

C.S.C. 35

NYASALAND PROTECTORATE



Annual Report
of the
Department
of
Game, Fish and Tsetse Control
for the
Year ended 31st December
1957

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Annual Report of the Department of Game, Fish and Tsetse Control for the Year 1957

(a) Staff and General

1. 1957 was a difficult year as regards staff, with no Fisheries Officer available, only two Game Control Officers in action for most of the period and four of the remaining senior staff on leave at various times during the year.

2. Due to shortage of housing and recruitment difficulties no appointment could be made to the vacant post of Fisheries Officer, the previous incumbent officer having resigned in September, 1956. This long delay in replacement inevitably handicapped field work in connection with Lake fisheries and, apart from the programme under the Fish Ranger at Nkata Bay, this had to be restricted to what could be done by the junior staff under the occasional supervision of the Director.

3. The Director returned from leave on 6th July and reassumed charge of the Department from Dr. Steele, who had been Acting Director during the first part of the year. Dr. Steele then departed on leave on 27th October.

4. Mr. Muldoon, Game Control Officer, resigned at the end of February and his replacement did not arrive until November. In the meantime it had been necessary to send Mr. Llewellyn, Game Control Officer, on leave at the end of October and the resignation of the replacement for Mr. Muldoon, two days after assuming duty, left an awkward hiatus. Fortunately Mr. P. L. Potous agreed to serve on a temporary basis pending the engagement of a permanent officer.

5. Mr. Iles, Fishery Research Officer, returned from leave on 18th January and Mr. Rickman, Tsetse Ranger, departed on leave on 19th May and returned on 27th December.

6. Appendix I shows staff employed as at the end of the year.

7. In spite of the shortage of staff, however, some progress was made. Further work was done in providing facilities for visitors to Kasungu Reserve, a useful start was made with a training school for African fishermen, boat building for Africans continued satisfactorily and the introduction of fish farming in the Northern Province proceeded at an increased rate. On the tsetse control side the Karonga reclamation scheme showed unequivocal signs of coming to a successful conclusion.

(b) Game

CROP PROTECTION

8. Work in the Central and Southern Provinces followed the same general pattern as in previous years: the main efforts of the armed hunters were made in the vicinity of the Reserves, the Lake-shore plains, and the cotton areas of the Southern Province. As before, however, there were a number of short-term efforts against carnivora in various parts of the Protectorate. Two man-eaters and several stock raiders were killed. Attacks on vermin were continued when nothing more serious offered.

9. Towards the end of the year efforts were made to revive the interest of the general public in the control of vermin by private effort. Bounties were increased and an attempt was made to enlist the more active support of local authorities by

offering to refund one-third of their expenditure on bounty schemes if a "target figure" for the District was exceeded during the year.

10. The scheme was not introduced until late October, and there was not the time within which to judge its effectiveness before the end of the year, but there were some signs of increased effort.

11. Staff and housing difficulties prevented any direct effort in the Northern Province but the inhabitants of Nkata Bay District continued to maintain their high rate of vermin killing under the stimulus of the bounty scheme. This scheme was also extended to Rumpi District late in the year.

12. Appendix II shows the details of animals disposed of and Appendix III shows revenue accruing from crop protection activities.

CROCODILE HUNTING

13. The number of licensees fell to three during the year and these three were not in continuous action. 1,559 reptiles were reported as having been captured. Of this total 81 were trapped by Africans.

14. There were indications, towards the end of the year, of some resurgence in the crocodile population. For the most part the relative proportions of the various sizes in the catch remained much the same as in previous years, but there was an appreciably higher proportion of large crocodiles, particularly towards the end of the year and in Central Province waters.

15. Damage to gill-nets was also perceptibly heavier in the closing months of the year and it looked very much as if the hunted areas had received quite a number of immigrants from parts of the Lake not yet much exploited.

16. On the whole it does not appear that the crocodile population is progressively declining. On the contrary it seems to have steadied, though naturally at a lower level than before exploitation started. So far the only ill effect which appears likely to follow the diminishment of the crocodile population is an increase in the number of otters in the Upper Shire River and the increased raiding of traps by these animals. This disadvantage is, however, at least for the time being, more than offset by the increased opportunities of gill-netting.

17. The value of skins exported during the year was some £8,000.

GAME CONSERVATION

18. The general picture in the Reserves is that game is still on the increase in all of them, with the possible exception of the Lengwe.

19. In the Mwabvi Reserve nyala now seem fairly well established. They were seen every month from July onwards by the Reserve Guards and, at intervals, by the Game Control Officer. One can now more or less rely on seeing rhinoceros, at least within the portion of the Reserve which is their chosen habitat, and buffalo appear to have more permanent residence in the area. These latter were observed by the Game Reserve Guards every month from May onwards, and it seems probable they are present all the year round. Sable, kudu, impala and reedbuck also continue to be seen frequently.

20. The increasing number of occasions on which game is observed in the vicinity of the main road passing through the Kota Kota Reserve, lend colour to reports of an increased population in this area. Such observations are still the exception rather than the rule, but since there were practically none at all three or four years ago their occurrence, even in small numbers, is encouraging. Game

Reserve Guards' reports, and the observations of the Game Control Officer, indicate respectable populations of elephant, buffalo, eland, roan, sable, hartebeest and waterbuck, with kudu and a number of varieties of small buck in lesser numbers. Rhinoceros are also occasionally seen.

21. Kasungu Reserve continues to carry a fair elephant population, which shows no sign of declining. Other animals, however, although present in fair numbers if the evidence of spoor is to be believed, are still disappointingly wary in their habits. In the latter part of the dry season, at least, they leave the open *dambos* for the denser bush very early in the morning. Nevertheless a satisfactory number of buffalo, eland, roan, hartebeest and zebra were observed during the year by the Game Control Officer and Guards, while the Secretary of the Fauna Preservation Society himself can vouch for the presence of rhinoceros.

