

# THE STRUCTURE AND DYNAMICS OF COMMERCIAL CATCHES FROM INLAND WATERS OF ROMANIA IN 2008-2018

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## Abstract

Romania's hydrographic network is 843710 ha, which represents over 3.5% of the total area of the country.

In this paper are presented the quantitative and qualitative structure of the commercial fish catches in the inland waters of Romania during the period 2008 - 2018. The natural water basins constituting the national public domain and in which legal fishing takes place are: Danube, Danube Delta, the complex lake Razim - Sinoie, reservoirs, Prut and Siret.

The processed data come from data reported by economic agents authorized to practice the commercial fishing to the National Agency for Fisheries and Aquaculture.

The catches recorded in continental waters from our country during the 2008 - 2018 period varied as follows: the smallest quantity was registered in 2010 (2457 tonnes) and the largest quantity was recorded in 2016 (3868.51 tonnes).

The main species captured in Romania's inland waters in the 2008 - 2018 period were the following: prussian carp (41.74%), freshwater bream (11.66%), pontic shad (10.53%), roach (6.77%), carp (5.46%), wels catfish (5.01%), pike-perch (4.28%), northern pike (3.88%).

**Key words:** capture, fish, total allowable catch (TAC)

## INTRODUCTION

According to FAO forecasts, population growth will increase the food deficit, especially protein-based foods, in the near future [6].

Agriculture is essential for obtaining food resources, and aquaculture and fisheries are key areas of this industry.

The importance of this sector in agriculture and in the national economy is given above all by the role it plays through the potential of food resources, but also by its active role in creating environmental values, by generating and retaining wetlands and avian and avifauna biodiversity.

Fisheries and aquaculture are not without challenges, because of the increasing demand for fish and other aquatic organisms, as well as the degradation of aquatic ecosystems, requires the sustainable use of these aquatic resources.

Fishing was rarely "sustainable". Over time, the fishing has made certain species of fish (but also other aquatic organisms) exploited to the fullest, reaching some fish stocks in decline or endangered.

In order to conserve the fish stocks, measures are needed to protect them, consisting of biological regulations on fishing, entry control (fishing effort quotas) and output control (catch quotas) [5], [7].

The Romania's fisheries patrimony is constituted of areas permanently or temporarily covered with water, it is estimated to have an area of almost 500000 ha of stagnant waters, 66000 km of flowing waters in the mountain and hillside area and 25000 km<sup>2</sup> of marine waters in the Zone Exclusive Economic at the Black Sea. Water areas in the public domain are: 300000 ha of natural and pond lakes, 98000 ha of accumulation lakes and polders, 47000 km rivers from the hilly and plain area, 19000 km of mountain rivers, 1075 km of the Danube River [2].

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The manuscript was received: 19.09.2019  
Accepted for publication: 18.04.2020

**MATERIAL AND METHOD**

*Fish data*

The analysis of the fish catches' dynamics in 2008 - 2018 was made using the official records of the National Agency for Fisheries and Aquaculture [16]. It has also been compared to the annual orders issued establishing the quotas and fishing effort. [3], [4], [8], [9], [10], [11], [12], [13], [14], [15].

**RESULTS AND DISCUSSIONS**

The total annual catches (in tonnes) reported by commercial fishermen to the National Agency for Fisheries and Aquaculture in the period 2008 - 2018 are shown in Table 1.

Also, in the table are shown the catch quotas which have been established by annual orders (TACs) and the fishing effort quantified by number of boats.

Table 1 Situation of catches (reported and established) and fishing effort in 2008-2018

Year	The reported catch (t)	The reported catch (TACs )	Fishing effort (number of boats )
2008	3310	5523.632	1470
2009	2739	-	
2010	2457	4452.042	1497
2011	2717	3646.9	1647
2012	2626.59	3260.902	1589
2013	3096.36	6982.529	1714
2014	2540.9	5767.623	1602
2015	3742.4	5266.979	1560
2016	3868.51	5671.038	1602
2017	3592	5286.807	1549
2018	3283.9	5978.72	1854

Total allowable catches covered by annual orders varied between 3260 tonnes in 2012 and 698.529 tonnes in 2013.

