The waters of the Russian Federation, due to its geographic location, are characterized by a great diversity of species of fish-like vertebrates and fishes (Reshetnikov, 2013), including cartilaginous fishes (Chondrichthyes), which include sharks, rays, and chimaeras. Some of them are permanent residents of the Russian waters, while others migrate into our waters from the main habitats due to the nature of their biology or because of climate changes.

There is no large-scale targeted fishery for cartilaginous fishes in the Russian waters. The only exceptions are spiny dogfish (spurdog) *Squalus acanthias* and thornback ray (thornback skate) *Raja clavata*, which are caught in small quantities at the Black Sea coast (Luts et al., 2005). Basically, cartilaginous fishes are taken as by-catch in longline, netting, and trawl fisheries.

In the world practice, measures for conservation of cartilaginous fishes are taken both by particular international organizations and at the legislative level by a number of countries. However, despite the actions taken around the world, there is a reduction in species diversity and numbers of cartilaginous fishes. The reason for this, on the one hand, is the increased demand for derivatives of cartilaginous fishes (especially fins, which are used for cooking soup) and features of their biology (low growth rate and fecundity, late sexual maturity, long life span, etc.) on the other hand. The failure to take measures for the protection of cartilaginous fishes not only threatens preservation of biodiversity in our waters but can also result in loss of perspective fishery objects in the future.

The aim of the work is to assess the species diversity and conservation status of cartilaginous fishes registered in the waters of the Russian Federation.

**MATERIALS AND METHODS**

The data on species diversity are presented for the 11 Russian seas (the White, Barents, Kara, Laptev, East Siberian, Chukchi, Bering, Okhotsk, Japan, Azov, and Black) and the Kuril and Kamchatka waters of the Pacific Ocean (Pacific Northwest). The data on the occurrence of a particular species in the area under consideration are taken from the literature. Compilation of the list of cartilaginous fishes of the Russian waters was based on the scheme proposed by Nelson (2009). The Latin names of species are given in accordance with the electronic catalog of Eschmeyer (2013).

The conservation status is given according to the International Union for Conservation of Nature’s (IUCN) Red List of threatened species, that is, the list of species under threat of extinction. The species included in this list are divided in terms of the degree of threat into nine categories: Extinct (EX), Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC), Data Deficient (DD), and Not Evaluated (NE). The species characterized as threatened combine three categories: CR, EN, and VU. Each category is defined by the criteria that take into account parameters such as the population size, range, degree of decrease, rate of decay into smaller groups, etc. (IUCN, 2013).

In some cases, the IUCN conservation status was determined for the species whose taxonomic status was later revised, for example, *Rhinoraja interrupta* was considered a junior synonym of *Bathyraja interrupta* (Spies et al., 2011), *Rhinoraja taranetzi* a junior synonym of *Bathyraja taranetzi* (Nelson et al., 2004; *Raja binoculata*, a junior synonym of *Beringraja binoculata* (Nelson et al., 2004); and *Dipturus linteus* a junior synonym of *Rajella linteae* (Stehmann, 2012).
these cases, estimates of the conservation status of the species taking into account the revisions carried out were used. The validity of the North Pacific spotted spiny dogfish *Squalus suckleyi* was restored only recently (Ebert et al., 2010). Prior to this, it was thought that the Pacific Northwest is inhabited by population of the common spiny dogfish *S. acanthias*, whose conservation status has been identified and which we considered appropriate to be used in this paper. When the IUCN conservation status was determined not for a species as a whole but for its individual populations (for example, those Pacific and Atlantic), such species from different basins are provided with different estimates.

**RESULTS AND DISCUSSION**

**Species diversity.** Today, the waters adjacent to the coast of the Russian Federation are inhabited with 69 registered species of cartilaginous fishes belonging to 20 families (Tables 1–3).

The cartilaginous fish fauna of the Pacific consists of 55 species of sharks, rays, and chimaeras—respectively 19, 34, and 2 species. In the basin of the Arctic Ocean, there are four species of cartilaginous fishes (two species of rays and two species of sharks). Such small species diversity is due, primarily, to harsh climatic conditions and partly insufficient scrutiny of fish fauna of this region because of the fact that most of the year this water space is ice-bound. The cartilaginous fish fauna of the northern seas of the Atlantic Ocean basin (the Barents and White seas) is richer: there are 14 species, including seven rays, six sharks, and one chimaera. In the southern seas (the Azov and Black), there are only three species—one species of sharks and two species of rays. A small number of species can be explained by the territorial isolation of these seas from the ocean and specificity of their oceanographic conditions (reduced in comparison with the ocean salinity, shallowness of the Sea of Azov, presence of a hydrogen sulfide layer in the Black Sea, etc.).

The greatest species diversity in the waters of Russia (Fig. 1) is characteristic for rays of the families Arhynchobatidae (23 species), Rajidae (14 species), and Dasyatidae (five species). Among the sharks, representatives of the families Lamnidae (four species) and Carcharhinidae (three species) are most diverse. The rest of the families are represented by 1–2 species. The predominance among the cartilaginous fishes in our waters of representatives of the order Rajiformes is natural because the high species diversity within this taxonomic group is characteristic to high latitudes of both the hemispheres (Dolganov, 2003).

In the cartilaginous fishes fauna of the Pacific basin (Fig. 2), the highest diversity was observed in represen-

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1 The occurrence of the Arctic skate *Amblyraja hyperborea* in the far eastern waters, in our opinion, is questionable (Table 1). This species was first specified for the Russian far eastern waters by Dolganov (1983); subsequently, with reference to this publication, it was included in the list of species found in the waters of the Russian Far East (Borets, 2000; Fedorov, 2000; Sheiko and Fedorov, 2000; Fedorov et al., 2003). Meanwhile, the range of this skate is limited by the basins of the Atlantic and Arctic oceans. In the Russian waters, it was observed from the Barents to the East Siberian Sea (Vas’kov et al., 2006; Dolgov et al., 2011); it was not found in the Chukchi Sea (Mecklenburg et al., 2002; Lynghammar et al., 2013). At the same time, in the Bering Sea, in recent years, there have been repeated catches of the closely related to it broad skate *A. badia* (Stevenson et al., 2008; Lynghammar et al., 2013) with very similar external morphological features. Therefore, we believe that the published data on the findings of the Arctic skate in our far eastern waters are the result of incorrect species identification.

2 The Northern border of the range of the North Pacific spotted spiny dogfish *Squalus suckleyi* extends to the Kotzebue Sound in the Chukchi Sea (Mecklenburg et al., 2002; Lynghammar et al., 2013), so one can assume that it can also enter into the Russian waters of the Chukchi Sea. However, the occurrence of this species in our waters is not validated yet.