22. The Majete Reserve game populations are reported as building up very satisfactorily, though there is still a great deal of movement of soft-skinned buck out of the area in the dry season, which, of course, exposes them to shooting. This movement may be in search of water, and has always been assumed to be so, but the area is not as badly watered as was at one time thought to be the case, and at least some of the movement is probably in search of dry season grazing. Nevertheless very encouraging concentrations can be observed in the main river valley during the dry season.

23. Poaching in the above Reserves, though it still continues, is gradually being brought under better control and there were successful prosecutions in respect of offences in the Kasungu, Mwabvi and Majete Reserves.

24. On the Nyika Plateau game populations have built up considerably following the prohibition of hunting at the beginning of 1952. With the withdrawal of the officials of the Colonial Development Corporation from Chelinda camp, however, following the cessation of their softwood experiments, poaching is again reaching serious proportions.

25. Unfortunately these circumstances have coincided with the difficult staff position reported in the first section and it has been impossible to post a senior officer to the Northern Province this year. It is, however, hoped that it will be possible to remedy this situation in 1958.

26. With regard to opening reserves to visitors progress was a little disappointing. Due to staff shortages and to late rain in the preceding wet season, there was delay in completing the reopening of the Kasungu camp and it was not ready till too late in the season to be of much service. It should be possible to make a better showing in 1958 with the problems more clearly in view and the Lisitu River already strongly bridged as a result of this year's efforts.

27. Outside the Game Reserves there is little of moment to report. The figures of licences taken out show a small rise from previous years, but are still very far short of the number of firearms registered. The number of Protectorate licences taken out is still very small, surprisingly so in view of the limited schedule of the Resident's licence which most people take out and it is difficult to escape the conclusion that these limitations are frequently ignored.

28. There were some successful prosecutions of those offenders who employ hunters to shoot for them with a loaned firearm.

29. Nevertheless, game still persists in a number of areas outside Reserves though it is now mostly nocturnal in habit. The Sumbu area of Chikwawa still has a fair game population and a good deal of time was spent this season in trying to prevent poaching there. This locality may well offer possibilities for a Controlled

Area if easily recognizable boundaries can be defined. Elephant on the Cape Maclear peninsula still persist and were seen in the vicinity of the Palm Beach Inn and Lakeshore cottages on a number of occasions.

30. Wild dog were also in evidence in the Lower River area generally, though more particularly in the Majete and Mwabvi Reserves. One is doubtful whether to deplore the appearance of these very destructive animals, or to welcome them as a sign that there is some increase in game to attract them to the area. Towards the end of the year arrangements were made for the careful recording of observations of these animals, with a view to getting some idea of their cycle of movements as a prelude to an attempt to control them. The Nyasaland Fauna Preservation Society was asked to co-operate and it is hoped that members will assist during the coming year.

31. An observation on rhinoceros made by Mr. O. J. Carey, Game Control Officer, is perhaps worth recording. In the company of two Game Reserve Guards in the Mwabvi Reserve he came unexpectedly on a bull rhino. The animal was aggressive but he was able to get behind a rock before it charged, while the Game Guards similarly "froze" behind trees. He then attempted to take a photograph but since he was using a reflex camera had to expose himself above the rock to do so. On each occasion he made an attempt the rhino made an abortive charge up to the rock and he had to crouch down again. After some time the rhino was joined by two tick-birds. On the next occasion that Mr. Carey showed himself above the rock the tick-birds observed him and gave their alarm cry, whereupon the officer was interested to observe that the rhino immediately turned tail and made off as quickly as possible.

32. It seemed that the stimulus of the alarm cry brought forth the immediate response of retreat, notwithstanding the earlier aggressive response to the presence of an unknown object.

33. The question of a new Wild Birds Protection Ordinance was still under discussion with the Fauna Society at the close of the year.

(c) Fishery

THE STATE OF THE FISH STOCKS

34. The figure of *Tilapia* catch per unit effort of the two sample ring-nets in the south-east arm shows a small decline from the 1956 level, though it is still higher than some years ago.

35. It is, however, to be noted that one of the two firms whose catches have been the basis of calculations for some years greatly increased the size of its ring-nets during 1957. In making allowance for this it has been assumed that the catching ability of a ring-net increases in direct proportion to the increase in size, but this may well err on either side of the truth so the detail of the 1956/57 comparison cannot be fully relied upon.

36. Gill-net *Tilapia* catches show a small rise in the south-east arm. This may well reflect the fact that a more accurate method of calculating the effort employed has been used this year.

37. The total landings of *Tilapia*, mainly from ring-nets in the south-east arm, increased by about 57 per cent. but the number of pulls increased by 82 per cent. This, even without any allowance for the increased size of net in use, gives general support to the impression of a slightly reduced stock which emerges from the figures for individual nets. This may be due to some purely natural cause, but may also be due to the present greatly increased effort being more than the stock can bear.

38. The African records also show some fall in the *Tilapia* catch per single pull at nearly every station, but since the species here is not the same as that making up the bulk of the non-African catches the reason for it is probably not connected with the increased non-African effort. The species here is the inshore of the two main *Tilapia* species, which usually tends to undergo recession with a high Lake level, and the drop in catch is probably connected with this factor.

39. On the whole it seems likely that the stocks of both the main *Tilapia* species stand slightly lower than they did a year ago, and in view of the expansion taking place the situation is being carefully watched.