The distribution of total allowable catches according to the annual orders for natural water basins where commercial fishing is legally practiced is shown in Table 2 and Figure 1.

Table 2 Distribution of total allowable catches (2008 - 2018)

Year	TACs of RBDD	TACs of Danube	TACs of Prut	TACs of Siret	TACs of Olt
2008	3523.5	793.51	246	10.2	272.932
2010	3100	828.294	240	10.2	273.545
2011	2386	781	182.4	24.57	272.932
2012	2033.4	787.3	142.7	24.57	272.932
2013	5741.294	814.2	142.7	24.57	259.765
2014	4656.105	746.1	80.5	24.57	260.348
2015	4271.656	754.4	55.5	20.58	164.843
2016	4320.568	1087.5	59.6	20.42	182.95
2017	4042.987	1087.5	50.6	20.42	85.3
2018	4738.5	1087.5	50.6	20.42	81.7
TOTAL	38814.01	8767.307	1171.6	200.52	2127.247

\*RBDD - Reservation of the Danube Delta Biosphere

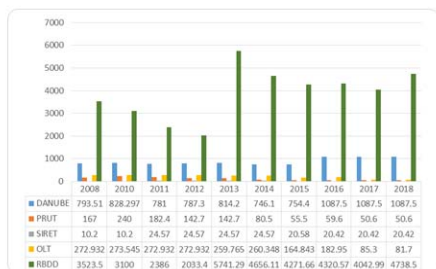


Figure 1 Dynamics of TACs on aquatic basins (2008 - 2018)

It is noticed that the largest quantities are set for the Danube Delta, but that they have increased in the period 2013 - 2018, reaching the maximum in 2013.

The quotas for the Danube River (km 140-km 1075) are relatively close, ranging from a minimum of 746.1 t to a maximum of 1087 t.

The quotas for the Prut River ranged from at least 50.6 t to a maximum of 246 t.

For the reservoirs on the Siret River, the quotas have varied between a minimum of 10.2 t and a maximum of 24.57 t.

And for the lakes on the Olt River, the total allowable total allowable catch set for commercial fishing ranged between a minimum of 81.7 t and a maximum of 273.545 t.

In the period 2008-2018, the quantities reported by fishermen to the National Agency for Fisheries and Aquaculture varied between 2457 tonnes (2010) and 3868,51 tonnes (2016) tonnes.

If we compare the quantities assigned by annual orders (TACs) and the quantities reported by fishermen, we notice that reports are sometimes even less than 50%. (Figure 2) therefore, we can say that it is a underreporting.

The species structure of the reported catches is dominated by cyprinides, namely: prussian carp (41.74%), freshwater bream (11.66%), roach (6.77%), carp (5.46%).

An important percentage of total catches is the pontic shad (10.53%), which is a migratory fish of great economic importance. The smallest percentages in catches were crucian carp (0.144%) and common nase (0.133%).

Asian cyprinids hold 3.22% of the total catches and the distribution by species is as follows: silver carp 2.08%, bighead carp 0.977%, grass carp 0.156%.

The ratio of fish prey and fish peaceful species is 0.35. (Figure 3)

The fishing effort (in number of boats) does not have large variations between 2008 and 2018, with a minimum of 1470 boats (in 2008) and a maximum of 1858 boats (in 2018).

