

ANALYSIS OF POSSIBLE RUSSIAN COD OVERFISHING IN THE NORWEGIAN AND BARENTS SEAS IN 2004-2006

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Russia and Norway are principal users of marine living resources in the Norwegian and Barents seas and our two nations are equally interested in conservation and maintenance of long-term abundant fish stocks in the region.

Initially, our equitable partnership implied active participation of both parties in the fish stock studies, monitoring, and development of technical measures for fisheries regulation and advice on catch rates, including supervision over achieving of national fish quotas.

However, as a consequence of the circumstances developed in Russia in the last 15 years, Russian Party has not been able to supervise fully, or at least on the level of the 1970-1980s, activities of either international, or even national fishing fleets in the region.

On the contrary, Norway, especially in recent years, has increased her enforcement activities and overtaken a considerable part of control over fisheries in the Norwegian and Barents seas, thus supervising not only the 200-mile zone, but the Adjacent area, open waters, and the international marine protected area of Spitsbergen. Considerable forces of the Norwegian Coastguard and Directorate of Fisheries are joined in the fight against international illegal fishing.

Undoubtedly, we should heartily welcome Norwegian initiatives on reducing illegal unreported and unregulated (IUU) fishing, which nullifies all international efforts to develop the truly rational fisheries in the region. In this contest, it is obviously important to assess the scale of illegal catches. However, such assessments are indisputable only if they are free from bias and reveal actual overfishing situation.

This is not true, however, in case of Russian cod overfishing presented in Status reports by Norwegian Directorate of Fisheries and endlessly repeated in the mass media.

Norwegian Party computed Russian total catches of cod in 2005 using the input data from the following sources:

- The Norwegian Directorate of Fisheries: records of the landing sales;
- Satellite surveillance of activities of Russian fishing vessels and fish carriers (cod transportation to EU, Russia and other states);
- Inspections of vessels flying the flag of convenience which called into ports of third countries in 2005;
- Inspections of vessels with fishing permits and licenses to fish in the NEAFC area.

If there were no written documents indicating the amount of fish aboard a vessel, figures cited in the Status reports were based on the vessel's storage capacity noted in the application for the fishing license.

Norwegian computation results showed that during the period of 2002-2005 Russian overfishing totaled 64,000 -101,300 t (Table 1).

Table 1

Cod overfishing by Russian fishing vessels, Status reports of Norwegian Directorate of Fisheries

Year	Computed cod catches (t)	Russian cod quota (t)	Computed overfishing of the cod quota (t)
2002	277 431	189 999	87 432
2003	255 000	191 000	64 000
2004	292 000	212 600	79 400
2005	315 000	213 700	101 300

As to 2005, the Bergen Institute of Marine Research adjusted such assessments increasing the cod overfishing in 2005 up to 166,000 t. This increase was associated with pure theoretical computations based on interpolation of missing data, nevertheless, it was accepted by the Arctic Fisheries Working Group (AFWG) of ICES as a basis for the ACFM advice on the cod TAC for 2007.

While the Norwegian Directorate of Fisheries made its computations of the cod and haddock overfishing by Russian fishing vessels only with data from the satellite based Vessel Monitoring System (VMS) in the Norwegian Economical Zone (NEZ), Russian party obtained more complete information from the satellite based VMSs and in 2006 it allowed us to compute Russian possible cod catches in 2005. Russian computations differ considerably from those presented by Norway.

Computation of possible catches (and the IUU catch assessment) is fairly difficult. We decided to check earlier computations and made another data analysis independent of previous results.

Input data for assessment of the IUU fishing

1. Data from the satellite monitoring of fishing vessels:
 - location and directions of trips;
 - calls into ports.
2. Data on fishing vessels' operations, (Fishery Information System):
 - Information on daily catches of fishing vessels;
 - Information on daily output of fish products;
 - Information on transshipment;
 - Information on amount of fish products aboard fishing vessels;
 - Information on use of operation time at sea.
3. Russian marine navigation register - 2007:
 - Information on refrigerating capacity;
 - Information on storage capacity.

Methods of assessment of the IUU activities

In order to make full use of the available information and to carry independent assessments, we decided to perform completely independent calculations of the possible cod catches.

