TABLE 1

PRODUCTION AND UTILIZATION OF LADINO CLOVER ON THE PATTERSON CREEK CLEARINGS, PERIOD STARTING JANUARY 30, 1964.

Clearing	Date Clipped	Clearing Segment	Pounds/acre, oven-dry weight[1] Estimate	Standard error	n
#28	May 12	"Edge"	180.6	109.2	6
		"Center"	108.8	29.9	4
		Total	161.4	80.3	
#29	May 19	"Edge"	133.2	46.2	6
		"Center"	88.7	13.6	4
		Total	120.3	10.5	
#40	April 23	Total [2]	299.2	43.7	10
	June 4	Total	496.3	21.1	10
Two Clip Season		Total	795.5	48.4	

[1] Deer utilized all clover produced.
[2] Clearing 40 not stratified for "edge" and "center."

TABLE 2

PELLET GROUP CENSUS ON CLEARINGS AT THE PATTERSON CREEK STUDY AREA.

Date	Number of pellet groups, by clearing 28	29	40
April 2	All recent pellet groups removed		
8	6	11	6
14	7	9	5
23	0	4	3
29	0	1	1
May 5	0	2	2
12	0	1	4
June 4	(Invasion by native plants too		15
9	thick for accurate counts)		6

A SURVEY OF STREAMBANK WILDLIFE HABITAT

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INTRODUCTION

Most of our wildlife species use streambank cover as part of their daily range and many may live their entire life-span in this habitat. Yet it is strange that any mention of preserving a stream seems to be automatically thought of as a benefit to fishing. There is nothing wrong with this idea, except that it is a bit nearsighted. Whatever the reasons for the professional neglect of streambanks as wildlife habitat, they have been costly. Much of this particular type has been lost by default.

Streambank cover is commensurate with fish, water quality and wildlife! Without this protective vegetation, a stream is simply an open drainage ditch. Where do you find water quality, fish quality, wood ducks, squirrels, 'coons, furbearers and songbirds; along an open drainage ditch?

Every g.p. type wildlifer sooner or later recognizes that his main work is in the realm of Ecology. He is obliged to equate wildlife populations to environmental requirements. The weighty statistical studies of the number of mating calls, the daily bag limits, pounds of red meat and other various and sundry activities and products of a given species take on a singular insignificance if, during the course of the study period, something or someone has eliminated the living quarters of that species. It should be admitted, however, that had such volumes been produced on the saber-toothed tiger, the three-toed Eo-hippus and such, they would probably have made interesting reading today.

OBJECTIVES AND PROCEDURES

This study was initiated in Kentucky in 1963 as a result of observations of random destruction of streambank habitat. The purpose was to observe and record the current status and practices which adversely affect the quality of this important habitat type; to note expected future changes and to note possible remedial measures. The field work was generally completed in 1966.

A review of available literature showed very little reference to streambank cover as wildlife habitat. Field studies were conducted on foot and by boat. Standard data collecting forms were used. Photographs in color and black and white were taken to illustrate observations. Records were maintained on the mileage of stream surveyed, the status of the habitat—altered or normal—types of wildlife species observed and human activity observed. Some of the better streams were selected for the study. A detailed job completion report on this study is now in preparation.

FINDINGS

A total of eighteen streams or sections of streams were surveyed, covering a distance of 226.0 miles. Of this total, 93.5 miles (41.4%) was found to have been recently altered. Outstanding examples of good and bad practices were found. The most often observed streambank wildlife habitat destruction practice was in agricultural clearing, where land along the stream had been bulldozed and otherwise cleared, supposedly to increase crop production or provide more land for cultivation. Severe washing, erosion and siltation, debris blocked channels and subsequent flooding marks were noted where these destructive practices were applied. Refuse dumping, gravel operations and random and clear-cutting of trees are more than just a common occurrence.

The most extensive example of total destruction of streambank habitat was found on Salt River. For a distance of fourteen miles and a width of one hundred feet on each side, the banks were clear-cut and cleaned of trees and shrubs. This was a flood control project, authorized through the U. S. Army Corps of Engineers. Along with stumps and snags, the channel was so filled with silt that the small survey boat dragged in mid-stream.

In the over-all study, the streambank habitat surveyed was found to be damaged or destroyed by methods ranging from individual tree cutting to strip-clearing to complete elimination of all cover adjacent to the stream.

Following is a list of some of the destructive practices encountered, which may give an idea of the rate at which the habitat depletion is occurring.

Agricultural Clearing, Tree Cutting, Flood Control Projects, U.S.D.A. Watershed Projects, U.S.A.C.E. Flood Control and Channelization Projects, Highway-Bridge Construction, Road Gravel Operations, Campsite Clearing, Refuse Dumping, Livestock Access, Industrial Pollution, Coal Mine Pollution and Siltation, Oil Operations Pollution, Pipe Line Clearing, Public Works Relief Projects.

DISCUSSION

It was observed during the course of this study that streambank habitat is being depleted at an alarmingly rapid rate. Nearly one-half of the streamside cover was found to be altered. The damage is done by both public and private operations and activities. Water quality is being reduced. Fishery resources are being depleted. Wildlife habitat is being destroyed. One is reminded that the wildlife species found along streams are interdependent and very little wildlife can exist without the natural streambank habitat.

Losses of suitable wildlife cover are so extensive due to—call them civilized uses—industry, building, changing farm practices and the rest, that streambank habitat may well be the most practicable of all types of natural wildlife environment that can be rescued and preserved. There is no other habitat type that supports as many different species of wildlife, yet is so readily accessible to the greatest number of common every-day people—anywhere in the country.