40. One species which has shown definite signs of increase, at least in the Upper Shire River, is the weed-eating *Tilapia*; *T. melanopleura*. Occasional specimens have always been present in the Upper Shire but have not been common. During the early part of 1957, however, the relative abundance of this species rose very considerably, probably as a result of the amount of grass and weed suddenly brought within reach by the rise in water level, and to some extent it seems to have displaced the hitherto common *T. shirana*.

41. Catches of *Labeo* and "barbel" appeared reasonably steady in comparison with last year's figures, though there was some considerable rise in the catch for non-African gill-nets on the south-east arm.

42. The *utaka* fishery showed increases at most stations but a shortfall at Malindi, usually the most important centre of this fishery.

43. Unfortunately, with no Fisheries Officer in the field to make an adequate check of data collected by the recorders or submitted by the various firms, all the 1957 figures must be accepted with reserve.

44. Statistical details are given in Appendices V and VI.

THE NON-AFRICAN FISHERY

45. Five commercial licences were in force during the year, with four licensees in continuous action.

46. In general it was a year of very considerable expansion. The three firms based in the south-east arm all expanded their efforts, two by the addition of further craft and one by greatly increasing the size of the ring-nets in use.

47. The total non-African craft in action under the flags of these firms now amounts to twelve ring-net boats, two smaller craft for gill-netting, mostly used in the south-west arm, nine fish-carrying barges, of which two are self-propelled, and three small motor boats for towing carriers. Most of the firms, including the firm based in the south-west arm, have further craft on order or under construction.

48. Catches in the south-east arm rose to 3,984 short tons in the year, an increase of 48 per cent. over 1956 figures, and in the south-west rose to 421 short tons, giving an increase of 97 per cent.

49. Much of this increase was the result of the activities of the firm first licensed in 1956, but the older established firms also increased their catches, and both the new firm and one of the older firms made considerable efforts in the south-west arm.

50. A feature of the general picture was the increase in the landings over the period July to December, when hitherto catches have been low. The catch over this period in 1957 was 1,652 short tons against 907 short tons over the same period in the previous year.

THE AFRICAN FISHERY

51. In the absence of a Fisheries Officer it has not been possible to keep in close touch with the individual African fishermen now gradually emerging as commercial operators in the southern half of the Lake. There are, however, known to be seven in Fort Johnston area and about three in the Kota Kota area who might properly be described under this heading. Six of these are using powered craft.

52. Owing to the difficulty of securing statistics from many of these people without personal visits and inspection of records, it is not possible to give detailed figures of catches for a representative sample. The few detailed statistics which have been collected, however, suggest a figure of 2-3 tons per month per unit, on the average.

53. One fisherman who received a loan of £300 from Government in April was almost in a position to pay it back by the end of the year, and still have enough ready money left for the replacement of gear and other running expenses.

54. The majority of these embryonic commercial operators, however, badly need advice and assistance in the management side of their ventures and it is hoped that it will be possible to provide this at an early date.

55. Taking the African fishery as a whole the main development is the greatly increased use of gill-nets all over the Lake. This does not show particularly well in the tables on the African fishery, which merely list the number of nets, the catch of which was recorded, but the sales of nets by the commercial firms make it plain that a big increase is taking place.

56. Another feature worth recording is the gradual increase in the use of the Chilimila net in the south-east arm. This is a desirable development as, unlike the seine-net, once almost the only method of fishing in the south-east arm, it causes no damage to breeding grounds and very seldom takes immature *Tilapia*.

57. The abrupt rise in the level of the Upper Shire River during the wet season of 1957 considerably affected seine-net fishing in the River, as most of the beaches were submerged, and this is the main reason for the falling off in the use of the seine-net in this locality and in Malombe also. It was in part counteracted by the increased use of fish traps but these suffered a good deal of interference from otters and, generally speaking, the importance of the river fishing declined. No doubt, however, new beaches will be developed and in so far as a good many fish breed in the river or Lake Malombe, the *Tilapia* stocks may well be the better for the temporary suspension of shore seining.

58. It is apparent that indifferent distribution of supplies of fishing gear is still putting some brake on African fishery development, particularly in the far north.

THE FISH TRADE

59. There were some important developments on the marketing and distribution side during the year. The newly established non-African firm installed an ice plant and small cold room and introduced the carriage of fish in boxes, with crushed ice. Shortly after this one of the older firms followed suit and also brought three insulated trucks into use.

60. A 25-ton capacity cold store was completed and brought into operation at Limbe and another, of 10 tons capacity, was approaching completion at Mlanje by the end of the year. Another firm plans similar developments.

61. There seems to have been little if any response to the improved condition of fish in the hill area retail markets, i.e. the African markets at Limbe, Blantyre, etc. Prices in September and October, normally fairly high, were down to an average of

2½d, 3d or at most 4d per fish (*Lidole*), against a Lake-shore African price of 3d per fish for this species at this time. Obviously what response there was to the improved condition of the fish was largely offset by the unusually large quantities reaching the markets.

62. The bulk buyers at the depots, however, reacted more positively to the improved condition and are now very discriminative as to condition. Prices, however, have not been unusually high and the market is still a highly competitive one.

63. In general the effect of the improvements seems to have been not to increase the average price of fish sold but to cut down losses due to fish going bad before it can be sold. The improvements, however, have been too recently introduced to permit of a proper appreciation of consumer response.

64. In view of these improvements in distribution arrangements, coupled with the very considerable increase in catches, Government decided that, as an experiment, the export ban should be lifted for the first six months of 1958, which is normally a season of plenty.

65. There is little to report on the purely African side of fish trading. The majority of fishermen continue to sell to fish buyers rather than market the fish themselves, and seem to obtain rather better prices from them than from the general Lake-shore public. Comparatively speaking they seem to secure better prices than those obtained by the non-African firms on the open markets in the Shire Highlands area.

