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# An Annotated List of the Marine and Brackish-Water Ichthyofauna of Aniva Bay (Sea of Okhotsk, Sakhalin Island):

## 1. Petromyzontidae—Agonidae Families

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Received January 10, 2018

**Abstract**—Based on a critical analysis of literature data for the past 200 years and the results of our own multiyear studies, an annotated list of marine, brackish-water, and anadromous (migratory) fish found in Aniva Bay (southern part of the Sea of Okhotsk, southern part of Sakhalin Island) is given: 274 species (against 164 previously mentioned) in three classes, 22 orders, 67 families, 161 genera. For a number of species, information is provided on collection specimens that confirm their presence within the studied water area. For each species, Latin and English names, taxonomic remarks, information on conservation status, ecology, abundance and commercial importance are given. The first part provides brief information about the history of the study and geographical and climatic-oceanographic characteristics of the bay as well as the first 137 species of the annotated list, represented by 83 genera, 35 families, and 19 orders.

**Keywords:** ichthyofauna, annotated list, conservation status, commercial importance, marine and brackish waters, Aniva Bay, southern part of the Sea of Okhotsk, Sakhalin Island

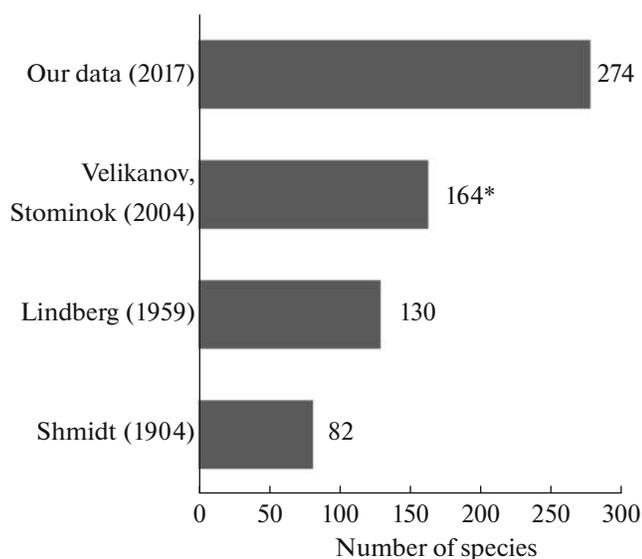
**DOI:** 10.1134/S0032945218040033

### INTRODUCTION

The first scientific data on the fish population of Aniva Bay were obtained as a result of the first Russian round-the-world trip (1803–1806) under the command of I.F. Krusenstern. After the completion of the expedition, V.G. Tilesius published a number of scientific articles in which he gave the first data on some coastal fishes in waters of Sakhalin and described several new marine and brackish-water fishes, including from Aniva Bay: *Agonus rostratus* Tilesius, 1813, and *Phalangistes fusiformis* Tilesius in Pallas, 1814 (Tilesius, 1813; Pallas, 1814). Subsequent scientific data on the fishes of this bay appeared almost 100 years later. Schmidt (1904), on the basis of his own collections on Sakhalin Island (including Aniva Bay) and the collection of the Zoological Institute (now ZIN RAN), summarized the data on the ichthyofauna of the Far East seas of Russia and compiled the first list of the bay's fishes (82 species) and also described a number

of new species for the first time: *Cottiusculus gonez*, *Cottus amblystomopsis*, *Chloea aino*, *Agonomalus jordani*, *Eumicrotremus pacificus*, *Lycenchelys brachyrhynchus*, *L. fasciatus*, *Acanthopsetta nadeshnyi*, *Microstomus stelleri*, *Hippoglossoides dubius*, *Hippoglossus stenolepis*, *Limanda schrenki*. Schmidt (1905) gave information for the first time on the commercial fish species of Sakhalin Island, including Aniva Bay.

