

THE WOOLEY CREEK SURVEYS, 1967 and 1968 1/

REF 90591

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Region 1, Inland Fisheries

SUMMARY

Surveys were conducted in 1967 and 1968 to determine the magnitude and distribution of the summer steelhead (Salmo gairdneri) and spring run king salmon (Oncorhynchus tshawytscha) populations of Wooley Creek and the resulting angler pressure and angler harvest.

It was estimated that (1) less than 300 angler hours annually were spent on Wooley Creek, (2) the adult summer salmonid population was composed of about 193 individuals in 1968, and (3) angler harvest did not exceed eleven percent of the adult summer salmonid population.

These surveys resulted in the conclusions that future disturbances of the Wooley Creek watershed, due to logging, road construction or some other practice, could raise water temperatures to a point deleterious to both adult and juvenile summer salmonids, (2) closing a section of Wooley Creek to angling was ineffective in preventing angling and fish harvest from that area, and (3) present angler harvest of adult summer salmonids is not great enough to warrant concern at this time.

It was recommended that (1) angling closures be abandoned as a management tool and the entire stream opened to angling, (2) similar surveys should be continued annually, and (3) the Department of Fish and Game and other state and federal agencies should work together to determine sound methods for protecting and enhancing these populations of summer steelhead and spring run king salmon.

Submitted

Anadromous Fisheries Branch Administrative Report No. _____

Woolley Creek has a mean gradient of about 105' per mile.

Water temperatures at the mouth range from at least 70°F during August in some years to an estimated 35°F during December and January.

Woolley Creek and its tributaries upstream from a point approximately halfway between Bridge Creek and Canyon Creek lie within the Marble Mountain Wilderness Area (Figure 1). About 8.5 miles of the mainstream of Woolley Creek are below the wilderness area boundary.

A U.S. Forest Service maintained foot trail exists along Woolley Creek from its mouth at least as far upstream as Big Meadows Creek. However, the trail provides little direct access to the stream for much of this distance where the trail lies several hundred feet above Woolley Creek on steep rugged mountain-sides. In 1967 and 1968 no part of Woolley Creek was accessible by road.

SUMMARY OF ANGLING REGULATIONS

The following are some of the angling regulations which were in effect on Woolley Creek during 1967 and 1968.

1. Trout or salmon angling was permitted during the general trout season (April 29 through October 31, 1967 and April 27 through November 15, 1968).
2. The entire stream was open to trout and salmon angling during 1967 but that section of Woolley Creek between the confluences of Haypress Creek and Hancock Creek was closed to all angling during 1968.
3. The bag limit for trout and salmon separately or in the aggregate was:
 - a. Ten fish, or
 - b. Ten pounds and one fish.
4. The fish must take the hook voluntarily in its mouth. Snagging is unlawful.
5. Use of multiple hooks with shortest distance between hook points greater than 1½ inches or shank longer than two inches is unlawful.

