COUNTRY DISAGGREGATION OF CATCHES OF THE FORMER SOVIET UNION (USSR)[1]

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ABSTRACT

All now-independent republics of the former Soviet Union (USSR) collectively reported their catch from 1950-1987 as USSR landings to the Food and Agriculture Organization (FAO). After 1987, and leading up to the dissolution of the USSR, the previous component republics of the Soviet Union began reporting fisheries landings separately, with tonnage of reported catches having declined considerably. Here, we disaggregated the reported USSR marine fisheries catch from 1950-1987, and assigned USSR catches to the six former Soviet Union members that have marine fisheries (Georgia, Ukraine, Estonia, Latvia, Lithuania and the Russian Federation). We undertake this disaggregation by assuming proportionality of catches (based on the average of the first five years of separate reporting) between the post- and pre-dissolution period. We thus explicitly assume that fishing vessels were always affiliated with one of these six now independent former Soviet Union republics.

INTRODUCTION

In the fisheries landings database of the Food and Agriculture Organization of the United Nations (FAO FishStat), all now independent republics of the former Soviet Union (USSR) collectively reported their catch from 1950-1987 as USSR landings (Figure 1a). After 1987, in the years leading up to the dissolution of the USSR, Soviet Union republics began reporting fisheries landings separately, with tonnage of reported catches having declined considerably (Figure 1b). The since 1988 independently reported catches by FAO statistical areas for these republics (Figure 2) demonstrate the spatial reduction in distant water fleet fishing, especially by the Baltic countries (i.e., Estonia, Latvia and Lithuania), which have essentially ceased to fish outside of Atlantic waters (Figure 2c, d, e), while the Russian Federation's largest catches result from their North Pacific fleet based in Russia's Far East ports (Figure 2 a). Here, our goal was to develop and apply a method to disaggregate the reported USSR marine fisheries catch from 1950-1987, and assign it to the six republics of the former Soviet Union that have marine fisheries, i.e., Georgia, Ukraine, Estonia, Latvia, Lithuania and the Russian

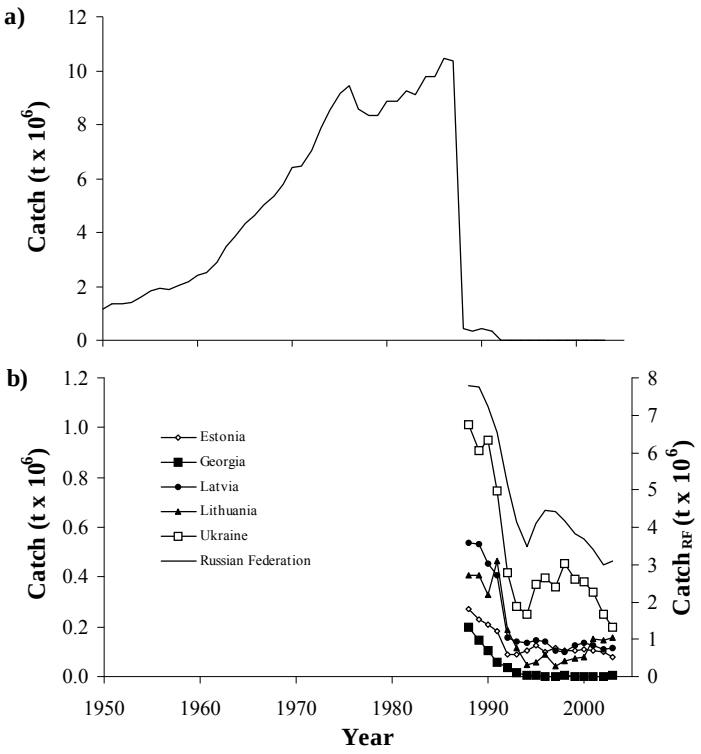

Figure 1. Marine fisheries landings reported by FAO on behalf of: a) USSR 1950-1991; and b) now independent former USSR republics 1988-2003. Note different scale for landings of Russian Federation (RF). Separate reporting commenced in 1988 for most fisheries, but not all (FAO, 2004).

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Federation. We thus assumed that fishing vessels and fishers were always associated or affiliated with one of these six now independent former Soviet Union entities.

