NATIONAL FISHERIES RESOURCES RESEARCH INSTITUTE (NaFIRRI), NATIONAL AGRICULTURAL RESEARCH ORGANISATION (NARO)

FINAL REPORT OF THE FISHERIES CATCH ASSESSMENT SURVEY IN THE UGANDAN WATERS OF LAKE VICTORIA FOR THE MAY 2014 SURVEY

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CATCH ASSESSMENT SURVEYS ARE JOINTLY CONDUCTED BY THE NATIONAL FISHERIES RESOURCES RESEARCH INSTITUTE (NaFIRRI), THE DEPARTMENT OF FISHERIES RESOURCES (DFR), AND THE DISTRICTS OF BUSIA, NAMAYINGO, BUGIRI, MAYUGE, JINJA, MUKONO,BUIKWE, BUVUMA, WAKISO, KAMPALA, MPIGI, MASAKA, KALUNGU, KALANGALA AND RAKAI.

FOREWORD

Monitoring fish stocks as well as the magnitude, distribution and trends of fishing effort and fish catches is required for sound fisheries resources management. Catch Assessment Surveys (CASs) are a popular fish stock assessment tool used to monitor the capture fish stocks to generate information for their management. Results of CASs on the Uganda part of Lake Victoria provide the emerging trends of fish production in the lake, which together with information from similar surveys in the Kenyan and Tanzanian parts of the lake show the lake wide perspective of fisheries production and is utilized in the planning and management of the fisheries resources of Lake Victoria. Regular Catch Assessment Surveys (CASs) were conducted on Lake Victoria between July 2005 and December 2008 under the Implementation of a Fisheries Management Plan (IFMP) Project but were plagued by inconsistencies after the end of the project and no CAS data was collected for the years 2009, 2012 and 2013. For the years where CAS data is available beginning with 2010, only a single CAS was conducted. Seasonal variations affect fish catches and basing on one sampling to provide annual estimates for the lake may be misleading as it provides biased estimates.

The Lake Victoria Environmental Management Project Phase II (LVEMP II) funded the May 2014 CAS on the Uganda part of Lake Victoria. The CASs were carried out at 56 fish landing sites in the 15 riparian districts sharing the lake, following a statistical design laid down in Standard Operating Procedures (SOPs) agreed by the three partner states of the East African Community (LVFO, 2005). The National Fisheries Resources Research Institute (NaFIRRI), Jinja; the Directorate of Fisheries Resources (DiFR), Entebbe; and the 15 (formerly 11) riparian districts of Busia, Bugiri, Namayingo, Mayuge, Jinja, Mukono, Buikwe, Buvumma, Wakiso, Kampala, Mpigi, Masaka, Kalungu, Kalangala and Rakai jointly conducted the surveys. The CAS enumerators (112) were recruited from the fishing communities at the 56 participating landing sites on Uganda waters of Lake Victoria , trained and worked under direct supervision of sub county Fisheries Officers. In addition, the enumerators were given protective gears and CAS equipment. Capacity building of Beach Management Units (BMUs) and their participation in fisheries data collection is considered one of the avenues for sustainable data collection.

This report presents findings of the CAS conducted in the Ugandan waters of Lake Victoria in May 2014. The results of the previous thirteen harmonized CASs conducted since July 2005 (July, August, September and November 2005; in March, August and December 2006; in March and August 2007; in February and December 2008; March 2010 and May 2011) are included to show the emerging trends. The report also presents annual catch estimates for the Ugandan part of the lake from 2005 to 2014.

Results of these CASs show the emerging trends of fish production in the Ugandan waters of the lake, which together with information from similar surveys in the Kenyan and Tanzanian parts of the lake provide the lake wide perspective of fisheries production. This information together with other fish stock assessment and socio-economic monitoring survey data can now be utilized in the planning and management of the fisheries resources of Lake Victoria. The 2014 CAS results

were very vital in the development of the Lake Victoria Fisheries Management Plan 2014.

NaFIRRI is very appreciative of the funding by the IDA World Bank to NARO and the LVEMP II, which have sustained CASs and other Resource and Socio-economic monitoring activities related to the Implementation of the Lake Victoria Council of Ministers decisions beyond the IFMP phase. NaFIRRI is also very keen and supportive of all efforts being made to sustain resource monitoring programmes beyond the life of the IFMP and LVEMP II projects and has incorporated in NaFIRRI's Work plans a project on Evaluation of commercial catches in Uganda's major water bodies. This report is circulated to key stakeholders who are expected to provide feedback to NaFIRRI and engage policy in measures that illustrate response to scientific outputs.

J.S. Balirwa
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SUMMARY

Catch Assessment Surveys on Lake Victoria have been plagued with inconsistencies in data collection since the onset of harmonized sampling in July 2005, with some years (2009, 2012 and 2013) completely missing data while other have data collected in only one month (Table 9). Seasonal variations affect fish catches and basing on one sampling to provide annual estimates for the lake may result into biased estimates. Between July 2005 and May 2014, 14 Catch Assessment Surveys (CASs) were conducted at 56 pre-selected fish landing sites in the Ugandan part of Lake Victoria comprising approximately 10% of all landing sites in each of the former 11 (currently 15) districts sharing the lake. The CASs' were conducted following regionally harmonised Standard Operating Procedures (LVFO, 2005). This report covers the CAS conducted in May 2014 and puts into context the trends generated by results of the previous surveys.

A total of eight fish species groups were recorded during the May 2014 CAS. There was an increase in the annual fish catches from 183,000 metric tonnes (MT) in 2011 to 269 MT in 2014. The commercial catch on the lake was dominated by Mukene (166,000 MT, 61.3%), Nile perch (67,000 MT, 24.9%) and Tilapia (21,000 MT, 7.8%). The Mukene annual catch increased by a two-fold margin between May 2011 and May 2014 but remained of significantly low economic beach values compared to the large size species, Nile perch and Tilapia with low annual catches. Mukene fetched 92 billion Uganda shillings in annual beach revenue against the 362 and 90 billion from Nile perch and Tilapia respectively. The 166 MT of Mukene catch in May 2014 is the record highest since the beginning of CASs in July 2005.

Catch rates (kg/boat/day) of Mukene were highest in the sesse flat boats using small seines followed by the sesse flat using scoop nets and least in sesse pointed boats small seine boats. For the Nile perch fishery, catch rates were highest in sesse flat beach seine (24.9), followed by the sesse flat long line boats. The Tilapia fishery on the other hand registered highest catch rates in the sesse flat and parachute boats using fishing gears categorized as others (unidentified).

The use of illegal fishing gears like beach seines, monofilament gillnets, cast nets, and basket traps was evident in the May 2014 CAS and their continued use to harvest Nile perch and tilapia is unsustainable for these fisheries and could be the main cause for the observed declines in the two fisheries on the Lake. Management efforts on the lake need to be geared towards eliminating these illegal fishing practices. Similarly, there is urgent need to identify and determine the implication of fishing gears categorized as others (unidentified).

The rapid increase in Mukene catches coupled with very low beach values should be treated with caution. Continued monitoring is needed to rule out possibilities of seasonal variations besides strengthening value addition strategies for this fishery.

1 INTRODUCTION

Lake Victoria, with a surface area of 68,800 km^2, is the second largest freshwater body in the World. The largest part of the lake, i.e. 35,088 km^2 (51%) is in Tanzania, followed by the Ugandan part 29,584 km^2 (43%), and the Kenyan part 4,128 km^2 (6%). The lake has a shoreline length of 3,450 km: 1,150 km (33%) in Tanzania, 1,750 km (51%) in Uganda and 550 km (16%) in Kenya. The lake's fisheries support a vibrant fish export industry, which is one of the major foreign exchange earners of the three Partner States sharing the lake. The lake is also a very important source of high protein food and employment for the peoples of the Partner States of the East African Community (EAC).

The Partner states of the EAC through the Lake Victoria Fisheries Organisation (LVFO) have been monitoring the exploitation of the fisheries resources of Lake Victoria through harmonised fisheries data collection around the lake including collection of information on trends of fishing effort and fish catches through Catch Assessment Surveys (CASs). The data generated by CASs provide Catch per unit effort (CPUE), which, together with fishing effort information obtained from regular biannual Frame surveys is used to estimate catches. Data from CASs also provide a rough index of stock size. The monthly catches in this report, covering the period between July 2005 and December 2008 were calculated using raising factors from the 2008 Frame Survey data, those covering March 2010 and September 2011 were estimated using the 2010 Frame Survey and those in 2014 used the 2012 Frame Survey data.

This CAS report provides estimates of the quantities of fish landed in the riparian districts sharing the Ugandan waters of Lake Victoria; the monetary value of the fish catches; the contribution of different fish species to the catches; and the trends in fish catch rates, and the monthly catches for the sampled month since the beginning of harmonized CAS activities in July 2005 to May 2014. The report also compares the annual catch and gross beach value of catch landings in 2005, 2006, 2007, 2010, and 2014. A total of 14 CASs have been undertaken in the Uganda sector of the lake with data gaps in 2009, 2012 and 2013 due to financial constraints. The annual catch estimates for the years 2010, 2011 and 2014 were based on one sampling covering the rainy season and may not capture changes that could occur in dry season. There is need to include dry season sampling in future surveys.

2 METHODOLOGY

2.1 The Catch Assessment Survey Design

The CASs conducted in the Ugandan waters of Lake Victoria follow a design laid out in the approved Standard Operating Procedures for Catch Assessment Surveys on Lake Victoria (LVFO, 2005). This is a two-stage stratified sampling design whereby: within each district, a sample of primary sampling units (PSUs) i.e. the fish landing sites were first selected, and then, at each PSU, stratified samples of Secondary Sampling Units (SSUs) i.e. the Vessel gear type, are randomly selected by the field enumerator for sampling.

2.2 Sampling Units

Landing sites are the primary sampling units (PSUs) and the vessel-gear (VG) types landing at each site are the secondary sampling units (SSUs). Within each of the formerly eleven districts sharing the Ugandan part of the lake, 10% of all landing sites (PSUs) selected for sampling at the beginning of the surveys in 2005 were maintained but implementation of the CAS activities were done by new districts. A total of 56 PSUs (Appendix 1) were sampled in the Ugandan part of Lake Victoria. The landing sites were selected randomly with Probability Proportional to Size (PPS), where size is based on the number of vessels landing at the site.

There have been changes in district boundaries that resulted in formation of new districts with corresponding changes in location of some CAS landing sites (Appendix 2). However for purposes of maintaining the SOPs, landing sites in the formerly 11 districts were considered during the further analyses of monthly and annual estimates because the 2010 Frame survey was based on the former eleven districts. The 2014 survey provides CAS results for all the 15 riparian districts sharing Lake Victoria on the Uganda side.

During the sampling period, the enumerators identified the numbers of all Vessel-Gear (VG) types at each landing site that landed or were expected to land during the sampling day and allocated sampling effort among the SSUs and VG types in proportion to the number of vessels to be sampled. The maximum sample per day per PSU was set at 20 vessels. Sampling was done in four days in the month, staggered to two consecutive days in either the first and third or second and forth weeks of the month.

2.3 Data capture

Regionally harmonised data forms were used to record field data. The enumerators were trained and provided with a *Field Guide* containing the data recording instructions to ensure effective data capture. Provision for close supervision of enumerators by the Sub-county Fisheries Officers and spot checks by District Fisheries Officers and Officers from the National Fisheries Authorities, i.e. the National Fisheries Resources Research Institute (NaFIRRI), and the Department of Fisheries Resources (DFR) were made to ensure that data collection was done according to the laid down procedures and to eliminate fabricated records.

2.4 Estimation of CAS-based Indicators

Data were stored and analysed using Microsoft Excel. The fishing crafts were segregated into effort groups (Vessel-gear combinations) and the CAS indicators estimated for each effort group.

(i) The mean fish catch rates (kg boat^{-1} day^{-1}) were estimated for each effort group by species.

(ii) The fish catches were estimated using the mean fish catch rates and the Frame survey data of 2008, 2010 and 2012. For each effort group, the Boat activity coefficient (*B),* i.e. the probability that a fishing vessel of each vessel-gear type *g* would be active on any day during the month was estimated as the mean number of days boats in each effort group fished in a week divided by the

number of days in a week. The catch (*C)* of each effort group was then estimated.

(iii) The beach value of the catch, i.e. the gross income to the fishers, was estimated by raising the estimated catch in each effort group by the mean unit price of each fish species landed.

(iv) The data used to estimate the annual catch of 2005 was based on the data collected July and November 2005 and the estimates for 2006 and 2007 were based on the Annual programme estimates period of the IFMP project (October to September of the following year) rather than the calendar year. Thus the data collected in the period October 2005 to September 2006 were used to estimate the catches for 2006 and the data collected in the period October 2006 to September 2007 used to estimate the catches for 2007. In 2008, CAS data were collected in February and December and the two data points were used to estimate the annual catches. There was no CAS undertaken in the years 2009, 2012 and 2013 with only one CAS implemented in 2010, 2011 and 2014. The mean monthly estimates in each of the three years were raised through 12 months to obtain the annual catch estimates.

3 RESULTS

Details of the results, i.e. fish catch rates and the estimated fish catches are in Appendices 3&4.

3.1 Fish catch rates (kg boat^{-1}day^{-1})

Nile perch catch rates

Nile perch was targeted majorly by three main fishing gears, the beach seines, long lines and gillnets operated in three boat categories Sesse flat, Sesse pointed and parachute boats, but was also recorded as by-catch in boats operating small seines. By vessel gear category, the Sesse paddle propelled boats operating beach seines registered the highest catch rates (24.9 kg/boat/day), followed by the Sesse flat long line boats (24.4 kg/boat/day) and parachute boats operating beach seines (19.3 kg/boat/day). These results reflect an almost two fold decline from the 44.5 kg/boat/day recorded in 2011 for the Sesse flat paddle propelled beach seine boats and a 21% increase from 19.2 kg/boat/day in the Sesse flat paddle propelled long line boats. The catch rates in Sesse Flat paddle propelled gillnet boats increased from 7.2kg/boat/day to 12.3 kg/boat/day while those of in Sesse pointed paddle propelled boats decreased from 5.0 kg/boat/day to only 2.4 kg/boat/day.

