essential if emergency first aid is to be administered in cases of particular mishaps. Discussions related to the need for other types of equipment, including those with managers of other rivers were less conclusive. At the present time, at least one backboard has been "hidden" by outfitters along the Upper Youghiogheny, however its location is known only to those outfitters who cooperated in its caching. It is unlikely that the board is legally cached since that would require an agreement between outfitters and landowner(s). It is recommended that MDNR act as a sponsoring agency in negotiating agreements for the caching of backboards at recommended locations, and that MDNR work in cooperation with outfitters to see that these caches are secure and well maintained.

Discussions with outfitters, guides and kayakers suggest that the backboards should be cached at three or four locations along the corridor at sites below major rapids where mishaps are likely to occur and at eddies where boater access to shore is easiest. The recommended locations are indicated on Figure D-2.<sup>21</sup>

As relates to other equipment cached with backboards, primary concerns include security and maintenance. Although the provision of radios for emergency use would be ideal, questions related to maintenance of batteries, protection of equipment from the elements, and theft (hand-held radios might be carried away in any craft or overland) must be considered. Since the implementation of a standardized first-aid equipment list would provide outfitters with the basics for short term survival, and since most mishaps are likely to occur in warmer periods of the year, it is not deemed necessary to cache equipment other than backboards at emergency posts.

**Outfitter Preparedness.** The development by each outfitter of emergency rescue plans, copies of which are submitted to MDNR during the annual permitting process, should serve as a framework for EMS response. Effective emergency rescue plans should address the issues indicated below. There is no one best solution to dealing with these issues. The combination of such variables as the structure and organization of the particular outfitter operation (including whether the outfitter runs the river quickly or at leisure or whether the outfitter has agreements with private landowners to access property within the corridor), the experience of the river guides and their knowledge of the river and surrounding terrain, the type of equipment carried (outfitters often tailor their emergency kits to include items not required by regulation but which have special applications in the hands of its guides) can affect the best solution to emergency management. All emergency rescue plans, however, should address the following issues:

- How are victims to be rescued from the river? For example:

Under what conditions is rescue by water (raft), land (4-wheel drive vehicle) and air (helicopter) to be employed?

What arrangements have been made, or how will arrangements be made and with whom, to have necessary means of transportation available?