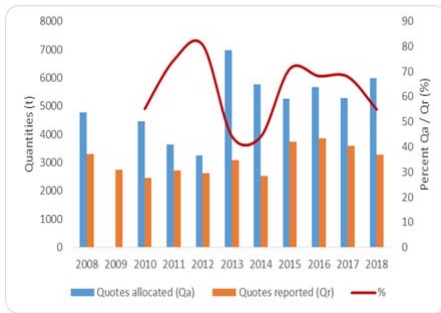


Figure 2 Evolution of TACs and reported quantities of fish (2008-2018)

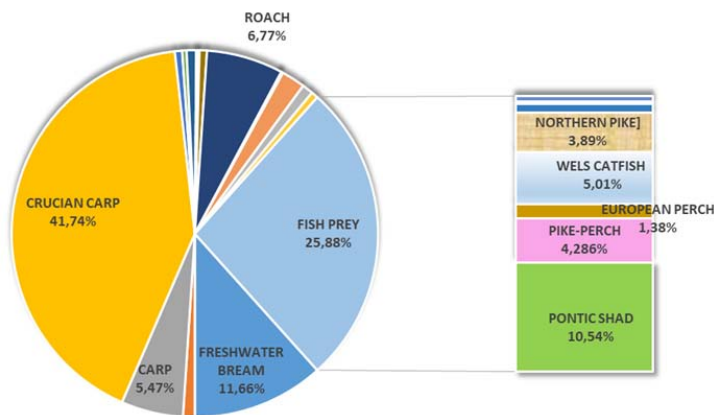


Figure 3 The species structure of the reported catches (2008 – 2018)

## CONCLUSIONS

For a sustainable exploitation of fishery resources, commercial fishing in Romania is carried out by professional fishermen and the quantities of aquatic organisms and fishing effort are regulated by annual orders.

Taxonomic structure of the ichthyofauna is dominated by cyprinides, the best represented being prussian carp (41.74%), freshwater bream (11.66%), roach (6.77%), carp (5.46%), and from asian cyprinids the silver carp hold 2.08%.

Among the prey species dominated the wels catfish (5.01%) followed the pike-perch (4.28%) and northern pike (3.89%), the percentages being relatively close.

Between 2008 and 2018, the total quantity of fish allocated by annual TACs was 51080.684 tonnes and that reported by fishermen to the National Agency for Fisheries and Aquaculture was 33973.66 tonnes.

Due to the fact that each year there are significant differences between allocated and reported quotas, it indicates that there are underreported.

The catches reported during this period it represents on average 66.5% of the allocated quotas, which makes us consider that fishermen reported only a small percentage of the real catch.

The number of boats allocated (fishing effort) by annual orders does not differ significantly between 2008 and 2018. We do not have data about the real fishing effort.

The recovery of depleted fish stocks is a key issue and one to which most countries committed themselves in 2002 as part of the World Summit on Sustainable Development [1].

## ACKNOWLEDGMENT

This work was supported by Center for Scientific Research “Romania Center for Modeling of Recirculating Aquaculture Systems” (MoRAS), from University Dunărea de Jos, of Galați which was established as a result of the implementation of the POSCCE project 622/11.03.2014.