Tilapia catch rates

Tilapia were the most sought after species targeted by almost all gear vessel combinations. The parachute boats, locally known as *bawo tatu* were the main fishing crafts involved in the tilapia fishery on the Ugandan waters of Lake Victoria in May 2014. The Sesse paddle propelled boats, to a lesser extent were also operated in the tilapia fishery, and gillnet were the most commonly used gears to target tilapia in both craft types. Other gears used in the tilapia fishery but less frequently were basket traps, hand line hooks and cast nets. The paddle powered parachute, Sesse flat and Sesse pointed boats using fishing gears categorized as others (unidentified) registered the highest catch rates of 22.1kg/boat/day, 18.3 kg/boat/day and

14.1kg/boat/day respectively in the tilapia fishery. Cast net operated in parachute and Sesse flat paddle powered boats also recorded substantially high catch rates (Appendix3). The parachute boats using gillnets and which have for long been specialised in the tilapia fishery registered significant reductions in catch rates from those recorded in the previous two catch assessment surveys of March 2010 (8.7kg/boat/day) and May 2011 (6.5 kg/boat/day) to 4.9 kg/boat/day in May 2014. Foot fishers using gills nets and hand lines were also involved in the tilapia fishery, recording considerable catch rates of 4.7 kg/boat/day and 3.6 kg/boat/day respectively.

Mukene/Dagaa catch rates

Four major vessel gear categories were involved in the Mukene fishery on Lake Victoria in May 2014 (Appendix 3). The catch rates for the respective vessel gear categories were; Sesse flat boats using small seines (249.5 kg/boat/day), Sesse flat boats using scoop nets (205.4 kg/boat/day), catamarans using small seines (122.8 kg/boat/day), and Sesse pointed boats using small seines (100.2 kg/boat/day) but the dominant were the Sesse flat paddle powered boats using small seines (Lampala) and scoop nets. The observed results for all the vessel gear categories showed an increase in the catch rates from those recorded during the previous CAS of March 2010 and May 2011.

3.2 National Estimates of monthly fish catches of the main commercial species

Table 1 summarises trends of estimated monthly catches of the sampled months between July 2005 and May 2014 on the Uganda part of Lake Victoria while appendices 5-18 provides detailed monthly catch landings segregated by species and district.

The monthly catch landing of Nile perch reduced from 6005.1 t in May 2011 to 5624.7 t May 2014, being the lowest monthly catch estimate since the beginning of the surveys in July 2005, while that of Tilapia increased from 1612 t in May 2011 to 1759.9 t in May 2014. The Mukene catch almost doubled from a monthly estimate of 7400.7 t in May 2011 to 13,825.2 t in May 2014, the highest value ever recorded since July 2005. The other five species encountered contributed very small portions to the catch of May 2014.

Table 1. Estimated monthly fish catches in the Ugandan part of Lake Victoria between July 2005 and May 2014

Month	Nile perch	Tilapia	Mukene	Other spp	Total
Jul-05	8031.2 ± 1242.4	2828.9 ± 526.7	9445.0 ± 3239.0	2300.3 ± 752.3	22605.4 ± 5760.4
Aug-05	6633.9 ± 1268.9	2346.0 ± 469.0	8142.6 ± 1252.5	102.1 ± 134.9	17224.6 ± 3125.3
Sep-05	8322.8 ± 1268.0	2401.9 ± 586.9	11494.2 ± 2450.2	101.1 ± 96.8	22320.0 ± 4401.9
Nov-05	8646.3 ± 1100.8	2214.4 ± 425.1	6384.7 ± 1087.4	101.6 ± 98.1	17347.0 ± 2711.4
Mar-06	7099.1 ± 1098.3	2331.2 ± 921.4	8430.8 ± 3311.3	224.6 ±204.3	18085.7 ± 5535.3
Aug-06	7367.7 ± 1058.7	2206.2 ± 512.9	8587.0 ± 1275.2	176.4 ± 162.8	18337.3 ± 3009.6
Dec-06	8371.0 ± 1066.5	2371.3 ± 416.9	9948.3 ± 3629.1	170.3 ± 154.0	20860.9 ± 5266.6
Mar-07	6710.6 ± 998.1	1923.4 ± 472.5	11994.6 ± 3541.0	247.0 ± 185.2	20875.6 ± 5196.8
Aug-07	6,965.4 ± 807.3	1,908.0 ± 332.4	6,660.1 ± 1,270.6	236.3 ± 170.4	15,769.9 ± 2,580.6
Feb-08	6,569.0 ± 894.6	1,869.2 ± 424.6	5,582.4 ± 721.6	294.9 ± 178.7	14,315.5 ± 2219.5
Dec-08	6,927.1 ± 946.3	1,390.2 ± 400.4	6,084.4 ± 959.0	120.0 ± 101.1	14,521.7 ± 2,406.8
March-10	7080.8 ± 433.7	1414.3 ± 169.4	4893.1 ± 790.9	189.2 ± 55.3	13577.4 ± 1449.4
May -11	6005.1 ± 481.1	1612.5 ± 539.1	7356.7 ± 500.1	300.4 ± 98.2	15274.7 ± 1118.6

May-14	5615.0 ± 139.5	1761.2 ± 158.2	13784.4 ± 600.9	1299.5 ± 856.5	22460.2 ± 1755.1

3.3 Monthly fish catch estimates by district and beach value of the main commercial species

The total monthly and annual catches in each of the 15 riparian districts was calculated based on the total number of fishing crafts in each district (Table 2). In addition, the finer details of the craft-gear characteristics, determine the differences in the estimates for each fish species among the districts. Thus, the districts of Buvuma (20%), Kalangala (16.5%), Namayingo (14.2%), and Mukono (13.7%) with higher proportions of fishing crafts on the Ugandan part of the lake (Frame survey, 2012) had the largest share of the fish catch estimates for all species in May 2014 (Tables 3-7). Generally, there has been a continuous increase in the beach values from commercial catches landed on the Uganda side of Lake Victoria since July 2005. The gross monthly beach value from the sale of fish was unevenly distributed in the riparian districts, but was highest for the Nile perch followed by Mukene and tilapia.

Table 2. Distribution of fishing crafts including rafts and foot fishers in the riparian districts of the Ugandan part of Lake Victoria (Frame survey 2012 data).

District	craft No.	%
Bugiri	90	0.32
Buikwe	1487	5.32
Busia	198	0.71
Buvuma	5583	19.96
Jinja	322	1.15
Kalangala	4619	16.51
Kalungu	180	0.64
Kampala	147	0.53
Masaka	1104	3.95
Mayuge	2707	9.68
Mpigi	736	2.63
Mukono	3834	13.71
Namayingo	3965	14.18
Rakai	561	2.01
Wakiso	2438	8.72
Total	**27971**	**100.00**

Table 3. Estimated monthly catches (tones) and beach value (Mill.shs) of Nile perch in the Ugandan part of Lake Victoria by district (July 2005 to May 2014).

Month	Total catch /BeachValue	Busia	Bugiri	Mayuge	Namayingo	Jinja	Mukono	Buikwe	Buvuma	Kampala	Wakiso	Mpigi	Masaka	Kalungu	Kalangala	Rakai	Total
Jul-05	Catch	29.0	1589.0	757.1		48.2	3074.4			47.4	546.8	160.2	200.8		1390.3	187.9	8,031.2
	Value	55.9	3060.9	1458.4		92.8	5922.2			91.2	1053.3	308.6	386.9		2678.2	361.9	15,470.4
Aug-05	Catch	17.4	1102.7	572.3		41.2	2633.2			42.3	467.2	143.4	174.6		1269.1	170.7	6,633.9
	Value	33.5	2124.1	1102.3		79.3	5072.3			81.4	900.0	276.2	336.3		2444.7	328.9	12,778.9
Sep-05	Catch	28.3	1392.0	748.1		54.3	3362.7			63.3	593.5	161.7	216.8		1516.9	185.2	8,322.8
	Value	54.5	2681.4	1441.1		104.6	6477.5			122.0	1143.3	311.5	417.6		2922.1	356.7	16,032.2
Nov-05	catch	24.8	1589.3	792.4		50.8	3348.6			51.1	576.0	170.2	221.0		1599.3	222.9	8,646.3
	Value	47.8	3061.5	1526.3		97.8	6450.4			98.4	1109.5	327.8	425.7		3080.7	429.3	16,655.3
Mar-06	Catch	23.5	1204.5	642.6		44.2	2810.2			49.0	488.3	152.5	186.2		1323.7	174.3	7,099.1
	Value	45.3	2320.3	1237.8		85.1	5413.2			94.4	940.7	293.7	358.7		2549.9	335.8	13,674.8
Aug-06	Catch	48.0	1217.3	639.3		50.6	2924.7			57.6	527.2	168.3	197.0		1368.5	169.3	7,367.7
	Value	92.4	2344.9	1231.6		97.4	5633.7			110.9	1015.6	324.3	379.4		2636.0	326.1	14,192.2
Dec-06	Catch	20.3	1599.9	763.7		41.7	3193.2			50.5	543.3	171.4	214.3		1548.0	224.6	8,371.0
	Value	32.7	2570.5	1227.1		67.0	5130.5			81.1	872.9	275.4	344.4		2487.2	360.9	13,449.7
Mar-07	Catch	17.9	1,231.3	594.6		41.6	2,637.4			45.5	466.0	139.2	164.6		1,215.1	157.5	6,710.6
	Value	28.7	1,978.3	955.3		66.8	4,237.5			73.2	748.8	223.6	264.4		1,952.3	253.0	10,782.0
Aug-07	Catch	19.2	1,349.2	615.8		42.9	2,689.4			42.2	470.0	139.1	163.9		1,257.7	176.0	6,965.4
	Value	35.8	2521.8	1151.0		80.2	5026.8			78.9	878.5	260.0	306.4		2350.8	328.9	13019.1
Feb-08	Catch	18.3	1,170.4	562.6		43.0	2,589.3			42.5	461.9	134.4	169.1		1,218.3	159.3	6,569.0
	Value	40.6	2,594.8	1,247.3		95.3	5,740.5			94.1	1,024.1	297.9	374.9		2,700.9	353.1	14,563.5
Dec-08	Catch	20.8	1,286.1	593.5		42.1	2,633.5			44.2	448.5	175.6	274.5		1,215.7	192.5	6,927.1
	Value	46.9	2,892.5	1,334.8		94.6	5,922.8			99.4	1,008.7	395.0	617.4		2,734.1	432.9	15,579.0
March-10	Catch	49.6	885.1	793.1		92.1	2577.4			56.6	644.4	254.9	453.2		1,104.6	169.9	7,080.8
	Value	173.3	3,094.2	2,772.4		32.2	9,010.4			198.0	2,252.6.	891.1	1,584.3		3,861.6	594.1	24,735.4
May-11	Catch	42.0	750.6	672.6		78.1	2185.9			48.0	546.5	216.2	384.3		936.8	144.1	6,005.1
	Value	190.4	3,400.6	3,046.9		35.4	9,902.5			217.6	2,475.6	979.4	1,741.1		4,243.9	652.9	27,204.7
May-14	Catch	39.8	18.1	544.5	797.2	64.7	770.9	299.0	1122.8	29.6	490.2	148.0	222.0	36.2	928.9	112.8	5,624.7
	Value	213.6	97.1	2,922.7	4,279.3	347.5	4,137.9	1,604.9	6,026.6	158.6	2,631.3	794.3	1,191.5	194.3	4,986.2	605.5	30,191.5

Table 4. Estimated monthly catches (tones) and beach value (Mill.shs) of Tilapia in the Ugandan part of Lake Victoria by district (July 2005 to May 2014).

Month	Total catch and Beach Value	Busia	Bugiri	Mayuge	Namayingo	Jinja	Mukono	Buikwe	Buvuma	Kampala	Wakiso	Mpigi	Masaka	Kalungu	Kalangala	Rakai	Total
Jul-05	Catch	19.4	272.1	269.9		39.1	869.0			20.2	300.5	167.5	246.3		572.0	52.9	2,828.9
	Value	18.7	262.8	260.7		37.8	839.5			19.5	290.3	161.8	238.0		552.6	51.1	2,732.8
Aug-05	Catch	22.6	193.1	359.3		57.7	787.0			25.8	180.7	135.1	203.7		361.9	32.8	2,359.8
	Value	21.7	184.8	343.9		55.2	753.2			24.7	172.9	129.3	194.9		346.3	31.4	2,258.3
Sep-05	Catch	12.3	238.3	226.9		31.2	696.7			14.9	259.6	148.3	234.7		492.4	46.4	2,401.9
	Value	11.9	230.2	219.2		30.2	673.0			14.4	250.8	143.3	226.7		475.7	44.8	2,320.2
Nov-05	Catch	13.3	217.4	219.4		32.0	664.5			16.6	240.9	129.5	205.4		434.3	41.3	2,214.4
	Value	12.8	210.0	211.9		30.9	641.9			16.1	232.7	125.1	198.4		419.5	39.9	2,139.1
Mar-06	Catch	16.6	247.4	233.1		30.9	732.4			17.5	234.5	131.4	192.7		453.1	41.6	2,331.2
	Value	16.0	239.0	225.2		29.8	707.5			16.9	226.6	127.0	186.1		437.7	40.2	2,251.9
Aug-06	Catch	11.7	231.6	241.7		31.2	667.0			17.0	232.8	123.7	191.6		420.7	37.2	2,206.2
	Value	11.3	223.7	233.4		30.2	644.3			16.4	224.9	119.5	185.1		406.4	36.0	2,131.2
Dec-06	Catch	13.0	232.4	253.1		34.6	688.6			17.2	261.9	138.3	229.3		462.0	40.8	2,371.3
	Value	12.4	221.9	241.7		33.1	657.4			16.5	250.0	132.0	218.9		441.1	39.0	2,263.9
Mar-07	Catch	9.1	188.2	196.4		28.4	555.1			13.5	225.7	111.9	183.5		376.5	35.2	1,923.4
	Value	8.7	179.6	187.5		27.1	530.0			12.9	215.4	106.9	175.1		359.4	33.6	1,836.3
Aug-07	Catch	10.5	162.7	188.5		22.6	569.6			14.1	216.3	112.8	195.4		381.8	33.8	1908.0
	Value	12.8	198.2	229.6		27.6	693.8			17.1	263.5	137.4	238.1		465.1	41.2	2324.4
Feb-08	Catch	10.7	166.6	180.3		25.7	567.8			13.7	210.7	111.3	178.9		370.1	33.4	1869.2
	Value	13.5	209.9	227.1		32.4	715.4			17.3	265.5	140.3	225.4		466.3	42.0	2355.2
Dec-08	Catch	18.2	176.1	145.4		34.5	377.4			11.4	191.5	79.2	110.3		217.3	29.0	1,390.2
	Value	29.6	287.2	237.2		56.3	615.5			18.6	312.3	129.2	180.0		354.4	47.3	2,267.5
March-10	Catch	9.9	176.8	158.4		18.4	514.8			11.3	128.7	50.9	90.5		220.6	33.9	1414.3
	Value	21.5	384.6	344.6		40.0	1,120.1			24.6	280.0	110.8	196.9		480.0	73.9	3,077.2
May-11	Catch	11.3	201.6	180.6		21.0	587.0			12.9	146.7	58.1	103.2		251.6	146.7	1612.5
	Value	31.6	564.9	506.2		58.8	1,645.1			36.2	411.3	162.7	289.2		705.1	108.5	4,519.4
May-14	Catch	12.5	5.7	170.4	249.4	20.3	241.2	93.6	351.3	9.2	153.4	46.3	69.5	11.3	290.7	35.3	1,759.9
	Value	52.9	24.0	723.5	1,059.3	86.0	1,024	397.3	1,491.8	39.3	651.3	196.6	294.9	48.1	1,234.3	149.9	7,473.4

Table 5. Estimated monthly catches (tonnes) and beach value (Mill. shs) of Mukene in the Ugandan part of Lake Victoria by district (July 2005 to May 2014).