There would be considerable difficulty in attempting to resolve problems relating to streams and streambanks. Rights are not always clear. Laws are inadequate or inadequately enforced. Authority is dispersed. Liability and responsibility for the welfare of a stream environment is taken lightly or dismissed completely. In fact, water laws do not appear to include streambank habitat. It must be made known in box-car letters that wildlife too is a major loser in stream pollution and destruction. Once this loss is recognized, wildlife may assume the proper perspective among the many needs for clean water and stream preservation. Perhaps then a portion of the touted stream programs can be designated to the preservation of streambank wildlife habitat.

It seems logical, to me at least, that the U.S.D.A. Soil Conservation Service would have instituted a streamside preservation program back in the early days. What is a more fitting practice to an agency ascribed with the responsibility of soil and water conservation? Where is an example more pronounced than on a streambank; where the destroyed bank cover promotes eroding of the soil they would protect, directly into the water they would conserve?

In many cases, if not most, channel clearing and other "improvement" practices, if necessary, were made so by the very streamside tenants that the project is designed to benefit. Does a present-day landowner have any more right to destroy the stream environment than he would have granted to the owner before him? Would he condone destruction of a stream on lands that would become his in future years? It is likely that had landowners been advised and restrained from cutting trees off the banks, plowing to the water's edge, dumping refuse into the channel and abusing the stream in so many ways, the stream would not need to be "improved" today.

There is dire need for an immediate program of long range for all streams, which is coordinated to consider all uses of a stream. The basic aim of such a program would be toward satisfying all uses required of a stream environment complex, calibrated to the ability of the complex to sustain such uses.

Apparently most plans on streams, as currently devised and executed, are of the "one-shot" variety; to build big or bigger dams, to realign or straighten the channel; to clear and snag vegetation from the bank and channel; to prevent pollution and, in a few instances, to reserve for recreation only. I know of none that utilize a total "*Stream Environment Concept*," which takes into consideration all uses and needs of and for a stream environment complex.

Among existing authorities, or those who are in the position to exercise authority, concepts of what is good or bad for a stream and its environment differ widely. Cost-benefit ratios are often based on an extremely singular purpose. Projects often result in complete destruction of a natural stream complex—which is in itself a question of good or bad, depending on the viewpoint. A single stream can support many different uses, if the users grant consideration to each other. Unless,

and until some manner of mutual regard and respect is customary, misuse and abuse will prevail.

A cardinal rule in elementary first-aid is to "remove the cause, then treat the symptoms." In most cases, flooding and low-flow are symptoms. A study of the stream complex will usually reveal the cause. Most of the one-shot programs are aimed at treating symptoms. These are temporary measures and generally expensive. To remove the cause usually elicits some measure of pain, but is the only real cure.

RECOMMENDATIONS

If there is a single greatest need, it appears in this study to be the need for a *"Stream Environment Concept"*: To develop a unification of purpose between the authorities, managers and users of streams, and to consider the channel, the bank cover and the adjacent watershed as a complex whole.

A long range stream environment management program might be implemented in the following manner:

1. Establish criteria for an Inventory and Classification of all streams.
2. Conduct an inventory and classify all streams according to their capabilities and desired uses.
3. Establish a management program, listing needs for maintenance and improvement for each stream or section of stream.
4. Establish a use priority system for each stream in accordance with its capabilities to sustain such uses.
5. Establish Stream Management and Control Boards on a State and County level to:
   (a) Enumerate all streams in the area of jurisdiction.
   (b) Set up priorities and requirements for all uses.
   (c) Establish a system of control for all uses.
   (d) Establish methods and procedures for maintenance and improvements.
   (e) Review all proposed projects on streams in the area of jurisdiction.

Listed below are some steps that might be taken by a given agency for more immediate benefits to stream environment preservation, but which may not require the above detailed organizational structure:

1. Education as to the benefits of good stream environment could be a vital part of teaching and lecturing in schools, camps, clubs and organizational meetings.
2. Publicity is a valuable tool that can be used to prevent destruction and promote respect and regard for the value of stream environment. Conservation editors and writers could be much more effective in this direction.
3. Promote acquisition and control of streambank habitat by fee purchase, lease and agreements.
4. Afford protection by zoning or the various types of easements.
5. Provide for public review at county or fiscal court level, as well as at state level, all proposed projects involving all or any portion of a stream environment complex.
6. Coordinate fisheries management and game management needs and objectives in all projects where stream environment is involved.
7. Protect stream environment by legal prohibition of the destruction of bank cover within fifty feet of the channel.
8. Formulate cooperative agreements with public and private land management agencies to protect natural streambank habitat. For example: Careful selection and marking of trees for timber sales by service foresters. (This was done in Kentucky.)
9. Petition for a U.S.D.A. practice to promote use of filter strips and protection to enhance natural streamside cover. Include such a practice in A.C.P. cost-sharing, S.C.S. farm planning and in Extension advisory.
10. Make provisions for mitigation of stream environment losses due to impoundments or channel work in public projects by fee

acquisition of streamside border. The acquisition, fifty feet on each side of the channel, should be in direct ratio of one mile purchased for one mile damaged.

11. Petition for inclusion of protective measures for natural streamside cover in public laws such as the "Water Quality Act" and the "Water Resources Planning Act," and subsequent programs resulting from these acts.

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