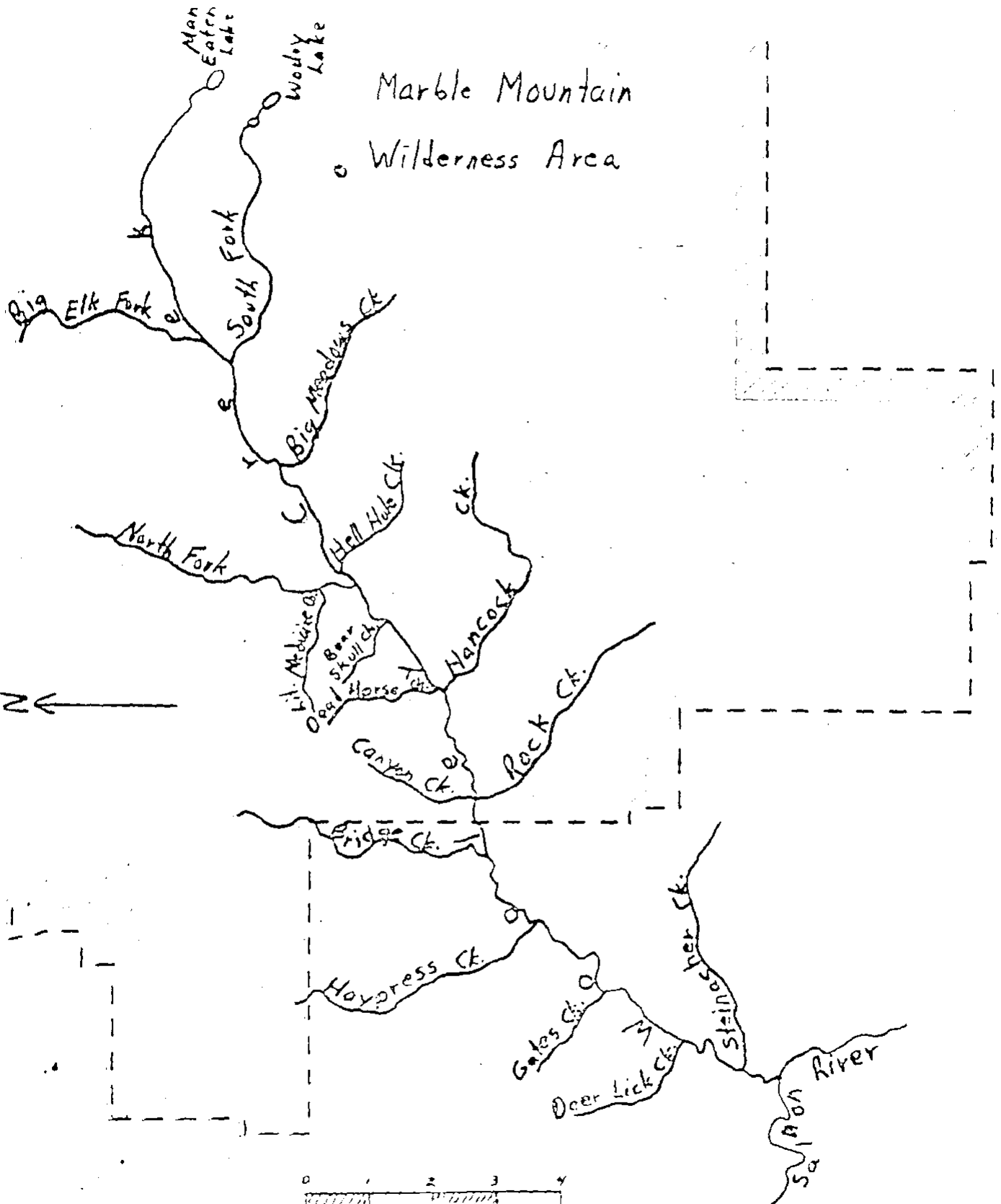


Fig. 1

Scale: 1/2 inch = 1 mile

DESCRIPTION OF FISHES

Summer steelhead trout (Salmo gairdneri) and spring run king salmon (Oncorhynchus tshawytscha) are the two species and races of fish discussed in the report.

Summer steelhead trout are those steelhead which return from the ocean to freshwater in the spring before they are sexually mature. Instead of spawning immediately these fish normally migrate slowly upstream through the river system until they reach suitable resting pools in the headwater streams. They remain in the stream during that summer, fall and winter to spawn the succeeding spring (one year later).

Spring run king salmon are merely those king salmon which ascend some freshwater streams in the spring, remain in those streams through the summer, spawn in the fall and die.

METHODS

Because there was no way to both accurately and practicably determine angler pressure and sport fish harvest for Wooley Creek by the usual sampling methods, it was decided to have the anglers themselves voluntarily furnish this information.

Angling report cards were placed in a covered metal box beside the Wooley Creek trail at a small unnamed stream about 30 minutes from the Salmon River end of the trail. The box with the cards was placed by the trail each year about May 1, and taken down after the end of the general trout season. A poster near the box asked anglers leaving Wooley Creek to complete a card for each day's fishing whether they caught fish or not and return the card to a locked portion of the box. A properly completed card revealed the date fished, area of Wooley Creek or its tributaries fished, hours fished, number and size of fish caught and released, and number and size of fish caught and kept.

A reconnaissance or fish population survey was conducted once each summer by a team of two department biologists. The 1968 survey was considerably more intensive and extensive than the 1967 survey. The 1967 survey involved counting adult fish in four of the approximate six miles of the main stem of Wooley Creek between Haypress Creek and the North Fork, in addition to observations made in several pools in Wooley Creek in the vicinity of Wooley Camp, Gates Creek, and Deer Lick Creek. This survey was conducted in early September.

The 1968 fish population survey involved walking Wooley Creek from its mouth to the confluence of Big Meadows Creek, except for a one and one-half mile stretch between the mouth and Deer Lick Creek, and a one mile reach between Deer Lick Creek and Gates Creek. This survey was conducted in early August. The use of face masks and snorkling gear in 1968 improved the accuracy of the observations, however, the glass face plate was lost from one of the face masks part way through the survey. As a result, not all of the stream was surveyed with the aid of a face mask. The areas which were not surveyed with a face mask were located between Gates Creek and Haypress Creek and between Canyon Creek and Dead Horse Creek. In 1968 all pools measuring approximately 12' x 30' by five feet deep or larger were inspected closely for adult summer salmonids by looking both from the surface and from underwater with the use of a face mask.

Estimates of total population size were obtained only in 1968 and were determined by assuming two thirds of the actual number of adult salmonids present in a walked section of stream would be observed with the aid of a face mask and snorkling gear, while one third of the actual number of adult salmonids would be observed in the sections surveyed without the aid of face masks or snorkling gear.

The main stem of Wooley Creek was divided into four areas of unequal length for purposes of data presentation. These areas and their descriptions are:

Area 1. Wooley Creek mouth to confluence of Deer Lick Creek, a distance of approximately 2.0 miles.

Area 2. Confluence of Deer Lick Creek to confluence of Haypress Creek, a distance of approximately 4.0 miles.

Area 3. Confluence of Haypress Creek to confluence of Hancock Creek, a distance of approximately 5.3 miles.

Area 4. That portion of Wooley Creek above the confluence of Hancock Creek. The distance to Big Meadows Creek is approximately 5.3 miles and the distance to the confluence of the South Fork is about 7.5 miles.

Unsurveyed portions of any one of the four areas were assumed to contain the same number of fish per mile as the surveyed portions of that area. In the case of the area from the mouth of Wooley Creek to Deer Lick Creek, nine adult summer salmonids were estimated to be present in the $\frac{1}{2}$ mile surveyed. Since the area in question is two miles in length, 36 (4x9) adult salmonids were estimated to be present in the entire area.

RESULTS

Angler Use and Salmonid Harvest

In 1967, 21 angling report cards were completed by anglers leaving Wooley Creek. Of those 21, one was voided because of obviously inaccurate data, leaving a total of 20 valid cards. Of those 20 valid cards, 16 lacked one or more pieces of information.

In 1968, 22 angling report cards were completed by anglers leaving Wooley Creek. Of those 22, two were declared invalid because of obviously inaccurate data coupled with a liberal sprinkling of obscenities, leaving as in 1967, a total of 20 valid cards. Of those 20 valid cards, 15 lacked one or more pieces of information.