Month	Total catch and Beach Value	Busia	Bugiri	Mayuge	Namayingo	Jinja	Mukono	Buikwe	Buvuma	Kampala	Wakiso	Mpigi	Masaka	Kalungu	Kalangala	Rakai	AAA	Overall
Jul-05	Catch	19.0	744.2	570.6		6.2	3436.5			7.6	446.1	30.4	450.2		3722.8	11.4	-	9445.0
	Value	3.7	145.1	111.3		1.2	670.1			1.5	87.0	5.9	87.8		725.9	2.2	-	1841.8
Aug-05	Catch	21.0	822.0	621.6		2.5	3436.9			8.4	461.8	33.6	479.5		2242.8	12.6	-	8142.6
	Value	4.1	160.3	121.2		0.5	670.2			1.6	90.0	6.5	93.5		437.4	2.5	-	1587.8
Sep-05	Catch	29.3	1148.9	869.5		4.1	4821.1			11.7	648.5	47.2	670.9		3225.3	17.7	-	11494.2
	Value	5.7	224.0	169.5		0.8	940.1			2.3	126.5	9.2	130.8		628.9	3.5	-	2241.4
Nov-05	Catch	14.4	561.4	427.8		3.6	2477.0			5.9	327.3	24.2	332.9		2201.4	9.0	-	6384.7
	Value	2.8	109.5	83.4		0.7	483.0			1.2	63.8	4.7	64.9		429.3	1.7	-	1245.0
Mar-06	Catch	19.7	792.1	590.0		3.9	3349.1			7.9	444.3	32.2	454.2		2722.6	14.9	-	8430.8
	Value	3.8	154.5	115.1		0.8	653.1			1.5	86.6	6.3	88.6		530.9	2.9	-	1644.0
Aug-06	Catch	19.6	766.4	583.3		4.2	3360.6			7.8	444.0	31.3	454.8		2903.1	11.7	-	8587.0
	Value	3.8	149.5	113.7		0.8	655.3			1.5	86.6	6.1	88.7		566.1	2.3	-	1674.5
Dec-06	Catch	28.1	1103.4	831.8		2.4	4476.5			11.9	611.0	45.9	633.2		2187.2	16.9	-	9948.3
	Value	5.4	212.4	160.1		0.5	861.7			2.3	117.6	8.8	121.9		421.0	3.3	-	1915.1
Mar-07	Catch	28.6	1127.0	864.9		5.8	4800.6			11.8	639.4	50.2	655.3		3793.3	17.8	-	11994.6
	Value	3.6	140.9	108.1		0.7	600.1			1.5	79.9	6.3	81.9		474.2	2.2	-	1499.3
Aug-07	Catch	15.4	602.0	457.8		3.2	2626.5			6.1	347.6	24.6	356.6		2211.1	9.2	-	6660.1
	Value	3.4	134.3	102.1		0.7	585.7			1.4	77.5	5.5	79.5		493.1	2.1	-	1485.2
Feb-08	Catch	12.8	500.4	380.7		2.7	2,190.5			5.1	289.6	20.4	296.8		1,875.6	7.7	-	5,582.4
	Value	3.4	134.6	102.4		0.7	589.2			1.4	77.9	5.5	79.8		504.5	2.1	-	1,501.7
Dec-08	Catch	9.6	864.6	531.2		-	2,038.9			2.8	243.5	62.6	518.1		1,813.1	-	-	6,084.4
	Value	2.6	237.8	146.1		-	560.7			0.8	67.0	17.2	142.5		498.6	-	-	1,673.2
March-10	Catch	34.0	607.1	544.0		63.1	1,767.9			38.9	442.0	174.8	310.8		757.7	116.6	36.2	4893.1
	Value	9.3	167.0	149.6		17.4	486.2			10.7	121.5	48.1	85.5		320.6	32.	10.0	1,345.6
May-11	Catch	51.5	919.6	823.9		95.6	2677.8			58.9	669.5	264.8	470.8		1147.6	176.6	44.0	7400.7
	Value	26.7	477.5	427.9		49.7	1,390.6			30.6	347.7	137.5	244.5		596.0.	91.7	22.9	3,843.2
May-14	Catch	97.9	44.5	1,338.4	1,959.6	159.1	1,894.9	734.9	2759.8	72.7	1,204.9	363.8	545.6	89.0	2,283.3	277.3		13,825.6
	Value	54.6	24.9	747.9	1,059.0	88.9	1,058.8	410.7	1,542.1	40.6	673.3	203.3	304.9	49.7	1,275.9	154.9		7,725.5

Table 6. Estimated monthly catches (tones) and beach value (Mill. Shs.) of other fish species (Haplochromines, Bagrus, Protopterus, Clarias and others) in the Ugandan part of Lake Victoria presented by district between July 2005 and May 2014

Month	Total Catch/ Beach Value	Busia	Bugiri	Mayuge	Namayingo	Jinja	Mukono	Buikwe	Buvuma	Kampala	Wakiso	Mpigi	Masaka	Kalungu	Kalangala	Rakai	Overall
Jul-05	Catch	7.6	278.8	201.3		2.2	1,061.2			4.1	151.7	21.0	147.7		413.5	11.3	2,300.3
	Value	7.9	300.5	221.7		1.3	1,160.6			3.8	163.7	18.2	165.4		442.4	8.4	2,493.9
Aug-05	Catch	10.5	8.2	7.1		0.9	37.6			0.7	9.1	5.2	4.3		16.9	1.6	102.1
	Value	8.9	6.4	5.7		0.7	26.7			0.5	7.2	3.9	3.2		12.7	1.2	77.0
Sep-05	Catch	2.3	13.8	10.5		1.9	36.2			0.9	11.0	4.2	4.0		14.8	1.5	101.1
	Value	1.9	10.9	8.3		1.5	27.5			0.7	8.9	3.3	3.2		11.4	1.2	78.8
Nov-05	Catch	0.4	12.1	9.2		1.0	32.7			0.9	11.3	6.2	5.6		20.0	2.2	101.6
	Value	0.3	9.2	7.1		0.7	23.2			0.6	8.7	4.7	4.5		14.8	1.7	75.6
Mar-06	Catch	3.1	21.8	19.9		2.2	91.6			2.0	22.0	9.5	8.1		41.2	3.2	224.6
	Value	1.9	15.2	14.3		1.6	65.5			1.4	16.5	6.9	5.8		29.5	2.1	160.6
Aug-06	Catch	0.6	16.0	13.6		1.5	64.4			1.4	16.8	7.7	6.7		45.3	2.4	176.4
	Value	0.5	13.1	11.3		1.2	53.2			1.1	14.1	6.5	5.7		42.1	1.9	150.8
Dec-06	Catch	0.8	14.6	13.2		1.7	71.1			1.9	15.8	7.8	7.1		33.7	2.5	170.2
	Value	0.6	11.4	10.1		1.2	53.1			1.4	12.0	5.8	5.3		24.9	1.9	127.9
Mar-07	Catch	0.8	24.2	22.0		2.7	103.7			2.3	25.0	9.3	7.9		46.0	3.0	247.0
	Value	0.6	17.3	15.7		1.9	73.7			1.6	17.8	6.8	5.8		32.9	2.1	176.3
Aug-07	Catch	0.79	22.09	19.72		2.98	109.48			2.37	21.76	6.92	5.78		42.38	2.01	236.30
	Value	0.78	21.94	20.02		2.87	106.16			2.30	21.38	6.84	6.38		41.43	1.96	232.06
Feb-08	Catch	1.0	23.8	21.6		3.4	133.6			3.0	27.3	11.1	7.5		59.2	3.4	294.9
	Value	1.0	24.2	22.2		3.5	136.1			3.1	27.8	11.1	7.6		60.1	3.4	300.1
Dec-08	Catch	0.9	13.7	13.0		1.6	45.8			1.0	11.5	5.1	5.3		19.1	2.9	120.0
	Value	1.4	21.4	20.4		2.4	71.5			1.6	18.1	7.8	8.3		29.6	4.5	186.9
March-10	Catch	1.3	23.7	21.2		2.5	68.9			1.5	17.2	6.8	12.1		29.5	4.5	189.2
	Value	2.6	46.6	41.8		4.9	135.9			3.0	34.0	13.4	23.9		58.2	9.0	373.2
May-11	Catch	2.1	37.5	33.6		3.9	109.3			2.4	27.3	10.8	19.2		46.9	7.2	300.4
	Value	4.7	83.3	74.6		8.7	242.6			5.3	60.6	24.0	42.7		104.0	16.0	666..5
May-14	Catch	8.8	4.0	121.0	177.2	14.4	171.3	66.4	249.5	6.6	108.9	32.9	49.3	8.0	206.4	25.1	1,250.0
	Value	23.2	10.6	317.5	464.8	37.8	449.5	174.3	654.6	17.2	285.8	86.3	129.4	21.1	541.6	65.8	3,279.6

Table 7. Estimated monthly Catches (t) and value mill. Shs) of all fish species pooled in the Ugandan part of Lake Victoria presented by district (July 2005 to May 2014).

Month	Catch / Beach value	Busia	Bugiri	Mayuge	Namayingo	Jinja	Mukono	Buikwe	Buvuma	Kampala	Wakiso	Mpigi	Masaka	Kalungu	Kalangala	Rakai	
Jul-05	Catch	75.0	2884.0	1798.9		95.8	8441.2			79.3	1445.2	379.0	1045.1		6098.6	263.4	22605.4
	Value	86.3	3769.3	2052.1		133.1	8592.4			116.0	1594.3	494.5	878.0		4399.1	423.7	22538.8
Aug-05	Catch	71.5	2126.0	1560.3		102.2	6894.7			77.2	1118.8	317.3	862.1		3890.7	217.7	17238.4
	Value	68.2	2475.5	1573.1		135.6	6522.4			108.3	1170.2	416.0	627.9		3241.0	363.9	16702.1
Sep-05	Catch	72.2	2793.0	1855.0		91.5	8916.7			90.9	1512.7	361.4	1126.4		5249.5	250.8	22320.0
	Value	74.0	3146.6	1838.1		137.1	8118.2			139.3	1529.4	467.2	778.4		4038.1	406.2	20672.6
Nov-05	Catch	52.9	2380.2	1448.7		87.4	6522.8			74.5	1155.4	330.1	764.9		4254.9	275.3	17347.0
	Value	63.7	3390.2	1828.8		130.1	7598.5			116.2	1414.7	462.4	693.6		3944.3	472.6	20115.0
Mar-06	Catch	62.9	2265.8	1485.6		81.2	6983.3			76.3	1189.1	325.6	841.2		4540.7	234.0	18085.6
	Value	67.0	2729.0	1592.3		117.3	6839.2			114.2	1270.3	433.8	639.2		3548.0	381.0	17731.3
Aug-06	Catch	79.8	2231.3	1477.9		87.5	7016.7			83.8	1220.8	331.0	850.1		4737.6	220.6	18337.2
	Value	107.9	2731.2	1590.0		129.6	6986.6			130.0	1341.2	456.3	658.9		3650.7	366.3	18148.7
Dec-06	Catch	62.3	2950.3	1861.8		80.4	8429.5			81.5	1432.0	363.3	1083.9		4231.0	284.9	20860.9
	Value	51.2	3016.2	1639.0		101.7	6702.8			101.2	1252.5	422.0	690.5		3374.3	405.1	17756.6
Mar-07	Catch	56.4	2570.7	1677.9		78.5	8096.8			73.1	1356.1	310.7	1011.3		5430.8	213.4	20875.6
	Value	41.6	2316.1	1266.6		96.6	5441.3			89.2	1062.0	343.5	527.3		2818.8	291.0	14293.8
Aug-07	Catch	45.8	2136.0	1281.8		71.7	5994.9			64.8	1055.8	283.4	721.7		3892.9	221.0	15769.9
	Value	52.8	2876.2	1502.7		111.4	6412.5			99.8	1240.9	409.7	630.3		3350.4	374.1	17060.7
Feb-08	Catch	42.8	1861.3	1145.3		74.8	5481.2			64.3	989.6	277.2	652.2		3523.2	203.7	14315.5
	Value	58.5	2963.6	1599.0		131.9	7181.2			115.9	1395.3	454.8	687.8		3731.8	400.6	18720.4
Dec-08	Catch	42.8	1861.3	1145.3		74.8	5481.2			64.3	989.6	277.2	652.2		3523.2	203.7	14315.5
	Value	58.5	2963.6	1599.0		131.9	7181.2			115.9	1395.3	454.8	687.8		3731.8	400.6	18720.4
March-10	Catch	94.8	1692.7	1516.6		176.0	4929.0			108.3	1232.3	487.5	866.6		2112.4	325.0	13577.4
	Value	206.7	3692.5	3308.5		384.0	10752.5			236.3	2688.1	1063.4	1890.6		4608.2	709.0	29549.9
May-11	Catch	106.9	1909.3	1710.8		198.6	5560.0			122.2	1390.0	549.9	977.6		2382.9	366.6	15318.7
	Value	253.5	4526.4	4055.6		470.7	13180.8			289.7	3295.2	1303.6	2317.5		5648.9	869.1	39924.3
May-14	Catch	159.0	72.3	2,174.2	3183.5	258.5	3,078.3	1,193.9	4,483.4	118.0	1957.5	590.9	886.4	144.5	3,709.4	450.4	22460.2
	Value	344.5	156.6	4711.5	6898.4	560.2	6670.5	2587.1	9715.2	255.8	4241.7	1280.5	1920.8	313.2	8038.0	976.0	48,670.1