66. Even so prices were not high on the average particularly in the south. *Chambo*, a medium sized *Tilapia*, for example, fetched about 1d each throughout the year on the beach at Lake Malombe and 2d each at Chief Mponda's village in the Shire River. Even the higher price represents no more than three times the price charged in 1939, nearly twenty years ago, which is an insignificant rise compared to the price increase in other local produce.

67. Prices in the Northern Province were, however, far higher than in the South and though catches are smaller and the expenses of operating higher it seems that there should be opportunities for small scale commercial operators, at least at places such as Nkata Bay.

DEVELOPMENT WORK

68. During the year a small training school for fishermen was started at Nkata Bay, under the supervision of the Fish Ranger. The object of this school is to teach new or improved techniques, and to give instruction in such matters as the running and maintenance of boats and engines and the elements of management of a small commercial fishery. Parallel with its teaching, the school runs its own small fleet of boats and nets and markets the catches so that students acquire practical experience as well as theoretical instruction.

69. Five courses were held during the year, starting in March, and 21 trainees attended them. Of these about six showed real promise of developing into useful commercial operators and one, visited since undertaking the course, has clearly derived considerable benefit from his training. This is not a high proportion but a useful start has been made.

70. In the South the building of simple craft continued. Four boats were built and sold during the year and a fifth practically completed. Orders continue to come in.

71. It is also worth recording that an independent African carpenter, encouraged and instructed by the example at the Fisheries Station, has built a boat on his own account and has taken orders for others.

72. In view of the fact that these craft cost some £50 each, and that in only one case did the purchaser receive any assistance in loan or subsidy, the continued demand for them is a very encouraging sign of progress in the African fishing industry.

EXPERIMENTAL WORK

73. Experiments were continued with three 4-inch nylon nets, one 54 meshes deep and the others 27 meshes deep with false upper halves made of old seine netting and laced cotton lines respectively.

74. This experiment, started in 1956, arose from earlier conclusions that in the south-east arm the upper half of a 54-inch mesh net, while it did not actually catch fish, nevertheless tended to deflect fish into the lower half. The idea was to find out whether false upper halves made from cheap or waste material would have the same effect and give a 27-mesh net the catching power of a 54.

75. Thirteen sets were made in 1956 and 45 in 1957. The results of the whole series in numbers of fish caught and weight are as follows:

	<i>Tilapia</i>	<i>Labeo</i>	<i>Bagrus</i>	<i>Clarias</i>	<i>Other</i>	<i>Weight</i>
54-mesh nylon ..	418(51%)	185(23%)	112(13%)	74(9%)	34(4%)	1,498 lb.
27-mesh nylon and seine netting ..	98(35%)	88(32%)	45(17%)	23(8%)	24(8%)	459 lb.
27-mesh nylon and cotton lacing ..	149(51%)	80(28%)	40(13%)	15(5%)	8(3%)	486 lb.

76. There appears, therefore, to be little doubt that the deeper nylon net is much more effective than any arrangement involving false upper halves.

77. It is to be noted also that unless one assumes that the false tops actually inhibited the fishing of the lower halves of proper meshing, the experiment is a further indication of the superiority of the 54-mesh over the 27-mesh net in these southern waters.

78. This is the reverse of the conclusion arrived at by the Fishery Research Organization working at Nkata Bay, and the explanation of the difference may be the fairly high percentage of *Tilapia* in the southern catches. This fish is probably less of a bottom living species than the *Bagrus* and *Clarias* which make up the greater part of the northern catches and is, perhaps, more likely to pass over a narrow net than they are.

79. Experiments were also made with coloured gill-nets. The fall in catches of the ordinary white nets during moonlight periods strongly suggests that, in shallow water, fish see and avoid the net at these times and it seemed that coloured nets might have some advantages.

80. Accordingly 4-inch-mesh nylon nets, each of 60 yards set length and 26 meshes deep, coloured light blue, dark blue, light green, dark green, and white, were fastened end to end and set parallel to the shore in six fathoms. The order of the nets in the series was changed each time and 24 sets had been made by the close of the year. The sets started on a new moon and were at intervals over two complete lunar months and not quite half a third.

81. To date results in numbers of fish and weight are as follows:

(1) WHOLE PERIOD

	<i>No. fish</i>	<i>Weight</i>
Light green	171	332 lb.
White	153	291 lb.
Dark green	173	268 lb.
Dark blue	146	265 lb.
Light blue	146	239 lb.

(2) BETWEEN FIRST AND LAST QUARTER

	<i>First lunar month</i>		<i>Second lunar month</i>		<i>Half third lunar month</i>	
	<i>No. fish</i>	<i>Weight</i>	<i>No. fish</i>	<i>Weight</i>	<i>No. fish</i>	<i>Weight</i>
Light green	19	55 lb.	16	29 lb.	19	48 lb.
White	23	47 lb.	11	35 lb.	8	25 lb.
Dark green	18	37 lb.	13	30 lb.	16	30 lb.
Dark blue	16	31 lb.	17	48 lb.	6	11 lb.
Light blue	28	48 lb.	9	9 lb.	11	18 lb.

82. So far it will be observed, the light green seems to have a slight lead on the other nets, either in number of fish, weight, or both, but the experiment continues.

FISHERIES RESEARCH ORGANIZATION

83. Pending the completion of a new house no appointment was made to the vacant post of second Research Officer at Nkata Bay.

84. The existing officer, who returned from leave early in January, turned his main attention to working out the biology of the *usipa* (*Engraulicypris sardella*), and began to make detailed observations on the *nchila* (*Labeo mesops*), both these fish being important members of the northern fish stocks.

85. As part of this programme the plankton sampling was intensified and the collection of other hydrographic data also increased.

86. There is nothing spectacular to report on these projects and a great deal of hard work will have to be done before any clear picture emerges.