Furthermore, we made the assumption that, for each FAO statistical area, the distribution of landings between the six republics in the first few years of separate reporting approximated the distribution of USSR landings by former USSR republics in that FAO area prior to 1988. We acknowledge that this assumption may not accurately reflect historic developments of fishing fleets in these six republics, or temporal differences in expansion into FAO areas by each former USSR entity.

Here, we present the reported catch of the former USSR disaggregated to the six component republics, and report on the disaggregation method, which has also been used to disaggregate the historic catch data for former Yugoslavia (see Rizzo and Zeller, this volume).

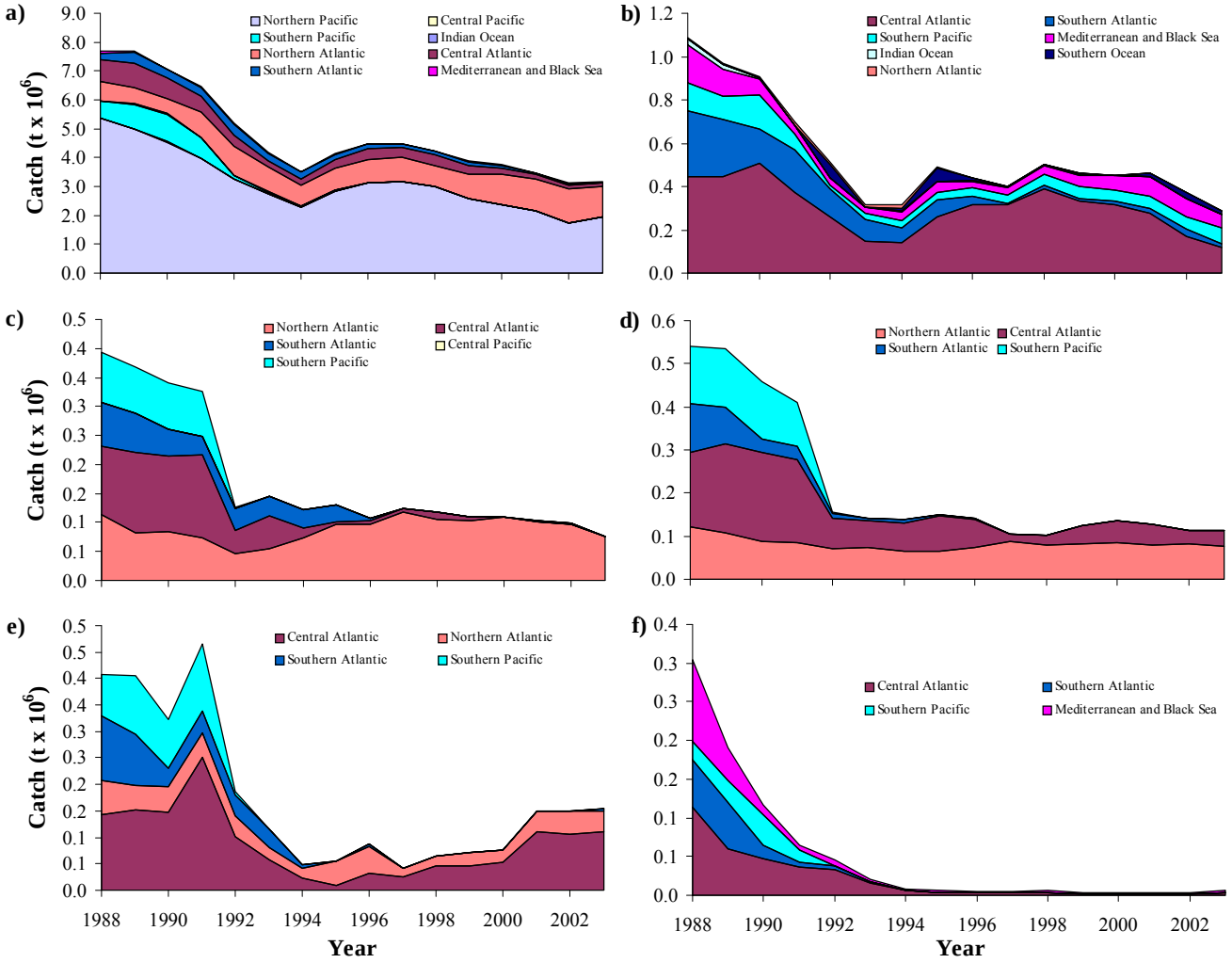

Figure 2. Catch by FAO statistical areas of the constituent republics of the former USSR, as separately reported since 1988 by a) Russian Federation, b) Ukraine, c) Estonia, d) Latvia, e) Lithuania, and f) Georgia.