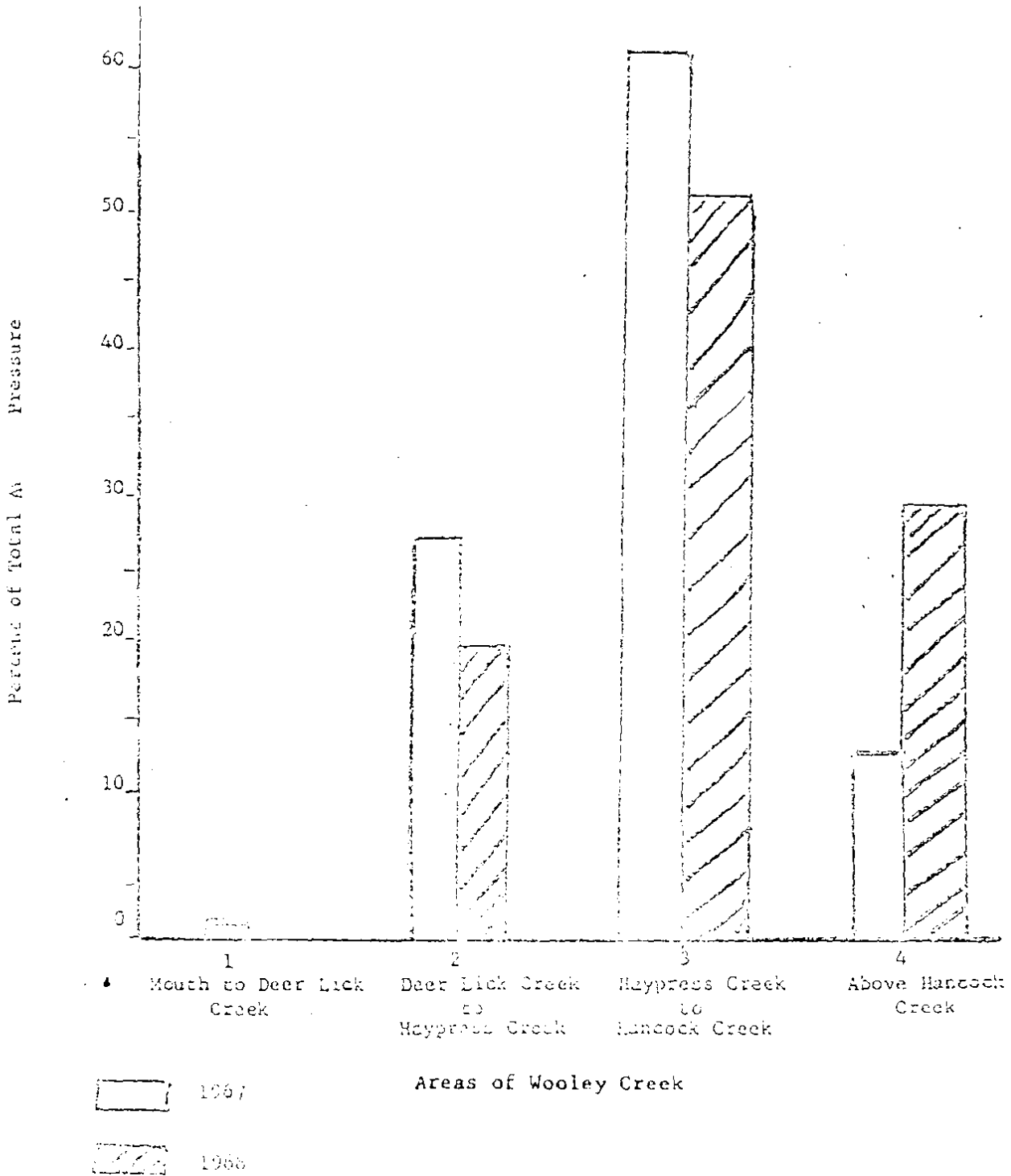
Wooley Creek Mainstem

In 1967, Wooley Creek anglers reported fishing 219 hours on 55 different days. In 1968, anglers reported fishing 77 hours on 27 different days. During 1967, the first report card was completed on June 22 and the last on September 26, while in 1968 these events occurred on May 25, and October 26. Combining angler use information from the data cards for both years for the mainstem of Wooley Creek indicated that a very insignificant amount of fishing occurred in Area 1, that about $\frac{1}{4}$ of the annual angler pressure occurred in Area 2 approximately $\frac{1}{2}$ of the annual angler pressure occurred in Area 3 and about $\frac{1}{4}$ occurred in Area 4 (Table 1). No angler reported fishing upstream farther than about $\frac{1}{2}$ mile above Big Meadows Creek during either year. The large portion of the angling effort indicated for area 3 is of particular interest in view of the closure of this area in 1968; the implications of this observation are found in the discussion section.

