

Ichthyofauna of the Fresh and Brackish Waters of Russia and Adjacent Areas: Annotated List with Taxonomic Comments.

1. Families Petromyzontidae–Pristigasteridae

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Abstract—A complete annotated list of fresh and brackish waters ichthyofauna of the Russian Federation and adjacent areas, based on a critical analysis of scientific publications of the last 200 years, and on the data of the authors' research, is the aim of this study. The taxonomic composition of the freshwater and brackish water fish fauna of Russia remains insufficiently studied. This may result incorrect data on the true number of fish species of this category, not only for the waters of Russia, but also in the modern system of the world ichthyofauna as a whole, and also does not give a complete idea of the range, degree of endemism, abundance, conservation status, commercial value, and others important aspects. Until the present study, according to various sources, the Russian freshwater and brackish water ichthyofauna was estimated to amount from 351 to 486 species, respectively. However, based on our ongoing research, these numbers are too low and need to be revised. The total species number in all categories should include at least 800 species also including the introduced non-native species, as well as species not yet recorded from Russian waters, but suggested to be found in the future. In this first part of our updated checklist, we provide a basic historical review of ichthyological research in Russia, together with the first 77 species belonging to three classes (Petromyzonti, Elasmobranchii and Actinopteri), ten orders (Petromyzontiformes, Lamniformes, Carcharhiniformes, Squaliformes, Rajiformes, Myliobatiformes, Acipenseriformes, Elopiformes, Anguilliformes and Clupeiformes), nineteen families (Petromyzontidae, Alopidae, Lamnidae, Triakidae, Carcharhinidae, Sphyrnidae, Somniosidae, Squalidae, Rajidae, Arhynchobatidae, Dasyatidae, Acipenseridae, Polyodontidae, Megalopidae, Anguillidae, Muraenesocidae, Clupeidae, Engraulidae and Pristigasteridae) and 38 genera. For each species, the following details are presented: scientific and English common names, taxonomic position with comments and synonyms (if necessary), conservation status, world distribution, zoogeographic characteristics, distribution in Russian waters and adjacent areas, abundance, and commercial value.

Keywords: ichthyofauna, fish, taxonomic overview, annotated list, conservation status, commercial importance, fresh and brackish waters, Russia

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INTRODUCTION

The Russian Federation is the largest country in the world, covering one-eighth of the earth's terrestrial surface, i.e. more than 17 million km², roughly the size of South America. The freshwater systems of Russia include more than 3 million rivers and the same number of lakes. Unique climatic conditions (often

severe, because 65% of the country's territory is subjected to permafrost, having 5–6 snow months, but in some regions, there also are 10–11 winter months), inaccessibility, low population density (e.g. in Siberia), extremely long sea coasts and other important factors have significantly influenced the fish species richness and diversity. The Ural Mountain Range is

part of the conventional boundary between the continents of Europe and Asia.

The first comprehensive systematic study on the Russian fish fauna in the former Russian Empire, both from fresh and marine waters, was performed by the excellent natural scientist Peter Simon Pallas (Pallas, 1814; biography see Svetovidov, 1981), in the third volume of his three-volume publication, entitled “Zoo-graphia Rosso-Asiatica”. Previously, just a few Russian freshwater fish species, mostly salmonids, had been described by the German apothecary Johann Julius Walbaum (Walbaum, 1792; biography see Müller, 1973), based on the Arctic research of Pennant (1784, 1785), such as *Cyprinus carpio caspicus* Walbaum, 1792, *Salmo gorbuscha* Walbaum, 1792, etc. Pallas’s comprehensive study formed a robust background for further research on fishes in the Russian Empire. Only a century later, the efforts were continued by Gratzianov (1907) in his publication “Versuch einer Übersicht der Fische des Russischen Reiches”. Among recent studies, the first book “Nature of Russia: Animal Life. Fishes” by Vasil’eva (1999) included a list of 950 marine and freshwater fish species, and the monograph “Place of Ichthyofauna of Russia in the System of World Fish Fauna” by Romanov (2015) provided brief information on 1450 species from the marine habitats and freshwaters.

The first monographs on the freshwater fishes of the Russian Empire and the former Soviet Union were published by L.S. Berg in the early 20th century, entitled “Fauna of Russia and Adjacent Countries” [Faune de la Russie et des pays limitrophes. Poissons (Marsipobranchii et Pisces)], (e.g., Berg, 1911, 1912, 1914). In 1916, Berg provided generalized information on the entire freshwater ichthyofauna for the first time, and presented it in a separate monograph “Les Poissons des eaux douces de la Russie” [Freshwater Fishes of the Russian Empire], the second, revised edition of this monograph “Freshwater fishes of Russia”. A second edition appeared in 1923, and included 283 species and 95 subspecies. Later, this work was significantly amended and summarized in three fundamental volumes of “Freshwater fishes of the U.S.S.R. and adjacent countries” (Berg, 1948, 1949a, 1949b) with information on 375 species and 153 subspecies of fishes and fish-like vertebrates. For Russia in its current boundaries, monographs were published by a team of authors and edited by Reshetnikov (*Annotirovannyi catalog...*, 1998; *Atlas...*, 2003): “Annotated check-list of cyclostomata and fishes of the continental waters of Russia” (with 351 species in 17 orders, 47 families, and 178 genera from the continental waters of Russia (including estuarine and brackish water fishes) and “Atlas of Russian freshwater fishes” (only 293 species are included, representing 13 orders, 33 families, and 138 genera), and by Bogutskaya and Naseka (2004) “Catalogue of agnathans and fishes of fresh and brackish waters of Russia with comments on nomenclature and taxonomy” (includes 486

species arranged in 18 orders, 43 families, and 175 genera). Some information on freshwater brackish water and anadromous fishes was also provided by Parin and his colleagues (Parin, 2001, 2003; Parin et al., 2002; Evseenko, 2003; Vasil’eva, 2003; Fedorov, 2004), including the recent monograph “Fishes of Russian Seas: annotated catalogue” (Parin et al., 2014), as well as in the “Popular Atlas and Identification Key. Fishes” (Vasil’eva, 2004), which allows identifying about 450 of the most common species. In addition, information on different taxa is presented in the regional reviews of ichthyofauna cited in this work.

Certainly, for such a huge country as Russia, the number of generalizing publications on the composition of ichthyofauna seems to be small. This is due to the fact that traditionally research on freshwater and marine fauna was carried out by different groups of researchers, as well as with a high species diversity of ichthyofauna, which is constantly updated due to the discovery of new alien species and native representatives that deserve description as new taxa. In addition, the number of species included in the lists of freshwater and brackish water faunas is constantly increasing due to environmental changes and ecological shifts in fish. For example, these phenomena led to the appearance in brackish water of a number of Far Eastern fish species, which usually treated as exclusively marine species and are absent in previous reports on freshwater ichthyofauna.

The so-called “marine” fish inhabiting the mouths and lower reaches of rivers, brackish water lagoons, and lakes adjacent to the sea, including examples such as the shark species *Lamna ditropis* Hubbs et Follett, 1947, and pufferfishes of the genus *Takifugu* (Dyldin et al., 2016).

In this study, we combine data collected over the past 200 years to present the comprehensive systematic list of both typical freshwater fishes and brackish water and marine species that occur in the fresh or brackish water bodies of Russia.

MATERIALS AND METHODS¹

This contribution is based mainly on the critical analysis of literature sources (books, publications, dissertations, and reports of research institutes), type catalogues and databases (for example, “Eschmeyer’s Catalog of Fishes” (2021) or “The Global Biodiversity Information Facility” (2021)), as well as materials of our own long-term studies.

It should be mentioned that in the 20th century, Russian systems were used for the classification of fishes, such as Berg (1955), Lindberg (1971), Rass (1983) and others, which are now outdated. Accordingly, the system of higher taxa (classes, orders and

¹ Complete information on the research methodology see: Dyldin et al., 2020.

families) was adopted in accordance with the main modern concepts (Nelson, 2006; Parin et al., 2014; Nelson et al., 2016; *Eschmeyer's Catalog...*, 2021; *Species...*, 2021) with some additions which are discussed. Authorship of the families is following Van der Laan et al. (2014).

Following the previous works (Annotated Catalogue..., 1998; Bogutskaya and Naseka, 2004) on brackish water fish species, we mean not only those species that constantly inhabiting such waters (for example, the Caspian Sea, or brackish coastal lagoons or lakes), but also marine species that enter river estuaries and may occur in completely freshwater habitats.

According to the Venice System for the Classification of Marine Waters According to Salinity, adopted at the International Limnological Congress in 1959 in Venice, the following categories were adopted: freshwater (salinity to 0.5‰), mixohaline or brackish (0.5 to 30.0‰), oligohaline (from 0.51 to 5.0‰), mesohaline (from 5.1 to 18.0‰), polyhaline (from 18.1 to 30.0‰), euhaline, or marine (from 30.1 to 40‰) and hyperhaline, or over-salted (more than 40‰). At the same time, the salinity of the World Ocean, depending on latitude and climate, reaches 32–36‰.

The low salinity ranges from 2 to 18‰ in the Baltic, Black, Azov and Caspian seas. The lowest salinity fluctuated in the Baltic surface waters between 2‰ (the Gulf of Finland) and 9‰ (off the coast of Kaliningrad Region). In the Caspian Sea salinity ranges from 2‰ (in the northern part) to 13‰ (in the southern part). Fluctuation in salinity 11–13‰ was confirmed to the Sea of Azov, 17–18 to 10–12‰ to the Black Sea along the coast in places the confluence of large rivers (salinity grew with water depth). Natural reservoirs with similar salinity (not exceeding 30‰) occur east of the White Sea to the East Siberian Sea. Huge masses of freshwater originating from the largest rivers of Siberia reduce the salinity of the White, Kara, Laptev and East Siberian seas. In summer, the salinity decreases significantly also due to the melting of ice. Thus, the salinity does not exceed 16–22‰ near the coasts, locally near the estuaries of Siberian rivers it is reduced to almost 0‰.

Information on each species is presented as to the follow:

(1) Serial number.

(2) Scientific (Latin) and English (common) names. The scientific name is accompanied by the author(s) and the year of the original description. The English common names follow published works (Lindberg and Gerd, 1972; Lindberg et al., 1980; Kotlyar, 1984; Reshetnikov et al., 1989; Parin et al., 2014), or reputable online sources (Froese and Pauly, 2021).

(3) Zoogeographical characteristics, follow Froese and Pauly (2021) and *Eschmeyer's Catalog...* (2021), including the following categories: Arctic Ocean, North Pacific, Northwestern Pacific, Northeastern

Pacific, Atlantic, Northwestern Atlantic, Northeastern Atlantic, etc., including such general categories as circumpolar, and circumpolar. For freshwater species, the main common (native) distribution regions (e.g., such as Japan, China, and Russia), or river basins (e.g., Amur River basin) are presented. In some cases of a wider distribution, the total area is given as East Asia, Europe, etc.

(4) Ecological groups (marine, brackish water, freshwater, amphidromic and anadromous, the latter also include one catadromous species, so-called residential forms).

(5) Relative abundance (very common, common, rare, or very rare species).

(6) Commercial value, if not specified, then the species is either rare, under protection, or of no interest to the fishery.

(7) Additional taxonomic information for most species is contained in the "Remarks" section.

(8) Conservation status is mentioned following the criteria of IUCN (2003, 2012, 2015, 2019): Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concern, Data Deficient, and Not Evaluated, the Red Book of the Russian Federation (RDBRF, 2021) including the following categories: 0, probably extinct; 1, endangered; 2, reducing in number or distribution; 3, rare; 4, with undefined status; 5, restored and restoring.

The following abbreviations were used: *—not recorded from Russian waters, but known from adjacent areas; ?— taxonomic status or identification doubtful or the range is not clear; i—introduced species; #—new record for the freshwater and brackish water ichthyofauna of Russia, are not recorded by Berg (1948, 1949a, 1949b), *Annotated Catalogue...* (1998), *Atlas...* (2003), or Bogutskaya and Naseka (2004); An.— anadromous species; Ct.—catadromous species; Mr.—marine species; Br.—brackish water species; Fr.—freshwater species; Rs.—residential form; Am.—amphidromic species; Enc.—endemic species (exclusively occurring in Russian waters); ICZN—International Code of Zoological Nomenclature; RDBRF—Red Book of the Russian Federation.

It should be noted that we have not included in this list alien species used in aquaculture or aquarium fish which have never been found in natural waters of Russia. This part would include the species: (1) Adriatic sturgeon *Acipenser naccarii* Bonaparte, 1836, included in the Catalogue of Russian fishes by Bogutskaya and Naseka (2004), which was tried unsuccessfully to use only in aquaculture; (2) *Acipenser fulvescens* Rafinesque, 1817, a native of North America, was noted by Holčík (1991) as an introduced species, but an attempt to use it in aquaculture was unsuccessful, and it was not noted either in aquaculture or outside fish farms in Russia.