Materials and Methods

The former USSR reported landings to FAO until 1991; however, separate reporting by its constituent republics (Georgia, Ukraine, Estonia, Latvia, Lithuania and the Russian Federation) commenced in 1988 (Figure 1b). Here, we assumed that, for each FAO statistical area, the distribution of reported landings between the component republics of the former USSR that fished in the first few years of separate reporting in the given FAO area reflected the proportion of total landings by these republics prior to 1988.

Thus, potential changes over time in the scale and size of the fishing industry between component republics in a given FAO area were not considered here.

We used landings data from the online version of FishStat available to us in late 2006 (FAO, 2004), from which we extracted the reported catches of marine taxa (based on the *Sea Around Us* Project [www.seaaroundus.org] commercial taxa database) for the USSR (1950-1991), and for the six component republics (1988-2003). Thus, we excluded freshwater species, marine mammals, algae and other plants. Landings reported by FAO as <0.5 t were assumed to be 0.25 t.

We first examined trends in total reported catch following separate reporting (starting 1988) and calculated the proportion each republic contributed to the total landings in each FAO area, averaged for a five year reference period 1988-1992. We based the proportions to assign to each republic on a period of five years, from 1988-1992, since reported catches immediately following separate reporting may likely be inaccurate. Thus

$$P_{k,l} = \sum_{j=1988}^{j=1992} C_{k,l} \;/\; \sum_{j=1988}^{j=1992} C_k \qquad \ldots 1)$$

where $P_{k,l}$ is the average proportion of catch C in FAO area k reported by republic l in the reference years j (here limited to the reference period 1988-1992). We assumed that catch reported individually by republics only after 1992 constituted a new fishery or new target species that did not reflect catch composition from 1950-1987.

The resulting proportions of catch $P_{k,l}$ per FAO area for each republic are shown in Table 1. Countries whose reported catches accounted for less than 1% of total reported catch per FAO area for all republics combined for the period 1988-1992, were assumed not to have significant fisheries pre-1988 in that area and were excluded from the subsequent disaggregation of pre-1988 catches (note that the proportions for the remaining republics were adjusted to sum to unity).

The same concept was applied at the reported taxon level i as:

$$P_{i,k,l} = \sum_{j=1988}^{j=1992} C_{i,k,l} \;/\; \sum_{j=1988}^{j=1992} C_{i,k} \qquad \ldots 2)$$

Subsequently, the catch CT by taxon i in FAO area k reported by the former USSR in year y (being 1950-1991) was allocated to each constituent republic l by FAO area k as:

$$C_{i,k,l,y} = P_{i,k,l} \times CT_{i,k,y} \qquad \ldots 3)$$

The following exceptions to our basic assumptions and rules applied:

i. For yellowtail flounder (*Limanda ferruginea)* in the Northwest Atlantic (FAO area 21), high landings were reported by three republics only after 1992, and we used these values to calculate republic allocations for USSR landings for this taxon in this area;

ii. Where USSR reporting extended beyond 1987 (i.e., into the early 1990s), the proportions to allocate to each republic were based on the catches for the period from the first year of individual reporting until 1992, and the USSR reported landings after 1987 were assigned to the Russian Federation;

iii. Some taxa reported by the USSR until 1987 disappeared from statistics after 1988. In such cases, the proportions of USSR catch to allocate to individual republics could not be calculated for these individual taxa. Instead, we used the percentage of the total catch each republic reported for that area (formula 1) to disaggregate the USSR data for these taxa; and

iv. USSR landings from the Arctic Sea (FAO area 18) were assigned to the Russian Federation exclusively (see Table 1). Note, however, that landings reported by FAO on behalf of the Russian Federation (and previously the USSR) for FAO area 18 are known to be substantial underestimates, and a correction has been proposed (see Pauly and Swartz, this volume).