## REFERENCES

- [1] Beddington J. R., Agnew D. J., Clark C. W., 2007: Current Problems in the Management of Marine Fisheries, Science Journal, Vol. 316, Issue 5832, pp. 1713-1716, DOI: 10.1126/science.1137362.
- [2] Bocăneală V., Dima C. R., Dobrin D., Gheorghe Șt., Luchian C., Mariuțan V., Petcu I., 2006: Fisheries Inspection Manual, p.7, ISBN-10, 973-0-04692-, ISBN 978-973-0-04692-2.
- [3] Common Order 368/391/2015 on the approval of measures to regulate fishing effort and fishing quotas allocated for 2015 by species and zones, <http://www.anpa.ro/wp-content/uploads/file/Legislatie%20Ordine%202015/ORDIN%20COMUN%20TAC%202015%20.pdf>
- [4] Common Order 284/613/2016 approving measures to regulate fishing effort and quotas, <http://www.anpa.ro/wp-content/uploads/file/Legislatie%20Ordine%202016/ordin.comun.284.613.2016.pdf>
- [5] Emergency Ordinance 23/2008 on fisheries and aquaculture (completed and amended by Law 317/2009) <http://www.anpa.ro/wp-content/uploads/2011/05/Legea%203172009.pdf>
- [6] FAO, 2018, The State of World Fisheries and Aquaculture, Rome, Italy, ISBN: 978-92-5-130562-1
- [7] Law no. 317/2009 for the approval of Government Emergency Ordinance no. 23/2008 on fishing and aquaculture,
- [8] Order no. 19/237 of 27 January 2010 approving the measures to regulate fishing effort and quotas for 2010, [http://www.anpa.ro/wp-content/uploads/2011/05/ORDIN%20%20%20Nr.%2019\\_237%20din%2027%20ianuarie%202010.19\\_237din27ianuarie2010.pdf](http://www.anpa.ro/wp-content/uploads/2011/05/ORDIN%20%20%20Nr.%2019_237%20din%2027%20ianuarie%202010.19_237din27ianuarie2010.pdf)
- [9] Order no. 48/2011 on the approval of measures regulating fishing effort and fishing quotas for 2011 by species and zones, <https://lege5.ro/Gratuit/ge2dcnrvgi/ordinul-nr-999-2011-privind-aprobarea-masurilor-de-reglementare-a-efortului-de-pescuit-si-a-cotelor-de-pescuit-pentru-anul-2011-pe-specii-si-zone>
- [10] Order no. 116/2012 on the approval of measures regulating the fishing effort and the fishing quotas allocated for 2012, <https://lege5.ro/Gratuit/gmytmojxhe/ordinul-nr-116-2012-privind-aprobarea-masurilor-de-reglementare-a-efortului-de-pescuit-si-a-cotelor-de-pescuit-alocate-pentru-anul-2012>
- [11] Order no. 1.318 / 2013 on the approval of measures regulating the fishing effort and the fishing quotas allocated for 2013, <https://lege5.ro/Gratuit/gm3denjsgj/ordin-nr-1318-2013-privind-aprobarea-masurilor-de-reglementare-a-efortului-de-pescuit-si-cotele-de-pescuit-alocate-pentru-anul-2013>

<https://lege5.ro/Gratuit/gezdzqobzgu/legea-nr-317-2009-pentru-aprobarea-ordonantei-de-urgenta-a-guvernului-nr-23-2008-privind-pescuitul-si-acvacultura>

[12] Order no. 284/2014 on the approval of measures to regulate fishing effort and the fishing quotas allocated for 2014 by species and zones, <https://lege5.ro/Gratuit/gm4tgojsg4/ordinul-nr-284-2014-privind-aprobarea-masurilor-de-reglementare-a-efortului-de-pescuit-si-cotele-de-pescuitalocate-pentru-anul-2014-pe-specii-si-zone>

[13] Order no. 13/142/2017 approving measures to regulate fishing effort and allocation of fishing quotas for 2017 on species and areas, M.O. nr.141/24 .02.2017

[http://www.anpa.ro/wp-content/uploads/file/Legislatie%20Ordine%202017/13\\_142\\_2017%20tac.pdf](http://www.anpa.ro/wp-content/uploads/file/Legislatie%20Ordine%202017/13_142_2017%20tac.pdf)

[14] Order no. 546/352/2018 approving measures to regulate fishing effort and allocation of fishing quotas for 2018 on species and areas, [http://www.anpa.ro/wp-content/uploads/file/Legislatie%20Ordine%202018/ORDIN%20nr\\_%20546%20din%2028%20martie%202018.pdf](http://www.anpa.ro/wp-content/uploads/file/Legislatie%20Ordine%202018/ORDIN%20nr_%20546%20din%2028%20martie%202018.pdf)

[15] Order no. 243/354/2019 approving measures to regulate fishing effort and quotas allocated for 2019, by species and areas, [http://www.anpa.ro/wp-content/uploads/file/ORDIN%20nr\\_%20243%20354-2019-TAC.pdf](http://www.anpa.ro/wp-content/uploads/file/ORDIN%20nr_%20243%20354-2019-TAC.pdf)

[16] Statistical reports on total catches for commercial fishing 2008-2017- The total catches reported by the authorized economic agents to practice the commercial fishing in the waters under the jurisdiction of Romania <http://www.anpa.ro/wp-content/uploads/file/2008-2017.pdf>