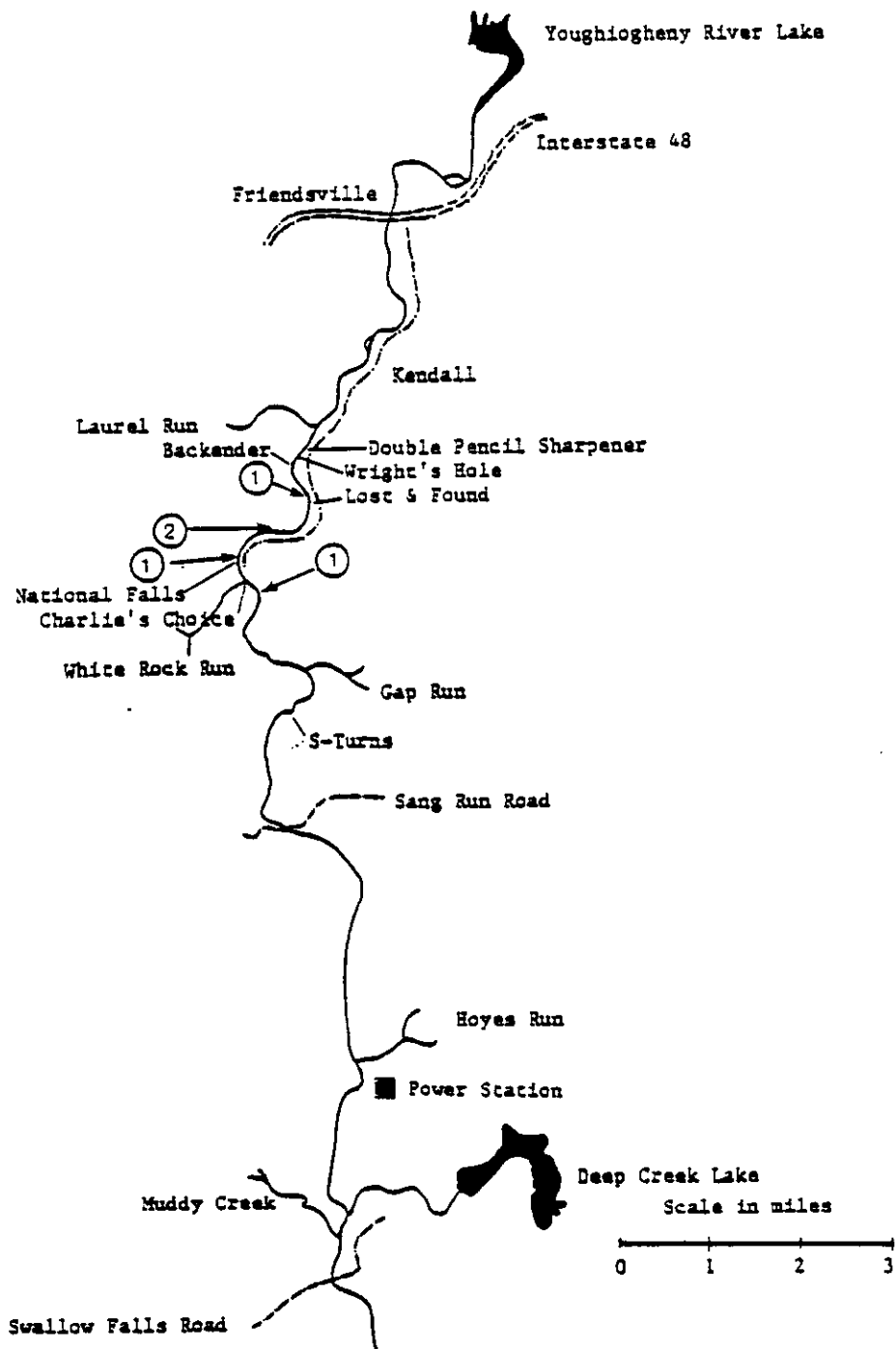


Figure D-2. Recommended Location of Emergency Supply Caches in the Upper Youghiogheny River Corridor

What steps are to be taken to assure the availability of appropriate EMS or other vehicles at appropriate rescue sites at the necessary time?

- How are emergency situations to be communicated to the end of the trip and EMS personnel?  
For example:

How and when do trip leaders or guides signal the existence of emergencies requiring rescue?

Which agencies/individuals are notified and in what order of priority?

What procedures are to be followed if a trip is "overdue"?

What constitutes an "overdue trip"?

Which areas of the river provide easiest access to roads, traditional forms of communication (e.g. telephones) or people?

When, how, and by whom will these resources be sought for involvement in rescue processes?

- What non-medical protocols are to be applied to meeting needs of victims and in what priority?  
For example:

How is responsibility assigned in case of emergency? (e.g. Who goes for help? Who stays with victims?)

- How is an emergency reconnaissance and rescue to be conducted? For example:

Have both the rescuers and those who will be designated to stay with the emergency victim been provided with adequate advance instruction in rescue procedures to be able to optimize the efforts of all involved in successfully conducting search procedures?

Assurance of emergency victim survival in situations where rescue cannot be accomplished before nightfall, or where adverse weather conditions threaten individual well-being, requires wilderness survival skills. While it is not realistic to expect that all whitewater guides be accomplished in the area of wilderness survival skills, consideration should be given to the benefits of such training for trip leaders at the minimum.

### Fire Suppression Services Assessment

This section considers the structure and resources available for suppression <sup>22</sup> of natural fuels (timber and grasslands) fires occurring in the corridor of the Upper Youghiogheny River between the Sang Run bridge and Friendsville. A description of jurisdiction and responsibility and an inventory of equipment and manpower are presented. As with emergency medical services, the emergency fire suppression services system for the Upper Youghiogheny River corridor is presented on the basis of its constituent parts:

1. **Manpower:** the local volunteers, MDNR professionals and allied personnel with appropriate training to suppress fires,

2. **Training:** the provision of appropriate initial and continuing training of manpower in all levels of fire suppression techniques,
3. **Communications:** the network of equipment, personnel and facilities which enable emergency fire alert, dispatch and suppression coordination, and
4. **Equipment:** the ground and air vehicles and other transportation facilities equipped to meet the fire suppression needs of the service area.