TAXONOMIC LIST

I. CLASS **PETROMYZONTI**—Lampreys1. ORDER **PETROMYZONTIFORMES** Berg, 1940—Lampreys1. Family **PETROMYZONTIDAE** Bonaparte, 1831—Northern lampreys1. Genus **CASPIOMYZON** Berg, 1906

1. (An.) *Caspiomyzon wagneri* (Kessler, 1870)—Caspian lamprey. Endemic species in the Caspian Sea basin, migrating to Sefidrud, Shirinrud, Kheyroud, etc. in southern part of the sea, and in Russian water migrating into Ural and Volga rivers for spawning; larvae also occurring in these river systems (Zavialov et al., 2006; Bogutskaya et al., 2013; Jouladeh-Roudbar et al., 2020; Orlov et al., 2021a). Currently, it is regularly observed in the Terek River tributaries (Sunzha, Argun and Dzhalka rivers) (Orlov et al., 2021a). Anadromous. Rare. Historically, before the construction of the Volgograd reservoir (1958–1961), this species was commercially used (Gratzianov, 1907; Berg, 1948; *Promyslovye ryby...*, 1949; Orlov et al., 2021a).

Remarks. Considered as on the verge of extinction in territorial waters of Russia (Zavialov et al., 2006; Bogutskaya et al., 2013), possibly except for the Terek River basin (Orlov et al., 2021a).

Conservation status: IUCN (Near Threatened, 2008)/RDBRF (category 2).

2. Genus **ENTOSPHEMUS** Gill, 1862

2. (An., Rs.) *Entosphenus tridentatus* (Richardson, 1837)—Pacific lamprey. North Pacific and adjacent Arctic Ocean. Russia: in the Sea of Okhotsk from off southwestern Kamchatka to central part and in the Bering Sea northwards to Cape Navarin, including eastern Kamchatka, Commander Islands and Pacific side of Kurils (Sheiko and Fedorov, 2000; Shuntov et al., 2003; Orlov et al., 2008; Ivanov and Sukhanov, 2010; Parin et al., 2014; Orlov and Baitaliuk, 2016); probably also southern Sea of Okhotsk and eastern part of Sakhalin Island (Lindberg and Legeza, 1959; Orlov, 2012). Anadromous, capable of lengthy feeding and spawning migrations (Murauskas et al., 2019; Orlov et al., 2020), freshwater (in Canada and USA, present as a landlocked forms). Common in Bering Sea (Orlov and Baitaliuk, 2016). Not used in fishery in Russia.

Conservation status: IUCN (Not Evaluated).

3. Genus **EUDONTOMYZON** Regan, 1911

3. (Fr.) *Eudontomyzon mariae* (Berg, 1931)—Ukrainian brook lamprey. Drainages of Baltic, Black, Azov, Mediterranean and Caspian seas (Berg, 1948, as *Lampetra mariae*; Holčík and Šorić, 2004; Levin and Holčík, 2006; *Krasnaya kniga...*, 2007; Luzhnyak, 2010; Renaud, 2011; Ivanchev et al., 2013; Vasil'eva

and Luzhnyak, 2013; Parin et al., 2014; Sarycheva et al., 2014; Çiçek et al., 2015). Russia: in the basins of the Dnieper, Don, Kuban and Volga rivers, including rivers of the western Caucasus flowing into the Black Sea (Berg, 1948; *Krasnaya kniga...*, 2007; Vasil'eva and Luzhnyak, 2013; Sarycheva and Sarychev, 2013; Sarycheva et al., 2014; Levin et al., 2016). Freshwater. Rare, except locally common.

Remarks. The current distribution limits for this species require further study (Levin et al., 2016), due to the possible wider dispersion in the Caspian Sea basin. Levin and Holčík (2006), Šanda and Vukić (2009) and Hanel et al. (2009, 2015) believed that taxa *Eudontomyzon vladkovi* Oliva et Zanandrea, 1959 and *E. stankokaramani* Karaman, 1974 are two separate species, but they are recently synonymised with *E. mariae* (e.g., Naseka et al., 2009; Renaud, 2011).

Conservation status: IUCN (Least Concern, 2011)/RDBRF (category 2, for populations of the Black Sea rivers of Krasnodar Krai).

4. Genus **LAMPETRA** Bonnaterre, 1788

4. (An., Rs.) *Lampetra fluviatilis* (Linnaeus, 1758)—European river lamprey. Northeastern Atlantic, North, Baltic, and Mediterranean seas, including their drainage systems. Russia: Baltic Sea in Neva, Luga and Narva rivers, also Lake Onega and some tributaries of Lake Ladoga, as well as rivers of Kaliningrad Region, including Neman River; was found in Volga (Berg, 1948; *Atlas...*, 2003; Vasil'eva and Sotnikov, 2004; Pervozvanskii et al., 2010; Parin et al., 2014; Chernova, 2014). Anadromous, freshwater, in some lakes of Scotland, Finland and Russia also as residential forms. Common, with little importance to fisheries.

Conservation status: IUCN (Least Concern, 2011).

5. *(Fr.) *Lampetra lanceolata* Kux et Steiner, 1972—Turkish brook lamprey. Southern Black Sea basin of Anatolia, Turkey, at Trabzon and in Lake Sapanca basin (Fricke et al., 2007; Freyhof, 2014; Gözler et al., 2011; *Eschmeyer's Catalog...*, 2021). Not yet recorded from Russia, but thought to occur in some tributaries of the Caucasian coast of the Black Sea (Bogutskaya and Naseka, 2004). Freshwater.

Remarks. If *L. ninae* is conspecific with this species (see below), its distribution should be included in the range of *L. lanceolata*.

Conservation status: IUCN (Endangered, 2014)

6. # (Fr.) *Lampetra ninae* (Naseka, Tuniyev et Renaud, 2009)—Western Transcaucasian brook lamprey. Western Transcaucasia in the Psezuapse, Shakhe, Mzymta, Psou, Bzyb' and Mokva rivers, Russia and Abkhazia (Naseka et al., 2009; Renaud, 2011; Tuniyev et al., 2016); Georgia (Kuljanishvili et al., 2020). Freshwater. Clarification of current

abundance needs additional investigation, but probably rare.

Remarks. According to a recent phylogenetic study based on mtDNA *COI* barcoding (Tutman et al., 2017) *Lampetra ninae* is probably a junior synonym of *Lampetra lanceolata*.

Conservation status: IUCN (Near Threatened, 2014)/RDBRF (category 2, included in *Eudontomyzon mariae*).

7. (Fr.) *Lampetra planeri* (Bloch, 1784)—European brook lamprey. Drainages of North, Baltic, Caspian (probably, as invasion species) and Mediterranean seas south to southern Italy (Berg, 1948; *Atlas...*, 2003; Kottelat and Freyhof, 2007; Sperone et al., 2019; Zvezdin et al., 2021). Russia: only occurs in the Volga basin (from the upper to the middle reaches), where it probably entered from the Baltic Sea (after canal construction), as an invasive species (Berg, 1948; Zvezdin et al., 2021); in the Baltic Sea basin, it is distributed in rivers of Kaliningrad Region and Gulf of Finland, as well as in Ilmen, Ladoga and Onega lakes basins (Berg, 1948; *Atlas...*, 2003; Vasil'eva, 2004; Korolyev and Reshetnikov, 2008; Ivanchev and Ivancheva, 2010; Kolotey et al., 2020; Zvezdin et al., 2021). Freshwater. Not numerous, but in some places it may be common, e.g., in the upper reaches of the Oka River (above the city of Kaluga) (Korolyev and Reshetnikov, 2008; Ivanchev and Ivancheva, 2010).

Remarks. Interspecific mating and the taxonomic status of *L. fluviatilis* and *L. planeri* ("pair species") repeatedly discussed in recent decades (Huggins et al., 1970; Schreiber and Engelhorn, 1998; Espanhol et al., 2007; Staponkus and Kesminas, 2014; Makhrov and Popov, 2015; Kucheryavyy et al., 2017; etc.).

Conservation status: IUCN (Least Concern, 2011).

5. Genus *LETHENTERON* Gray, 1851

8. (An., Rs.) *Lethenteron camtschaticum* (Tilesius, 1811)—Arctic lamprey. North Pacific, Arctic and adjacent Northeastern Atlantic. Russia: from Murman coast (Kola Peninsula) and White Sea basin east to Ob River (to Novosibirsk reservoir, see Zhuravlev, 2003) and Yenisei River, also in the Lena River drainage (as a residential form, see: Kirillov and Knizhin (2014)), and from Anadyr River to Kamchatka, on the Asian coast to southern Primorskii Krai, including entire Sakhalin and southern Kurils (Berg, 1948; Shedko, 2002; Chereshev, 2008; Pervozvansky et al., 2010; Makhrov et al., 2013; Orlov et al., 2014; Parin et al., 2014; Dyldin and Orlov, 2016; Orlov and Baitaliuk, 2016; Zadelenov et al., 2020; Dyldin et al., 2020). Anadromous, with residential forms in freshwater. Common, locally very common, but of minor importance to fisheries, e.g., in Amur River (Dyldin and Orlov, 2016).

Remarks. The hypothesis on conspecificity of two nominal species—*L. camtschaticum* and *Lampetra ninae*—was presented by Artamonova et al. (2011b) based on molecular studies on Caucasian lampreys.

Conservation status: IUCN (Least Concern, 2013).

9. (Fr.) *Lethenteron kessleri* (Anikin, 1905)—Siberian brook lamprey. Arctic Ocean and North Pacific. Russia: probably only in Ob-Irtysh basin and in some others rivers of Western Siberia (Zhuravlev, 2003; Dyldin and Orlov, 2016; Romanov et al., 2017; Zhuravlev and Lomakin, 2017; also see note by Dyldin et al., 2019). Freshwater. Rare.

Remarks. This is a controversial species (see: Naseka and Renaud, 2020), and it is necessary to distinguish a lectotype from the surviving syntypes in Tomsk State University (Dyldin et al., 2019). Some of genetic studies (Yamazaki et al., 2006; Lang et al., 2009; Artamonova et al., 2011a) did not reveal any distinctions between *Lethenteron kessleri* and *L. reissneri*; data on their difference from *L. camtschaticum* are contradictory; thus *L. kessleri* was included in synonymy of *L. reissneri* by Parin et al. (2014). Further research is needed, as well as carrying out genetic and morpho-biological studies of this species with sister taxa *L. reissneri* and *L. camtschaticum* from their type locality.

Conservation status: IUCN (Not Evaluated).

10. (Fr.) *Lethenteron reissneri* (Dybowski, 1869)—Far Eastern brook lamprey. River basins of the Pacific and adjacent areas of the Arctic Ocean. Russia: drainages of Japan, Okhotsk and Bering seas, in Chukotka to Anadyr and Kamchatka, and along Asian coast to southern Primorskii Krai, as well as Amur River (including Khanka Lake), Sakhalin and Kuril islands (Berg, 1948; Shedko, 2002; Bugaev et al., 2007; Chereshev, 2008; Dyldin and Orlov, 2016, 2021). Freshwater. Common, but locally rare.

Remarks. According to Yamazaki and Goto (1996, 1998) and Yamazaki (2002), the taxon *L. reissneri* probably includes two new species in the southern part of Korean Peninsula, and Hokkaido and Honshu islands (Japan). According to genetic data (Kucheryavyy et al., 2007; Artamonova et al., 2011a, 2015; Nazarov et al., 2011, 2013), the lampreys *L. reissneri* and *L. kessleri* are ecological forms of *L. camtschaticum*. This opinion was not accepted by Renaud and Naseka (2015), also see note by Dyldin and Orlov (2016), Dyldin et al. (2019).

Conservation status: IUCN (Least Concern, 2008).

6. Genus *PETROMYZON* Linnaeus, 1758

11. (An., Rs.) *Petromyzon marinus* Linnaeus, 1758—Sea lamprey. North Atlantic and adjacent Arctic Ocean. Russia: Baltic Sea drainage, including Gulf

of Finland and Gulf of Gdansk, entering rivers, e.g., Narva, Neman, Zapadnaya Dvina, as well as in Barents Sea (Berg, 1948; Dolgov, 2006; *Promyslovye ryby...*, 2006; Karamushko et al., 2009; Tylik, 2010; Dolgov, 2011; *Checklist ...*, 2012; Parin et al., 2014; Chernova, 2014; Novikov and Kharlamova, 2018; Dyldin et al., 2020). Anadromous, freshwater (residential form in some lakes of North America). Rare in Russian waters in the past (Berg, 1948), currently also rare.

Conservation status: IUCN (Least Concern, 2013)/RDBRF (category 4).