1. Assessment of transport activities of Russian fishing vessels was based on:
 - analysis of the species composition of catches from the Barents and Norwegian seas;
 - determination of the number of trips related to transporting of the cod and haddock products to third countries by Russian fishing vessels and fish carriers;
 - determination of storage capacity of vessels engaged in the cod and haddock transport on the basis of data about the refrigerating capacity of vessels (Russian marine navigation register -2007);
 - analysis of the degree of the cod and haddock processing aboard the fishing vessels on the basis of data from the Fishery Information System;
 - calculation of possible amount of the cod and haddock products transported to third countries on the basis of data about the number of trips and storage capacity of the vessels;
 - calculation of possible amount of cod (live weight) transported to third countries with account of the degree of processing;
 - combined calculation of possible catches with the account of data on landings in Norway and Russia.
2. Analysis of fishing operations made by Russian fishing vessels on the basis of the following:
 - composition of the fishing fleet considering the power of the main engine;
 - calculation of the mean daily cod catches with account of vessels' performance;
 - determination of the 95% confidence interval for the mean daily cod catches;
 - determination of the number of days at sea based on data about vessels' position (satellite based Russian Fishery Monitoring Center) with account of use of operation time at sea;
 - calculation of possible cod catches on the basis of data about the mean daily catches and the number of days at sea.

Calculation results

1. Assessment of transport activities of Russian fishing vessels

Assessing transport activities of fishing vessels, we should take into account the character of cargo. Because we are interested in transportation of only cod and haddock, it is necessary to identify the possibility that the cargo in question includes cod and haddock products. We assume that for rough estimate it will be sufficient to analyze the catch composition in the region of the Barents and Norwegian seas.

Analysis of catch data shows that a considerable amount (57-59 %) of marine living resources taken by Russian fishing vessels in the Barents and Norwegian seas includes other species but cod and haddock (Fig. 1). Consequently, when we analyze transport of the cod and haddock products, we should exclude transport of other species from the total number of trips made by fishing vessels to the continent/ Saint-Petersburg /Kaliningrad or Murmansk/ Arkhangelsk.

In order to avoid errors in assessment of the species composition of the cargo, overall inspection of vessels carrying fish and fish products was made. Data of the Fishery Monitoring System revealed the cargo character and destination for each vessel. The analysis showed a relative annual stability of data for the period of 2004-2006 (Fig. 2).

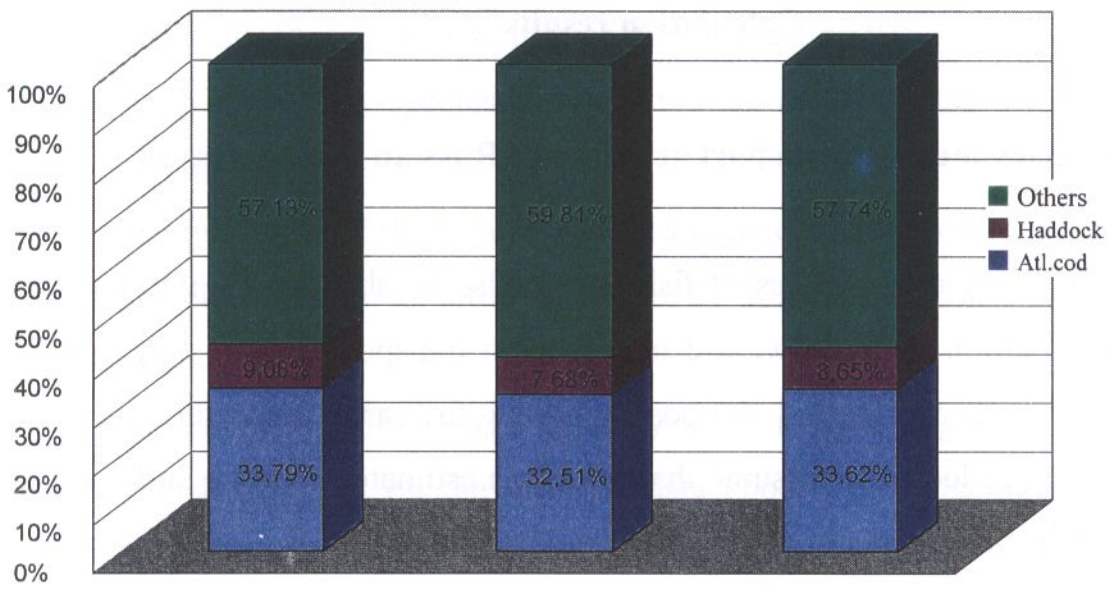


Fig. 1. Catch composition for Russian fishing vessels operating in the Barents and Norwegian seas