Table 1. Sum total catch and proportions of total catch calculated for each republic in each FAO area for the 1988-1992 reference period. Landings of republics shown in bold represent less than 1% of the total catch from that area by all republics and were not allocated any former USSR catches in that FAO area for the 1950-1988 period.

FAO area code	FAO area name	Republic	Total reference period catch 1988-1992 (t)	Proportion of former USSR catch allocated
48	Atlantic, Antarctic	**Latvia**	**0**	**0.000**
		Russian Federation	103,617	0.651
		Ukraine	55,570	0.349
34	Atlantic, Eastern Central	Estonia	569,587	0.081
		Georgia	113,720	0.016
		Latvia	852,750	0.122
		Lithuania	794,814	0.113
		Russian Federation	3,093,377	0.441
		Ukraine	1,587,446	0.226
27	Atlantic, Northeast	Estonia	349,022	0.080
		Latvia	394,423	0.090
		Lithuania	160,817	0.037
		Russian Federation	3,426,332	0.784
		Ukraine	**40,697**	**0.009**
21	Atlantic, Northwest	Estonia	50,779	0.078
		Latvia	75,898	0.116
		Lithuania	83,682	0.128
		Russian Federation	443,484	0.678
		Ukraine	**0**	**0.000**
47	Atlantic, Southeast	Estonia	173,435	0.074
		Georgia	152,289	0.065
		Latvia	142,344	0.061
		Lithuania	192,174	0.082
		Russian Federation	957,875	0.411
		Ukraine	714,842	0.306
41	Atlantic, Southwest	Estonia	86,115	0.075
		Latvia	126,047	0.110
		Lithuania	142,432	0.124
		Russian Federation	507,071	0.441
		Ukraine	289,364	0.251
31	Atlantic, Western Central	Lithuania	368	0.302
		Russian Federation	849	0.698
58	Indian Ocean, Antarctic	Russian Federation	761	0.123
		Ukraine	5,446	0.877
57	Indian Ocean, Eastern	Ukraine	33	1.000
51	Indian Ocean, Western	**Georgia**[a]	**2,191**	**0.020**
		Lithuania	**353**	**0.003**

Table 1. Sum total catch and proportions of total catch calculated for each republic in each FAO area for the 1988-1992 reference period. Landings of republics shown in bold represent less than 1% of the total catch from that area by all republics and were not allocated any former USSR catches in that FAO area for the 1950-1988 period.

FAO area code	FAO area name	Republic	Total reference period catch 1988-1992 (t)	Proportion of former USSR catch allocated
		Russian Federation	47,713	0.437
		Ukraine	59,018	0.540
37	Mediterranean and Black Sea	Georgia	175,268	0.219
		Russian Federation	183,830	0.230
		Ukraine	439,768	0.550
88	Pacific, Antarctic	Russian Federation	0	1.000
77	Pacific, Eastern Central	**Estonia**	**0**	**0.000**
		Lithuania	8,991	0.571
		Russian Federation	6,686	0.425
		Ukraine	**68**	**0.004**
67	Pacific, Northeast	Russian Federation		1.000
61	Pacific, Northwest	Russian Federation	22,409,650	0.999
		Ukraine	**12,248**	**0.001**
87	Pacific, Southeast	Estonia	302,634	0.069
		Georgia	102,039	0.023
		Latvia	471,459	0.108
		Lithuania	387,632	0.088
		Russian Federation	2,673,831	0.610
		Ukraine	444,269	0.101
81	Pacific, Southwest	Estonia	21,346	0.033
		Georgia	**3,110**	**0.005**
		Latvia	34,991	0.053
		Lithuania	26,878	0.041
		Russian Federation	531,346	0.811
		Ukraine	37,888	0.058
71	Pacific, Western Central	Russian Federation	32,382	1.000

[a] Catches of Georgia in the Western Indian Ocean were reported only for 1988 and the country was assumed to have no fisheries there prior to 1988.