II. CLASS ELASMOBRANCHII—Sharks and batoids

2. ORDER LAMNIFORMES Garman, 1885—Mackerel sharks

2. Family ALOPIIDAE Bonaparte, 1835—Thresher sharks

7. Genus *ALOPIAS* Rafinesque, 1810

12. # * (Mr., Br.) *Alopias vulpinus* (Bonnaterre, 1788)—Thintail thresher. Circumglobal in temperate and cold waters. Not found in Russian waters (Parin et al., 2014; Dyldin, 2015), but probably in southern Sakhalin Island, including Aniva Bay (Dyldin and Orlov, 2018; Dyldin et al., 2021). Record closest to Sakhalin in 2004 from southern Sea of Okhotsk off Hokkaido, Japan; also known from the Sea of Japan (Shinohara et al., 2014; Dyldin et al., 2021). Marine, brackish water.

Conservation status: IUCN (Vulnerable, 2019).

3. Family LAMNIDAE Bonaparte, 1835—Mackerel sharks

8. Genus *CARCHARODON* Smith, 1838

13. # (Mr., Br.) *Carcharodon carcharias* (Linnaeus, 1758)—Great white shark. Nearly circumglobal, but mostly in temperate seas. Russia: in southern part of Sea of Okhotsk and Sea of Japan, including Peter the Great Bay, and Sakhalin Island (found near mouth of Uryum River, Aniva Bay), and alongside of Kurils (Sokolovskaya et al., 1998; Ivanov and Sukhanov, 2002; Sokolovskii et al., 2007, 2011; Velikanov, 2010; Dolganov, 2012; Parin et al., 2014; Dyldin, 2015; Dyldin and Orlov, 2018, 2021); potentially the Pacific and Bering coast of Kamchatka (Berg, 1911; Nakano and Nakaya, 1987; Sheiko and Fedorov, 2000). Marine, brackish water. Classified as a rare species in Russian waters (only observations of individual specimens in warmer years).

Conservation status: IUCN (Vulnerable, 2019).

9. Genus *LAMNA* Cuvier, 1816

14. # (Mr., Br.) *Lamna ditropis* Hubbs et Follett, 1947—Salmon shark. North Pacific. Japan (from Pacific coast of Hokkaido), in Okhotsk and Bering seas, and on North American side from Gulf of Alaska and British Columbia (Canada) to central Baja California, Mexico. Russia: Japan, Okhotsk and Bering seas, including Sakhalin Island and along Pacific coasts of Kurils and Kamchatka (Lindberg and Legeza, 1959; Eschmeyer and Herald, 1983; Amaoka et al., 1989; Blagoderov, 1993; Sheiko and Fedorov, 2000; Mecklenburg et al., 2002; Love et al., 2005, 2021; Chereshevnev et al., 2005; Sokolovskii et al., 2007, 2011; Parin et al., 2014; Dyldin and Orlov, 2016, 2018, 2021). Marine, brackish water; occurs in estuaries and lower reaches of some rivers flowing into Sea of Japan, and along the coast of Primorskii Krai (Dyldin and Orlov, 2016, 2018). Common. Subject to special fishery; sometimes caught as bycatch. Minor fishing to the middle of the 20th century in Primorye, Sea of Japan (*Promyslovye ryby...*, 1949).

Conservation status: IUCN (Least Concern, 2019).

3. ORDER CARCHARHINIFORMES Garman, 1913—Ground sharks

4. Family TRIAKIDAE Gray, 1851—Hound sharks

10. Genus *TRIAKIS* Müller et Henle, 1838

15. # (M., Br.) *Triakis scyllium* Müller et Henle, 1839—Banded hound shark. Northwestern Pacific. Russia: southern Kurils, coast of Primorskii Krai (Sea of Japan) and probably southern part of Sakhalin Island (Gubanov, 1993; Parin et al., 2014; Dyldin, 2015; Dyldin and Orlov, 2018; Rigby et al., 2021). Marine, brackish water, enters estuaries (is tolerant of reduced salinities) (Rigby et al., 2021). Very rare.

Conservation status: IUCN (Endangered, 2021).

5. Family CARCHARHINIDAE Jordan et Evermann, 1896—Requiem sharks

11. Genus *CARCHARHINUS* Blainville, 1816

16. # (Mr., Br.) *Carcharhinus brachyurus* (Günther, 1870)—Copper shark. In nearly all temperate, subtropical and tropical seas. Russia: Peter the Great Bay, the Sea of Japan (Lindberg and Legeza, 1959; Sokolovskii et al., 2007, 2011; Parin et al., 2014; Dyldin, 2015). Marine, brackish water, enters lower course of large rivers (Dyldin et al., 2018; Huvneers et al., 2020). Rare.

Conservation status: IUCN (Vulnerable, 2020).

17. # (Mr., Br.) *Carcharhinus japonicus* (Temminck et Schlegel, 1850)—Indo-Pacific sandbar shark. Northwestern Pacific, in tropical and temperate waters. Russia: Peter the Great Bay in Sea of Japan,

and most likely off southwestern Sakhalin Island (Lindberg and Legeza, 1959; Sokolovskii et al., 2007, 2011; Parin et al., 2014 (as *C. plumbeus*); Dyldin, 2015; Dyldin and Orlov, 2016, 2018, 2021). Marine, brackish water. Very rare.

Remarks. According to recent molecular studies, western Atlantic populations of *C. plumbeus* (Nardo, 1827) *sensu stricto* are distinct from the Indo-Pacific ones, and the name *C. japonicus* should be restored for the latter (Naylor et al., 2012; Ebert et al., 2013; Dyldin et al., 2020).

Conservation status: IUCN (Endangered, 2021, for *C. plumbeus*).

12. Genus *RHIZOPRIONODON* Whitley, 1929

18. # * (M., Br.) *Rhizoprionodon acutus* (Rüppell, 1837)—Milk shark. Circumglobal in tropical to temperate seas. Russia: probably in southeastern Sakhalin Island (Dyldin and Orlov, 2018; Dyldin et al., 2018, 2021). Closest record to Sakhalin from southern Sea of Okhotsk (Ueno, 1971, as *Scoliodon walbeehmi*; Nagasawa and Torisawa, 1991); also recorded from the Sea of Japan (Shinohara et al., 2014). Marine, brackish water, occasionally recorded from estuaries (Rigby et al., 2020).

Conservation status: IUCN (Vulnerable, 2020).

6. Family *SPHYRNIDAE* Bonaparte, 1840— Hammerhead sharks

13. Genus *SPHYRNA* Rafinesque, 1810

19. # (Mr., Br.) *Sphyrna zygaena* (Linnaeus, 1758)—Smooth hammerhead. Probably circumglobal, but mostly in temperate and tropical waters. Russia: from coast of Peter the Great Bay north to Tatar Strait in Sea of Japan, also Sea of Okhotsk (Lindberg and Legeza, 1959; Sokolovskaya et al., 1998; Sokolovskii et al., 2007, 2011; Parin et al., 2014; Dyldin, 2015; Dyldin and Orlov, 2018, 2021; Rigby et al., 2019); recorded from the Black Sea, can be found off Russian coasts (Parin et al., 2014). Marine, brackish water, entering lower reaches of rivers (Rigby et al., 2019). Very rare.

Conservation status: IUCN (Vulnerable, 2019).

4. ORDER *SQUALIFORMES* Goodrich, 1909—Dogfish sharks

7. Family *SOMNIOSIDAE* Jordan 1888— Sleeper sharks

14. Genus *SOMNIOSUS* LeSueur, 1818

20. # (Mr., Br.) *Somniosus microcephalus* (Bloch et Schneider, 1801)—Greenland shark. Northern and southern parts of Atlantic including Arctic. Russia: in the Barents (including Franz Josef Land), White,

Kara (Kara and Baydaratskaya bays) and Laptev seas (Andriashev, 1954; *Promyslovye ryby...*, 2006; Dolgov, 2013; Parin et al., 2014; Dyldin, 2015; Chernova et al., 2015; Meckenburg et al., 2018; Dolgov et al., 2018; Orlov et al., 2021d). In winter and spring, this species approaches the shores entering shallow water bays (Dolgov, 2011; Rusyaev and Orlov, 2013; Orlov et al., 2021d). Marine, brackish water. Common, but in the White, Kara, and Laptev seas is rare. Previously in the Barents Sea was a subject of fisheries (Orlov et al., 2021d), now is caught as bycatch but is not commercially important (Dolgov, 2011).

Conservation status: IUCN (Near Threatened, 2015).

8. Family *SQUALIDAE* Blainville, 1816—Dogfish sharks

15. Genus *SQUALUS* Linnaeus, 1758

21. # (Mr., Br.) *Squalus acanthias* Linnaeus, 1758—Piked dogfish. Atlantic and adjacent Arctic Ocean, but not in tropical areas. Russia: in Black and Azov seas (Atlantic), also in Barents and White seas (Arctic Ocean) (Berg, 1911; Andriashev, 1954; Svetovidov, 1964; Dolgov, 2006, 2011; Vasil'eva, 2007; Diripasko et al., 2011; Vasil'eva and Luzhnyak, 2013; Ebert and Stehmann, 2013; Parin et al., 2014; Dyldin, 2015; Boltachev and Karpova, 2017). Marine, brackish water, rarely found in Sea of Azov, where the salinity is 11–13‰, but regularly in Black Sea at a salinity of 17–18‰. Common. Often caught as bycatch, but not important for fishery.

Remarks. A separate subspecies *Squalus acanthias ponticus* Myagkov et Kondyurin, 1986 was described from the Black Sea, but the subspecies is usually not recognised as valid, e.g., by Vasil'eva (2007), Parin et al. (2014).

Conservation status: IUCN (Vulnerable, 2020).

22. # (Mr., Br.) *Squalus suckleyi* (Girard, 1855)—North Pacific spiny dogfish. North Pacific and adjacent Arctic Ocean. From Korean Peninsula, Japan and Sakhalin Island north to the Chukchi Sea (Alaska) and Gulf of Anadyr (Russia), and along Commander-Aleutian chain and Pacific coast of North America to southern part of Baja California, Mexico (Schmidt, 1904; Ebert et al., 2010; Orlov et al., 2012a, 2012b; Parin et al., 2014; Dyldin and Orlov, 2018, 2021; Dyldin et al., 2018; Love et al., 2021). Marine, brackish water. Found in estuaries of rivers and brackishwater lagoons of Sakhalin Island and Primorskii Krai. Common. Not targeted in Russia by commercial fishery.

Conservation status: IUCN (Least Concern, 2016).

5. ORDER **RAJIFORMES** Müller et Henle, 1841—Skates

9. Family **RAJIDAE** de Blainville, 1816—Skates

16. Genus **AMBLYRAJA** Malm, 1877

23. # (Mr., Br.) *Amblyraja radiata* (Donovan, 1808)—Thorny skate. North Atlantic and adjacent Arctic Ocean. Russia: in the Barents, White and northern Kara seas (Berg, 1911; Andriashev, 1954; Dolgov, 1997, 2011, 2013; *Promyslovye ryby...*, 2006; Dolgov et al., 2013, 2018; Parin et al., 2014; Dyldin, 2015); Baltic Sea including Gulf of Gdansk (*Checklist...*, 2012). Marine, brackish water; known from Baltic Sea, where the salinity (Gulf of Gdansk) only reaches 9‰. Common. Often caught as bycatch in the Barents Sea, usually discarded (only part of the catch is used, see Dolgov, 2011).

Conservation status: IUCN (Vulnerable, 2020).

17. Genus **BERINGRAJA** Ishihara, Treloar, Bor, Senou et Jeong, 2012

24. # (Mr., Br.) *Beringraja pulchra* (Liu, 1932)—Mottled skate. Northwestern Pacific. Russia: southern Okhotsk and Japan seas, including southern Kuril and Sakhalin islands (Lindberg and Legeza, 1959; Sokolovskii et al., 2007, 2011; Dolganov, 2010; Parin et al., 2014, as *Raja pulchra*; Dyldin and Orlov, 2018, 2021; Dyldin et al., 2018; Dulvy et al., 2020). Marine, brackish water. Common. Not targeted by commercial fisheries.

Remarks. According to Ishihara et al. (2012), this species has been placed in genus *Beringraja*, based on the results of morphological and genetic analyses (Last et al., 2016a).

Conservation status: IUCN (Endangered, 2020).

18. Genus **RAJA** Linnaeus, 1758

25. # (Mr., Br.) *Raja clavata* Linnaeus, 1758—Thornback skate. Eastern Atlantic and adjacent Arctic Ocean. Russia: Azov and Black seas (Svetovidov, 1964; Vasil'eva, 2007; Diripasko et al., 2011; Vasil'eva and Luzhnyak, 2013; Dyldin, 2015, as *Malacoraja clavata*; Boltachev and Karpova, 2017). Marine, brackish water. Common. Minor importance for fishery in the Black Sea.

Conservation status: IUCN (Near Threatened, 2016).

10. Family **ARHYNCHOBATIDAE** Fowler, 1934—Softnose skates

19. Genus **ARCTORAJA** Ishiyama, 1958

26. # (Mr., Br.) *Arctoraja smirnovi* (Soldatov et Pavlenko, 1915)—Smirnov's skate. Northwestern Pacific. Russia: southern Okhotsk and Japan seas,

including Peter the Great Bay, Tatar Strait, southern Sakhalin Island and Kurils (Lindberg and Legeza, 1959; Orr et al., 2011; Dyldin, 2015; Dyldin and Orlov, 2018, 2021). Marine, brackish water. Common.