### Services Structure

For all fires involving natural fuels and for fires occurring on publicly-owned land, the Maryland Forest, Parks and Wildlife Service, Cooperative Forest Management (CFM) unit has jurisdiction.<sup>23</sup> However, due to the large number of natural fuels fires occurring each year, CFM does not routinely respond to most such fires until notified by the first company arriving at the scene (referred to as the first due company) that its involvement is required. *Critical area* fires are the exception; CFM responds to all fires in areas so designated. The combination of the inaccessibility of the Upper Youghiogeny River corridor from the Sang Run bridge north to Friendsville to fire vehicles and manpower and the types and quantities of natural fuels present in the corridor have resulted in the the corridor's being designated a critical area. Thus, the CFM responds to all natural fuels fires within the corridor.

Generally, even in cases of critical area fires local volunteer fire companies are first to respond. In the Upper Youghiogeny River corridor from the Sang Run bridge to Friendsville, first due companies are the Friendsville Volunteer Fire Company (Co.# 110) located at Friendsville and the Deep Creek Volunteer Fire Company (Co.# 30) located at McHenry, four miles from the Sang Run bridge. The Friendsville Company is designated as the first due company for all points north of the Sang Run bridge. The Deep Creek Company is designated as the first due company for fire emergencies at or south of the Sang Run bridge.

Maryland is one of seven states comprising the Mid-Atlantic Fire Compact. Joint agreement of the natural resources agencies of Pennsylvania, West Virginia, Virginia, New Jersey, Ohio, Delaware and Maryland provide fire suppression support to each state from any or all of the others in extraordinary fire emergencies.

**Manpower.** First-due companies are manned by volunteers and respond on a 24-hour basis. Due to difficulties of maintaining adequate manpower levels during all periods, each company is backed-up by another, nearby company. In the event that Friendsville cannot muster an adequate emergency force for a given call, volunteers and equipment are dispatched from the Accident Volunteer Fire Company (Co. # 50) located at Accident, 6 miles from Friendsville. Similarly, the Deep Creek VFC is backed-up by the Oakland Volunteer Fire Company (Co.# 40), located at Oakland, 15 miles from Sang Run. The numbers of available and responding volunteers for each of the first due and back-up companies is presented in Table D-7.

Table D-7. Number of First-due and Back-up Fire Company Members and Responding Volunteers

	Members	Responding Volunteers*	Percent Responding
Friendsville	28	18	64%
Deep Creek	32	20	63%
Accident	40	25	63%
Oakland	43	25	58%

\* Responding volunteers represents the largest number of members likely to respond to any routine, short-duration fire call. Longer duration or extreme emergency calls may result in higher response rates among members.

Source: Personal interview with Spiers, Thomas, Ringer, Rudy: Friendsville, Deep Creek, Accident, and Oakland VFC.

The core of the CFM firefighting manpower comes from three boy's forestry camps for male Juvenile Services detainees, aged 14 to 18 years. Maintained by the Maryland Forest, Parks and Wildlife Service, these camps are located at Backbone Mountain, Lonaconing, and Meadow Mountain. CFM officials estimate that each camp can provide two ten-man crews (a total of 60 men) for fire emergencies. Each crew-boss is a MFPW/CFM staffer from either the Savage River or the Potomac State Forest.

**Training.** All members of volunteer fire companies are required to complete minimum fire control and suppression training. Annual fire control and suppression training is provided by the Maryland Fire and Rescue Institute headquartered at Cumberland. Although extremely recent restructuring of fire training programs and competencies has occurred,<sup>24</sup> the scope of volunteers' fire control and suppression knowledge can be understood according to the following classifications:

**Basic:** an overview of fire control and suppression including natural fuels fires; basic apparatus use and care; VFC and fire scene structure and organization

**Intermediate:** control and suppression of special types of fires; special technical aspects of firefighting

**Advanced:** control and suppression of hazardous materials fires

All volunteers must complete the basic level training course within their first year of service with the VFC, however, a small percentage of members at each company has completed higher levels of training as indicated in Table D-8.