3.4 Annual Fish Catches and Value

The annual fish Catch estimates based on the sample month estimates from 2005 to 2011 are presented in Table 9 and details by district are in Appendix 19(a-e). The overall annual Catches of Nile perch in the Ugandan part of the lake has continued to decline over the years from 94,903 t in 2005 to 70,061 in 2011 and 67,496.6 in May 2014; a 29% reduction in 9 years. Despite the reduction in Catches, the gross revenue from the Nile perch catches has almost doubled from 183 billion Uganda shillings to 362 billion. The annual catch estimates for tilapia reduced by 34% from 29,415.0 t in 2005 to 19,350 in 2011 and increased by 8.4% to 21,119 t in May 2014 (Table 9). Similar to the Nile perch, the gross revenue from the tilapia catches has tripled from Uganda shillings 28.4 billion to 89.7 billion. The annual catch estimate for Mukene of 164,907.3 t in May 2014 is highest record for the species in ten years since 2005 but is still of low economic value compared to the Nile perch and tilapia fisheries.

Table 8. Estimated annual catch landings (t) on the Ugandan part of Lake Victoria presented by district and species for May 2014

District	Nile perch	Tilapia spp	Mukene/Dagaa	Haplochromines	Bagras spp	Protopterus	Clarias spp	Other species	Total	%
Bugiri	217.2	67.9	533.8	16.7	0.9	5.4	3.9	21.4	867.1	0.3
Buikwe	3587.9	1122.6	8819.1	275.3	15.4	88.8	63.9	353.9	14326.9	5.3
Busia	477.7	149.5	1174.3	36.7	2.1	11.8	8.5	47.1	1907.7	0.7
Buvuma	13473.3	4215.6	33117.4	1034.0	57.9	333.6	239.8	1328.9	53800.5	20.0
Jinja	776.9	243.1	1909.7	59.6	3.3	19.2	13.8	76.6	3102.4	1.2
Kalangala	11147.3	3487.9	27400.1	855.5	47.9	276.0	198.4	1099.5	44512.6	16.5
Kalungu	434.3	135.9	1067.5	33.3	1.9	10.8	7.7	42.8	1734.3	0.6
Kampala	354.7	111.0	871.8	27.2	1.5	8.8	6.3	35.0	1416.3	0.5
Masaka	2663.8	833.5	6547.6	204.4	11.4	66.0	47.4	262.7	10636.8	3.9
Mayuge	6533.9	2044.4	16060.5	501.4	28.1	161.8	116.3	644.5	26090.9	9.7
Mpigi	1775.8	555.6	4365.0	136.3	7.6	44.0	31.6	175.2	7091.2	2.6
Mukono	9250.8	2894.5	22738.6	709.9	39.8	229.0	164.7	912.5	36939.7	13.7
Namayingo	9566.9	2993.4	23515.5	734.2	41.1	236.9	170.3	943.6	38201.8	14.2
Rakai	1353.6	423.5	3327.2	103.9	5.8	33.5	24.1	133.5	5405.1	2.0
Wakiso	5882.5	1840.6	14459.2	451.4	25.3	145.7	104.7	580.2	23489.6	8.7
Total	**67,496.6**	**21,119.0**	**165,907.3**	**5,179.9**	**290.1**	**1,671.2**	**1,201.4**	**6,657.5**	**269,522.9**	**100.0**

Table 9. Estimated Annual catches (tones) and value (Million shs) in 2005 to 2014

	2005		2006		2007		2008		2010		2011		2014	
	Catch (t)	value	Catch (t)	value	Catch (t)	value	Catch (t)	value	Catch (t)	value	Catch (t)	value	Catch (t)	value
Nile perch	94,903	182,810	91,039	175,368	86,655	147,454	80,977	180,855	84,969	297,048	70,061	326,456	67,496.6	362,298
Tilapia	29,415	28,351	27,061	26,141	24,356	25,515	19,557	27,736	16,971	36,926	19,350	54,233	21,119.0	89,681
Mukene	106,400	20,748	95,734	18,668	113,791	19,176	70,001	19,049	58,717	16,147	88,808	46,119	165,907.3	92,706
Other species	7,815	8,176	2,109	1,628	2,685	2,221	2,489	2,922	2,270	4,478	3,605	7,998	15,000.1	39,355
Overall	238,533	240,085	215,943	221,805	227,487	194,366	173,024	230,562	162,929	354,599	183,824	434,805	269,522.9	584,040

4 DISCUSSION

Catch Assessment Surveys provide an indication of the status of the fisheries in relation to catch, value of the catch, number of fishers, type and quantities of fishing crafts and gears in use in a particular period (LVFO, 2005). Trends in these factors tend to vary and quarterly assessments (i.e. every three months) provide early signals in the direction of the fisheries and what measure may be taken, enhanced or acted upon.

Since the onset of harmonized Catch Assessment Surveys on Lake Victoria in July 2005, the catches of Nile perch have continued to decline, registering the lowest value of 67,496.6 t in May 2014. Earlier CASs in the Ugandan part of the lake (Muhoozi, 2002) indicated peak Nile perch catches in the November-December period and a higher Nile perch catch estimate would be expected. The tilapia catches declined steadily from 29,415 t in 2005 to the lowest minimum of a 16,971 t in 2010 before increasing to the current 21,119 t in May 2014. The low tilapia and Nile perch catches in May 2014 correspond with higher unit prices and gross beach revenue from the catch compared to when the catches were higher in 2005 (Table 9). These results are also consistent with acoustics surveys of September 2014 during which a reduction in the biomass of Nile perch and tilapia and an upsurge of the Mukene biomass in the lake were observed. The ready market and price incentive is likely to be the main factor keeping fishers in business against declining catches. The general out cry of low catches in the fishery, closure of factories are other indicators of the depletion of the Nile perch and tilapia fisheries.

The Mukene catches remained relatively stable between 2005 and 2007 but reduced to the lowest record level of 58,717 t representing a 50% reduction between 2008 and 2010. The May 2014 surveys saw Mukene catches increase by a two-fold margin between 2011 and 2014 (Table 9). Mukene is a short lived fish that is likely to have strong seasonal variations in abundance. Inconsistence in sampling periods could be one of the reasons for the observed erratic changes in catches. The intended quarterly sampling in the Standard Operating Procedures for CASs was not closely followed because of funding gaps leading to inconsistent coverage of seasonal variations of catches.

The 2012 Frame survey showed a shift in the composition and distribution fishing effort. from that observed on Lake Victoria in 2008. The number of gillnets reduced on the lake while the small mesh size gillnets (2.5 and 3 inches of mesh size) increased by over 30%. The other illegal fishing gears like beach seines, small size hooks, basket traps, cast nets, and monofilament gillnets also registered a substantial increase, the latter three targeting mainly tilapia. These illegal fishing gears are a threat to the sustainability of the fisheries of Nile perch and tilapia. A point of concern in the Nile perch hook fishery that is not sufficiently documented is their impacts on the Nile perch and other fishes during bait collection in the lake using mosquito seines. The impacts of the long line fishery in the Nile perch fishery should be evaluated and the fishery regulated accordingly.

The use of Monofilament gillnets, basket traps and cast nets is a major threat in the tilapia fishery where they are most commonly used. They are being preferred by fishers because of their higher efficiency of catching fish than the ordinary multifilament gillnets as the tilapia catches continue to decrease. The basket traps and cast nets are operated in the shallow inshore areas targeting mainly the spawning stock of tilapia. The continued use of these gears is likely to exacerbate the status of the tilapia fishery if no management efforts to eliminate them on the lake are put in place. The elimination of the rampant use of illegal gears, especially beach seines and under sized gillnets that capture immature fish and monofilament gillnets should be given priority to reverse the trends of declining catches of Nile perch and tilapia. Other management interventions that would ensure quick recovery of the Nile perch and tilapia fisheries i.e. closed seasons/areas, regulation and reduction of the fishing effort targeting the species should be considered.

The Mukene fishery in the Ugandan waters of Lake Victoria is mainly a near shore activity in which paddle Sesse boats using small seines or scoop nets dominate the fishery. Fishing Mukene in the inshore habitats is detrimental to the other lake fisheries especially of the Nile perch and tilapia as high proportions of by-catch dominated by juvenile individuals of the two species are cropped. Recent acoustic surveys conducted in September 2014 however showed an increase in the biomass of the small pelagic species (Mukene and the haplochromines) in the open waters of the lake. Development of this fishery in the offshore waters, with the more efficient fishing methods suitable for open waters therefore remains an option to be explored to further increase the Catches of Mukene beyond the current levels. The catamaran boats, a recent technology of paired boats using small seines opted from the Tanzanian part of the lake and are more stable in the open waters during rough weather are slowly increasing in number and recorded moderate catch rates in the May 2014 survey. There is need to popularize this technology among the Mukene fisher folks through awareness campaigns. Success adoption of this technology on the lake, together with a strong policy on sustainable exploitation of the light fishery is hoped to transform this fishery in the Ugandan waters of Lake Victoria. Despite dominating the commercial fishery on the lake, the economic beach value from Mukene still remains too low compared to the other two important commercial fisheries of Nile perch and tilapia. Sustainability of the Mukene fishery on the lake should be evaluated alongside value addition to maximize economic value from the fishery.

5 CONCLUSIONS AND RECOMMENDATIONS

The commercial fishery on the Uganda part of Lake Victoria in May 2014 was dominated by three species Mukene (166,000 MT, 61.3%), Nile perch (67,000 MT, 24.9%) and Tilapia (21,000 MT, 7.8%). There has been a two-fold increase in the annual production of Mukene between May 2011 and 2014 and the lake fishery has shifted from dominance of large commercial stocks to Mukene which is of low economic value and requires substantial value addition to harness economic benefits. Sustainability of the Mukene fishery on the lake should be evaluated alongside value addition to maximize economic value from the fishery. Fish stock monitoring studies based on CASs should be more regular and need to be backed by information from the fishery independent surveys like

experimental trawling, gillnetting and acoustic surveys to accurately inform the lake management decisions.

The use of illegal fishing practices has persisted on the lake and is attributed to the decline of Nile perch and Tilapia catches. There is need to strengthen enforcement of the fisheries regulation to eliminate illegal destructive fishing practices on the lake.

6 REFERENCES

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APPENDICES

Appendix 1. List of fish landing sites selected and sampled in Catch Assessment surveys in the former districts Ugandan waters of Lake Victoria

District	Laning site
Bugiri	Golofa
	Bumeru A
	Butanila B
	Mwango
	Maruba
	Hama 'B'
Busia	Madwa
Jinja	Owen Falls Dam
	Wanyange
Kampala	Luzira Port Bell
Masaka	Nakigga
	Makonzi
Mayuge	Khaaza
	Maganda
	Malindi
	Nakirimira
	Ntinkalu
Rakai	Kasensero A
	Kasensero B
Wakiso	Kinywante
	Kagulube
	Nsonga-Kava
	Nakiwogo
	Kasenyi
Mukono	Buwagajjo
	Namugambe
	Bukaali
	Ziiru (Kibulwe)

District	Laning site
Mukono	Nantwalantya
	Kawunguli-Bulago
	Malija-Wabuziba
	Maala
	Kiruguma
	Lufu
	Kisu
	Gunda
	Kinaggaba
	Kawafu
	Zinga
	Kachanga-Bulago
	Luwero
	Kaziru
	Nambula
	Namugombe
	Kalega
	Nyenda
	Kiyindi
Mpigi	Katebo Lwazi
	Nakaziba
Kalangala	Banda
	Kakyanga
	Kasenyi
	Luku-Nabisukiro
	Mweena
	Kyagalanyi
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Appendix 2. Distribution of fish landing sites selected and sampled for Catch Assessment surveys in the current districts Ugandan waters of Lake Victoria in May 2014.