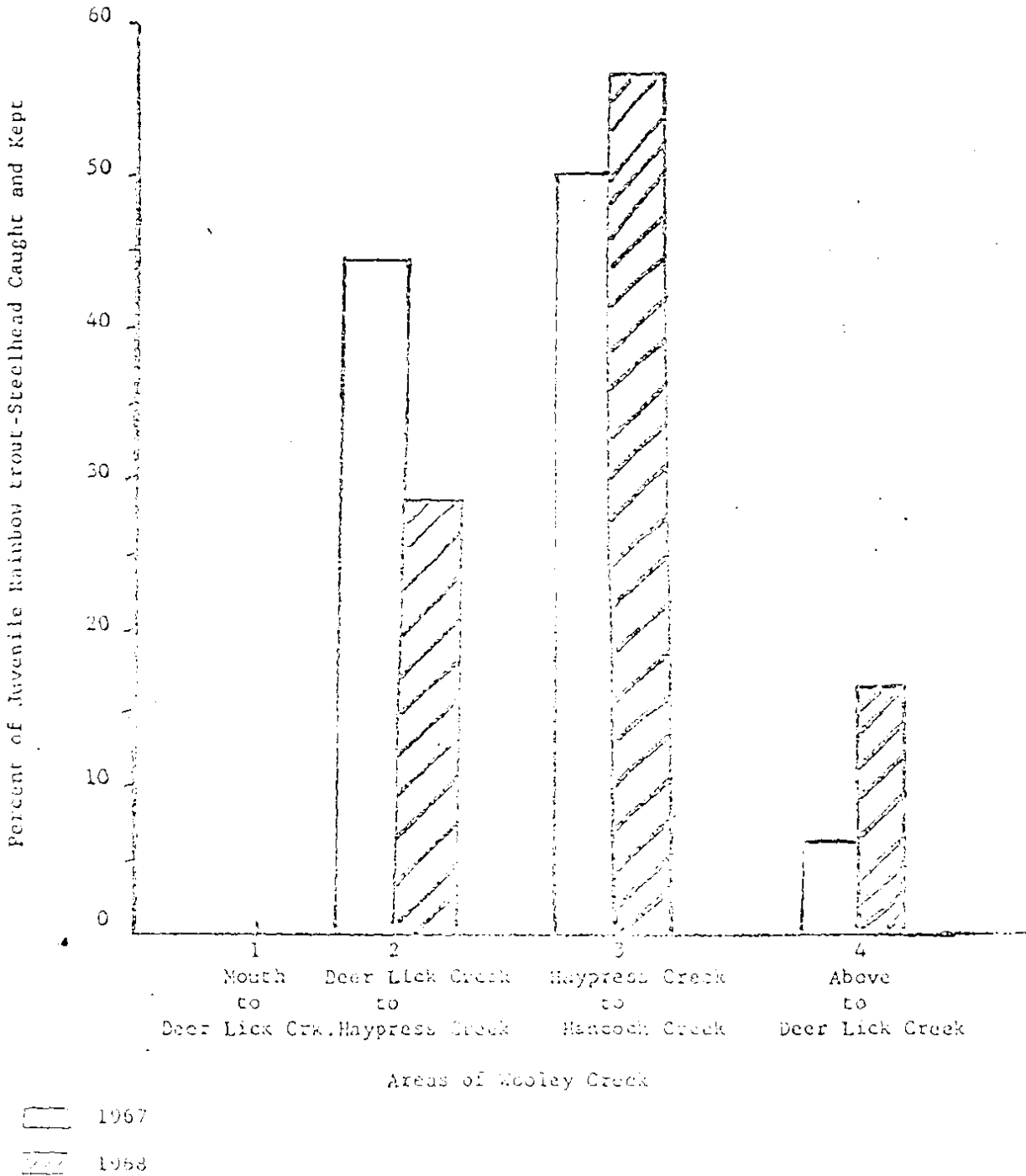
Anglers fishing Wooley Creek in 1967 reported catching and keeping 105 juvenile rainbow trout-steelhead from 5" to 14", six adult steelhead from 1 lb. to 7 lbs., and two adult king salmon, 4 lbs. and 5 lbs. Wooley Creek anglers in 1968 reported catching and keeping 75 juvenile rainbow trout-steelhead from 3" to 12". No harvest of adult salmonids was reported in 1968 (Tables 3, 4 and 5). At least 50 percent of each of the three categories of creel fish (juvenile rainbow trout-steelhead adult steelhead and adult king salmon) reported during 1967 and 1968 were from Area 3. (Tables 2, 3, and 4).

Anglers fishing Wooley Creek in 1967 reported releasing 486 juvenile rainbow trout-steelhead ranging in length from 3" to 9" and one, two and one-half pound king salmon. In 1968, Wooley Creek anglers reported releasing 466 juvenile rainbow trout-steelhead ranging in length from 3" to 12"; no adult fish were reportedly released in 1968. A majority of these fish were reportedly released in area 3 in both years (Table 5).