Table D-8. Number of Fire Control and Suppression Volunteers Trained at Each Technical Level by First-due and Back-up Company

	Basic	Level of Training Intermediate	Advanced
Friendsville	28	not available	not available
Deep Creek	32	8	5
Accident	40	17	4
Oakland	42	19	0

Source: Personal interviews with Spiers, Thomas, Ringer, Rudy: Friendsville, Deep Creek, Accident, and Oakland VFC.

Fire suppression training in each of the boys' forestry camps is provided twice annually under the direction of Forest, Parks and Wildlife Service representatives and encompasses the techniques and procedures which MFPWS applies in firefighting campaigns.

**Communications.** The emergency fire services communications system employs components of the EMS network for the provision of services. Specifically, the rapid request for aid is made possible through the telephone 9-1-1 system described earlier in this report. In addition, fire vehicles and each station are tied into the central Garrett County dispatch network, and many fire companies supplement this system with very low frequency hand-held radio <sup>25</sup> at fire scenes.

The system described enables both response and control of fire functions by establishing a network between central alarms, vehicles, back-up companies, the system communication center and helicopter services.

Although response time of CFM to a fire scene is estimated by MDNR at a minimum of one hour (Glass, 1989), each of the first due companies and back-up companies dispatch crews to fire sites within a matter of minutes as indicated in Table D-9.

Table D-9. Average Time Elapsed Between Receipt of Emergency Call by First-due and Back-up Companies and Fire Vehicles Leaving Station.

	Dispatch Time
Friendsville VFC	3 minutes
Accident VFC	3-4 minutes
Deep Creek VFC	3 minutes
Oakland VFC	5 minutes

Source: Personal interviews with Spiers, Thomas, Ringer, Rudy: Friendsville, Deep Creek, Accident, and Oakland VFC.

**Equipment.** A broad array of equipment is owned by the first-due and back-up companies as detailed in Table D-10. The general limitations of routine firefights in rural areas have encouraged these groups to purchase equipment which carries at least a small water supply. The availability of such equipment will be valuable to fire situations in the Upper Youghiogheny River corridor if the equipment can get close enough to discharge the water.

In addition, MFPWS-CFM equipment available includes a 350 h.p. bulldozer with tilt-bed transport truck, two jeeps with 60 gallon water tanks, three 3/4 ton patrol trucks with pumps, 160 gallon water tanks and equipment for fifteen firefighters, three portable pumps with 2000 feet of 1"-1.5" linen hose and a 1000 gallon collapsible water tank. Air support equipment in the form of a 100 gallon water bucket drop is available via the Maryland State Police helicopter located at Martin's Airport at Baltimore.

Table D-10. Fire Suppression Equipment Availability -- First-due and Back-up Companies

	Friendsville VFC	Deep Creek VFC	Accident VFC	Oakland VFC
750 gal. pumper		1		
500 gal. pumper	2			
1000 gal. pumper			1	
750 gal. pumper/tanker		1		
2500 gal. pumper/tanker		1		
3000 gal. pumper/tanker	1			
750 gal. tanker			1	
1200 gal. tanker			1	
1250 gal. tanker				1
1800 gal. tanker			1	
275 gal. brush truck	1	1	1	
ladder truck				1
4-wheel drive equipment truck		1	1	
backpack pumps*	13	4	8	10
fire rakes*	9	4	6	15
portable pumps	1		2	

\* On permanent loan from MFPWS:CFM

Source: Personal interviews with Glass, Spiers, Thomas, Ringer, Rudy: MFPWS:CFM; Friendsville, Deep Creek, Accident, and Oakland VFC.