Remarks. Some authors (Orr et al., 2011) placed this species in the subgenus *Arctoraja*, while others (Dyldin, 2015; Dyldin and Orlov, 2018, 2021; Dyldin et al., 2018) classified it in genus *Arctoraja*. Formerly, it was usually included in the genera *Breviraja*, *Raja* (Schmidt, 1904; Lindberg and Legeza, 1959) or *Bathyraja* (*Fishes of Japan...*, 2002; Parin et al., 2014; Weigmann, 2016; Last et al., 2016a; Misawa et al., 2020).

Conservation status: IUCN (Near Threatened, 2020).

6. ORDER **MYLIOBATIFORMES** Compagno, 1973—Stingrays

11. Family **DASYATIDAE** Jordan et Gilbert, 1879—Whiptail stingrays

20. Genus **HEMITRYGON** Müller et Henle, 1838

27. # (Mr., Br.) *Hemistrygon akajei* (Müller et Henle, 1841)—Red stingray. Northwestern Pacific. Russia: coast of Primorskiy Krai, Sea of Japan (Berg, 1911, as *Trygon akajei*; Lindberg and Legeza, 1959; Sokolovskaya et al., 1998; Sokolovskii et al., 2007, 2011; Parin et al., 2014, as *Dasyatis akajei*; Dyldin, 2015). Marine, brackish water, e.g. the mouth of Kamo River, Hiroshima, Japan (Nitta and Nagasawa, 2015). Rare.

Remarks. This species has usually been placed in the genus *Dasyatis* (see Weigmann, 2016), but was recently transferred to *Hemistrygon* (Last et al., 2016b).

Conservation status: IUCN (Near Threatened, 2021).

21. Genus **DASYATIS** Rafinesque, 1810

28. # (Mr., Br.) *Dasyatis pastinaca* (Linnaeus, 1758)—Common stingray. Eastern Atlantic and southwestern Indian Ocean. Russia: Black and Azov seas (Svetovidov, 1964; Vasil'eva, 2007; Diripasko et al., 2011; Vasil'eva and Luzhnyak, 2013; Dyldin, 2015; Boltachev and Karpova, 2017). Marine, brackish water. Common, caught as bycatch in Russian waters.

Conservation status: IUCN (Vulnerable, 2021).

III. CLASS **ACTINOPTERI**—Ray-finned fishes

7. ORDER **ACIPENSERIFORMES** Berg, 1940—Sturgeons

12. Family **ACIPENSERIDAE** Bonaparte, 1831—Sturgeons

22. Genus **ACIPENSER** Linnaeus, 1758

29. (An., Rs.) *Acipenser baerii* Brandt, 1869—Siberian sturgeon. Siberian rivers from upper Ob River to

Indigirka River and middle Kolyma River, including Baikal and Zaisan lakes (Berg, 1948; Sokolov and Vasil'ev, 1989a; Zhuravlev, 2003; Kirillov et al., 2008; Koposov and Chekaldin, 2009; Matveev et al., 2009; Zadelenov, 2015; Romanov et al., 2017; Dolgov et al., 2018; Zadelenov et al., 2020; Orlov et al., 2021b); documented in 2005 (two specimens) in lower and middle parts of Pechora River (Zakharov et al., 2007); as a result of aquaculture, some specimens have been recorded in the Baltic Sea (Parin et al., 2014). Anadromous with residential form, like for example in the upper Ob River (Zhuravlev, 2003). In the past, before the 1950s, it was targeted by commercial fisheries in large rivers of Siberia (e.g., Ob and Yenisei), but currently, the remaining populations are low in abundance (Zhuravlev, 2003; Zadelenov, 2015; Zadelenov et al., 2020); the object of aquaculture.

Remarks. This species is considered as either monotypical (Ruban, 1997, 1999), or are including 3–4 subspecies: *A. baerii baerii* Brand, 1869—Ob River sturgeon (Ob and Irtysh rivers systems), *A. baerii stenorrhynchus* Nikolskii, 1896—sharpnosed sturgeon (in rivers of Siberia from Indigirka to Kolyma, including southern Taimyr Peninsula), *A. baerii baicalensis* Nikolskii, 1896—Baikal sturgeon (Lake Baikal and its large tributaries of Selenga and Barguzin), and *A. baerii chatys* Drjagin, 1984—Yakut sturgeon or chatys (in rivers systems of Yakutia (Lena, Indigirka and Kolyma) flowing into Laptev and East-Siberian seas)). The taxonomic status of these subspecies needs additional investigations (Zadelenov, 2015; Dyldin et al., 2020; Zadelenov et al., 2020; Orlov et al., 2021b).

Conservation status: IUCN (Endangered, 2010)/RDBRF (category 2, with the exception of populations of Lena River basin).

30. * (An.) *Acipenser colchicus* Marti, 1940—Colchian sturgeon. Southeastern Black Sea basin, Rioni and Inguri rivers, including the small rivers Hopi, Supsa and Okum; lower Danube River (Marti, 1940; Movchan, 1967; Kottelat and Freyhof, 2007); this species was recorded from the Russian part of the Black Sea coast of Krasnodar Krai (Dyldin et al., 2020). Anadromous.

Remarks. According to Berg (1948), Svetovidov (1964), Pavlov (1980) and others, this taxon was treated as a subspecies *Acipenser gueldenstadti colchicus* Marti, 1940, with the vernacular name Black–Azov sturgeon.

It was also included in the species *Acipenser persicus* Borodin, 1897, as a subspecies *A. persicus colchicus* by Artyuhin and Zarkua (1986), *Annotated Catalogue...* (1998), *Atlas...* (2003), Khodorevskaya et al. (2007), Guchmanidze (2009), synonymised with *A. gueldenstaedtii* Brandt et Ratzeburg, 1833 by Kottelat (1997), or with *A. persicus* by Bogutskaya and Naseka (2004) and Kuljanishvili et al. (2020), or treated as a separate, valid species (Kottelat and Freyhof, 2007; Hanel et al., 2009; Bogutskaya et al., 2013).

To the present date, the Colchian sturgeon has practically not been studied from a genetic point of view. The results of various investigations allow us to consider it as an independent taxon. Its distribution in the Black Sea basin requires further research (Vasil'eva and Vasil'ev, 2021).

Conservation status: IUCN (Not Evaluated); we consider the species as Critically Endangered, but many Black Sea populations are Extinct in the Wild.

31. (An., Rs.) *Acipenser gueldenstaedtii* Brandt et Ratzeburg, 1833—Russian sturgeon. Historically in the Caspian, Black and Azov seas and their basins (Berg, 1948; Lebedev et al., 1969; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; Vlasenko et al., 1989a; Fricke et al., 2007; Vasil'eva, 2007; Diripasko et al., 2011; Bogutskaya et al., 2013). In the Caspian Sea, the natural reproduction today occurs only in the Volga and Ural rivers (Matishov et al., 2010). In the Black Sea, the so called autumn race of the species used to migrate regularly up the Danube to Bratislava. Until 1939, this sturgeon occurred in the lower part of the Morava River up to Suhograd (Baruš and Oliva, 1995). Specimens from aquaculture are recently recorded in the Baltic Sea (Parin et al., 2014). An anadromous species, but in the past known from the Volga and Ural rivers as a residential form (Nikolskii, 1950).

Remarks. According to Berg (1948), Movchan (1967), Russian sturgeon populations known from the Volga and Ural rivers must be accepted as the typical form. Matishov demonstrated that the number of spawning populations of Russian sturgeons in the Caspian Sea decreased during the past 40 years by at least 20 times (Matishov et al., 2010). Previously, the following subspecies of *A. gueldenstaedtii* were distinguished: *A. g. colchicus* Marti, 1940—Colchian sturgeon, *A. g. persicus* Borodin, 1897—Persian, or South Caspian sturgeon and nominative *A. g. gueldenstaedtii*—North Caspian sturgeon. Currently, the first two taxa are often considered as separate species, *A. persicus* and *A. colchicus* (e.g., Kottelat and Freyhof, 2007; Hanel et al., 2009; *Eschmeyer's Catalogue...*, 2021), or the latter is accepted as a subspecies of the Persian sturgeon—*A. persicus colchicus* (Vasil'eva and Vasil'ev, 2021).

Conservation status: IUCN (Critically Endangered, 2010).

32. (An.) *Acipenser medirostris* Ayres, 1854—Green sturgeon. Northeastern Pacific and Bering Sea. From eastern Kamchatka (not as *Acipenser mikadoi*, see e.g., Sheiko and Fedorov (2000), Tokranov and Sheiko (2006) and Bugaev et al. (2007)) and southern Alaska where it is found along the Pacific side of North America, south to northern Baja California, Mexico (*Assessment...*, 2004; Love et al., 2005, 2021). Anadromous. In Russian waters extremely rare, recorded only from a few individuals near Kamchatka (Bugaev et al., 2007).

Remarks. According to modern genetic data (e.g., Shmigirilov et al., 2007; Vasil'eva et al., 2009) the Asian form (*A. mikadoi*) and North American form (*A. medirostris*) are two separate species.

Conservation status: IUCN (Near Threatened, 2006).

33. (An.) *Acipenser mikadoi* Hilgendorf, 1892—Sakhalin sturgeon. Northwestern Pacific. Sea of Okhotsk and Sea of Japan, sporadically occurring in estuaries and lower reaches of Amur River, Tatar Strait, coast of Primorskii Krai (including Russian part of the Tumannaya River (Tumen)), and south to northern Korean Peninsula, including Sakhalin Island and Hokkaido Island to northern Honshu (Japan) (Berg, 1948; Lindberg and Legeza, 1965; Shedko, 2001; *Fishes of Japan...*, 2002; Omoto et al., 2004; Sokolovskii et al., 2007, 2011; Shmigirilov et al., 2007; Bogutskaya et al., 2008; Sokolovskii and Epur, 2008; Parin et al., 2014; Dyldin and Orlov, 2016, 2021; Dyldin et al., 2018, 2020). According to current data, this species is most often found in the Tumnin River flowing into the Tatar Strait, Khabarovsk territory, and the northwestern part of Sakhalin Island in the Bay of Viakhtu and Viakhtu River (Koshelev et al., 2012b). Anadromous. Very rare.

Remarks. The separate species status of *A. mikadoi* was confirmed by karyological and morphological studies, including comparative morphological analysis of this species and *A. medirostris* (Vasil'eva et al., 2009b). The validity of these species adopted in further publications (Zhou et al., 2013; Parin et al., 2014; Dyldin et al., 2020) limits the range of *A. medirostris* to the Bering Sea and the northeastern Pacific Ocean.

Conservation status: IUCN (Critically Endangered, 2010)/RDBRF (category 1).

34. (An.) *Acipenser nudiventris* Lovetsky, 1828—Ship. In the past, the range of *A. nudiventris* included drainages of the Caspian, Black, Azov and Aral seas (Berg, 1948; Svetovidov, 1964; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; Avetisov, 2006; Parin et al., 2014; Orlov et al., 2021c). Currently, this species has almost or completely disappeared everywhere. In the Black Sea, the largest population was associated with the Danube River, where it was found up to Bratislava, rarely to Vienna (Baruš and Oliva, 1995). The last records have been dated to 2003 and 2005 (Simonović et al., 2005; Avetisov, 2006; Shilin, 2021). In the Sea of Azov, this species entered the lower reaches of Kuban River up to the mouth of Laba River, but has not been found in these river during last 60 years (*Krasnaya kniga...*, 2007; Orlov et al., 2021c). In the basin of the Caspian Sea, it is currently not found in the Terek and Samur rivers, rarely found in the Volga and Kura, and has practically disappeared in the Ural (Shilin, 2021). Exclusively anadromous, see Avetisov (2006). Rare.

Remarks. Some authors treated the subspecies *Acipenser nudiventris derjavini* Borzenko, 1950 as valid, that entered Kura River for spawning (Kazanchev,

1981). Currently, it is included in the synonymy of *A. nudiventris*.

Conservation status: IUCN (Critically Endangered, 2010)/RDBRF (category 1).

35. # (An., Rs.) *Acipenser oxyrinchus* Mitchill, 1815—Atlantic sturgeon. Northwestern Atlantic, in USA and Canada, from Labrador to Florida (Smith and Clugston, 1997; Scott and Crossman, 1998); Baltic Sea and Barents Sea (Kolman et al., 2011a, 2011b; Parin et al., 2014). In the past, it penetrated up to Prague (Elbe River basin). Heinrich (1856) mentioned its rare occurrence in the upper Odra (Oder) near Bohumín (Oderberg) during the flood. The last capture in the Russian part of the Baltic Sea was in 1984 from Ladoga Lake (see Podushka, 1999; Barannikova and Holčík, 2000); the last finding in Estonia (Baltic Sea) in the Gulf of Riga occurred in 1996 (Paaver, 1996, 1999). As a result of the program for the restoration of the Baltic populations of the Atlantic sturgeon, launched in 2010, individuals were regularly recorded in the Russian part of the Curonian Lagoon (Gushchin et al., 2013, etc.). Anadromous, freshwater, a permanent freshwater-inhabiting form is known from Lake Ladoga (Berg, 1948).