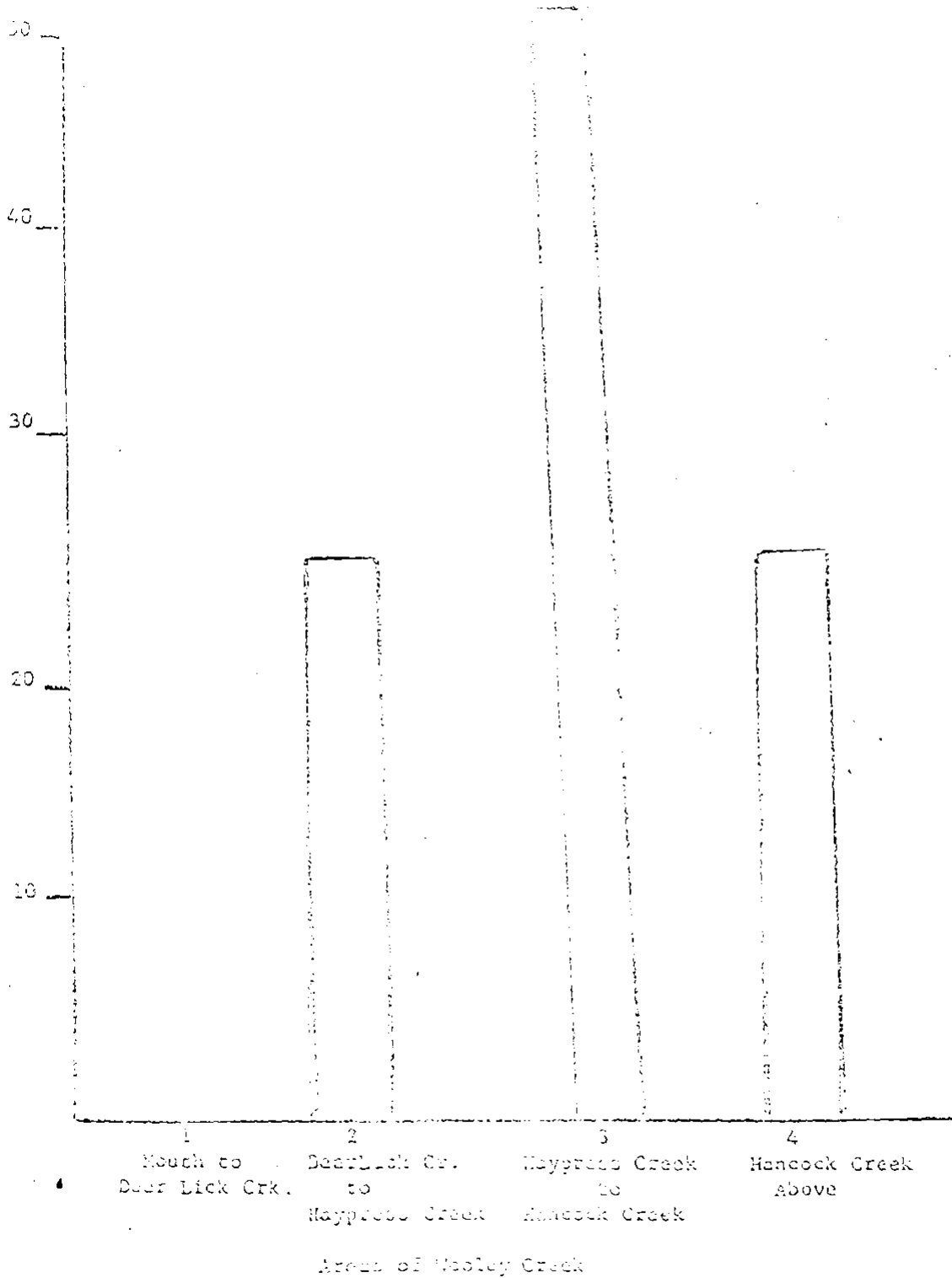
Percent of Total Annual Precipitation Occurring in Each of the Four Areas of the Mainstem of Wooley Creek, During 1967 and 1968



Percent of Total Juvenile Rainbow trout-Steelhead Caught and Kept From Each of the Four Areas of the Mainstem of Woolley Creek During 1967 and 1968