### Factors Constraining Fire Suppression

In Section 1 of the Youghioghney River Fire Plan, the MFPWS-CFM has identified a number of limitations to fire suppression. These limitations are consistent with factors limiting EMS and rescue service delivery in the corridor and with factors identified by local VFC officials assessing the Upper Youghioghney River situation:

1. The response time to potential fire sites is too long due to the remoteness of the area.
2. Potential fire site are inaccessible<sup>26</sup> to fire vehicles and manpower due to poor or non-existent roads and trails and non-negotiable terrain.
3. Topographic barriers result in poor communication signal transmission.

Another constraint, unique to the delivery of fire services, is related to the available water supply for fire suppression. Only one pond located on Elder Hill Trail Road provides accessible water for fire fighting. The same limitations of terrain (pumpers cannot get close enough to the river nor can heavy, portable pumps and hose be easily transported down steep slopes to the water's edge) that hamper EMS delivery in the corridor, preclude the use of the Youghioghney River as a source of water for firefighting.

To an extent, recommendations offered in this assessment address these constraints, however the severity of the problems cited suggests a detailed analysis of the topography and resources of the corridor. Such concerns have undoubtedly been the focus of the redrafted fire plan for the Youghioghney River corridor which has been underway by MDNR, CFM since earlier in 1989.

### Footnotes

- 1 Maryland Department of Natural Resources 08.15.04.05B stipulate that "the Department shall register as a whitewater guide an applicant who . . . submits a certificate that the applicant has sufficient experience on whitewater signed by the permitted commercial whitewater outfitter who will employ the guide during the term of the guide's registration . . . ."
- 2 First responders are those having initial contact with medical emergency situations (e.g. fire, police and other public safety personnel).
- 3 *Communicators* refers to EMS dispatchers.
- 4 EMT's (emergency medical technicians) are of two classifications: EMT-A (EMT's trained for ambulance service) and EMT (paramedics).
- 5 Based on the American Heart Association recommendation of 20% of the general population to be trained in CPR (cardio-pulmonary resuscitation).
- 6 Required numbers of 1st responders are determined by the staffing patterns of police departments and radio dispatched health professionals.
- 7 The Maryland Department of Transportation and the Highway Safety Act recommend a minimum of two EMTs per ambulance run, a standard which translates to two EMTs per staffing shift (three shifts per day, seven days a week). Generally, local fire and ambulance companies have adopted this standard.
- 8 Within certain Maryland EMS regions, a standard of six CRTs (cardiac rescue technicians) per ambulance company designated to carry out advanced life support is followed. The WMHSA recognizes the difficulty of fulfilling this standard in sparsely populated EMS Region I and recommends coverage at 75% of compliance to provide a safe level of requisite personnel for the service area.
- 9 American Red Cross CPR is offered in three formats: Adult CPR (4 or 6 hours), Community CPR (8 hours), and Child-Infant CPR (7 hours). There is no content difference between the 4 and the 6 hour Adult CPR course. According to the American Red Cross, the difference lies in time available to practice and assimilate the skills of the course. Community CPR includes skills relevant to both child-infant and adult cardiac emergencies.
- 10 Outfitters operating in Maryland and West Virginia generally require a higher skill level of trip leaders. This level is met if trip leaders complete, at minimum, the American Red Cross Advanced First Aid certification course. Outfitters on Pennsylvania's Lower Youghioghney River have tailored the American Red Cross Advanced First Aid course to the demands of whitewater boating emergencies. Since Red Cross training devotes attention to certain emergencies unlikely to arise in a whitewater setting (e.g. automobile extractions and baby delivery), outfitters have designed a River Rescue course which covers exposure to the medical skills training included in the Advanced First Aid curriculum. The course is taught in a whitewater setting with special emphasis on backboard extractions and river rescue. The skills learned are considered by Lower Youghioghney River outfitters to be more readily applicable to situations likely to occur in commercial whitewater boating settings, and outfitters report that guides receive certification for completion of Advanced First Aid through the local Red Cross office. A similarly designed course is being used by a least one outfitter operating whitewater trips in West Virginia.