Remarks. Some authors (Ludwig et al., 2002; Desse-Berset, 2009) suggest that *Acipenser oxyrinchus* had colonized the eastern Atlantic and replaced native *A. sturio*; it may have been introduced about 1,000 years ago by the vikings. Major problems in the conservation of the European populations of Atlantic sturgeon were discussed by Holčík (2000). The subspecies *Acipenser oxyrhynchus desotoi* Vladikov, 1955 (Gulf sturgeon), distributed in the Gulf of Mexico and its tributaries (Smith and Clugston, 1997; Harris, 2003), is currently considered as a separate species (*Eschmeyer's Catalog...*, 2021).

Conservation status: IUCN (Near Threatened, 2006, for the native area)/RDBRF (category 0).

36. (An.) *Acipenser persicus* Borodin, 1897—Persian sturgeon. Caspian Sea endemic. Persian sturgeon migrates from the sea into the Kura and Sefidrud rivers for spawning; less intensive spawning migrations occur towards the Volga and Ural rivers (Berg, 1948; Movchan, 1967; Kazanchev, 1981; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; Khodorevskaya et al., 2007; Bogutskaya et al., 2013). Anadromous. Rare.

Remarks. Some authors considered it a subspecies *Acipenser gueldenstaedtii persicus* (Berg, 1948; Movchan, 1967; Kazanchev, 1981), others identified it as a distinct species *Acipenser persicus* with a subspecies *Acipenser persicus colchicus* Marti, 1940 (Artyukhin and Zarkua, 1986; Vlasenko et al., 1989b; Reshetnikov, 2003), or even considered a synonym for *A. gueldenstaedtii* Brandt et Ratzeburg, 1833 (Ruban et al., 2011). Recently, the validity of *A. persicus* was confirmed by a comprehensive analysis of various available data (Vasil'eva and Vasil'ev, 2021).

Conservation status: IUCN (Critically Endangered, 2010).

37. (Fr., Br.) *Acipenser ruthenus* Linnaeus, 1758—Sterlet. Basins of the Black, Azov, Caspian, Baltic, White, Barents and Kara seas (Berg, 1948; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; *Krasnaya kniga...*, 2007; Diripasko et al., 2011; Vasil'eva and Luzhnyak, 2013; Parin et al., 2014; Zadelenov, 2015; Romanov et al., 2017; Dolgov et al., 2018; Orlov et al., 2021b). Most attempts to introduce the species in western and northern Europe have failed (Sokolov and Vasil'ev, 1989b). Native sterlet inhabited the Kuban River until 1940; in 1998 a reacclimatization started in Krasnodar Reservoir, where the species is now widely distributed in the Kuban River basin from the upper to the lower reaches (*Krasnaya kniga...*, 2007). This sturgeon formerly occurred frequently in the Danube River (Slovakia) and in some of its tributaries (Baruš and Oliva, 1995). Freshwater, rarely in brackish water (but not diadromous). Locally common. Commercial species, but some populations are included in RDBRF.

Remarks. Berg (1948) distinguished the Siberian sterlet *Acipenser ruthenus ruthenus natio marsiglii* Brandt, 1833, further treated as a subspecies *A. ruthenus marsiglii* (*Annotated Catalogue...*, 1998; *Atlas...*, 2003; Bogutskaya and Naseka, 2004; Romanov, 2005) from the Ob, Irtysh and Yenisei rivers, including the southern Taimyr, or included in the synonymy of *A. ruthenus* (Parin et al., 2014; *Eschmeyer's Catalog...*, 2021). An artificial fertile hybrid with *Huso huso* (Linnaeus, 1758), the so called bester, is widely used in aquaculture (see e.g., Havelka et al., 2017) and was introduced into the Sea of Azov and some reservoirs (Vasil'eva and Luzhnyak, 2013).

Conservation status: IUCN (Vulnerable, 2010)/RDBRF (category 1, for populations from Dnieper and Angara rivers basins; category 2, for populations of Don, Sura and Ural rivers basins; category 5, for populations of the middle and upper Kama River basins).

38. (An., Rs.) *Acipenser schrenckii* Brandt, 1869—Amur sturgeon. Russia, Mongolia, China and Japan (Hokkaido) in the Sea of Okhotsk and Japan (Omoto et al., 2004; Kottelat, 2006; Koshelev et al., 2012a; Hagihara et al., 2018). Russia: Historically, from Ul'bansky Bay (the mainland of the Sea of Okhotsk), Sakhalin Bay (Sakhalin Island) and Amur River estuary to upper sections of Amur River including basins of rivers Onon, Shilka, Argun, Zeya, Bureya, Sungari and Ussuri; also in Khanka Lake (Berg, 1948; Novomodny et al., 2004; Kottelat, 2006; Shmigirilov et al., 2007; Bogutskaya et al., 2008; Koshelev et al., 2012a; Dyldin and Orlov, 2016, 2021; Dyldin et al., 2020; Orlov et al., 2021b). The current range of *A. schrenckii* in the Amur River basin is reduced to the lower reaches of Amur River and its estuary (Koshelev, 2010). The species has completely disappeared from many areas (Argun, Shilka, Onon, Ingoda and Zeya, including

Lake Khanka). Anadromous (but resident freshwater populations are also known).

Remarks. Currently, the number of the Amur sturgeon has reduced at least ten times in the middle part of the Amur River basin. The population in the Zeya-Bureya basin is completely extinct (Novomodny et al., 2004; Koshelev, 2010).

Conservation status: IUCN (Critically Endangered, 2010)/RDBRF (category 1, for Zeya-Bureya population).

39. (An.) *Acipenser stellatus* Pallas, 1771—Starry sturgeon. Basins of Aegean, Marmara, Adriatic, northern Caspian, Black and Azov seas (Berg, 1948; Svetovidov, 1964; Shubina et al., 1989; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; Fricke et al., 2007; Diripasko et al., 2011; Vasil'eva and Luzhnyak, 2013; Parin et al., 2014; Bogutskaya et al., 2013; Dyldin et al., 2020). In the past, the largest populations existed in the Caspian Sea (Shubina et al., 1989); in the 19th century, this species was very rare in the Danube (Slovakia), exceptionally reaching Austria and Bavaria (Germany) during migration (Baruš and Oliva, 1995). Anadromous. Currently it is rare, mainly supported by artificial reproduction.

Remarks. Berg (1948) distinguished *A. stellatus* from the south Caspian as *natio cyrensis*. A separate subspecies *A. stellatus donensis* Lovetsky, 1834 was described from the Sea of Azov, and *A. stellatus danubialis* Brusina, 1902 from the Danube River; both are synonymised with *A. stellatus*.

Conservation status: IUCN (Critically Endangered, 2010).

40. (An., Rs.) *Acipenser sturio* Linnaeus, 1758—Sturgeon. Eastern Atlantic. Historically, it was believed that this species was distributed from the North Cape and the White Sea to the Mediterranean, Black and Baltic seas (Berg, 1948; Svetovidov, 1964; Holčík et al., 1989; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; Kottelat and Freyhof, 2007; Fricke et al., 2007). Molecular-genetic studies did not confirm its occurrences in the Baltic and Barents seas, both in the present and in the past (Parin et al., 2014). Currently it is found only in the Gironde Estuary in France (Kottelat and Freyhof, 2007; Tiedemann et al., 2007; Desse-Berset, 2009). In 1999 and 2007 it was also found near the mouth of the Rioni River, Black Sea (Guchmanidze, 2009), but it was not recorded off the Russian coasts by the end of the 20th century. Anadromous.

Conservation status: IUCN (Critically Endangered, 2010)/RDBRF (category 0).

23. Genus *HUSO* Brandt et Ratzeburg, 1833

41. (An., Rs.) *Huso dauricus* (Georgi, 1775)—Kaluga. Northwestern Pacific. In the Okhotsk and Japan seas from Kamchatka to Hokkaido and northern Honshu (Japan), including coast of Primorski

Krai, Amur River basin, Sakhalin Island (south to Aniva Bay) and Taui Bay in the Sea of Okhotsk (Berg, 1948; Amaoka and Nakaya, 1975; Honma and Itano, 1994; Novomodny et al., 2004; Omoto et al., 2004; Chereshev et al., 2005; Sokolovsky et al., 2007; Shmigirilov et al., 2007; Bogutskaya et al., 2008; Koshelev et al., 2012a; Matsubara et al., 2012; Parin et al., 2014; Dyldin and Orlov, 2016, 2021; Dyldin et al., 2018; Orlov et al., 2021b). Anadromous, freshwater. An important commercial species in the past, now very rare, fishing is prohibited; artificially reproduced in sturgeon hatcheries (RDBRF).

Remarks. Both molecular genetic and cytological data have shown that the genus *Huso* Brandt et Ratzeburg, 1833 is a polyphyletic group with two species united by only two morphological features. These results suggest the restoration of the initial states of the kaluga and great sturgeon as members of *Acipenser* (Vasil'eva et al., 2009a), which is still recognized in only a few works (Koshelev et al., 2012a; Vasil'eva and Luzhnyak, 2013; Bogutskaya et al., 2013; Parin et al., 2014).

Conservation status: IUCN (Critically Endangered, 2010)/RDBRF (category 1, for the Zeya-Bureya population, Amur River basin).

42. (An.) *Huso huso* (Linnaeus, 1758)—Beluga or great sturgeon. Mediterranean, Caspian, Azov and Black seas basins (Berg, 1948; *Annotated Catalogue...*, 1998, *Atlas...*, 2003; Vasil'eva, 2007; Fricke et al., 2007; Diripasko et al., 2011; Vasil'eva and Luzhnyak, 2013; Bogutskaya et al., 2013; Boltachev et al., 2015). Historically this species was widespread in the Caspian, Black and Azov Seas, and was found in the Iberian Peninsula (Hernando et al., 1999). The autumn race of the beluga migrated from the Black Sea through Danube River up to Slovakia and up to Morava River (Czech Republic). An accidental occurrence of this species at Lanžhot in Moravia was observed in 1916 (Hanel and Lusk, 2005); its further migrations to Austria and Bavaria were recorded (Baruš and Oliva, 1995). In the Sea of Azov, since 1994, only an episodic appearance has been observed, but until 1981 its number was estimated at more than 550,000 individuals (Rekov, 2000; *Krasnaya kniga...*, 2007). Since 1986, the commercial fishery of beluga has been prohibited, and individuals can only be caught for sturgeon hatcheries and farms (*Krasnaya kniga...*, 2007). Currently, the beluga is artificially reproduced and bred at mainly the Don and Kuban fish farms (*Krasnaya kniga...*, 2007). Anadromous.

Remarks. Three separate subspecies of the great sturgeon were accepted by some authors, namely *Huso huso maeoticus* Sal'nikov et Malyatskii, 1934 from the Sea of Azov, *Huso huso ponticus* Sal'nikov et Malyatskii, 1934 from the Black Sea (e.g., *Krasnaya kniga...*, 2007), as well as *H. huso caspicus* Babushkin, 1942 from the Caspian region. In modern literature,

they are usually included in the synonyms for *A. huso* (Vasil'eva, 2007; Eschmeyer's Catalog..., 2021).

Conservation status: IUCN (Critically Endangered, 2010)/RDBRF (category 1, for the Azov Sea populations).

13. Family **POLYODONTIDAE** Bonaparte, 1835—Paddlefishes

24. Genus **POLYODON** *Polyodon* Lacepède, 1797

43. (i) (Fr.) *Polyodon spathula* (Walbaum, 1792)—Mississippi paddlefish. Native range in rivers and lakes of eastern North America, in Mississippi and its tributaries, such as the Ohio and Missouri, and others rivers flowing into the Gulf of Mexico. This species is bred and reproduced in fish farms in European part of Russian Federation (for example, in the Goryacheklyuchevskoe fish farm, Krasnodar Krai and some fish farms on the Crimean Peninsula), and was also released into several reservoirs (e.g., Krasnodar Reservoir) where it is sometimes caught, in the Sea of Azov (Moskul, 1994, 1998; Vasil'eva, 1999; Emtyl' and Ivanenko, 2002; Kruglikov, 2009; Vasil'eva and Luzhnyak, 2013; Kudersky, 2015; Karpova and Boltachev, 2017), as well as Siberia and in the basin of Sea of Japan, including Khanka Lake in the Amur River basin (Kharin and Cheblukov, 2009; Svirskiy and Barabanshchikov, 2010; Kharin and Vinnikov, 2011). Freshwater. Local importance for aquaculture in southern Russia.