District	Landing site
Namayingo	Golofa
	Butanila ‘B’
	Mwango
	Hama 'B'
	Maruba
	Bumeru ‘A’
Busia	Madwa
Jinja	Masese
	Wanyange
Kampala	Luzira Port Bell
Masaka	Nakigga
	Makonzi
Mayuge	Khaaza
	Maganda
	Malindi
	Nakirimira
	Ntinkalu
Rakai	Kasensero A
	Kasensero B
Wakiso	Kinywante
	Kagulube
	Kitufu
	Kigungu
	Kasenyi
Buvuma	Bukaali
	Ziiru (Kibulwe)
	Zinga

District	Landing site
Buvuma	Luwero
	Lufu
	Namugombe
	Gunda
	Kiruguma
	Kaziru
	Nyenda
	Malija-Wabuziba
	Kisu
Mukono	Maala
	Kawafu
	Kimmi
	Kachanga-Bulago
	Namugambe
	Kinaggaba
	Nantwalantya
Buikwe	Kalega
	Buwagajjo
	Kiyindi
	Nambula
Mpigi	Nakaziba
	Nabisukiro
Kalungu	Kamuwunga
Kalangala	Banda
	Kakyanga
	Kasenyi
	Luku-Nabisukiro
	Mweena
	Kyagalanyi
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Appendix 3. Fish Catch rates (kg boat^{-1} day^{-1}) in the Ugandan part of Lake Victoria presented by effort group (Vessel-gear type) and species for May 2014 (Boat days = number of times the vessel-gear type was sampled after a fishing trip of one day)

Vessel-Gear type code	**Average Days per Week**	**Nile perch**	**Tilapia spp**	**Mukene/Dagaa**	**Haplochromines**	**Bagras spp**	**Protopterus**	**Clarias spp**	**Other species**
CA-SS	5.0	0.0	0.0	122.8	0.0	0.0	0.0	0.0	0.0
FF-CN	4.3	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0
FF-GN	3.8	0.5	4.7	0.0	0.0	0.0	0.0	0.0	0.0
FF-HL	4.5	0.0	3.6	0.0	9.7	0.0	0.0	0.0	0.0
FF-TR	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.0
PA-BS	4.2	19.3	0.0	0.0	0.6	0.0	0.0	0.0	0.0
PA-CN	4.7	0.2	10.2	0.0	0.0	0.0	0.0	0.1	0.0
PA-GN	5.0	2.1	4.9	0.0	0.4	0.1	0.3	0.0	0.4
PA-HL	4.3	6.7	1.4	0.0	0.0	0.0	0.5	0.3	0.0
PA-LL	4.6	4.2	0.1	0.0	0.0	0.0	4.4	2.6	0.0
PA-OT	3.3	8.0	22.1	0.0	0.0	0.0	0.0	0.0	0.0
PA-TR	6.2	0.6	6.0	0.0	0.0	0.0	0.9	0.1	0.0
RF-HL	4.5	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0
SF-BS	4.7	24.8	3.0	0.0	0.7	0.0	0.6	0.0	0.0
SF-CN	5.6	0.3	8.6	0.0	0.5	0.0	0.1	0.0	0.0
SF-GN	5.2	12.3	2.3	0.0	0.1	0.0	0.4	0.2	2.7
SF-HL	4.6	4.4	2.4	0.0	0.2	0.0	0.1	0.0	0.0
SF-LL	3.7	24.4	0.1	0.0	0.0	0.1	0.1	0.5	0.0
SF-OT	4.3	0.2	18.3	0.0	0.0	0.4	0.0	0.0	0.0
SF-SN	3.5	0.0	0.0	205.4	0.0	0.0	0.0	0.0	0.0
SF-SS	4.2	0.1	0.0	249.5	8.0	0.0	0.0	0.0	0.0
SF-TR	6.1	0.1	6.8	0.0	0.0	0.0	0.3	0.4	0.0
SP-BS	4.9	24.9	0.5	0.0	1.2	0.0	0.0	0.0	0.0
SP-CN	6.3	1.9	2.6	0.0	0.0	0.0	0.0	0.0	0.0
SP-GN	5.7	2.4	1.2	1.1	0.0	0.0	0.0	0.0	4.7
SP-HL	4.9	5.2	1.4	0.0	0.0	0.0	0.0	0.0	0.0
SP-LL	3.8	13.9	0.1	0.0	0.0	0.0	0.2	0.0	0.0
SP-OT	6.7	0.0	14.1	0.0	0.0	0.0	0.0	0.0	0.0
SP-SS	3.9	0.0	0.0	100.2	1.0	0.0	0.0	0.0	0.0
SP-TR	6.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	14.6
Grand Total	**4.8**	**10.6**	**2.4**	**19.7**	**0.7**	**0.0**	**0.3**	**0.2**	**1.2**

Appendix 4. Estimated annual catch landings (tones) on the Ugandan part of Lake Victoria presented by effort group (Vessel-gear type) and species for May 2014.

Vessel-Gear type code	**Nile perch**	**Tilapia spp**	**Mukene/Dagaa**	**Haplochromines**	**Bagras spp**	**Protopterus**	**Clarias spp**	**Other species**	**Overall**
CA-SS	-	-	261.0	-	-	-	-	-	261.0
FF-CN	-	4.6	-	-	-	-	-	-	4.6
FF-GN	7.8	73.2	-	-	-	-	-	-	81.0
FF-HL	-	204.9	-	550.4	-	1.4	1.4	-	758.2
FF-TR	-	-	-	-	-	-	-	113.1	113.1
PA-BS	581.5	-	-	16.9	-	-	-	-	598.4
PA-CN	32.8	1,364.4	-	5.4	-	-	7.4	2.5	1,412.4
PA-GN	820.3	1,888.4	-	149.2	34.8	127.6	5.5	141.5	3,167.4
PA-HL	1,791.2	377.5	-	6.5	-	121.5	91.2	-	2,387.9
PA-LL	204.6	6.2	-	-	-	212.1	125.6	-	548.6
PA-OT	1,425.9	3,943.6	-	-	-	-	-	-	5,369.5
PA-TR	51.5	486.0	-	-	-	70.1	7.3	-	614.8
RF-HL	-	46.3	-	-	-	-	-	-	46.3
SF-BS	6,005.0	738.7	-	158.2	-	154.5	11.4	9.9	7,077.9
SF-CN	56.0	1,497.2	-	89.9	-	11.5	-	-	1,654.5
SF-GN	26,565.2	5,020.6	402.8	282.9	55.5	780.2	380.9	5,728.2	39,216.3
SF-HL	1,149.4	622.8	-	44.5	-	27.8	-	-	1,844.5
SF-LL	25,057.0	68.1	-	-	127.3	128.0	563.0	3.1	25,946.4
SF-OT	44.7	3,437.9	-	-	71.5	-	-	-	3,554.1
SF-SN	-	-	20,933.5	-	-	-	-	-	20,933.5
SF-SS	31.7	2.6	108,212.1	3,488.5	-	-	-	-	111,735.0
SF-TR	1.3	146.2	-	-	-	5.9	7.7	-	161.0
SP-BS	855.5	18.5	-	40.3	-	-	-	-	914.2
SP-CN	65.1	89.2	-	-	-	-	-	-	154.3
SP-GN	286.9	140.1	134.4	-	1.0	-	-	549.8	1,112.2
SP-HL	203.8	55.5	-	-	-	-	-	-	259.2
SP-LL	2,250.8	10.6	-	-	-	30.6	-	2.4	2,294.3
SP-OT	-	858.2	-	-	-	-	-	-	858.2
SP-SS	8.4	-	35,963.5	347.3	-	-	-	-	36,319.2

SP-TR	-	17.6	-	-	-	-	-	107.1	124.7
Total	67,496.6	21,119.0	165,907.3	5,179.9	290.1	1,671.2	1,201.4	6,657.5	269,522.9

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 5. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for July 2005

DISTRICT	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±		±
Busia	29.0	9.9	19.4	6.2	19.0	2.8	6.3	1.6	0.1	0.1	0.1	0.2	0.0	0.0	1.1	1.0	**75.0**	**21.8**
Bugiri	1,589.0	243.6	272.1	59.1	744.2	111.4	245.2	63.2	1.4	1.9	4.4	5.7	0.5	0.7	27.2	24.6	**2,884.0**	**510.2**
Mayuge	757.1	136.3	269.9	75.8	570.6	92.5	183.9	47.5	1.0	1.2	4.2	5.6	0.5	0.7	11.7	9.8	**1,798.9**	**369.4**
Jinja	48.2	9.6	39.1	6.6	6.2	4.5	0.0	0.0	0.1	0.1	0.3	0.5	0.1	0.1	1.7	1.2	**95.8**	**22.6**
Mukono	3,074.4	451.3	869.0	165.4	3,436.5	800.5	965.3	248.3	5.4	6.5	7.2	7.8	1.5	1.8	81.8	67.1	**8,441.2**	**1,748.8**
Kampala	47.4	8.4	20.2	4.1	7.6	1.1	2.5	0.7	0.1	0.1	0.3	0.3	0.0	0.0	1.2	0.8	**79.3**	**15.6**
Wakiso	546.8	95.4	300.5	44.7	446.1	91.5	132.8	34.4	0.9	1.1	4.0	4.1	0.4	0.6	13.6	10.6	**1,445.2**	**282.4**
Mpigi	160.2	32.6	167.5	24.2	30.4	4.5	10.1	2.8	0.3	0.3	2.5	2.4	0.3	0.3	7.8	5.7	**379.0**	**72.9**
Masaka	200.8	45.9	246.3	34.0	450.2	81.5	140.1	36.1	0.6	0.8	1.6	1.6	0.2	0.4	5.1	4.6	**1,045.1**	**205.0**
Kalangala	1,390.3	188.6	572.0	97.9	3,722.8	2,046.8	359.1	92.6	2.4	2.9	5.4	5.0	0.8	1.0	45.8	37.8	**6,098.6**	**2,472.7**
Rakai	187.9	20.9	52.9	8.5	11.4	1.7	3.8	1.0	0.2	0.2	0.6	0.5	0.1	0.1	6.6	6.0	**263.4**	**39.0**
	8,031.2	**1,242.4**	**2,828.9**	**526.7**	**9,445.0**	**3,239.0**	**2,049.1**	**528.1**	**12.5**	**15.3**	**30.6**	**33.8**	**4.4**	**5.8**	**203.8**	**169.3**	**22,605.4**	**5,760.4**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 6. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for August 2005.

	NP	95%CL	TL	95%CL	DA	95%CL	HA	95%CL	BD	95%CL	PA	95%CL	CG	95%CL	OT	95%CL		**95%CL**
Busia	17.4	3.9	11.9	2.6	21.0	2.8	0.0	0.0	0.0	0.0	6.2	17.4	3.5	17.4	0.8	1.1	**60.8**	**45.3**
Bugiri	1,102.7	203.7	233.2	55.8	822.0	110.3	0.4	0.5	1.0	1.3	3.5	3.7	1.1	1.5	2.2	1.6	**2,166.1**	**378.3**
Mayuge	572.3	135.1	226.5	52.3	621.6	84.3	0.3	0.5	0.8	1.0	3.3	3.6	1.1	1.5	1.6	1.2	**1,427.4**	**279.5**
Jinja	41.2	10.2	34.9	7.4	2.5	0.6	0.0	0.0	0.1	0.1	0.3	0.4	0.1	0.1	0.3	0.2	**79.4**	**19.2**
Mukono	2,633.2	476.8	757.2	162.0	3,436.9	485.9	0.6	1.0	5.1	6.6	10.1	11.9	5.4	7.9	16.4	16.1	**6,864.8**	**1,168.3**
Kampala	42.3	10.3	20.0	4.5	8.4	1.2	0.0	0.0	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.1	**71.4**	**16.7**
Wakiso	467.2	106.2	241.1	43.3	461.8	64.1	0.5	0.7	0.9	1.3	4.3	4.4	1.3	1.6	2.1	1.5	**1,179.2**	**223.1**
Mpigi	143.4	35.3	130.9	19.8	33.6	4.6	0.3	0.4	0.3	0.3	2.3	2.1	0.6	0.7	1.8	1.5	**313.1**	**64.7**
Masaka	174.6	49.9	190.9	29.7	479.5	65.5	0.3	0.5	0.2	0.3	1.7	1.8	0.5	0.6	1.7	2.0	**849.2**	**150.2**
Kalangala	1,269.1	216.3	458.4	83.7	2,242.8	431.6	0.6	0.9	2.1	2.6	5.8	5.5	2.6	3.0	5.8	4.1	**3,987.2**	**747.7**
Rakai	170.7	21.2	41.1	7.9	12.6	1.7	0.1	0.1	0.2	0.2	0.7	0.8	0.2	0.2	0.5	0.3	**226.0**	**32.3**
	6,633.9	**1,268.9**	**2,346.0**	**469.0**	**8,142.6**	**1,252.5**	**3.0**	**4.7**	**10.8**	**13.9**	**38.4**	**51.9**	**16.5**	**34.7**	**33.4**	**29.7**	**17,224.6**	**3,125.2**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 7. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for September 2005

District	NP	95%CL	TL	95%CL	DA	95%CL	HA	95%CL	BD	95%CL	PA	95%CL	CG	95%CL	OT	95%CL		**95%CL**
Busia	28.3	6.2	12.3	3.2	29.3	6.4	0.1	0.1	0.0	0.0	1.8	1.2	0.1	0.1	0.3	0.3	72.2	17.7
Bugiri	1,392.0	209.3	238.3	105.2	1,148.9	253.1	0.2	0.2	4.8	5.3	6.2	6.2	0.7	1.0	1.9	1.7	2,793.0	581.9
Mayuge	748.1	126.0	226.9	64.3	869.5	191.6	0.1	0.2	1.6	1.8	5.8	5.9	0.9	1.1	2.1	3.2	1,855.0	394.1
Jinja	54.3	9.5	31.2	6.4	4.1	1.1	0.0	0.0	0.1	0.1	1.1	1.0	0.3	0.4	0.4	0.2	91.5	18.7
Mukono	3,362.7	504.5	696.7	180.1	4,821.1	1,048.6	0.3	0.3	4.3	4.6	20.2	18.5	1.8	2.4	9.6	6.4	8,916.7	1,765.4
Kampala	63.3	10.7	14.9	2.7	11.7	2.6	0.0	0.0	0.0	0.0	0.6	0.5	0.0	0.0	0.2	0.1	90.9	16.8
Wakiso	593.5	101.8	259.6	53.6	648.5	143.1	0.2	0.2	0.6	0.7	6.6	5.9	1.7	2.1	1.9	1.8	1,512.7	309.2
Mpigi	161.7	22.9	148.3	18.2	47.2	10.6	0.1	0.1	0.2	0.2	2.4	2.4	0.5	0.6	1.0	0.7	361.4	55.6
Masaka	216.8	41.2	234.7	41.1	670.9	146.9	0.0	0.1	0.2	0.2	2.9	3.6	0.3	0.4	0.6	0.4	1,126.4	233.9
Kalangala	1,516.9	215.6	492.4	100.4	3,225.3	641.9	0.2	0.2	1.6	1.5	8.7	8.3	0.7	1.0	3.6	2.1	5,249.5	971.1
Rakai	185.2	20.3	46.4	11.7	17.7	4.0	0.0	0.0	0.3	0.3	0.8	0.8	0.2	0.2	0.3	0.2	250.8	37.5
	8,322.8	**1,268.0**	**2,401.9**	**586.9**	**11,494.2**	**2,450.2**	**1.2**	**1.5**	**13.7**	**14.6**	**57.0**	**54.3**	**7.3**	**9.4**	**21.8**	**17.1**	**22,320.0**	**4,401.9**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 8. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for November 2005