87. The report on the main survey of the northern Lake is now virtually complete and it is hoped to present this during 1958.

88. At a meeting of the Joint Fishery Research Organization Advisory Committee held at Nkata Bay during October it was considered that the Organization, as a research body, should present its own Annual Reports. Such a report will be issued for 1957 and further details in this general report are therefore unnecessary.

TROUT FISHING

89. The 1956/57 season, ending in March, 1957, produced some excellent fish on the Northern Rumpi and Kaziwiziwi Streams. The Chapeluka Stream on Mlanje Mountain, reopened for the 1956/57 season, showed considerable benefit from its rest.

90. On the Northern Rumpi 24 licences were issued of which 16 were duly surrendered at the end of the season with the statutory fishing reports. These showed 57 rod-days, 93 fish caught and 54 retained. The average size of fish retained was 13 inches and 10.6 inches for those put back. Best fish of the season was 17 inches.

91. The Kaziwiziwi returns showed 11 rod-days, with 16 fish caught and 15 retained. The average size of those retained was 13 inches and the single fish returned was $11\frac{1}{2}$ inches. Best fish of the season measured 16 inches.

92. For Mlanje 20 licences were issued but only 8 surrendered at the close of the season. This failure to return licences is a most unsatisfactory state of affairs, but the attention of licensees has been drawn to the regulations which will in future be more strictly enforced.

93. The returned licences showed a total of 16 rod-days, 189 fish caught and 48 retained. The average size of fish retained was 10.7 inches and of those returned it was 6.2 inches. Best fish of the year was $14\frac{1}{2}$ inches.

94. A total of 47 licences were issued for the Mlunguzi Stream, of which only 12 were surrendered at the end of the season. The reports given show a total of 67 rod-days with 296 fish caught, out of which 34 were retained. The average size of those retained was 12.2 inches and of those returned 6.5 inches. Best fish of the year was $18\frac{1}{4}$ inches.

95. The above data are somewhat misleading without the qualification that practically all the fish of reasonable size came from the reservoir. The fish in the stream proper were not very numerous and very much smaller.

96. Following the reasonably successful results of closing the Chapeluka it was decided during 1957 that similar steps might be taken on the Mlunguzi. Ideally the whole stream should be rested, but in view of the good results from the reservoir and the difficulty, in any event, of fishing this wide expanse of water exhaustively without a boat, it was decided to leave the reservoir open but to close the major part of the stream itself. It was accordingly closed from Williams Falls to the upper limit of the reservoir.

97. Meanwhile, on the positive side of Zomba trout conservancy, the trout rearing and feeding ponds begun in 1956 were duly completed. This was through the good offices of the Principal Forest Assistant, Zomba Plateau, under whose supervision the work was carried out.

98. The ponds were stocked with some 200 young trout from the stream early in December and are being fed artificially with a view to subsequent release in the stream.

99. Inspections of the Southern Rumpi or Chelinda in the north, and the Wamkurumadzi on the Kirk Range were carried out during the year. These two streams have both been stocked, the Southern Rumpi some years ago and the Wamkurumadzi in 1956.

100. The Southern Rumpi showed some good trout in the extreme upper reaches on the Nyika Plateau, but nothing could be found in the lower levels. The Wamkurumadzi, most disappointingly, seemed completely devoid of trout. There is just a chance that some may have survived, since they would not yet be large and the stream is not an easy one to observe, but it appears that this stocking may have failed.

101. Both the lower levels of the Southern Rumpi and the Wamkurumadzi have a migrant population of indigenous fish, which move up from the Runyina and Shire Rivers respectively, during the rains. The apparent failure of both streams suggests

that trout may be unable to maintain themselves against the attacks of local predators and that stocking should be confined to rivers with a definite fish barrier between the point of stocking and the habitats of indigenous fish.

102. The 1957/58 season was still current when this Report was written and it was too early to analyse results in detail. Some good fish are known to have been taken from the Mlunguzi reservoir and from the Northern Rumpi, but the Kaziwiziwi, which flows into the Northern Rumpi, seems to be devoid of fish at present. The weather was very hot during the early part of the season and fish may have moved to the extreme upper reaches.

103. During the year a fishing camp, to operate on self-service lines, was completed on the Northern Rumpi and should be opened for service next year.

104. Two attempts to establish a stock of brown trout at the Nchenachena hatchery were made. The first failed due to delays in transport of the ova. The second was proceeding with fair success when the entire stock was destroyed in the course of a few days by a virulent disease, subsequently identified by a United Kingdom expert as "fin and mouth virus".

FISH FARMING

105. The first exhaustive fishing of the Tipwiri ponds was carried out during the year and results are given below.

106. The figures concern three ponds, of approximately an acre each. Pond A was supplied with maize waste as direct feed for the fish, and Pond B was supplied with compost, as indirect feed through the production of plankton. Both these ponds received an addition of lime before being filled. Pond C was left in its natural state as a control. Grass cuttings from bank trimmings were also added to Ponds A and B.

107. The returns show a fairly clear lead for the pond supplied with direct feed in the form of maize waste but the pond supplied with compost also produced a better crop than the unfed pond. The result is, of course, the expected one in the light of experiments conducted in other countries and the whole arrangement was designed as a demonstration rather than an experiment.

108. Details of the results are given in Appendix VII. It should be noted that they confirm previous impressions of the superiority of *T. melanopleura* over *T. shirana*.

109. Experiments are now continuing with pure *T. melanopleura* stock and beans and millet planted and grown in the ponds as feed while they are temporarily empty.

110. Some trials in the sale of fish were made and 907 lb. disposed of at the rate of 1s per lb. It is thought that there would be little difficulty in disposing of the whole crop at this rate.