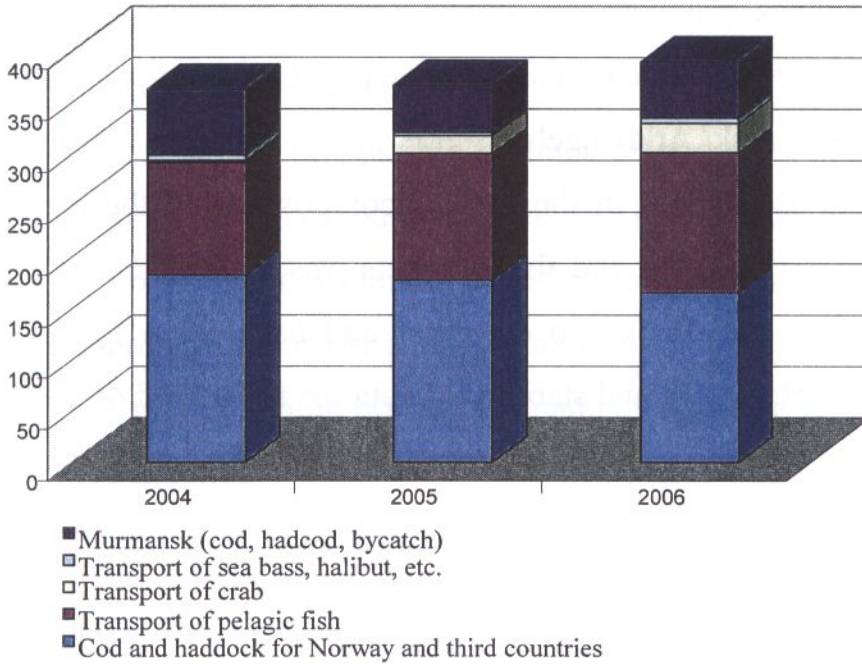


Fig. 2. Number of trips related to fish transportation by Russian fish carriers, 2004-2006

The amount of the transported cod and haddock products was estimated on the basis of data about vessels' storage capacity (determined using data about the refrigerating capacity).

Similarly, using the overall inspection method, we assessed the fishing vessels' transportation of fish products to third countries. Data of the satellite surveillance of

the vessels' calls into ports of third countries and information on the character of cargo aboard these vessels on the entrance allowed us to determine the number of trips related to the cod and haddock transport to third countries (Fig. 3). Given that information on the cargo aboard the vessels is sometimes unreliable, we proceeded with our estimations of the cargo amounts using data on the vessels' refrigerating capacity available from Russian marine navigation register.

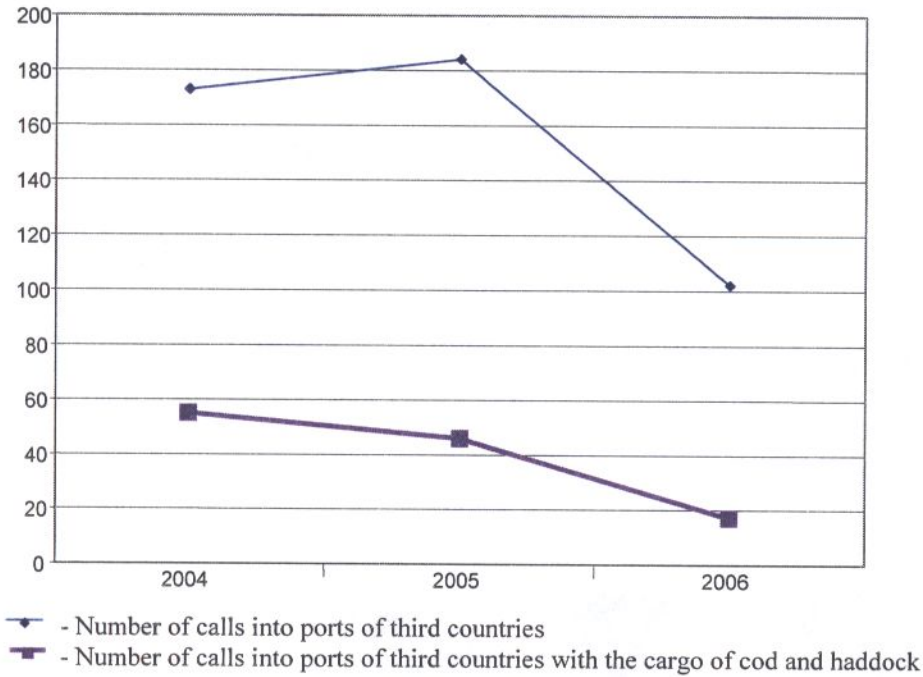


Fig. 3. Number of calls-into-ports of third countries made by Russian fishing vessels