District	NP	95%CL	TL	95%CL	DA	95%CL	HA	95%CL	BD	95%CL	PA	95%CL	CG	95%CL	OT	95%CL		**95%CL**
Busia	24.8	3.8	13.3	3.7	14.4	2.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.2	0.1	**52.9**	**9.8**
Bugiri	1,589.3	202.3	217.4	50.9	561.4	76.7	0.3	0.5	1.4	1.9	6.4	6.5	0.6	1.3	3.5	3.1	**2,380.2**	**343.3**
Mayuge	792.4	123.7	219.4	48.1	427.8	60.2	0.3	0.5	0.7	0.9	5.3	4.8	0.6	1.7	2.4	1.9	**1,448.7**	**241.6**
Jinja	50.8	8.8	32.0	5.9	3.6	1.8	0.0	0.0	0.0	0.1	0.3	0.3	0.0	0.5	0.6	0.4	**87.4**	**17.7**
Mukono	3,348.6	403.1	664.5	129.0	2,477.0	371.4	0.4	0.7	3.2	3.9	13.4	12.7	1.9	4.1	13.8	9.4	**6,522.8**	**934.3**
Kampala	51.1	8.4	16.6	3.2	5.9	1.1	0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.1	0.4	0.2	**74.5**	**13.4**
Wakiso	576.0	85.6	240.9	44.6	327.3	50.4	0.4	0.7	0.6	0.7	6.5	5.1	0.8	2.9	3.1	2.2	**1,155.4**	**192.3**
Mpigi	170.2	26.6	129.5	19.8	24.2	5.4	0.2	0.4	0.2	0.2	3.6	2.6	0.4	0.9	1.7	1.1	**330.1**	**57.1**
Masaka	221.0	36.1	205.4	34.8	332.9	45.3	0.4	0.7	0.2	0.2	3.3	2.6	0.6	0.9	1.1	1.0	**764.9**	**121.6**
Kalangala	1,599.3	182.9	434.3	76.8	2,201.4	471.2	0.6	1.0	1.4	1.7	9.7	7.8	1.3	2.0	7.0	5.0	**4,254.9**	**748.4**
Rakai	222.9	19.4	41.3	8.5	9.0	1.9	0.1	0.1	0.2	0.2	1.2	1.1	0.1	0.3	0.7	0.6	**275.3**	**32.1**
	8,646.3	**1,100.8**	**2,214.4**	**425.1**	**6,384.7**	**1,087.4**	**2.5**	**4.6**	**7.9**	**9.9**	**50.3**	**43.8**	**6.4**	**14.7**	**34.5**	**25.1**	**17,347.0**	**2,711.5**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 9. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for March 2006

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±		±
Busia	23.5	9.4	16.6	9.4	19.7	8.4	0.0	0.0	0.1	0.1	0.2	0.2	0.5	0.6	2.4	3.7	**62.9**	**31.8**
Bugiri	1,204.5	177.0	247.4	96.8	792.1	347.2	0.2	0.4	1.6	2.2	6.8	6.2	2.9	2.9	10.2	9.3	**2,265.8**	**642.0**
Mayuge	642.6	121.1	233.1	91.2	590.0	251.5	0.2	0.4	1.2	1.6	6.9	6.2	3.1	3.2	8.5	8.5	**1,485.6**	**483.8**
Jinja	44.2	9.5	30.9	10.5	3.9	1.1	0.0	0.0	0.2	0.2	0.6	0.4	0.5	0.4	1.0	0.5	**81.2**	**22.8**
Mukono	2,810.2	438.9	732.4	349.4	3,349.1	1,384.8	1.1	1.6	5.6	5.4	26.1	20.5	18.1	16.0	40.7	35.2	**6,983.3**	**2,251.9**
Kampala	49.0	7.8	17.5	9.4	7.9	3.4	0.0	0.0	0.1	0.1	0.6	0.5	0.3	0.3	0.9	0.5	**76.3**	**22.1**
Wakiso	488.3	74.8	234.5	79.2	444.3	186.0	0.3	0.5	1.6	2.1	9.0	8.2	3.7	3.6	7.4	5.5	**1,189.1**	**360.0**
Mpigi	152.5	28.5	131.4	42.6	32.2	14.5	0.1	0.2	0.7	1.1	3.8	3.8	1.1	1.3	3.8	2.9	**325.6**	**94.8**
Masaka	186.2	34.1	192.7	46.6	454.2	190.4	0.1	0.1	0.4	0.6	3.6	3.4	0.6	0.8	3.5	4.6	**841.2**	**280.6**
Kalangala	1,323.7	178.1	453.1	171.1	2,722.6	915.1	0.5	0.8	2.8	3.2	13.4	11.8	6.6	6.4	17.8	13.2	**4,540.7**	**1,299.6**
Rakai	174.3	18.9	41.6	15.2	14.9	8.9	0.0	0.1	0.3	0.3	0.9	0.9	0.2	0.3	1.8	1.3	**234.0**	**46.0**
	7,099.1	**1,098.3**	**2,331.2**	**921.4**	**8,430.8**	**3,311.3**	**2.6**	**4.1**	**14.6**	**17.0**	**71.8**	**62.1**	**37.7**	**35.8**	**97.8**	**85.3**	**18,085.6**	**5,535.3**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 10. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for August 2006

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±		±
Busia	48.0	11.5	11.7	2.6	19.6	2.7	0.0	0.1	0.1	0.1	0.3	0.2	0.0	0.0	0.2	0.2	**79.8**	**17.4**
Bugiri	1,217.3	165.6	231.6	98.7	766.4	104.9	1.2	1.6	2.3	2.5	9.3	8.3	0.9	1.0	2.3	1.7	**2,231.3**	**384.4**
Mayuge	639.3	120.8	241.7	111.2	583.3	80.2	1.1	1.5	1.2	1.4	8.7	7.6	0.8	1.0	1.7	1.2	**1,477.9**	**324.8**
Jinja	50.6	11.0	31.2	5.4	4.2	0.8	0.1	0.1	0.2	0.2	0.8	0.6	0.1	0.2	0.3	0.2	**87.5**	**18.5**
Mukono	2,924.7	397.1	667.0	134.8	3,360.6	475.6	6.4	7.9	5.6	5.1	36.5	31.1	5.4	6.5	10.5	6.7	**7,016.7**	**1,064.8**
Kampala	57.6	9.2	17.0	3.1	7.8	1.1	0.1	0.1	0.1	0.1	0.8	0.6	0.1	0.1	0.3	0.2	**83.8**	**14.5**
Wakiso	527.2	89.4	232.8	35.5	444.0	62.1	1.5	2.1	1.0	0.9	11.3	9.5	1.1	1.3	1.9	1.2	**1,220.8**	**202.0**
Mpigi	168.3	30.9	123.7	23.2	31.3	4.3	0.7	1.0	0.5	0.4	5.0	4.0	0.6	0.6	0.9	0.5	**331.0**	**64.9**
Masaka	197.0	33.4	191.6	28.6	454.8	63.0	0.8	1.1	0.3	0.3	4.3	4.0	0.6	1.0	0.8	0.5	**850.1**	**131.9**
Kalangala	1,368.5	173.3	420.7	64.0	2,903.1	479.0	17.1	21.0	2.5	2.1	18.5	15.5	2.5	2.7	4.7	2.9	**4,737.6**	**760.4**
Rakai	169.3	16.5	37.2	5.6	11.7	1.6	0.2	0.3	0.3	0.2	1.3	1.0	0.3	0.3	0.4	0.3	**220.6**	**25.8**
	7,367.7	**1,058.7**	**2,206.2**	**512.9**	**8,587.0**	**1,275.2**	**29.2**	**36.7**	**14.1**	**13.2**	**96.8**	**82.5**	**12.4**	**14.9**	**23.9**	**15.6**	**18,337.2**	**3,009.6**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 11. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for December 2006

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±		±
Busia	20.3	2.7	13.0	2.9	28.1	10.2	0.1	0.1	0.0	0.0	0.2	0.2	0.1	0.2	0.4	0.2	**62.3**	**16.4**
Bugiri	1,599.9	216.1	232.4	58.5	1,103.4	401.6	1.2	1.0	0.7	0.7	6.2	6.2	3.3	4.7	3.2	2.2	**2,950.3**	**690.9**
Mayuge	763.7	143.0	253.1	68.4	831.8	305.1	0.9	0.8	0.4	0.4	6.5	6.5	2.4	3.3	3.1	2.0	**1,861.8**	**529.5**
Jinja	41.7	7.1	34.6	5.6	2.4	2.5	0.2	0.2	0.0	0.0	0.7	0.5	0.3	0.3	0.5	0.3	**80.4**	**16.4**
Mukono	3,193.2	378.8	688.6	127.1	4,476.5	1,657.5	6.5	5.6	2.1	1.9	31.9	28.6	11.8	15.3	18.9	11.5	**8,429.5**	**2,226.3**
Kampala	50.5	6.5	17.2	3.3	11.9	5.4	0.2	0.1	0.0	0.0	0.9	0.6	0.2	0.3	0.5	0.3	**81.5**	**16.6**
Wakiso	543.3	72.5	261.9	35.1	611.0	229.7	1.2	1.1	0.4	0.4	7.6	6.4	3.0	3.5	3.5	2.2	**1,432.0**	**350.9**
Mpigi	171.4	27.4	138.3	18.9	45.9	18.0	0.9	0.7	0.2	0.2	3.4	3.5	1.4	1.7	1.9	1.1	**363.3**	**71.4**
Masaka	214.3	28.8	229.3	27.4	633.2	225.8	0.3	0.3	0.2	0.2	3.9	5.3	1.0	2.0	1.7	1.1	**1,083.9**	**290.9**
Kalangala	1,548.0	164.7	462.0	64.4	2,187.2	767.0	3.4	2.9	1.1	1.0	15.4	13.0	5.4	6.3	8.4	5.2	**4,231.0**	**1,024.5**
Rakai	224.6	18.9	40.8	5.4	16.9	6.2	0.3	0.2	0.1	0.1	1.0	0.8	0.5	0.6	0.6	0.4	**284.9**	**32.7**
	8,371.0	**1,066.5**	**2,371.3**	**416.9**	**9,948.3**	**3,629.1**	**15.0**	**13.0**	**5.3**	**4.9**	**77.8**	**71.5**	**29.4**	**38.1**	**42.7**	**26.6**	**20,860.9**	**5,266.6**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 12. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for March 2007

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±		±
Busia	17.9	3.0	9.1	2.3	28.6	8.1	0.0	0.0	0.0	0.0	0.5	0.4	0.0	0.0	0.2	0.3	**56.4**	**14.3**
Bugiri	1,231.3	201.5	188.2	69.2	1,127.0	309.1	2.4	2.4	1.4	1.8	14.6	11.2	1.2	1.5	4.6	1.6	**2,570.7**	**598.4**
Mayuge	594.6	110.5	196.4	70.1	864.9	235.3	2.1	2.1	0.7	0.9	15.1	11.4	1.1	1.4	3.0	1.5	**1,677.9**	**433.2**
Jinja	41.6	7.7	28.4	9.8	5.8	2.6	0.0	0.0	0.1	0.1	1.8	1.6	0.1	0.1	0.7	0.4	**78.5**	**22.4**
Mukono	2,637.4	369.4	555.1	139.7	4,800.6	1,371.5	7.6	7.5	3.8	4.2	68.4	49.3	5.3	5.9	18.5	10.3	**8,096.8**	**1,957.8**
Kampala	45.5	7.3	13.5	2.8	11.8	3.7	0.0	0.0	0.1	0.1	1.6	1.1	0.1	0.2	0.5	0.3	**73.1**	**15.5**
Wakiso	466.0	75.9	225.7	58.3	639.4	182.3	1.1	1.1	0.7	0.8	18.1	14.0	1.4	1.6	3.7	2.1	**1,356.1**	**336.1**
Mpigi	139.2	23.3	111.9	20.6	50.2	16.0	0.2	0.2	0.3	0.2	6.2	4.6	0.7	0.8	2.0	1.1	**310.7**	**66.7**
Masaka	164.6	26.8	183.5	23.1	655.3	182.4	1.0	0.9	0.2	0.2	5.1	3.8	0.6	0.7	1.0	0.7	**1,011.3**	**238.6**
Kalangala	1,215.1	156.4	376.5	68.2	3,793.3	1,224.2	2.6	2.6	1.6	1.6	29.6	21.7	2.9	3.1	9.3	3.9	**5,430.8**	**1,481.6**
Rakai	157.5	16.3	35.2	8.3	17.8	5.8	0.0	0.0	0.2	0.2	1.5	1.2	0.2	0.3	1.0	0.3	**213.4**	**32.3**
	6,710.6	**998.1**	**1,923.4**	**472.5**	**11,994.6**	**3,541.0**	**17.0**	**16.8**	**9.2**	**10.2**	**162.5**	**120.3**	**13.9**	**15.5**	**44.4**	**22.4**	**20,875.6**	**5,196.8**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 13. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for August 2007