111. In actual fact, however, the greater part of the crop was distributed to stock African-owned ponds, Mission school ponds, etc. The details are as follows:

African fish ponds	..	..	..	..	7,200 fish	..	537 lb.
Department of Agriculture (dams)	..	..	..	..	1,600 "	..	139 "
C.D.C. (dams)	..	..	..	..	200 "	..	12 "
Veterinary Department (dams)	..	..	..	..	200 "	..	27 "
Restocking Tipwiri	..	..	..	..	4,575 "	..	330 "
Mission and school ponds	..	..	..	..	4,600 "	..	262 "
Casual labour	..	..	..	..	1,800 "	..	112 "
Casualties (cropping and sorting)	..	..	..	..	900 "	..	36 "
Sales	..	..	..	..	8,500 "	..	907 "

A balance of about 2,362 lb. was retained for stocking other ponds.

112. The significance of the demonstration has by no means been lost on the local population. A number of people attended the demonstration and instruction course at Tipwiri, small fish ponds are being constructed in many parts of the hill area of the Northern Province and the idea of fish farming has undoubtedly caught the imagination of the northern people.

113. Up to date the majority of the units constructed have been on a small scale, designed to produce a few hundred pounds per year for domestic consumption rather than sale, but a few farmers have realized useful sums from the sale of their fish crops. On this scale, however, the practice is unlikely to challenge the natural Lake fishery for some time.

114. The virus disease mentioned in the report on trout also attacked some of the *Tilapia*, though fortunately not those in the main ponds. The attack was virulent and death resulted a few hours after the appearance of the first symptoms, which were a bluish white film on the pectoral fins. An important feature of the attack was that it was selective for size and species, attacking alevin trout, but not the larger specimens, large *T. shirana* but not small ones, and *T. melanopleura* not at all.

(d) Tsetse Control

GENERAL

115. With the Tsetse Botanist acting as Director of the Department till mid-July and the single Tsetse Ranger on leave from mid-May to the end of December, opportunities were limited.

116. Nevertheless work on more detailed surveys of selected areas continued. Some of them were carried out partly as a training exercise for the Tsetse Scouts, now being taught to work independently as far as possible, and some to gain information on changes in the position since the 1950-53 investigation.

117. Surveys were conducted in the east Malombe area in Fort Johnston District and the riverine plain opposite Fort Johnston Station, the Dowa Lake-shore, with special reference to the Chitala Agricultural Station, and the east bank of the Shire River below the Cholo escarpment.

118. The survey in the latter area revealed no tsetse and further confirmed the view that trypanosomiasis in the Port Herald and Chiromo areas is the result of carried fly plus mechanical transmission.

DECONTAMINATION POSTS

119. The decontamination posts on main roads were maintained as usual. For the third year in succession the catches at these posts showed a rise. Though this is in part no doubt due to increased traffic, the rise is more than directly proportionate and it seems likely that there is some resurgence of fly within the various belts covered.

KARONGA RECLAMATION SCHEME

120. In the absence of the Tsetse Ranger on leave during the season when work was possible, no extensive programme of clearing could be undertaken. The identification of the small infestation sites persisting after the major habitat clearance last year was, however, proceeded with, and will simplify work next year when it is hoped to make the final attack on the portion of the belt immediately threatening the cattle area. This should bring the project to a point where it can safely be left, pending the outcome of negotiations for an attack on the remaining portion of the belt including that in Tanganyika Territory.

121. A small amount was spent on mopping-up operations in the Ngerenge and Katumbi areas.

122. Fly catches in the patrols covering the areas of action, including north Yembe section where mopping-up operations have not been attempted, show drops of 92 per cent. to 97 per cent. below the original figures, whereas those in the unattacked portion of the belt show only a 2 per cent. fall.

123. Utilization of the cleared valleys for garden land in the north Yembe section had a very good effect in preventing regeneration, and what fly remain are almost confined to the small parts left uncleared in 1956.

H. J. H. BORLEY

Director

Game, Fish and Tsetse Control

APPENDIX I

Senior Staff as at 31st December, 1957

Director	H. J. H. BORLEY, M.A.
Tsetse Botanist	B. STEELE, B.SC., PH.D.
Fish Ranger (Rivers)	A. V. GIFKINS
Fish Ranger	K. T. HOWARD
Game Control Officers	E. T. LLEWELLYN O. J. CAREY P. L. POTOUS
Tsetse Ranger	C. H. E. RICKMAN

FISHERY RESEARCH ORGANIZATION (Nkata Bay Sub-Station)

Scientific Officer	T. D. ILES, B.SC.
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APPENDIX II

CROP PROTECTION SCHEME

Animals Killed and Staff employed 1st January to 31st December, 1957

	<i>Totals</i> <i>1956</i>		<i>Northern</i> <i>Province</i>		<i>Central</i> <i>Province</i>		<i>Southern</i> <i>Province</i>		<i>Total</i>
Average No. of hunters	21	..	—	..	14	..	8	..	22
Average No. of netters ..	4	..	—	..	4	..	—	..	4
Average total men per month	25		—		18		8		26

ANIMALS KILLED:

Elephant	25	..	—	..	23	..	22	..	45
Hippo	74	..	—	..	29	..	33	..	62
Buffalo	9	..	—	..	—	..	1	..	1
Waterbuck	1	..	—	..	—	..	—	..	—
Eland, kudu, roan ..	—	..	—	..	—	..	—	..	—
Other buck	2	..	—	..	—	..	—	..	—
Baboon	963	..	—	..	604	..	225	..	829
Pig	50	..	—	..	17	..	14	..	31
Vermin netted	546	..	—	..	225	..	—	..	225
Vermin killed for bounty by private effort.									
A.D.W. finance ..	4,243	..	2,631	..	4,492	..	—	..	7,123
Vermin killed for bounty by private effort.									
Local Treasury finance	No figures		—	..	5,375	..	6,116	..	11,491
Carnivora	12	..	—	..	8	..	16	..	24