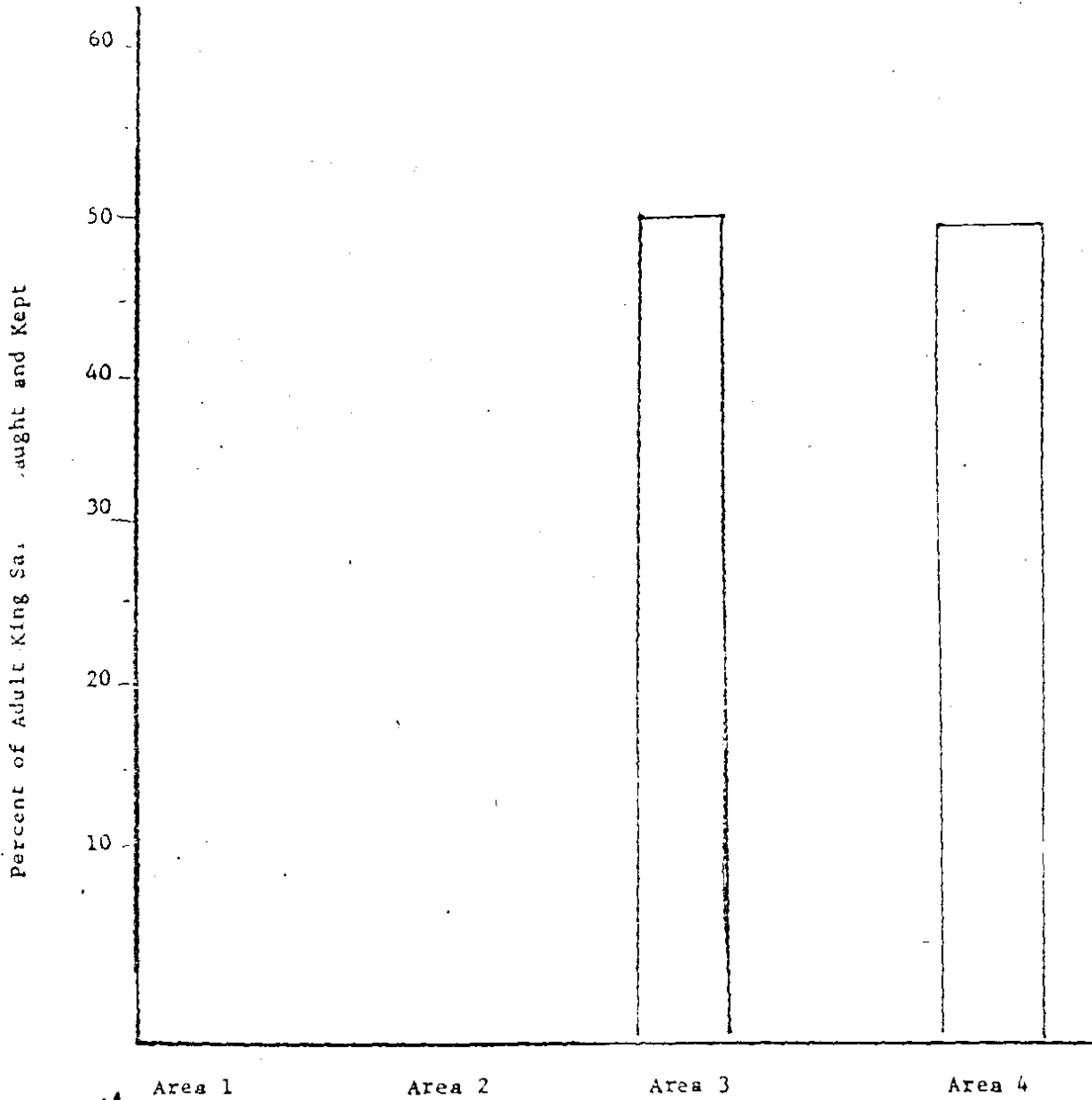


Percent of Deer Harvested in Each Area and Kept
From Each of the Four Areas of the Watershed of Woolley Creek During 1967



None reported harvested in 1968.

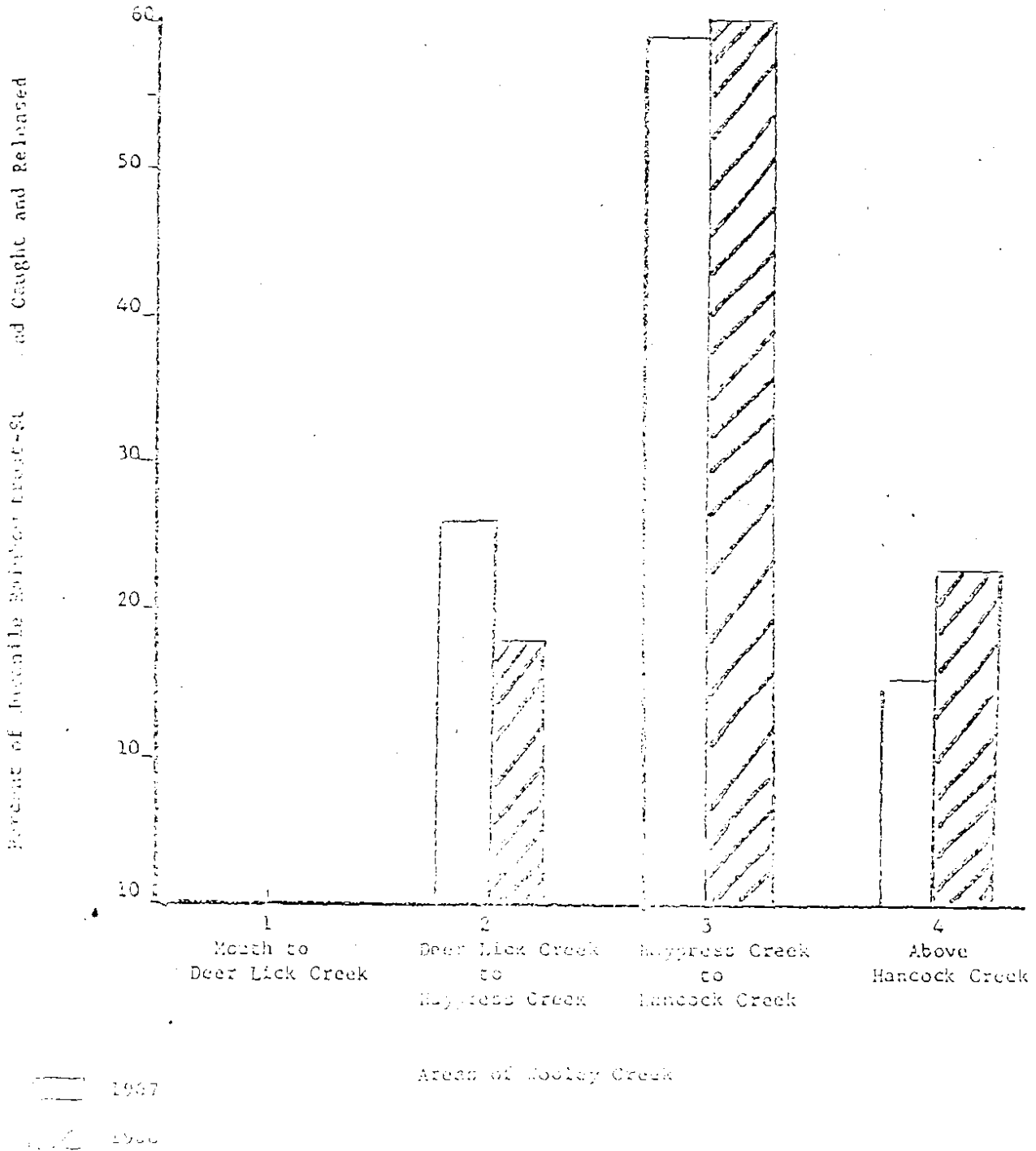
Percent of Total Adult King Salmon Caught and Kept
From Each of the Four Areas of the Mainstem of Wooley Creek during 1967



Areas of Wooley Creek

1. None reported harvested in 1968. This table represents the only two king salmon reported caught and kept in 1967.

Percent of Total Juvenile Rainbow Trout-Sterling and Caught and Released From Each of the Four Areas of the Mainstem of Woolly Creek During 1967 and 1968



The percent of angler nonresponse to completing the angling report cards is not know. To account for this probable factor it was assumed that of every four anglers who fished Wooley Creek or its tributaries, only three would complete an angling report card. There is no factual data to confirm this, only the impressions of department personnel. Under this assumption, 75 percent of the total angling pressure and fish harvest was reported from both the mainstem Wooley Creek and its tributaries to obtain estimates of total pressures and harvest, then, each reported total was divided by .75 (Table 6). These expanded totals may more accurately reflect the true angler pressure and angler harvest.