RESULTS AND DISCUSSION

Using the method outlined and applied here, we suggest that the disaggregated reported catch for the former USSR and now independent republics may more reliably illustrate the potential contribution each former member of the USSR made to its globally reported catches during the 1950-1991 period (Figure 2). As expected, the Russian Federation dominated total catches throughout the period, with assigned catches peaking at just over 8 million t in the late 1980s (Figure 3a), followed by the Ukraine, whose assigned catches peaked at just over 1 million t (Figure 3b).

We emphasize that the present, assigned landings data are approximate values (by republic) based only on landings reported by FAO on behalf of the former USSR between 1950 and the early 1990s. Thus, these data do not, currently, account for IUU (Illegal, Unreported and Unregulated) catches. The area- and republic-specific catches as derived here for the disaggregated former USSR will be integrated into the spatially allocated global catch database of the *Sea Around Us* Project, and will be available on the project website in 2008 (www.seaaroundus.org). As part of this integration, the presently assigned catches for Estonia for the Baltic Sea (part of FAO area 27) will be corrected based on the previous reconstruction for this area by Ojaveer (1999).

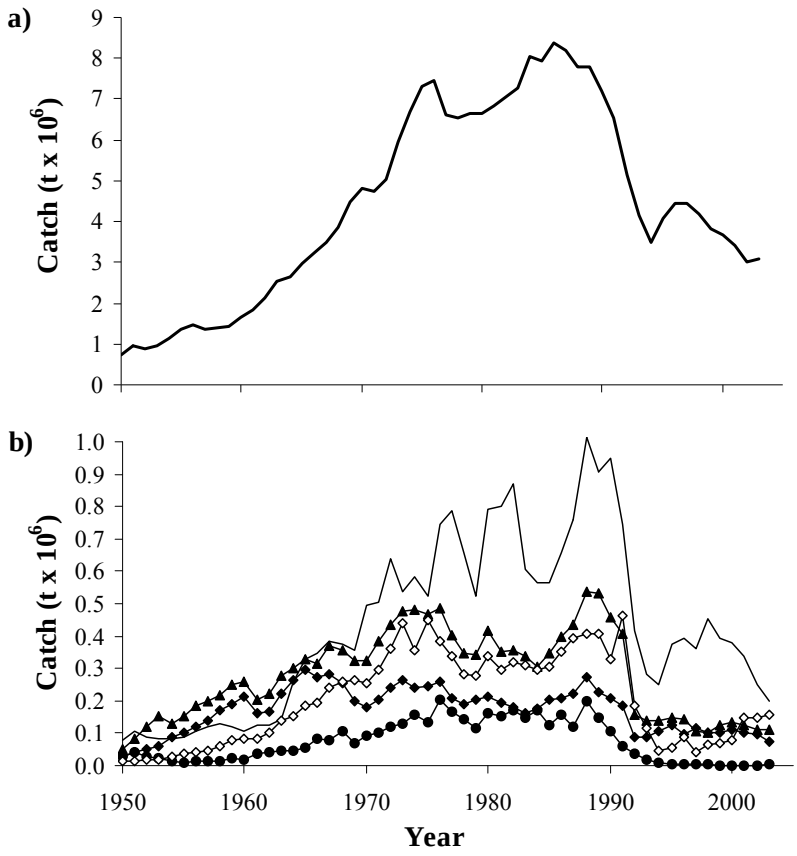

Figure 3. Disaggregated marine fisheries catch for the now independent countries of the former USSR: a) Russian Federation; and b) Lithuania (◊), Latvia (▲), Estonia (♦), Georgia (●), and Ukraine (thin line). Note differences in scale.

As a final note, we emphasize that the present data do not proclaim to be 'true' in terms of republic assignment over time. However, by using our assumption-based allocation approach to assign historic catches to country entities enables full time series to be derived for each now-independent republic of the former USSR. This will permit better evaluation of historic fisheries development and country specific trends in fisheries to be derived and evaluated, using only former USSR data for the pre-1988 period, which is currently not possible. Thus, the data as derived here should be considered as a move towards the likely 'true' country-specific patterns and trends over time.

ACKNOWLEDGEMENTS

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