APPENDIX III

Revenue accruing from Crop Protection Activities

Value of ivory	
Value of meat and skin sales	£930
	£140

APPENDIX IV

Game Licences issued during 1957

Type	No. issued	Value £
Residents	2,459	2,459
Protectorate Full	156	780
Visitors Full	1	10
Temporary	11	27
Elephant	12	120
Licences for sale and export of meat	18	49
TOTAL		£3,445

APPENDIX V

NON-AFRICAN FISHERY

Table I. Total hauls of each type of net per annum south-east arm

Type of Net	1953	1954	1955	1956	1957
Ring-net	3,755	4,729	4,214	3,728	6,803
Gill-net	600	814	649	858	745

Table II. Average catch per single haul of net

(Numbers represent dozens)

Firm No.	Fish	1953	1954	1955	1956	1957
No. 1 Ring-net S.E. arm	Tilapia	60	52	88	121	113
No. 2 Ring-net S.E. arm	Tilapia	62	36	48	53	51
* Gill-net S.E. arm 3 $\frac{3}{4}$ "	Tilapia	1	—	—	1	4
	Labeo	22	32	27	19	41
	Catfish	4	5	1	5	8
* Gill-net 3 $\frac{3}{4}$ " S.W. arm	Tilapia	Not used		2	5	3
	Labeo	Not used		7	20	19
	Catfish	Not used		11	9	10
* Gill-net 4" S.E. arm	Tilapia	Not used		—	—	8
	Labeo	Not used		—	—	30
	Catfish	Not used		—	—	25
* Gill-net 4" S.W. arm	Tilapia	Not used		—	—	1
	Labeo	Not used		—	—	20
	Catfish	Not used		—	—	8

* Figures corrected to 1,000 yds. set length.

Table III. Total catches of more important species

(Numbers represent dozens. Weight estimated as short tons)

Year	Tilapia (adult)	Tilapia (immature)	Labeo	Catfish	Other	Weight
S.E. Arm						
1953	228,820	—	28,818	5,044	5	2,118
1954	210,710	—	41,015	8,071	18	2,147
1955	287,003	—	27,658	3,525	5	2,536
1956	304,660	—	23,094	6,192	—	2,680
1957	479,675	—	16,148	6,742	126	3,984
S.W. Arm						
1955	1,261	—	2,508	5,612	322	135
1956	2,802	—	9,977	5,367	912	213
1957	3,725	—	22,757	10,135	3,105	421

Table IV. Landings per month. (Short tons)

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
326 ..	330 ..	518 ..	527 ..	567 ..	379 ..	278 ..	139 ..	354 ..	514 ..	318 ..	149

Table V. Number of nets registered by non-African firms

Type of Net	Number	Fees paid
Ring-net	7	£70
Gill-net	21,100 yds.	£106

APPENDIX VI
AFRICAN FISHERY

Table I. Total number of hauls of main types of net observed at Recording Stations

Station	Large Meshed Seines			Small Meshed Seines			Gill-Nets			Chitimila or Ring-Net		
	1955	1956	1957	1955	1956	1957	1955	1956	1957	1955	1956	1957
Malindi	—	—	—	1,424	2,782	1,247	209	238	634	—	—	—
Matewera	189	58	141	147	323	244	46	28	97	—	—	—
Shire River	1,271	912	576	—	—	—	—	—	—	—	—	—
Mpemba	5	55	23	554	220	325	212	2,400	7	—	—	—
Monkey Bay	16	17	15	145	47	67	20	57	1,814	703	662	747
Kota Kota	148	140	29	8	268	207	483	251	790	261	495	280
Salima	509	587	460	124	21	121	7	100	94	—	—	—
Domira Bay	197	95	169	74	198	158	784	147	100	—	—	—
Chia	176	251	—	10	—	—	94	450	648	147	262	476
Lake Chirwa	—	—	—	—	—	—	5,570	6,215	5,014	—	—	—
Lake Malombe	383	296	15	—	—	—	16	34	1,050	—	—	—

Table II. Average catch per single haul of net at Recording Stations

(Figures represent actual number of fish)

A. Large Meshed Seines

Period and Station		Tilapia (Adult)	Tilapia (Immature)	Labeo	Catfish	Haplochromids
Matewere	1955	91.52	—	3.32	2.24	—
	1956	42.67	—	0.39	0.84	—
	1957	33.54	—	1.30	0.55	2
Mpemba	1955	78.20	—	4.20	6.60	—
	1956	12.35	—	2.62	0.60	—
	1957	33.60	—	0.26	1.39	—
Shire River	1955	25.79	—	1.95	0.23	—
	1956	40.14	—	0.93	0.58	—
	1957	29.26	—	1.28	0.65	—
Monkey Bay	1955	58.12	0.115	11.00	1.00	—
	1956	27.94	0.170	6.29	1.41	0.10
	1957	11.87	0.105	1.73	2.46	—
Kota Kota	1955	30.27	—	75.12	16.82	—
	1956	52.16	—	20.21	10.35	160
	1957	10.17	—	43.41	29.28	50
Salima	1955	49.21	—	17.62	6.17	—
	1956	79.30	—	22.78	6.03	—
	1957	81.40	—	17.15	6.03	—
Domira Bay	1955	109.71	—	70.94	12.43	—
	1956	167.10	—	49.16	9.06	55
	1957	123.07	—	36.74	4.17	20
Chia Lagoon	1955	28.86	—	4.65	5.24	—
	1956	15.61	—	0.50	1.78	—
	1957	—	—	—	—	—
Mpamba	1955	31.84	—	76.09	33.76	—
	1956	124.87	—	79.95	18.89	—
	1957	141.81	—	55.81	31.96	—
Lake Malombe	1955	245.37	—	2.75	1.03	—
	1956	93.28	—	1.37	0.68	—
	1957	20.27	—	0.60	0.60	—