Conservation status: IUCN (Vulnerable, 2019, for the native area).

8. ORDER **ELOPIFORMES** Valenciennes, 1847—Tenpounders

14. Family **MEGALOPIDAE** Jordan et Gilbert, 1883—Tarpons

25. Genus **MEGALOPS** Lacepède, 1803

44. # (Mr., Br.) *Megalops cyprinoides* (Broussonet, 1782)—Indo-Pacific tarpon. Indo-West Pacific, from Red Sea and East Africa east to Society Islands, south to northern Australia (Parin et al., 2014; *Eschmeyer's Catalog...*, 2021). Russia: Novgorodskaya Bight in Peter the Great Bay, Sea of Japan (Sokolovskii et al., 2007, 2011; Dolganov et al., 2008). Marine, brackish water, also entering rivers and freshwater lakes (Vasil'eva and Vasil'ev, 2012; Adams et al., 2016). Very rare. A single specimen was recorded in Russian waters in 2006.

Conservation status: IUCN (Data Deficient, 2016).

9. ORDER **ANGUILLIFORMES** Berg, 1940—Eels

15. Family **ANGUILLIDAE** Rafinesque, 1810—Freshwater eels

26. Genus **ANGUILLA** Schrank, 1798

45. (Ct.) *Anguilla anguilla* (Linnaeus, 1758)—European eel. Northeastern Atlantic and adjacent Arctic Ocean. Russia: lower parts of Pechora River, White and Barents seas, including Ladoga, Onega and Chudskoe lakes; also in Kaliningrad region in the Neman and Pregolya rivers, Baltic Sea basin. Individual specimens were also reported from the Black and Azov Sea basins, i.e. in the Don, Kuban and other rivers, and along coast of Sochi and in Crimean Peninsula (Kohnenko et al., 1977; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; Emtyl' and Ivanenko, 2002; Vasil'eva, 2007; Karamushko et al., 2009; Diripasko et al., 2011, 2015; *Checklist ...*, 2012; Vasil'eva and Luzhnyak, 2013; Karpushevskaya and Shibaev, 2014; Boltachev and Karpova, 2017). As a result of the introduction into Seliger Lake the species was also found in the Volga River basin, the Caspian Sea (Vasil'eva, 1999). As a non-native, it is also known in the Caspian waters of Iran and Azerbaijan (Jouladeh-Roudbar et al., 2020). Catadromous. Common and commercially important only in the Baltic Sea basin (Parin et al., 2014). Within the last 50 years, the European eel has turned from one of the largest freshwater fishery resources in many areas of Europe and northern Africa to an endangered species (Hanel et al., 2019).

Conservation status: IUCN (Critically Endangered, 2020)/RDBRF (category 1, for the basins of the Barents, White, Black and Azov seas).

16. Family **MURAENESOCIDAE** Kaup, 1859—Pike congers

27. Genus **MURAENESOX** McClelland, 1844

46. # (Mr., Br.) *Muraenesox cinereus* (Forsskål, 1775)—Daggertooth pike conger. Tropical Indo-West Pacific. Russia: southern Sakhalin Island, including Aniva Bay and Peter the Great Bay in Sea of Japan (Lindberg and Legeza, 1965; Sokolovskaya et al., 1998; Sokolovskii et al., 2007, 2011; Parin et al., 2014; Dyldin et al., 2018, Dyldin and Orlov, 2021). Marine, brackish water, occasionally entering freshwater. Very rare.

Conservation status: IUCN (Least Concern, 2021).

10. ORDER **CLUPEIFORMES** Bleeker, 1859—Herrings

17. Family **CLUPEIDAE** Cuvier, 1816—Herrings

28. Genus **ALOSA** Linck, 1790

47. # (An.) *Alosa agone* (Scopoli 1786)—Mediterranean twaite shad. Mediterranean and Black Sea basins. Russia: Black Sea, Bay of Novorossiysk, including Kerch Strait (only known from a single specimen caught in 1924) (Emtyl' and Ivanenko, 2002; Movchan, 2010). Anadromous. Very rare at the Russian coasts.

Remarks. Previously, the species was identified by Russian authors as *A. fallax nilotica* (Geoffroy St. Hilaire, 1809) or *Alosa fallax* (non Lacepède 1803), but according to Bianco (2002) it should be regarded as *Alosa agone*.

Conservation status: IUCN (Least Concern, 2008)/RDBRF (category 4).

48. (An.) *Alosa alosa* (Linnaeus, 1758)—Allis shad. Eastern Atlantic. Russia: coast of Kaliningrad Region, Baltic Sea (Berg, 1948; Svetovidov, 1952; Whitehead, 1985; Quignard and Douchement, 1991; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; Parin et al., 2014). The allis shad very rarely occurred in Bohemia (Central Europe) in the first half of the 19th century; specimens caught by professional fishermen were preserved in the collection of the National Museum in Prague. Towards the end of 19th century, the allis shad disappeared from the most European rivers (Baruš and Oliva, 1995). Anadromous. Very rare.

Conservation status: IUCN (Least Concern, 2008).

49. # (An.) *Alosa baltica* Kukuev et Orlov, 2018—Baltic Sea twaite shad. Northeastern Atlantic, Baltic Sea. Russia: Baltic Sea, coast of Kaliningrad Region, including Gulf of Finland, and lower reaches of Neman River (Berg, 1948; Svetovidov, 1964; Manyukas, 1989; Winkler et al., 2000; *Promyslovye ryby...*, 2006; Tylik and Svirina, 2011; Parin et al., 2014; Karpushevskaya and Shibaev, 2014, as *A. fallax* or *A. fallax nilotica* (non Geoffroy St. Hilaire, 1809); Kukuev and Orlov, 2018). Anadromous. Common. Formerly a target species of commercial fishery in Curonian and Vistula bays of the Baltic Sea (Winkler et al., 2000; Tylik and Svirina, 2011). It is assumed that in some parts of the Baltic Sea it has completely disappeared, and in others it is rare (Thiel et al., 2004). This is probably not the case, since, according to Kukuev and Orlov (2018) after a few years dense accumulations are formed here, which can serve as a target of commercial fishing.

Remarks. The species was originally described as a subspecies *Alosa fallax balticus* Kukuev et Orlov, 2018. A distinctive features of this species, and one that separates it from the closely related species *Alosa fallax*, as well as in *A. fallax balticus*, is the low number of gill rakers on the first branchial arch, one of the lowest among the species and subspecies of herrings of the genus *Alosa* of the Northeastern Atlantic and the seas of its basin. Moreover, population of the Baltic Sea is genetically distinct (Moog, 2014; Mitenkova, 2015). Therefore we now treat the Baltic subspecies as a separate species *A. baltica*. In the past, it was listed as part of *A. fallax* or *A. fallax fallax* (Berg, 1948; Svetovidov, 1952; Whitehead, 1985; Manyukas, 1989; Tylik and Svirina, 2011; Parin et al., 2014; etc.).

Conservation status: IUCN (Not Evaluated)/RDBRF (category 4, as *A. f. fallax* for the basin of Baltic Sea).

50. (Br.) *Alosa braschnikowi* (Borodin, 1904)—Caspian marine shad. Widespread throughout the Caspian Sea (Berg, 1948; Svetovidov, 1952; Whitehead, 1985; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; Vasil'eva, 1999; *Promyslovye ryby...*, 2006; Bogutskaya et al., 2013; Esmaeili et al., 2014; Jouladeh-Roudbar et al., 2020). Brackish water. Very common; target species of commercial fisheries.

Remarks. Several incorrect spellings of the specific names including “*braschnikovi*”, “*brashnikov*” or “*braschnikovii*” were used (see Bogutskaya and Naseka, 2004; Bogutskaya et al., 2013). Within this species, several local population groups were identified, associated with different parts of the sea and differing in some morphological features, as a result of which the next subspecies were accepted: *Alosa braschnikowi agrachanica* (Mikhailovskaya, 1941)—Agrakhan shad, western Caspian Sea, populations migrate in the winter to the southern Caspian Sea; *A. b. autumnalis* (Berg, 1915)—Big-eyed shad, eastern and western parts of the southern Caspian Sea; *A. b. braschnikowi* (Borodin, 1904)—Braschnikov's shad, populations migrate to spawn in the northern Caspian Sea; *A. b. grimmi* (Borodin, 1904)—Grimm's shad, southern Caspian Sea; *A. b. kisselevitschi* (Bulgakov, 1926)—Kisselevitsch's shad, southern (mainly southwestern) Caspian Sea; *A. b. nirchi* (Morozov, 1928)—Krasnovodsk shad, eastern Caspian Sea; *A. b. orientalis* (Mikhailovskaya, 1941)—Eastern shad, eastern part of the southern Caspian Sea; and *A. b. sarensis* (Mikhailovskaya, 1941)—western part of the southern Caspian Sea (Berg, 1948; Svetovidov, 1952; Whitehead, 1985; *Annotated Catalogue...*, 1998; *Promyslovye ryby...*, 2006). Bogutskaya et al. (2013) consider them as discussed species; however, recent publications provide conflicting data on genetic divergence between different Pontic-Caspian forms of shads (Mezhzherin et al., 2009; Sotelo et al., 2012).

Conservation status: IUCN (Data Deficient, 2017).

51. (An.) *Alosa caspia* (Eichward, 1838)—Caspian shad. Endemic of the Caspian Sea basin, but mostly in the western part (Bogutskaya and Naseka, 2004; Kottelat and Freyhof, 2007; Bogutskaya et al., 2013; Jouladeh-Roudbar et al., 2020). Anadromous. Common, often caught as bycatch.

Remarks. In previous publications (Berg, 1948; Svetovidov, 1952, 1973; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; *Promyslovye ryby...*, 2006; Vasil'eva, 2007; etc.), it was considered as a Caspian subspecies of the Ponto-Caspian species *Alosa caspia sensu lato*. Recently, the populations of the Black and Azov seas are classified as a separate species *Alosa tanaica* (Grimm, 1901), but their genetic distinction from the Caspian populations is unknown. Within the Caspian populations the following subspecies were accepted in the past: *Alosa caspia caspia* (Eichward, 1838), mainly of western Caspian Sea; in western and southern parts

of Caspian Sea in winter, adults enter Volga River to spawn; *A. c. aestuarina* (Berg, 1932) from the northern Caspian Sea; *A. c. knipowitschi* (Iljin, 1927) from southwestern Caspian Sea; *A. c. persica* (Iljin, 1927) inhabiting southeastern Caspian Sea; *A. c. salina* (Svetovidov, 1936) in the northeastern Caspian Sea (Berg, 1948; Svetovidov, 1952, 1964; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; *Promyslovye ryby...*, 2006; Vasil'eva, 2007). They are presented as discussed species by Bogutskaya et al., 2013, but not confirmed by molecular studies (Sotelo et al., 2012; Bani et al., 2019).

Conservation status: IUCN (Least Concern, 2008).

52. (An., Rs.) *Alosa immaculata* Bennett, 1835—Pontic shad. Black Sea and Sea of Azov (including Crimean Peninsula), from where adults make upstream spawning migrations into Don, Danube, Dnieper, Dniester and Kuban drainages (Berg, 1948; Svetovidov, 1952; Whitehead, 1985; Moskul, 1998; Emtyl' and Ivanenko, 2002; Fricke et al., 2007; Vasil'eva, 2007; Luzhnyak, 2010; Diripasko et al., 2011, 2015; Karpova and Boltachev, 2012; Vasil'eva and Luzhnyak, 2013; Parin et al., 2014; Boltachev and Karpova, 2017; Dyldin et al., 2020). Anadromous, freshwater (residential form in the Don River basin). Common, one of the important herrings in Black and Azov seas (*Promyslovye ryby...*, 1949; Vasil'eva and Luzhnyak, 2013), often caught as bycatch.

Remarks. In earlier publications such as Berg (1948), Svetovidov (1952, 1964), Whitehead (1985), *Annotated Catalogue...* (1998), *Atlas...* (2003), *Promyslovye ryby...*, (2006) the species was adopted *Clupea pontica* Eichwald, 1838 or *Caspialosa kessleri pontica*, later included in the synonymy of *A. immaculata* (Kottelat, 1997; Vasil'eva, 2004; Bogutskaya and Naseka, 2004).

Conservation status: IUCN (Vulnerable, 2008).

53. (An.) *Alosa kessleri* (Grimm, 1887)—Caspian anadromous shad. Throughout Caspian Sea, from where it performs spawning migrations into the Volga drainage. Few individuals reach Ural and Terek rivers, and before the construction of the Volgograd dam, they reached Oka River (to Kaluga), Kama and Sura drainages (Berg, 1948; Whitehead, 1985; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; Vasil'eva, 2004; *Promyslovye ryby...*, 2006; Ivanchev and Ivancheva, 2010; Bogutskaya et al., 2013; Artaev et al., 2013; Dyldin et al., 2020). Anadromous. Common, caught as bycatch.