Tributaries to Wooley Creek

The report cards indicated that a very small portion of the total angler effort occurred in the tributaries. Anglers in 1967 reported fishing 14 hours on Deer Lick Creek, Haypress Creek, Bridge Creek, and the North Fork Wooley Creek and catching 21 juvenile rainbow trout-steelhead from 4" to 7" of which 15 were released. Eighty-eight percent of all tributary angling during 1967 was accomplished on Haypress Creek and Bridge Creek. Estimates of total 1967 pressured harvest are 19 angler hours and a catch of 28 juvenile rainbow trout-steelhead of which 20 were released (Table 7).

In 1968 anglers reported fishing six hours on Bridge Creek and Haypress Creek and catching 53 juvenile rainbow trout-steelhead from 4" to 10" of which nine were released. Estimates of total 1968 pressure and harvest are eight angler hours and a catch of 71 juvenile rainbow trout-steelhead of which 12 were released (Table 7).

Fish Population Surveys

1967

A valid estimate of the size of the 1967 summer steelhead and spring run king salmon populations could not be made due to the nature of the 1967 fish population survey.

Reported and Estimated Total of Angler Hours
 Number of Fish Caught, Wooley Creek Mainstem, 1967 and 1968

	1967		1968	
	Total Reported (1)	Estimated Total (2)	Total Reported (1)	Estimated Total (2)
Angler Hours	219	292	77	103
Juvenile Rainbow Trout-Steelhead Caught and Released	486	648	466	621
Juvenile Rainbow Trout-Steelhead Caught and Kept	105	140	75	100
Adult Steelhead Caught and Kept	6	8	0	0
Adult King Salmon Caught and Kept	2	3	0	0

1. Number actually reported by anglers from completed angling report cards.
2. Number actually reported by anglers from completed angling report cards plus estimates for those anglers who neglected to complete angler report cards.

Reported and Estimated Total Angler Hours and
 Number of Fish Caught, Wooley Creek Tributaries, 1967 and 1968.

	1967		1968	
	Total Reported (1)	Estimated Total (2)	Total Reported (1)	Estimated Total (2)
Angler Hours	14	19	6	8
Juvenile Rainbow Trout-Steelhead Caught and Released	15	20	9	12
Juvenile Rainbow Trout-Steelhead Caught and Kept	6	8	44	59

1. Number actually reported by anglers from completed angler report cards.
2. Number actually reported by anglers from completed angler report cards plus estimates for those anglers who neglected to complete angler report cards.

Nevertheless, it was the general impression during this 1967 survey both from the observations of the biologists and from recorded observations of certain anglers that the populations of both summer steelhead and spring running salmon were fairly well scattered along the entire length of Wooley Creek. Adult fish were observed or reported in Wooley Creek between Gates Creek and approximately Hell Hole Creek. During the summer of 1967 Bridge Creek and Haypress Creek were the only tributaries inspected for adult salmonids and none were seen. Water temperatures, flow estimates, estimates of water clarity and other data taken in 1967 are listed in Appendix A-1.

1968

Wooley Creek Mainstem. The results of our observations during the summer of 1968 indicated our general impressions of 1967 had been essentially correct. We found no large concentrations of adult salmonids in any one pool, rather the fish were well scattered through Wooley Creek from its mouth to Big Meadows Creek (Table 8).

Adult steelhead were observed in the mainstem of Wooley Creek from the mouth upstream for a point about 16.5 miles to $\frac{1}{4}$ mile downstream from Big Meadows Creek. Adult king salmon were observed in the mainstem from just above the mouth of Deer Lick Creek upstream for about 14.5 miles to a point $\frac{1}{4}$ mile downstream from Big Meadows Creek.

In the approximate 16.6 miles of Wooley Creek between its mouth and Big Meadows Creek, there were an estimated 11.6 adult salmonids per mile during August, 1968 (Table 9). Of 83 pools (about 12' x 30' by five feet deep or larger) checked in August, 1968, 56, or 68 percent appeared to be empty. The remaining 27, or 32 percent each contained at least one adult salmonid (Table 11). All pools inspected 1968 in Wooley Creek, from its mouth to

TABLE 8

Distribution of Adult Salmonids (Steelhead and King Salmon, combined) in Wooley Creek, August 1968.