On the basis of data about the number of trips related to transporting of the cod and haddock products by Russian fishing vessels and the storage capacity of these vessels, as well as Norwegian data on the amount of cod and haddock aboard the vessels (i.e. cod and haddock made 93% of the cargo aboard the fish carriers of which cod was 82% and haddock was 18 %, respectively; for fishing vessels, cod and haddock made only 55% of the cargo, with the further division into 86% (cod) and 14% (haddock)), we obtained the following results (Table 2).

Transportation of fish products to third countries

Volume of transported fish products	2004 г.	2005 г.	2006 г.
Fishing vessels	19405,77	15146,28	5630,04
Fish carriers	102159,96	112246,7	95159,79
Cod products			
Fishing vessels	9178,92921	7164,19	2663,009
Fish carriers	77907,1855	85599,32	72568,86
Total	87086,1147	92763,51	75231,86
Total cod (live weight) transported to third countries	145869,242	155378,9	126013,4

Conversion of cod products into live weight was made with data on the degree of processing available from Russian Fishery Monitoring Center (Fig. 4).

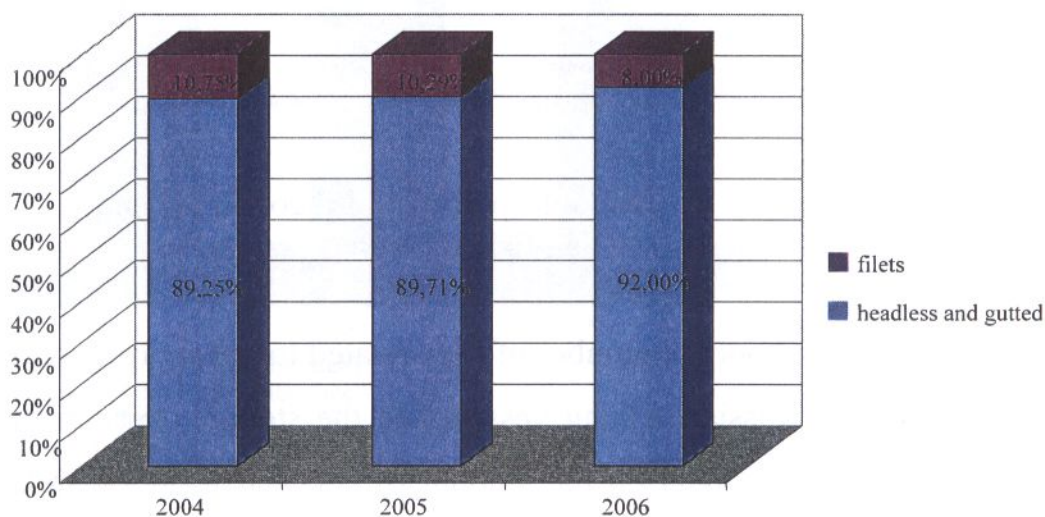


Fig. 4. Degree of processing (cod)

We assumed that the cod filets made 10% of all the transported cod products with the conversion factor of 3.25 (actual conversion factor for filets varies in the range of 2.9 – 3.25 and depends on the filet type).

Assessing transport activities, we counted trips made by those vessels which destined for maintenance or for removal from fisheries as they could carry fish products if they called into European ports en route from Murmansk or Norway.

Further, we should note that large-tonnage vessels transporting cod and haddock do not always have full load. Thus, according to data of the satellite surveillance, a vessel with the storage capacity of >3000 t received fish only from six fishing vessels and considering the storage capacity of the latter, the former could not receive more than 1,831 t, even if these fishing vessels had been fully loaded with cod and haddock. Erroneous assumption of this kind could increase the computed catch (live weight) per one trip by $\approx 2,500$ t.

Summing up all the data on computed cod cargo (live weight) to third countries, Norway and Russia, we would get the amount of possible catch based on assessment of transport activities (Table 3).