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±		±
Busia	19.2	3.6	10.5	4.1	15.4	1.6	0.1	0.1	0.0	0.0	0.3	0.2	0.1	0.1	0.3	0.2	**45.8**	**9.8**
Bugiri	1,349.2	151.3	162.7	30.2	602.0	60.8	1.7	2.6	2.3	2.4	11.9	9.8	2.3	1.9	3.9	2.5	**2,136.0**	**261.6**
Mayuge	615.8	83.4	188.5	36.0	457.8	48.5	1.5	2.3	0.9	1.1	11.6	8.4	2.7	2.4	3.0	2.0	**1,281.8**	**184.2**
Jinja	42.9	7.3	22.6	4.0	3.2	1.5	0.2	0.3	0.0	0.0	1.6	0.9	0.3	0.3	0.9	0.5	**71.7**	**14.7**
Mukono	2,689.4	310.7	569.6	126.2	2,626.5	358.9	3.9	6.2	3.0	2.9	69.8	43.1	12.4	10.2	20.4	13.5	**5,994.9**	**871.7**
Kampala	42.2	5.6	14.1	2.9	6.1	0.6	0.0	0.0	0.0	0.0	1.4	0.8	0.4	0.3	0.6	0.3	**64.8**	**10.7**
Wakiso	470.0	60.0	216.3	30.7	347.6	43.2	0.6	1.0	0.6	0.5	13.4	8.6	3.0	2.5	4.1	2.6	**1,055.8**	**149.1**
Mpigi	139.1	18.5	112.8	14.3	24.6	2.5	0.2	0.4	0.2	0.2	3.3	2.2	1.1	0.9	2.0	1.0	**283.4**	**39.9**
Masaka	163.9	20.3	195.4	23.8	356.6	40.6	0.7	1.1	0.3	0.3	2.6	1.8	1.3	0.9	0.9	0.5	**721.7**	**89.4**
Kalangala	1,257.7	131.5	381.8	56.0	2,211.1	711.4	1.4	2.2	1.4	1.2	25.1	15.7	5.6	4.4	8.9	5.3	**3,892.9**	**927.8**
Rakai	176.0	15.2	33.8	4.2	9.2	0.9	0.0	0.1	0.2	0.2	0.8	0.6	0.3	0.2	0.7	0.3	**221.0**	**21.7**
	6,965.4	**807.3**	**1,908.0**	**332.4**	**6,660.1**	**1,270.6**	**10.4**	**16.3**	**9.0**	**8.9**	**141.7**	**92.0**	**29.4**	**24.2**	**45.8**	**28.9**	**15,769.9**	**2,580.6**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 14. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for February 2008

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±		±
Busia	18.3	3.5	10.7	9.0	12.8	1.5	0.1	0.1	0.0	0.0	0.4	0.3	0.1	0.1	0.3	0.1	**42.8**	**14.6**
Bugiri	1,170.4	170.1	166.6	36.0	500.4	57.6	1.6	2.2	0.5	0.7	12.9	7.1	3.2	2.5	5.6	3.2	**1,861.3**	**279.6**
Mayuge	562.6	87.2	180.3	43.5	380.7	44.2	1.6	2.3	0.3	0.4	12.9	7.3	3.0	2.3	3.8	1.9	**1,145.3**	**189.0**
Jinja	43.0	6.9	25.7	5.5	2.7	0.5	0.2	0.3	0.1	0.1	1.9	1.1	0.5	0.3	0.8	0.3	**74.8**	**14.9**
Mukono	2,589.3	337.7	567.8	177.3	2,190.5	264.6	6.2	7.5	2.1	2.6	79.5	42.5	18.6	13.3	27.3	12.1	**5,481.2**	**857.6**
Kampala	42.5	5.4	13.7	2.8	5.1	0.6	0.2	0.2	0.0	0.0	1.7	0.9	0.5	0.3	0.6	0.3	**64.3**	**10.5**
Wakiso	461.9	69.0	210.7	36.5	289.6	34.4	1.2	1.4	0.4	0.5	16.7	9.3	3.8	3.0	5.2	2.3	**989.6**	**156.3**
Mpigi	134.4	19.2	111.3	19.4	20.4	2.4	0.6	0.6	0.1	0.1	5.1	2.8	1.7	1.2	3.6	1.3	**277.2**	**47.0**
Masaka	169.1	28.4	178.9	29.0	296.8	34.8	0.7	1.0	0.1	0.1	4.1	2.5	1.1	0.9	1.4	0.7	**652.2**	**97.3**
Kalangala	1,218.3	150.6	370.1	60.9	1,875.6	280.2	4.6	6.9	0.9	1.1	30.8	16.5	8.3	5.9	14.5	6.4	**3,523.2**	**528.4**
Rakai	159.3	16.5	33.4	4.7	7.7	0.9	0.2	0.2	0.1	0.1	1.3	0.7	0.5	0.4	1.3	0.7	**203.7**	**24.2**
	6,569.0	**894.6**	**1,869.2**	**424.6**	**5,582.4**	**721.6**	**17.1**	**22.7**	**4.7**	**5.7**	**167.4**	**90.8**	**41.3**	**30.2**	**64.5**	**29.3**	**14,315.5**	**2,219.5**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 15. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for December 2008

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±		±
Busia	20.8	3.8	18.2	8.5	9.6	1.4	0.1	0.2	0.0	0.0	0.4	0.3	0.1	0.1	0.3	0.2	**49.6**	**14.5**
Bugiri	1,286.1	164.0	176.1	41.8	864.6	87.2	0.3	0.8	0.2	0.3	9.2	7.7	1.6	2.0	2.4	1.4	**2,340.6**	**305.2**
Mayuge	593.5	92.4	145.4	64.3	531.2	53.1	0.2	0.5	0.2	0.3	9.2	7.3	1.4	1.7	1.9	1.1	**1,283.1**	**220.8**
Jinja	42.1	9.0	34.5	8.9	-	-	0.0	0.1	0.0	0.1	0.9	0.7	0.2	0.3	0.4	0.2	**78.1**	**19.3**
Mukono	2,633.5	351.7	377.4	123.7	2,038.9	267.2	1.2	3.6	0.6	0.8	30.6	22.7	5.8	6.8	7.6	4.5	**5,095.6**	**781.1**
Kampala	44.2	7.2	11.4	3.3	2.8	0.3	0.0	0.0	0.0	0.0	0.6	0.5	0.1	0.1	0.3	0.2	**59.4**	**11.6**
Wakiso	448.5	73.1	191.5	54.5	243.5	25.4	0.2	0.4	0.2	0.2	8.5	6.7	1.1	1.3	1.6	1.0	**895.0**	**162.5**
Mpigi	175.6	29.0	79.2	14.5	62.6	8.0	0.1	0.3	0.1	0.2	3.2	2.4	0.4	0.5	1.2	0.7	**322.6**	**55.7**
Masaka	274.5	42.6	110.3	22.9	518.1	94.4	0.1	0.5	0.1	0.2	3.7	3.0	0.4	0.5	0.9	0.7	**908.2**	**164.9**
Kalangala	1,215.7	150.7	217.3	51.0	1,813.1	421.9	0.4	0.9	0.3	0.5	12.4	9.6	2.2	2.5	3.7	2.0	**3,265.2**	**639.1**
Rakai	192.5	22.9	29.0	6.8	-	-	0.1	0.1	0.0	0.0	2.1	1.7	0.2	0.2	0.5	0.3	**224.3**	**32.1**
	6,927.1	**946.3**	**1,390.2**	**400.4**	**6,084.4**	**959.0**	**2.9**	**7.5**	**1.9**	**2.6**	**80.8**	**62.7**	**13.4**	**16.2**	**21.0**	**12.2**	**14,521.7**	**2,406.8**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 16. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for March 2010

	NP .	±	TL .	±	DA .	±	HA .	±	BD .	±	PA .	±	CG .	±	OT .	±	TOTAL	±
Busia	49.6	3.0	9.9	1.2	34.0	5.5	0.0	0.0	0.1	0.0	0.8	0.2	0.2	0.1	0.3	0.1	**94.8**	10.1
Bugiri	885.1	54.2	176.8	21.2	607.1	98.9	0.0	0.0	1.6	0.7	14.0	3.8	3.5	1.2	4.6	1.3	**1692.7**	181.2
Mayuge	793.1	48.6	158.4	19.0	544.0	88.6	0.0	0.0	1.4	0.6	12.6	3.4	3.1	1.0	4.1	1.1	**1516.6**	162.3
Jinja	92.1	5.6	18.4	2.2	63.1	10.3	0.0	0.0	0.2	0.1	1.5	0.4	0.4	0.1	0.5	0.1	**176.0**	18.8
Mukono	2577.4	157.9	514.8	61.7	1767.9	287.9	0.1	0.1	4.6	2.0	40.8	11.0	10.1	3.4	13.3	3.6	**4929.0**	527.6
Kampala	56.6	3.5	11.3	1.4	38.9	6.3	0.0	0.0	0.1	0.0	0.9	0.2	0.2	0.1	0.3	0.1	**108.3**	11.6
Wakiso	644.4	39.5	128.7	15.4	442.0	72.0	0.0	0.0	1.1	0.5	10.2	2.8	2.5	0.9	3.3	0.9	**1232.3**	131.9
Mpigi	254.9	15.6	50.9	6.1	174.8	28.5	0.0	0.0	0.5	0.2	4.0	1.1	1.0	0.3	1.3	0.4	**487.5**	52.2
Masaka	453.2	27.8	90.5	10.8	310.8	50.6	0.0	0.0	0.8	0.4	7.2	1.9	1.8	0.6	2.3	0.6	**866.6**	92.8
Kalangala	1104.6	67.7	220.6	26.4	757.7	123.4	0.0	0.0	2.0	0.9	17.5	4.7	4.3	1.5	5.7	1.6	**2112.4**	226.1
Rakai	169.9	10.4	33.9	4.1	116.6	19.0	0.0	0.0	0.3	0.1	2.7	0.7	0.7	0.2	0.9	0.2	**325.0**	34.8
Arrow Aquaculture	-	-	-	-	36.2	-	-	-	-	-	-	-	-	-	-	-	**36.2**	**-**
Total	**7080.8**	**433.8**	**1414.3**	**169.4**	**4893.1**	**790.9**	**0.1**	**0.1**	**12.5**	**5.5**	**112.2**	**30.3**	**27.9**	**9.4**	**36.5**	**10.0**	**13,577.4**	**1449.4**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 17. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for May 2011

	NP .	±	TL .	±	DA .	±	HA .	±	BD .	±	PA .	±	CG .	±	OT .	±	TOTAL	±
Busia	42.0	3.4	11.3	3.8	51.5	0.0	0.7	0.2	0.0	0.0	0.9	0.4	0.1	0.1	0.3	0.1	**106.9**	**7.8**
Bugiri	750.6	60.1	201.6	67.4	919.6	0.0	12.9	3.0	0.4	0.3	16.4	6.3	2.4	1.1	5.4	1.5	**1909.3**	**139.8**
Mayuge	672.6	53.9	180.6	60.4	823.9	0.0	11.5	2.7	0.4	0.2	14.7	5.7	2.1	1.0	4.9	1.4	**1710.8**	**125.3**
Jinja	78.1	6.3	21.0	7.0	95.6	0.0	1.3	0.3	0.0	0.0	1.7	0.7	0.2	0.1	0.6	0.2	**198.6**	**14.5**
Mukono	2185.9	175.1	587.0	196.2	2677.8	0.1	37.5	8.8	1.2	0.8	47.9	18.5	6.9	3.2	15.8	4.5	**5560.0**	**407.2**
Kampala	48.0	3.8	12.9	4.3	58.9	0.0	0.8	0.2	0.0	0.0	1.1	0.4	0.2	0.1	0.3	0.1	**122.2**	**8.9**
Wakiso	546.5	43.8	146.7	49.1	669.5	0.0	9.4	2.2	0.3	0.2	12.0	4.6	1.7	0.8	3.9	1.1	**1390.0**	**101.8**
Mpigi	216.2	17.3	58.1	19.4	264.8	0.0	3.7	0.9	0.1	0.1	4.7	1.8	0.7	0.3	1.6	0.4	**549.9**	**40.3**
Masaka	384.33	30.79	103.20	34.50	470.83	0.01	6.60	1.55	0.22	0.14	8.42	3.25	1.22	0.56	2.77	0.79	**977.6**	**71.6**
Kalangala	936.8	75.1	251.6	84.1	1147.6	0.0	16.1	3.8	0.5	0.3	20.5	7.9	3.0	1.4	6.8	1.9	**2382.9**	**174.5**
Rakai	144.1	11.5	38.7	12.9	176.6	0.0	2.5	0.6	0.1	0.1	3.2	1.2	0.5	0.2	1.0	0.3	**366.6**	**26.8**
Arrow Aquaculture	-	-	-	-	**44.0**	-	-	-	-	-	-	-	-	-	-	-	**44.0**	-
Total	**6005.1**	**481.1**	**1612.5**	**539.1**	**7400.7**	**0.1**	**103.1**	**24.3**	**3.4**	**2.2**	**131.5**	**50.7**	**19.0**	**8.8**	**43.3**	**12.3**	**15,318.7**	**1118.6**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 18. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for May 2014

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	Total	±
Busia	18.1	0.0	5.7	0.0	44.4	0.2	1.3	0.2	0.1	0.0	0.4	0.0	0.3	0.0	1.8	0.0	72.0	0.5
Bugiri	298.5	0.6	93.6	0.7	732.8	2.7	21.5	2.6	1.3	0.2	7.4	0.4	5.3	0.4	29.6	0.2	1,190.0	7.8
Buikwe	39.7	0.1	12.5	0.1	97.6	0.4	2.9	0.3	0.2	0.0	1.0	0.1	0.7	0.1	3.9	0.0	158.5	1.0

Buvuma	1,120.8	2.3	351.5	2.6	2,751.4	10.0	80.6	9.7	4.8	0.9	27.8	1.6	19.9	1.5	111.1	0.7	4,467.9	29.2
Mayuge	64.6	0.1	20.3	0.2	158.7	0.6	4.7	0.6	0.3	0.0	1.6	0.1	1.1	0.1	6.4	0.0	257.7	1.7
Jinja	927.2	1.9	290.8	2.2	2,276.3	8.3	66.7	8.0	4.0	0.7	23.0	1.3	16.5	1.2	91.9	0.5	3,696.4	24.2
Mukono	36.1	0.1	11.3	0.1	88.7	0.3	2.6	0.3	0.2	0.0	0.9	0.1	0.6	0.0	3.6	0.0	144.0	0.9
Namayingo	29.5	0.1	9.3	0.1	72.4	0.3	2.1	0.3	0.1	0.0	0.7	0.0	0.5	0.0	2.9	0.0	117.6	0.8
Kampala	221.6	0.5	69.5	0.5	544.1	2.0	15.9	1.9	1.0	0.2	5.5	0.3	3.9	0.3	22.0	0.1	883.5	5.8
Wakiso	543.4	1.1	170.4	1.3	1,334.0	4.8	39.1	4.7	2.3	0.4	13.5	0.8	9.7	0.7	53.9	0.3	2,166.3	14.2
Mpigi	147.7	0.3	46.3	0.3	362.7	1.3	10.6	1.3	0.6	0.1	3.7	0.2	2.6	0.2	14.6	0.1	589.0	3.8
Masaka	769.7	1.6	241.4	1.8	1,889.4	6.9	55.4	6.7	3.3	0.6	19.1	1.1	13.7	1.0	76.3	0.4	3,068.2	20.0
Kalangala	796.0	1.6	249.7	1.9	1,954.0	7.1	57.3	6.9	3.4	0.6	19.7	1.1	14.1	1.1	78.9	0.5	3,173.0	20.7
Kalungu	112.6	0.2	35.3	0.3	276.5	1.0	8.1	1.0	0.5	0.1	2.8	0.2	2.0	0.2	11.2	0.1	448.9	2.9
Rakai	489.4	1.0	153.5	1.1	1,201.5	4.4	35.2	4.2	2.1	0.4	12.1	0.7	8.7	0.7	48.5	0.3	1,951.0	12.7
Total	**5624.7**	**11.6**	**1,759.9**	**13.2**	**13,825.2**	**50.1**	**404.0**	**48.5**	**24.2**	**4.3**	**139.1**	**7.8**	**99.7**	**7.5**	**556.5**	**3.3**	**22,384.1**	**146.3**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, OT=Other spp, ± Standard Error

Appendix 19. Estimated annual fish catches (t) and beach values (Million Ug.Shs) on the Ugandan part of Lake Victoria presented by district and species for 2006 to 2014.