Table II—(Continued)

B. Small Meshed Seines

Period and Station		Tilapia (Adult)	Tilapia (Immature)	Labeo	Catfish	Haplochromids
Malindi	1955	0.93	34.50	2.03	0.40	645
	1956	0.34	110.00	1.25	0.29	1,250
	1957	1.02	76	1.19	0.19	465
Matewere	1955	2.29	530	0.006	0.01	913
	1956	3.39	210	0.09	0.07	375
	1957	3.74	2,039	0.004	0.36	434
Mpemba	1955	0.24	115	0.009	0.02	1,079
	1956	0.64	70	0.05	1.92	685
	1957	0.30	85	—	0.007	540
Monkey Bay	1955	3.21	95	7.07	1.07	1,290
	1956	10.80	675	63.64	0.96	135
	1957	5.00	936	67.15	0.36	3.7
Kota Kota	1955	8.12	—	13.00	13.75	185
	1956	5.95	135	5.46	1.72	165
	1957	25.24	50	6.76	4.60	180
Salima	1955	7.72	—	5.59	6.95	1,410
	1956	46.05	—	1.76	3.67	1,205
	1957	43.53	—	43.09	5.06	520
Domira Bay	1955	60.85	—	21.83	9.94	530
	1956	87.39	230	24.68	4.80	465
	1957	79.76	10	19.41	9.24	2,850
Chia Lagoon	1955	6.50	—	0.10	—	—
	1956	—	—	—	—	—
	1957	—	—	—	—	—

Table III. Summary of catches by all methods observed at Recording Stations, 1957

(Actual numbers of Fish)

Station	Tilapia (Adult)	Tilapia (Immature)	Labeo	Catfish	Haplochromids
Malindi	5,577	95,070	7,498	4,093	579,935
Matewere	7,526	603,750	2,462	1,468	136,550
Shire River	30,917	28,185	1,435	3,724	44,475
Mpemba	13,733	26,350	6,987	5,877	654,350
Monkey Bay	1,542	64,175	5,660	1,741	426,975
Salima	46,827	—	29,232	5,741	229,200
Domira Bay	39,708	3,500	9,929	2,485	43,350
Chia Lagoon	68,869	—	6,505	6,338	—
Lake Chirwa	19,601	—	—	1,803	—
Mpamba	5,442	—	—	3,541	—
Lake Malombe	23,338	—	—	1,244	15,912
Kota Kota	9,976	10,750	13,602	6,037	39,250

APPENDIX VII
Fish Farming Demonstration—Tipwiri

Table I
FISHING DATA ON PONDS

	Pond A	Pond B	Pond C
Treatment	Lime (1,000 lb.) Maize waste—2,912 lb. at 56 lb. per week	Lime (1,000 lb.) Compost—5,200 lb. at 100 lb. per week	Untreated
No. and weight of fish stocked ..	6,000 and 225½ lb.	6,000 and 225½ lb.	6,000 and 225½ lb.
(50% 3-8 cm. 30% 10-12 cm. 20% 13 cm. 80% <i>T. shirana</i> 20% <i>T. melanopleura</i>)			
Date of stocking	November, 1955	November, 1955	October, 1955
Date of total cropping	January, 1957	January, 1957	March, 1957
No. and weight (lb.) of fish over 3 cm. <i>T. shirana</i> <i>T. melanopleura</i>	18,138 at 1,449½ 10,287 at 1,393	14,346 at 647½ 6,808 at 808½	17,029 and 195½ 6,338 and 248
No. and weight (lb.) of ¼ lb. and over	3,200 at 1,095½	2,231 at 725½	679 and 220

Table II

	CAPITAL COSTS	RECURRENT COSTS
Capital	Earthworks and ponds	£ 127
	Buildings (store, watchman's house, etc.)	58
	Equipment and materials	106
	Access road bridge	5
		£296
Recurrent	(Eighteen month period approx.)	£ 27
	Fertilizers (lime, maize, etc.)	121
	African farm supervisor	32
	Casual labour on maintenance, etc.	
		£180

APPENDIX VIII

Summary of Traffic and Flies caught at Decontamination Posts, 1957

Post	Position	Number of motor vehicles	Flies caught	Number of cycles	Flies caught	Number of pedestrians	Flies caught	Total flies
..	Outskirts of Kota Kota Township (N)	3,208	90	23,905	57	47,613	34	181
..	Outskirts of Kota Kota Township (S)	—	—	11,761	8	25,559	2	10
..	Approach to C.P. Highlands Kota Kota-Lilongwe Rd.	1,433	155	1,754	81	3,547	30	266
..	Outskirts of Fort Johnston East of Ferry Crossing	3,285	266	103,506	1,235	161,252	2,235	3,736
..	Approach to Zomba Highlands—Liwonde-Zomba Rd.	10,161	15	12,662	83	12,015	6	104

Long Term Records from Deflying Posts

Posts	Total Flies								
	1949	1950	1951	1952	1953	1954	1955	1956	1957
Kota Kota	113	..	34	..	..	105	..
Chota	34	..	16	..	..	5	..
Mbobo	179	..	45	..	..	205	..
Mvera	290	..	7	..	..	..	..
Fort Johnston	14,351	..	11,750	..	..	1,589	..
Lirangwe	93	..	32	..	..	..	..
Kasupe	207	..	88	..	..	63	..