Table 3

Cod catches estimated on the basis of assessment of the fish product transportation (t)

	2004 r.	2005 r.	2006 r.
Cod (live weight) for third countries	145869,242	155378,9	126013,4
Cod (live weight) for Norway	65744	72000	90000
Cod (live weight) for Russia	20000	13400	15000
Total	231613,242	240778,9	231013,4

- Data on landings in Norway in 2006 are absent. In the 1st half of 2006, landings in Norway totaled 47,000 t. Rough estimates are 90,000 t (based on annual landings in 2004 and 2005, increase in number of the fish carriers' trips to Norway in 2006, and decrease in number of the fishing vessels' to third countries).

2. Assessment of fishing for cod and haddock by Russian fishing vessels

Data of the satellite surveillance allow us to identify duration of the fishing vessels' presence in fishing grounds. However, having information on the mean daily catch, we should exclude from the total time at sea the length of downtime related to trips from one area to another, or periods of bad weather, transshipments, etc. Figure 5 presents a schematic relationship of various types of down time.

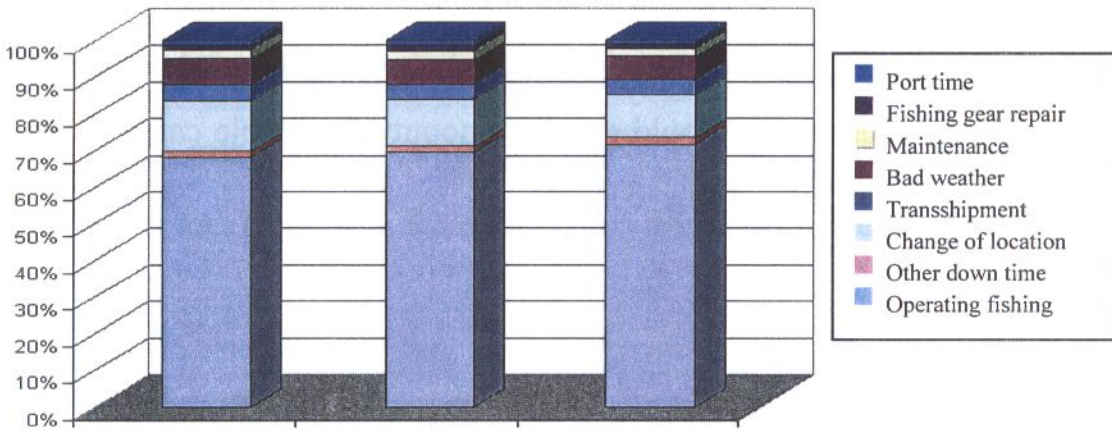


Fig. 5. Use of time at the cod and haddock fishing

From the available data we assume that the mean time of fishing operations makes 69,7% (95% confidence interval 68,2-71,3 %) of the total time at sea.

Given the cod fishery heterogeneity and dependence of the trawling output on the power of the main engine, the mean daily catch should be computed with consideration of the vessels' performance (Table 4).

Table 4

Power of the ME	Количество суток лова					
	NEZ/MPA			REZ/AA		
	2004	2005	2006	2004	2005	2006
3000-2500	503,4785	668,0915	610,996	213,552	258,7835	278,0625
2500-2000	994,3515	1374	1428,129	821,582	403,376	381,8725

2000-1500	4291,802	5123,765	5164,548	4460,864	3408,676	2788,04
1500-1000	1220,509	1078,141	865,3305	831,963	1185,659	1668,375
1000-225	3479,118	3450,941	2884,435	10354,31	11909,97	11608,18
225-55	49,6805	92,6875	6,6735	3617,037	6009,116	6567,466
Total	10538,94	11787,63	10960,11	20299,3	23175,58	23292

Computation of possible cod catches by Russian fishing vessels based on the analysis of the fishing vessels' daily reports and data of the satellite surveillance yields the value of 230-240,000 t (95% confidence interval) depending on the year (Fig. 6).