Remarks. *Alosa* (or *Caspialosa*) *kessleri volgensis* (Berg, 1913) and *Alosa* (or *Caspialosa*) *kessleri pontica* (Eichwald, 1838), which belonged to the subspecies of *A. kessleri* in earlier publications (Berg, 1948; Svetovidov, 1952, 1964; etc.), are now classified, respectively, as a separate species *A. volgensis* (see below) and a synonym of *A. immaculata* (see above).

Conservation status: IUCN (Least Concern, 2008).

54. (Mr., Br.) *Alosa maeotica* (Grimm, 1901)—Black Sea shad. Black and Azov seas (Berg, 1948; Moskul, 1998; Emtyl' and Ivanenko, 2002; *Promyslovye ryby...*, 2006; Vasil'eva, 2007; Luzhnyak, 2010; Diripasko et al., 2011, 2015; Vasil'eva and Luzhnyak, 2013; Parin et al., 2014; Çiçek et al., 2015; Boltachev and Karpova, 2017). Marine, brackish water (entering in lower reaches of Don and Kuban). Common, both in the past and at present fished as bycatch, and by recreational angling, mainly in Kerch Strait and Black Sea.

Remarks. Berg (1948) and Svetovidov (1952) assumed that this species was a local form named *Caspialosa brashnikovi maeotica* or *Alosa brashnikovi maeotica*. According to Svetovidov (1964) it was synonymised with *Alosa pontica* (Eichwald, 1838). It was proved as a separate species by craniological studies (Vasil'eva, 1996) and later confirmed by molecular analysis (Turan et al., 2015).

Conservation status: IUCN (Least Concern, 2008).

55. (i) (An.) *Alosa sapidissima* (Wilson, 1811)—American shad. Native range in Atlantic side of North America from St. Lawrence River and Nova Scotia (Canada) south to central Florida, USA (Eschmeyer and Herald, 1983; Whitehead, 1985; Mecklenburg et al., 2002; *Promyslovye ryby...*, 2006; Chereshnev, 2008). Starting in 1873, it was introduced on the Pacific side of North America (currently widespread from northern Baja California (Mexico) to Kamchatka Peninsula) where it has successfully naturalised (Quast and Hall, 1972; Eschmeyer and Herald, 1983; Whitehead, 1985; *Annotated Catalogue...*, 1998; Mecklenburg et al., 2002; Love et al., 2005, 2021). Russia: not native, known from eastern coast of Kamchatka in northwestern Bering Sea and Anadyr River (Berg, 1948; Svetovidov, 1952; Chereshnev and Zharnikov, 1989; Sheiko and Fedorov, 2000; Chereshnev et al., 2001; Tokranov and Sheiko, 2006; Chereshnev, 2008; Parin et al., 2014; Dyldin et al., 2020; Orlov et al., 2020). Anadromous. Very rare, only sporadically captured.

Conservation status: IUCN (Least Concern, 2019, for the native area).

56. (Br.) *Alosa saposchnikowii* (Grimm, 1885)—Saposhnikov's shad or Big-eyed shad. Caspian Sea, mainly in northern part (Berg, 1948; Svetovidov, 1952; Whitehead, 1985; *Promyslovye ryby...*, 2006; Malkin and Andrianova, 2008; Bogutskaya et al., 2013; Slynko and Tereshchenko, 2014; Jouladeh-Roudbar et al., 2020). Brackish water. Common, commercial species.

Remarks. For the data of the original description, see note by Bogutskaya and Kerzhner (2007).

Conservation status: IUCN (Data Deficient, 2017).

57. (Br.) *Alosa sphaerocephala* (Berg, 1913)—Agra-khan shad. Caspian Sea, but mainly in central and northern parts (Svetovidov, 1952; Whitehead, 1985; *Annotated Catalogue...*, 1998; Bogutskaya et al., 2013; Slynko and Tereshchenko, 2014; Jouladeh-Roudbar et al., 2020). Brackish water. Abundance data need to be clarified, but it is supposed to be common. Caught as bycatch in Kazakhstan.

Conservation status: IUCN (Least Concern, 2017).

58. ? (Br.) *Alosa suworowi* (Berg, 1913)—Suworow's shad. Caspian Sea (primarily in northern area), sporadically entering Volga delta (Berg, 1948; Svetovidov, 1952; *Annotated Catalogue...*, 1998). Brackish water. Abundance data need clarification, but it is supposed to be rare.

Remarks. Berg (1948) assigned this taxon to the genus *Caspialosa* and treated it as a separate species, although he referred to the publication of Svetovidov (1943), who believed that this taxon included hybrids of different shad species. Its taxonomic status remains uncertain (Svetovidov, 1952; *Annotated Catalogue...*, 1998; Bogutskaya et al., 2013; Dyldin et al., 2020).

Conservation status: IUCN (Data Deficient, 2017).

59. (An.) *Alosa tanaica* (Grimm, 1901)—Azov shad. Marmara, Black and Azov seas and adjacent waters; adults perform upstream spawning migrations into Don and Kuban drainages (Berg, 1948; Whitehead, 1985; Moskul, 1998; Emtyl' and Ivanenko, 2002; *Promyslovye ryby...*, 2006; Luzhnyak, 2010; Diripasko et al., 2011, 2015; Parin et al., 2014; Vasil'eva and Luzhnyak, 2013; Çiçek et al., 2015; Dyldin et al., 2020). Anadromous. Common; locally target of fisheries in Azov and Black seas, often also caught as bycatch.

Remarks. Svetovidov (1952, 1964), Whitehead (1985), *Annotated Catalogue...* (1998), *Atlas...*, (2003), *Promyslovye ryby...*, (2006), Vasil'eva (2007), Luzhnyak (2010) and others treated it as a subspecies, *Alosa caspia tanaica*, or *Caspialosa caspia tanaica* (Berg, 1948).

Conservation status: IUCN (Least Concern, 2008).

60. (An.) *Alosa volgensis* (Berg, 1913)—Volga shad. Caspian Sea, entering delta and lower reaches of Volga River for spawning, sporadically reaches Ural and Terek rivers (Berg, 1948; Svetovidov, 1952; Whitehead, 1985; *Annotated Catalogue...*, 1998; *Atlas...*, 2003; *Promyslovye ryby...*, 2006; Zavialov et al., 2006; Bogutskaya et al., 2013; Dyldin et al., 2020). Anadromous. In the past the species had commercial value (Berg, 1948; *Promyslovye ryby...*, 1949, 2006), but is rare now, sporadically caught as bycatch.

Remarks. Berg (1948), Svetovidov (1952), Whitehead (1985), *Annotated Catalogue...* (1998), *Atlas...*, (2003), *Promyslovye ryby...*, (2006), and

Zavialov et al. (2006) used the subspecies names *Caspialosa kessleri volgensis*, *Alosa kessleri volgensis* or *Alosa pontica volgensis*. In recent publications it is classified as a separate species (Bogutskaya and Naseka, 2004; Bogutskaya et al., 2013).

Conservation status: IUCN (Endangered, 2008)/RDBRF (category 2).

29. Genus *CLUPANODON* Lacepède, 1803

61. # (Mr., Br., Fr.) *Clupanodon thrissa* (Linnaeus, 1758)—Chinese gizzard shad. Northwestern Pacific. Russia: only a single specimen was recorded from Kievka Bay, Sea of Japan, Primorskii Krai (Parin et al., 2014). Marine, brackish water, freshwater. Very rare.

Conservation status: IUCN (Least Concern, 2017).

30. Genus *CLUPEA* Linnaeus, 1758

62. (Mr., Br., Rs.) *Clupea harengus* Linnaeus, 1758—Atlantic herring. North Atlantic and adjacent Arctic Ocean. Russia: Baltic (coast of Kaliningrad and Gulf of Finland), Barents, White and Kara seas, including Novaya Zemlya (Berg, 1948; Svetovidov, 1952; Andriashev, 1954; Whitehead, 1985; *Annotated Catalogue*, 1998; *Promyslovye ryby...*, 2006; Dolgov, 2011; *Checklist ...*, 2012; Karaseva et al., 2013; Parin et al., 2014). Marine, brackish water and freshwater (rarely entering freshwater, with permanent freshwater resident populations in Sweden and elsewhere). Very common; commercial species.

Remarks. Berg (1948), Svetovidov (1952, 1973), Andriashev (1954) distinguished the following subspecies: *C. harengus harengus* Linnaeus, 1758, *C. h. membras* Wulff, 1765, *C. h. pallasii* Valenciennes, 1847, *C. h. marisalbi* Berg, 1923 and *C. h. suworowi* Rabinerson, 1927. In later publications (e.g., Whitehead, 1985; Bogutskaya and Naseka, 2004; Parin et al., 2014; Dyldin and Orlov, 2016, 2021; Mecklenburg et al., 2018; Dyldin et al., 2018) *Clupea pallasii* is generally accepted as a separate species. Following this opinion, we consider the former subspecies *C. h. marisalbi* and *C. h. suworowi* conspecific to *C. pallasii* (see below). *C. h. membras* we consider a synonym of *Clupea harengus*; on the contrary, it is accepted as a valid subspecies by other authors (e.g. Bogutskaya and Naseka, 2004; Parin et al., 2014).

Conservation status: IUCN (Least Concern, 2010).

63. (Mr., Br.) *Clupea pallasii* Valenciennes, 1847—Pacific herring. Arctic Ocean and North Pacific. Russia: Arctic seas, including western part of Barents Sea and North Pacific Ocean in the Sea of Japan, Okhotsk and Bering seas (Berg, 1948; Andriashev, 1954; Whitehead, 1985; Orlov and Moiseev, 2000; Vdovin and Chernoiivanova, 2006; Dolgov, 2011, 2013; Parin et al., 2014; Dyldin and Orlov, 2016, 2021; Dyldin et al., 2018). Marine, brackish water; non-migratory

lagoon forms in brackish water, e.g., in British Columbia, Canada, Kamchatka and Sakhalin Island, Russia (Dyldin and Orlov, 2016); also landlocked populations. Very common; commercial species.

Remarks. The following three subspecies are at present identified within the species: (1) *Clupea pallasii marisalbi* Berg, 1923 White Sea herring, marine, brackish water, the White and Barents seas, (2) nominate *C. p. pallasii* Valenciennes, 1847 Pacific herring, marine, brackish water, from adjacent Arctic Ocean, the Pacific side of northern Japan (Hokkaido and Honshu) and the Russian Far Eastern seas including the Pacific coast of Kurils and Commander-Aleutian chain and along the American coast, and (3) *C. p. suworowi* Rabinerson, 1927—Suworow's herring, marine, brackish water, from the southwestern part of Barents Sea to the southern part of Kara Sea, including the Ob and Yenisei bays (*Annotated Catalogue*, 1998; Dolgov, 2004, 2011, 2013; *Promyslovye ryby...*, 2006; Bugaev et al., 2007; Wienerroither et al., 2013; Evseenko and Mishin, 2011; Parin et al., 2014; Dolgov et al., 2018). It should be noted that local genetic differences were found in some populations of Pacific herring. The most distinct differences were found between populations from Asia and Bering Sea and populations from North America (Carls et al., 2008).

Conservation status: IUCN (Data Deficient, 2019).

31. Genus *CLUPEONELLA* Kessler, 1877

64. Enc. (Fr.) *Clupeonella abrau* (Maliatsky, 1930)—Abrau sprat. Russia: endemic species in Lake Abrau, near Novorossiysk, eastern Black Sea (Berg, 1948; Svetovidov, 1952; Whitehead, 1985; Emtyl' and Ivanenko, 2002; *Krasnaya kniga...*, 2007; Dyldin et al., 2020; Lipka et al., 2021). Freshwater. In the past (in the mid-20th century to the end of the 1990s) high occurrences were documented (Berg, 1948; Luzhnyak, 2003). Current data regarding abundance are missing and further investigations are necessary (*Krasnaya kniga...*, 2007; Lipka et al., 2021).

Remarks. Berg (1948), Svetovidov (1952), Whitehead (1985), *Annotated Catalogue...*, (1998), *Atlas...* (2003) and others identified within the species *C. abrau* a separate subspecies *C. abrau muhlisi* Woltereck et Neu, 1934 with its occurrence in the Lake Apolyont, Turkey, Marmara Sea basin. According present opinions (e.g. Fricke et al., 2007; Çiçek et al., 2015), it is allocated to a separate taxon *C. muhlisi*.

Conservation status: IUCN (Critically Endangered, 2008)/RDBRF (category 3).

65. ? (Am.) *Clupeonella caspia* Svetovidov, 1941—Caspian sprat. Caspian Sea (mostly in central and southern parts of the sea) and lower reaches of Volga, Sura (in this tributary of the Volga has appeared in the 20th century), Ural and Terek drainages (Svetovidov, 1952; Whitehead, 1985; *Annotated Catalogue...*, 1998;

Atlas..., 2003; *Promyslovye ryby...*, 2006; Bogutskaya et al., 2013; Artaev et al., 2013; Jouladeh-Roudbar et al., 2020). Marine or anadromous (amphidromous, the spawning occurs in both fresh and sea water, see Svetovidov, 1952). Very common; commercial species.