		Observed	Estimate of Number Present in Area
Mouth to Deer Lick Creek	Area 1	6	36
Deer Lick Creek to Haypress Creek	Area 2	6	22
Haypress Creek to Hancock Creek	Area 3	38	99
Above Hancock Creek	Area 4	<u>24</u>	<u>36</u>
Total		74	193

TABLE 9

Estimated Number of Adult Salmonids
Per Mile in the Mainstem of Wooley Creek - August 1968

	Number Adult Salmonids Estimated	Approximate Mileage	Estimated Adult Salmonids Per Mile
Area 1	36	2.0	18.0
Area 2	22	4.0	5.5
Area 3	99	5.3	18.7
Area 4	36	5.3	6.8
	<hr/>	<hr/>	<hr/>
Total	193	16.6	11.6

1. Hancock Creek to Big Meadows Creek

Distribution of Adult Salmonids in Large Pools

	Number Of Pools Inspected	Number Of Pools Containing No Adult Salmonids
Area 1	9	5
Area 2	23	19
Area 3	27	17
Area 4	24	15
	-----	-----
Total	83	56

1. Those pools measuring approximately 5' x 30' by five feet deep or larger.
2. Hancock Creek to Big Meadows Creek.

Big Meadows Creek, contained an abundance of juvenile rainbow trout-steelhead from about 3" to approximately 8", most being less than 5". A few rainbow trout-steelhead from 8" to about 12" were also observed in each pool inspected.

Of the 49 adult salmonids that could be identified by species in Wooley Creek during 1968, 33 or 2/3 were steelhead and 16 or 1/3 were king salmon (Table 11). In all, 74 (identified and unidentified) adult salmonids were actually counted during the 1968 fish population survey, with the expanded estimate of the total ~~summer~~ salmonid population being 193 (Table 8), 129 steelhead and 64 king salmon.

The ~~maximum~~ and ~~minimum~~ water temperatures of Wooley Creek at Bear Skull Flat (approximately midway between Dead Horse Creek and Bear Skull Creek) varies about 7°F in August, 1968; from 69°F at 1900 on August 7 to 62°F at 0700 on August 8 (Appendix A-2).

Tributaries to Wooley Creek. During the ~~summer~~ of 1968, Haypress Creek, Rock Creek, Hancock Creek, and the North Fork Wooley Creek were inspected for adult salmonids and none were seen. Bridge Creek and the North Fork of Wooley Creek appeared to be the only tributaries capable of holding adult steelhead or king salmon through the ~~summer~~. A large deep pool in Bridge Creek at the base of the falls about 200 yards above the mouth could contain adult ~~summer~~ salmonid, in some year. The North Fork was walked from its mouth to the confluence of Little Medicine Creek a distance of about 3/4 mile. Five large pools were inspected in the North Fork and none contained adult salmonids. These pools were not as large, on the average as those pools inspected in the mainstem Wooley Creek. The North Fork has a much steeper gradient (about 307' per mile between its mouth and Little Medicine Creek) than does Wooley Creek in the area of the confluence of the North Fork. The North Fork in its first 3/4 of a mile contains many cascades and falls

Distribution of Adult Salmonids Identifiable As
Steelhead or King Salmon In The Mainstem of Wooley Creek - August, 1968

	King Salmon	Steelhead
Area 1	0	6
Area 2	1	5
Area 3	7	6
Area 4	8	16
	——	——
Total	16	33

four to five foot in height. Very little spawning gravel exists in the 3/4 mile. Juvenile rainbow trout-steelhead from 3" to 8" were abundant in pool near the mouth of the tributary, but these fish became less numerous as one progressed farther upstream. Water temperatures, flow estimates, notes on water clarity, and other data for tributaries taken in 1968 are listed in Appendix A-2.

DISCUSSION AND CONCLUSIONS

The 1967 and 1968 Wooley Creek surveys indicate that the adult summer steelhead and spring run king salmon populations are relatively small and angler reports indicate that a very small portion of these populations are being harvested. If we assume that the size of the 1967 population of adult summer salmonids was 200 individuals (about the same as the 1968 estimate), then we can determine approximately the percent of the summer salmonid populations harvested in 1967. Since eleven adult salmonids were estimated to have been caught and kept, anglers fishing Wooley Creek in 1967 probably harvested six percent of the total summer salmonid population. However, since the 1967 run may well have ranged from 100 to 300 adults, the percent harvest could likely fall within three to eleven percent. No harvest of adult summer steelhead or adult spring run king salmon was reported in 1968. In view of the preceding, it is extremely unlikely that this small harvest is significantly affecting the spawning stock of these summer salmonids.

It is interesting to note that although Wooley Creek between Haypress Creek and Hancock Creek (Area 3), was closed to all angling in 1968, fifty-one percent of the 1968 total angler pressure, sixty percent of

The 1968 released juvenile rainbow trout-steelhead and fifty-six percent of the 1968 harvested rainbow trout-steelhead were reported from this closed area. This closure was effected in 1968 to attempt to protect a portion of these summer steelhead and spring run king salmon from exploitation by man. It is evident from this data that the closure was not effective. In 1967 when Wooley Creek was open to angling in its entirety, Area 3 was the most popular with fishermen (60% of total angler hours spent here) and yielded the majority of fish released and fish kept. The fact this same area was closed to angling in 1968, did not appear to affect its popularity at all. I submit merely closing by regulation a portion of Wooley Creek to angling probably will not significantly protect the adult summer salmonid populations from human exploitation.

It would appear that (1) because of the small amount of angler pressure expended on Wooley Creek, (2) because of the very small harvest of summer steelhead and spring run king salmon, and (3) because these fish do not appear to concentrate but are well scattered throughout Wooley Creek, these populations of adult summer salmonids are presently in less danger from over-exploitation by man than is commonly believed.

In 1968, Wooley Creek water temperatures were approaching the upper tolerance limits for both adult and juvenile summer salmonids. Future changes in the Wooley Creek watershed due to for example, logging or road construction could cause the water temperature of Wooley Creek to become a limiting factor with regard to these fish. Under present U. S. Forest Service regulations, timber harvesting and road construction are not permitted within the Marble Mountain Wilderness Area but logging operations are permitted below the wilderness area boundary.