- <sup>11</sup> In the Health Systems Plan for Western Maryland (1980, p. 389) the HSGWM defines response time as the "time elapsed between a call reaching dispatch center, ambulance center or public safety agency, and assistance arriving on the scene."
- <sup>12</sup> An ambulance is scheduled and located at Friendsville one weekend (Thursday through Monday) each month.
- <sup>13</sup> Physicians and RNs constitute allied health personnel.
- <sup>14</sup> KKK-A-1822 designates vehicles meeting GSS standards and including equipment recommended by the American College of Surgeons for EMS.
- <sup>15</sup> Day-time dispatch time. From 6 p.m. until midnight, the squad garage is manned with trained personnel reducing dispatch time to 1 minute or less.
- <sup>16</sup> According to the American Trauma Society (WMHSA, 1980, 412), in cases of trauma injury, there exists a "golden hour" with respect to recovery. An ATS guideline recommends that appropriate trauma care should not be more than 60 minutes air or ground travel time from the site of an injury or from the hospital stabilization for 95% of emergency cases.
- <sup>17</sup> The severity of this limitation is diminished by new vehicles which have the ability to lift victims from an emergency site by means of a cable. Nonetheless, the width of the river gorge at certain points is too narrow to allow full access to the corridor by this means, and emergency rescue officials indicate that trees are a major limitation to both identifying the location of emergencies and removing victims from the air.
- <sup>18</sup> This figure is based on the 1985 estimate of permanent Garrett County population of 26,450. Population density does not include the summer and winter seasonal increase of 150,000+ tourists and other temporary residents.
- <sup>19</sup> The steep, narrow Upper Youghiogheny River gorge limits the effectiveness of UHF and VHF band (the frequency band on which commercial outfitters would operate) radio equipment. The construction of a radio tower at an appropriate site (3000' Fike's Hill near Big Bear Lake in West Virginia is being considered by two Upper Youghiogheny River outfitters for the erection of a private transmission tower) would improve on UHF signal generation from the gorge. Friendsville emergency services officials report success at sending signals from as far south as National Falls (refer to Figure D-2, page D-23) in the gorge to the VFC at Friendsville via 200 watt hand-held radios.
- <sup>20</sup> The difficulties of access into the corridor suggest the desirability of air search and evacuation by helicopter in cases of emergency. Certainly, "the use of helicopters for mountain rescues has ... greatly reduced the amount of time needed to get an accident victim to medical care .... However, helicopters usually can not make absolutely vertical ascents or descents [into gorges such as that surrounding the Youghiogheny]. Some space for an approach and departure is needed. The most level spot that is free from surrounding obstructions ... " is recommended, and strict cautions against the intrusion of helicopters into narrow areas obstructed by trees (such as the corridor) are given (Wilkerson, 1985, p. 97).
- <sup>21</sup> Recommended locations are numbered "1" and "2" to indicate siting priority. First aid equipment should be cached at sites indicated as "1" first and at sites indicated as "2" as resources allow.
- <sup>22</sup> It is the policy of the Maryland Forest, Parks and Wildlife Service, Cooperative Fire Management unit to suppress unauthorized, uncontrolled natural fuels fires.

- <sup>23</sup> It is the general responsibility of CFM to oversee the well-being of Maryland natural forest resources and to work cooperatively with private landowners to assure that end. Natural fuels fire control and suppression is a specific responsibility of that mandate.
- <sup>24</sup> The three levels of training outlined exist. Fire training at the basic level has been expanded from an 80- hour to a 100-hour course consisting of five modules. All volunteers are expected to complete all modules and in doing so are exposed to training that was previously encompassed in the basic and intermediate levels.
- <sup>25</sup> As described in a previous section of this report, these very low frequency hand-held radios have been found to be very effective in enabling communication between rescue personnel within the corridor at the VFC facility at Friendsville. Subsequent to a positive result to tests conducted in compliance with a recommendation made earlier in this report, it may be possible for fire officials to employ similar devices in fire fighting situations.
- <sup>26</sup> Under the Annotated Code of Maryland, Title 3, Subtitle 7 (Fire Hazards Prevention and Abatement), DNR has authority to enter private land to prevent and fight fires. This authority is extended to the volunteer fire companies first due at the scene. Discussion with local volunteer fire officials indicate that many private landowners in the corridor have informally granted rights of entry to VFC in situations of fires or other emergency.

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