Remarks. Earlier treated as a subspecies of *Clupeonella cultriventris* (Nordmann, 1840), see Whitehead (1985), *Annotated Catalogue...* (1998), *Atlas...* (2003), *Promyslovye ryby...*, (2006) and others. Kottelat and Freyhof (2007), Bogutskaya et al. (2013) raised it to species level. However, population genetic data showed that this is one of the intraspecific forms of the widespread species *Clupeonella cultriventris* (Karabanov, 2013).

Conservation status: IUCN (Least Concern, 2020).

66. (Am.) *Clupeonella cultriventris* (Nordmann, 1840)—Black Sea sprat. The Mediterranean (Marmara Sea), Black (e.g., Danube, Dniester, Dnieper rivers) and Azov (Don, Kuban rivers) seas, including adjacent areas (Whitehead, 1985; Svetovidov, 1973; Moskul, 1994, 1998; Emtyl' and Ivanenko, 2002; Vasil'eva, 2007; Diripasko et al., 2011, 2015; Karpova and Boltachev, 2012; Vasil'eva and Luzhnyak, 2013; Parin et al., 2014; Çiçek et al., 2015; Boltachev and Karpova, 2017). Amphidromous. Euryhaline, in coastal waters, lagoons and lakes (spawning was observed in freshwaters (Kuban River) and in estuaries, as well as in the Sea of Azov), freshwater (e.g., Krasnodar Reservoir: Moskul, 1994, 1998). Very common; commercial species in Black and Azov seas.

Remarks. The species *Clupeonella caspia* has been long considered as a subspecies *C. cultriventris caspia*, but in this list it is considered as the species under discussion (see above).

Borodin (1896) described a freshwater form *Clupea cultriventris* var. *tscharchalensis*, in Charkhal Lake, Ural River basin, Kazakhstan. Later, the same form was also discovered in the backwaters of the Volga River near Saratov (Berg, 1948). Formerly it was treated as a subspecies *C. cultriventris tscharchalensis* or synonymised with *C. cultriventris* (Borodin, 1896; Berg, 1948; *Annotated Catalogue...*, 1998). Later, it was classified as a separate species *C. tscharchalensis* (Kottelat and Freyhof, 2007; Hanel et al., 2009; Naseka, 2010), but population genetics demonstrate that *C. tscharchalensis* is only one of the forms of *C. cultriventris* (Karabanov, 2013).

Conservation status: IUCN (Least Concern, 2008).

67. (Br.) *Clupeonella engrauliformis* (Borodin, 1904)—Anchovy sprat. Caspian Sea, mainly in southern and central parts of the sea (Berg, 1948; Svetovidov, 1952; Whitehead, 1985; *Annotated Catalogue...*, 1998; *Promyslovye ryby...*, 2006; Bogutskaya et al., 2013; Esmaeili et al., 2014; Jouladeh-Roudbar et al.,

2020). Brackish water. Common. Commercial species.

Conservation status: IUCN (Endangered, 2018).

68. (Br.) *Clupeonella grimmi* Kessler, 1877—Southern Caspian sprat. Caspian Sea, mainly in southern and central parts of the sea (Berg, 1948; Svetovidov, 1952; Whitehead, 1985; *Annotated Catalogue...*, 1998; *Promyslovye ryby...*, Bogutskaya et al., 2013; Esmaeili et al., 2014; Jouladeh-Roudbar et al., 2020). Brackish water. Common species with commercial value.

Conservation status: IUCN (Endangered, 2018).

32. Genus *KONOSIRUS* Jordan et Snyder, 1900

69. (Mr., Br.) *Konosirus punctatus* (Temminck et Schlegel, 1846)—Dotted gizzard shad.

Northwestern Pacific. Russia: continental coast of Sea of Japan, and Tatar Strait from northern Primorskii Krai and Sakhalin Island near Aleksandrovsk-Sakhalinsky to Peter the Great Bay (Berg, 1948; Svetovidov, 1952; Lindberg and Legeza, 1965; Sokolovskaya et al., 1998; Sokolovskii et al., 2007, 2011; Parin et al., 2014; Dyldin and Orlov, 2016, 2021a; Dyldin et al., 2018). Marine, also inhabits brackish water lagoons and lakes. Usually common, but rare off Sakhalin. Caught as bycatch along the southern coast of Primorskii Krai.

Conservation status: IUCN (Least Concern, 2017).

33. Genus *SARDINA* Antipa, 1904

70. # (Mr., Br.) *Sardina pilchardus* (Walbaum, 1792)—European pilchard. Eastern Atlantic, from Iceland and North Sea south to Northwestern Africa (14°43' N), including Mediterranean Sea and Black Sea (Svetovidov, 1952, 1964, 1973; Whitehead, 1985; Emtyl' and Ivanenko, 2002; Reshetnikov et al., 2006; Fricke et al., 2007; Vasil'eva, 2007; Diripasko et al., 2011; Parin et al., 2014; Boltachev and Karpova, 2012). Recorded in 2011 from the Sea of Azov (Diripasko et al., 2011, 2015; Vasil'eva and Luzhnyak, 2013). Marine, brackish water. Common, caught as bycatch in the Black Sea.

Conservation status: IUCN (Least Concern, 2015).

34. Genus *SARDINELLA* Valenciennes, 1847

71. # (Mr., Br.) *Sardinella aurita* Valenciennes, 1847—Round sardinella. Atlantic. Eastern Atlantic, from Gibraltar to South Africa, including Mediterranean Sea and Black Sea (the latter including Crimean Peninsula and Krasnodar Krai) (Svetovidov, 1952, 1964, 1973; Whitehead, 1985; Boltachev et al., 2000; Emtyl' and Ivanenko, 2002; Zaika et al., 2004; Fricke et al., 2007; Vasil'eva, 2007; Boltachev and Karpova,

2017). Marine, brackish water. In the Black Sea it is a rare migrant from the adjacent Mediterranean Sea; recorded from Crimean Peninsula only based on a few specimens in 1981, 1998 and 2007 (Movchan, 2010; Abliazov et al., 2021).

Conservation status: IUCN (Least Concern, 2015).

72. # (Mr., Br.) *Sardinella zunasi* (Bleeker, 1854)—Japanese sardinella. Western Pacific. Russia: in the Sea of Japan, including Peter the Great Bay (Svetovidov, 1952; Lindberg and Legeza, 1965; Sokolovskaya et al., 1998; Sokolovskii et al., 2007, 2011; Parin et al., 2014). Marine, brackish water, including brackish-water lagoons and lakes (Ishitobi et al., 2000). Not very common, occurrence in Russian waters may be affected by water temperature, as it is only found in warm years. Caught as bycatch.

Conservation status: IUCN (Least Concern, 2017).

35. Genus *SARDINOPS* Hubbs, 1929

73. # (Mr., Br.) *Sardinops melanosticta* (Temminck et Schlegel, 1846)—Japanese pilchard. Northwestern Pacific and Bering Sea. From Commander Islands south to Pacific side of Japan, and to Taiwan and Hong Kong (China), including Sakhalin, Amurskiy Estuary, Primorskii Krai and Kurils (Svetovidov, 1952; Lindberg and Legeza, 1965; Whitehead, 1985; Sheiko and Fedorov, 2000; Ivanov and Sukhanov, 2002; Sokolovskii et al., 2007, 2011; Parin et al., 2014; Dyldin et al., 2018; Dyldin and Orlov, 2021a). Marine, brackish water, also recorded from brackish water lagoons of Sakhalin, including Amur Estuary, sometimes observed in estuaries of some rivers (Dyldin et al., 2018). Common. Abundance fluctuating according to its population dynamics; commercial exploitation in years when it is common.

Remarks. Some authors (e.g., Eschmeyer and Herald, 1983; Mecklenburg et al., 2002; Love et al., 2005, 2021) synonymised this taxon with *Sardinops sagax* (Jenyns, 1842), or treated it as a subspecies of *S. sagax*, following Andriashev (1937), Svetovidov (1952), Lindberg and Legeza (1965) and Ivanov (1997). In recent years, it was mainly considered as a separate species (Sheiko and Fedorov, 2000; *Fishes of Japan...*, 2002; Sokolovskii et al., 2007, 2011; Parin et al., 2014; Dyldin et al., 2018).

Conservation status: IUCN (Not Evaluated).

36. Genus *SPRATTUS* Girgensohn, 1846

74. (Mr., Br.) *Sprattus sprattus* (Linnaeus, 1758)—European sprat. Northeastern Atlantic. Russia: Baltic Sea (including Kaliningrad Region), Black and Azov seas (Berg, 1948; Svetovidov, 1952, 1964; Emtyl' and Ivanenko, 2002; Vasil'eva, 2007; *Checklist ...*, 2012; Vasil'eva and Luzhnyak, 2013; Karaseva et al., 2013;

Karpushevskaya and Shibaev, 2014; Boltachev and Karpova, 2017). Marine, brackish water lagoons and estuaries, including lower reaches of some rivers (Çiçek et al., 2015). Very common; important target species of commercial fisheries.

Remarks. Three subspecies have been currently recognized: *Sprattus sprattus sprattus* (Linnaeus, 1758)—European sprat, distributed throughout its range specified above, except for Baltic, Mediterranean, Adriatic, Marmara, Black and Azov seas, *S. s. phalericus* Risso, 1827—Black Sea sprat, in Mediterranean, Adriatic, Black and Azov seas, and *S. s. balticus* (Schneider, 1908)—Baltic sprat, in the Baltic Sea.

Conservation status: IUCN (Least Concern, 2018).

18. Family **ENGRAULIDAE** Gill, 1861—Anchovies

37. Genus *ENGRAULIS* Cuvier, 1816

75. (Mr., Br.) *Engraulis encrasicolus* (Linnaeus, 1758)—European anchovy. Eastern Atlantic. Along the Atlantic coast from Norway (Bergen) south to Angola, including Baltic, Mediterranean, Black and Azov seas (Svetovidov, 1964; Whitehead et al., 1988; Moskul, 1998; Emtyl' and Ivanenko, 2002; Borsa et al., 2005; Fricke et al., 2007; Vasil'eva, 2007; Diripasko et al., 2011; *Checklist ...*, 2012; Vasil'eva and Luzhnyak, 2013; Parin et al., 2014; Karpushevskaya and Shibaev, 2014; Boltachev and Karpova, 2017). Russia: Baltic (Kaliningrad Region), Black and Azov seas. Marine, brackish water, also occurring in estuaries. Very common; target species of commercial fisheries throughout its range.

Remarks. Former incorrect spellings of the species name include “*encrasicholus*”, “*engrasicholus*” or “*encrassicolus*” (see: Bogutskaya and Naseka, 2004). Earlier the populations from the Black and Azov seas were treated as separate subspecies: *Engraulis encrasicolus maeoticus* Pusanov, 1926—Azov Sea anchovy, from the Sea of Azov and eastern Black Sea and *E. e. ponticus* Aleksandrov, 1927—Black Sea anchovy, from the Black Sea (see: Emtyl' and Ivanenko, 2002; *Promyslovye ryby...*, 2006; Diripasko et al., 2011, 2015). They are currently considered invalid (Whitehead et al., 1988; Vasil'eva, 2007; Parin et al., 2014); this concept is supported by molecular data (Vodiasova and Abramson, 2017).

Conservation status: IUCN (Least Concern, 2015).

76. # (Mr., Br.) *Engraulis japonicus* Temminck et Schlegel, 1846—Japanese anchovy. Western Pacific. Russia: Japan and Okhotsk seas, including Sakhalin, coast of Primorskii Krai, Tatar Strait, southern Kamchatka and Kurils (Lindberg and Legeza, 1965; Sheiko and Fedorov, 2000; Velikanov, 2002, 2006; Chereshev et al., 2005; Sokolovskii et al., 2007, 2011; Parin et al., 2014; Dyldin et al., 2018). Marine, brackish water (larvae of this species inhabit river eustaries, e.g.,

in northern Taiwan in Tanshui River Estuary (Wang and Tzeng, 1997). Very common; caught as bycatch in summer, mainly off Primorskii Krai.

Conservation status: IUCN (Least Concern, 2018).

19. Family **PRISTIGASTERIDAE** Bleeker, 1872—
Longfin herrings

38. Genus **ILISHA** Richardson, 1846

77. # (Mr., Br.) *Ilisha elongata* (Bennett, 1830)—Elongate ilisha. Indo-West Pacific in tropical and subtropical. Russia: Peter the Great Bay, Sea of Japan (Taranetz, 1937; Svetovidov, 1952; Lindberg and Legeza, 1965; Sokolovskii et al., 2007, 2011; Parin et al., 2014). Marine, brackish water, entering river mouths. Rare, only occurring when water is warm; occasionally caught as bycatch.

Conservation status: IUCN (Least Concern, 2017).

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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