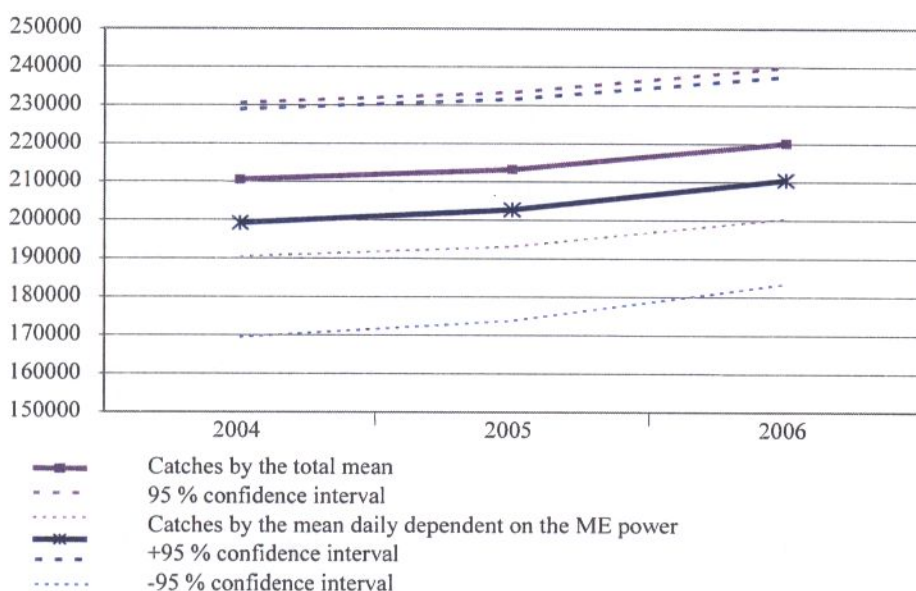


Fig. 6. Computed cod catch based on the mean daily catches

Conclusions

1. Rates of possible cod catches by Russian fishing vessels computed with the data on 2004-2006 (Russian Fishery Monitoring System) differ considerably from those presented by the Norwegian Directorate of Fisheries in its Status Reports.

2. According to the above-mentioned computations for the period of 2004-2006, the annual IUU fishing for cod in the Norwegian and Barents seas could total only 30-40,000 (Fig. 7).

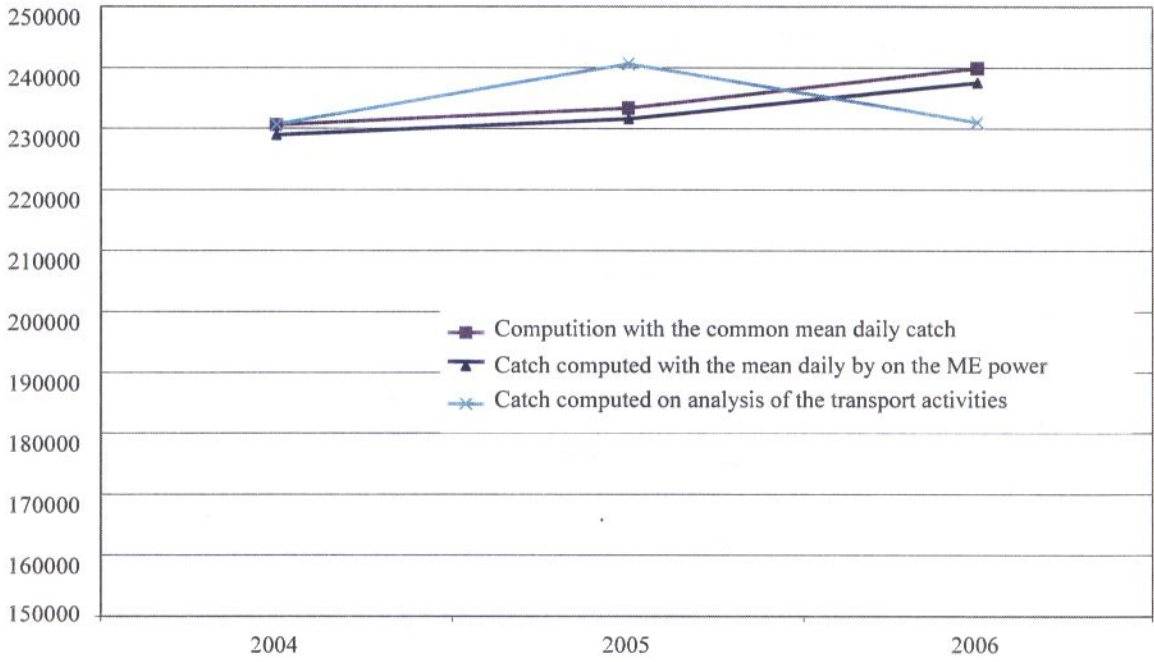


Fig. 7. Computed cod catch by Russian fishing vessels