(a) Nile perch

	2006		2007		2008		2010		2011		2014	
DISTRICT	Catch	Value	Catch	Value	Catch	Value	Catch	Value	Catch	Value	Catch	Value
Busia	396.0	762.7	227.7	388.5	234.9	524.70	594.8	2,079.3	504.4	2285.2	477.7	2,564.3
Bugiri	15,666.4	30,178.0	16,411.8	27,962.0	14,739.3	32,923.92	10621.3	37,130.9	9007.7	40807.1	217.2	1165.6
Mayuge	8,145.8	15,691.1	7,737.9	13,159.6	6,936.7	15,492.67	9516.6	33,269.3	8070.9	36563.1	6,533.9	35,072.0
Namayingo											9,566.9	51,351.7
Jinja	578.8	1,114.9	505.3	862.6	510.2	1,139.26	1104.6	3,861.6	936.8	4243.9	776.9	4,170.3
Mukono	35,852.5	69,062.3	33,550.4	57,081.1	31,337.0	69,979.81	30929.1	108,125.3	26230.4	118830.1	9,250.8	49,655.1
Buikwe											3,587.9	19,258.5
Buvuma											13,473.3	72,319.8
Kampala	632.9	1,219.1	546.4	927.8	519.8	1,160.92	679.8	2376.4	576.5	2611.7	354.7	1,903.8
Wakiso	6,297.8	12,131.3	5,842.0	9,941.3	5,462.53	12,196.53	7732.3	27,031.3	6557.6	29707.5	5,882.5	31,575.1
Mpigi	1,954.1	3,764.2	1,766.4	3,002.3	1,859.97	4,157.28	3058.9	10,693.7	2594.2	11752.4	1,775.8	9,532.1
Masaka	2,387.3	4,598.7	2,121.1	3,601.5	2,661.75	5,953.80	5438.1	19,011.0	4611.9	20893.2	2,663.8	14,298.2
Kalungu											434.3	2,331.2
Kalangala	16,912.7	32,578.8	15,771.7	26,825.5	14,603.90	32,610.27	13255.3	46,339.4	11241.6	50927.2	1,1147.3	59,834.8
Rakai	2,214.9	4,266.5	2,174.5	3,701.6	2,110.59	4,716.13	2039.3	7,129.1	1729.5	7835.0	1,353.6	7,265.7
	91,039.1	175,367.7	86,655.3	147,453.8	80,976.67	180,855.29	84,970.1	297,047.5	72,061.5	326,456.4	67,496.6	362,298.2

(b) Tilapia

	2006		2007		2008		2010		2011		2014	
DISTRICT	Catch	Value	Catch	Value	Catch	Value	Catch	Value	Catch	Value	Catch	Value
Busia	166.8	161.1	127.1	133.8	173.1	258.6	118.8	258.5	135.5	379.6	149.5	634.8
Bugiri	2,807.6	2,712.1	2,276.2	2,366.0	2,056.4	2,983.0	2,121.4	4,615.7	2418.8	6779.1	67.9	288.5
Mayuge	2,794.6	2,699.6	2,491.3	2,601.9	1,954.0	2,785.8	1,900.8	4135.7	2167.3	6074.1	2,044.4	8,681.5
Namayingo											2,993.4	12,711.3
Jinja	375.3	362.5	333.7	345.5	361.5	532.4	220.6	480.0	251.6	705.0	243.1	1,032.3
Mukono	8,290.7	8,008.8	7,126.8	7,479.3	5,671.0	7,985.5	6,177.5	13440.9	7043.6	19740.7	2,894.5	12,291.3
Buikwe											1,122.6	4,767.1
Buvuma											4,215.6	17,901.6
Kampala	205.0	198.0	175.7	184.4	150.8	215.3	1,355.8	295.4	154.8	433.9	111.0	471.3
Wakiso	2,825.7	2,729.6	2,774.6	2,905.4	2,413.0	3,466.6	1,544.4	3360.2	1760.9	4935.2	1,840.6	7,815.9
Mpigi	1,536.5	1,484.3	1,425.9	1,495.1	1,143.5	1,617.2	2011.0	1329.3	696.6	1952.4	555.6	2,359.5
Masaka	2,345.6	2,265.8	2,392.9	2,516.2	1,735.3	2,432.1	1088.1	2363.2	1238.4	3470.9	833.5	3,539.3
Kalungu											135.9	577.1
Kalangala	5,235.2	5,057.2	4,798.3	5,033.7	3,523.9	4,923.8	2647.5	5760.4	3018.7	8460.3	3,487.9	14,811.2
Rakai	478.5	462.2	433.0	453.5	374.0	535.8	407.3	886.2	464.4	1301.6	423.5	1,798.5
	27,061.4	26,141.3	24,355.6	25,514.8	19,556.6	27,736.0	16971.1	36925.7	19,350.5	54,232.7	21.119	89,682.2

(c) Mukene

	2006		2007		2008		2010		2011		2014	
DISTRICT	Catch	Value	Catch	Value	Catch	Value	Catch	Value	Catch	Value	Catch	Value
Busia	219.7	42.8	282.2	47.7	134.4	36.5	408.0	112.2	618.0	320.9	1,174.3	656.2
Bugiri	8,697.5	1,696.0	11,090.9	1,875.3	8,190.5	2,234.4	7285.4	2003.5	11035.0	5730.5	533.8	298.3
Mayuge	6,563.0	1,279.8	8,447.7	1,426.3	5,471.7	1,491.0	6527.7	1795.1	9887.4	5134.6	16,060.5	8,974.4

Namayingo											23,515.5	13,140.1
Jinja	47.2	9.2	47.3	7.8	16.2	4.4	757.7	208.4	1147.6	596.0	1,909.7	1,067.1
Mukono	37,624.8	7,336.8	46,851.3	7,921.2	25,376.2	6,899.6	21215.0	5834.1	32133.9	16687.3	22,738.6	12,706.0
Buikwe											8,819.1	4,928.0
Buvuma											33,117.4	18,505.5
Kampala	88.4	17.2	116.4	19.7	47.2	12.8	466.3	128.2	706.2	366.8	871.8	487.2
Wakiso	4,979.2	970.9	6,274.6	1,061.4	3,198.7	869.2	5303.7	1458.5	8033.5	4171.8	14,459.2	8,079.6
Mpigi	358.3	69.9	474.1	79.4	497.9	136.2	2098.2	577.0	3178.1	1650.4	4,365.0	2,439.1
Masaka	5,089.5	992.4	6,453.3	1,092.2	4,889.4	1,333.9	3730.1	1025.8	5649.9	2934.0	6,547.6	3,658.7
Kalungu											1,067.5	596.5
Kalangala	31,920.0	6,224.4	33,581.2	5,615.6	22,132.4	6,018.9	9092.1	2500.3	13771.7	7151.7	27,400.1	15,310.8
Rakai	146.5	28.6	172.2	29.0	46.0	12.4	1398.8	384.7	2118.7	1100.3	3,327.2	1,859.2
Arrow Aquaculture	-	-	-	-	-	-	434.4	119.5	528.2	274.2		
	95,734.1	18,668.1	113,791.3	19,175.6	70,000.5	19,049.2	58717.3	16147.3	88808.2	46118.5	165,907.3	92,706.5

(d) Other fish species

	2006		2007		2008		2010		2011		2014	
DISTRICT	Catch	Value	Catch	Value	Catch	Value	Catch	Value	Catch	Value	Catch	Value
Busia	18.2	11.4	9.8	8.0	11.6	14.4	15.9	31.3	25.2	56.0	106.2	278.6
Bugiri	206.1	155.1	252.2	210.6	225.2	273.6	283.9	559.8	450.6	999.7	48.3	126.6
Mayuge	178.1	136.3	227.5	190.8	207.6	255.2	254.3	501.6	403.7	895.7	1,452.1	3,809.7
Namayingo											2,126.1	5,578.1
Jinja	19.7	14.6	30.6	25.2	29.9	35.1	29.5	58.2	46.9	104.0	172.7	453.0
Mukono	800.3	604.0	1,172.5	968.6	1,076.4	1,245.4	826.6	1630.0	1312.1	2911.2	2,055.8	5,393.8
Buikwe											797.4	2,092.0

Buvuma											2,994.2	7,855.8
Kampala	17.9	13.3	26.6	21.8	24.4	28.0	18.2	35.8	28.8	64.0	78.8	206.8
Wakiso	208.4	163.9	257.9	212.5	232.9	276.0	206.6	407.5	328.0	727.8	1,307.3	3,429.7
Mpigi	96.0	74.4	96.6	78.8	97.3	113.8	81.8	161.2	129.8	287.9	394.7	1,035.4
Masaka	83.4	65.1	83.2	70.8	76.5	95.3	145.3	286.6	230.7	511.9	592.0	1,553.1
Kalungu											96.5	253.2
Kalangala	449.2	366.5	498.6	409.5	469.8	537.8	354.3	698.6	562.3	1247.6	2,477.3	6,499.6
Rakai	31.7	23.3	30.0	24.2	37.6	47.2	54.5	107.5	86.5	191.9	300.8	789.2
	2,109.0	1,627.9	2,685.5	2,221.0	2,489.3	2,921.6	2270.9	4478.1	3604.6	7997.8	15,000.1	39,354.7

(e) All fish species pooled

	2006		2007		2008		2010		2011		2014	
DISTRICT	Catch	Value	Catch	Value	Catch	Value	Catch	Value	Catch	Value	Catch	Value
Busia	800.6	978.1	646.9	578.1	554.0	834.2	1137.5	2481.4	1283.1	3041.7	1,907.7	4,133.8
Bugiri	27,377.6	34,741.3	30,031.1	32,413.9	25,211.3	38,414.9	20311.9	44309.9	22912.1	54316.4	867.1	1,879.0
Mayuge	17,681.5	19,806.8	18,904.3	17,378.6	14,570.1	20,024.6	18199.4	39701.7	20529.2	48667.5	26,090.9	56,537.6
Namayingo											38,201.8	82,781.2
Jinja	1,021.0	1,501.2	917.0	1,241.1	917.9	1,711.1	2112.4	4608.2	2382.9	5648.9	3,102.4	6,722.7
Mukono	82,568.3	85,011.9	88,701.1	73,450.3	63,460.7	86,110.3	59148.2	129030.4	66719.9	158169.4	36,939.7	80,046.2
Buikwe											14,326.9	31,045.6
Buvuma											53,800.5	116,582.6
Kampala	944.1	1,447.6	865.1	1,153.7	742.2	1,417.1	1300.0	2835.8	1466.4	3476.2	1,416.3	3,069.1
Wakiso	14,311.0	15,995.8	15,149.1	14,120.7	11,307.1	16,808.3	14787.0	32257.6	16680.0	39542.3	23,489.6	50,900.5
Mpigi	3,945.0	5,392.8	3,763.1	4,655.6	3,598.7	6,024.5	5849.8	12761.2	6598.7	15643.1	7,091.2	15,366.2
Masaka	9,905.8	7,922.0	11,050.5	7,280.7	9,362.9	9,815.1	10399.7	22686.7	11731.0	27810.0	10,636.8	23,049.3
Kalungu											1,734.3	3,758.0
Kalangala	54,517.2	44,226.9	54,649.8	37,884.3	40,730.0	44,090.7	25349.2	55298.7	28594.3	67786.9	44,512.6	96,456.5
Rakai	2,871.6	4,780.6	2,809.7	4,208.3	2,568.1	5,311.4	3899.9	8507.5	4399.1	10428.7	5,405.1	11,712.5
Arrow Aquaculture							4334.4	119.5	528.2	274.2		
	215,943.6	221,805.1	227,487.7	194,365.2	173,023.1	230,562.1	162929.3	354598.6	183824.8	434805.4	269,522.9	584,040.6

Appendix 20. Number of boats sampled per Catch Assessment Survey for the period 2005 to 2014

Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
2005							3375	2948	3563		3715		13,601
2006			2845					3976				3472	10,293
2007			3792					3878					7,670
2008		3738										3773	7,511
2009													
2010				3769									3,769
2011					4938								4,938
2012													
2013													
2014					4285								4,285
Overall Total													52,067