In the same period, some information on the fishes of Aniva Bay was given in a separate publication by Tanaka (1908) in a series of works published in 1911–1930 under the general title “Figures and Descriptions of the Fishes of Japan, Including Riukiu Islands, Bonin Islands, Formosa, Kuril Islands, Korea, and Southern Sakhalin” (a review of this extensive series is presented in the work of Tomiyama and Abe (1953) and also in the joint work on fishes of Japan with American colleagues (Jordan et al., 1913). However, the information on the ichthyofauna of this bay is



**Fig. 1.** Total number of fish species in Aniva Bay according to various sources: \*without a list of species.

given mainly on the basis of Schmidt's monograph (1904). It is necessary to separately note the "Albatross" USA scientific expedition, which in 1906 visited Aniva Bay and collected ichthyological material that served as the basis for Hubbs (1915) to describe several new species, such as *Hippoglossoides propinquus*, *Limanda asprella*, *L. korigarei*, and *L. sakhalinensis*. Sakhalin material collected in 1906 by the "Albatross" expedition from Aniva Bay is still kept in various collections of the United States (California Academy of Sciences, San Francisco (CAS-SU), National Museum of Natural History, Smithsonian Institution, Washington D.C. (USNM)). In the late 19th–early 20th century, the island ichthyofauna was studied by V.K. Brazhnikov, who was on the schooner "Storozh" in 1899–1902 and collected a vast collection of fishes from the Sea of Okhotsk and the Sea of Japan, including waters off the coast of Sakhalin and the Amur Liman, still kept in the ZIN. Later, Soldatov (1915), based on a specimen of ZIN RAN caught in Aniva Bay, described a new species *Artediellus schmidti*. Schmidt (1916), based on a specimen obtained by V.K. Brazhnikov (1899–1902) from Aniva Bay and transferred to ZIN RAN (ZIN RAN no. 19105), described a new species *Gilbertidia ochotensis*. Taranetz (1935) described a new species *Stichaeus ochriamkini*, a description of which included samples (syntypes) from Aniva Bay. Japanese researcher Isii (1940) gave some valuable information on coastal fishes of the southern part of Sakhalin, including Aniva Bay. In 1950, Schmidt's monograph (1950) on the fishes of the Sea of Okhotsk was published, which included information about a number of fishes from Aniva Bay.

Lindberg (1959) summarized the data on the ichthyofauna of Aniva Bay in the form of a separate list in

which he presented information on almost 130 species and subspecies of fish. The results of further research in this direction are presented in the fundamental works on the Far East seas of Russia by Lindberg et al. (Lindberg and Legeza, 1959, 1965; Lindberg and Krasnyukova, 1969, 1975, 1987; Lindberg and Fedorov, 1993; Lindberg et al., 1997). In this series of guidelines, there is information on the marine and brackish-water ichthyofauna of Sakhalin but, to a greater extent, for the southern part of the island, including Aniva Bay. Pietsch and Orr (2006), based on samples from Aniva Bay and the adjoining southern part of the Sea of Okhotsk and the Okhotsk Sea coast of Hokkaido, described a new species, *Triglops dorothy* Pietsch et Orr 2006, the holotype for which served a specimen from Aniva Bay sampled by the "Albatross" expedition in 1906. Thus, during 200 years of study, only over 20 species were described from Aniva Bay (Table 1), of which 13 are recognized today as valid. In addition, for other species *Liparis takashimensis* Nojima, 1936, a specimen from this bay was used as a neotype (ZIN RAN no. 42386) (Chernova, 2008).

Of the recent works for the investigated bay, mention should be made of the publication of Velikanov and Stominok (2004), in which the authors report on 164 species (but without provision of the actual list of these species), as well as a series of recent works (Dyldin and Orlov, 2016a, 2016b, 2017a, 2017b) on the freshwater and brackish-water ichthyofauna of Sakhalin Island, which provides information on 120 species of fish (Fig. 1). In addition to the above studies, scattered information on new findings, biology, and ecology for individual species or groups of species can be found in various scientific publications (Ueno, 1971; Borets, 2000; Kim, 2000; 2004; 2005; 2007; Nikiforov, 2001; Radchenko, 2002; Velikanov, 2002, 2004, 2006, 2010; Safronov and Nikiforov, 2003; Fadeev, 2005; Velikanov et al., 2005, 2016; Sokolovsky et al., 2007, 2011; Mukhametova, 2008; Velikanov and Mukhametov, 2011; Pietsch et al., 2012; Nikitin et al., 2013; Labai et al., 2014, 2015; Parin et al., 2014; Tuponogov and Kodolov, 2014; Dyldin, 2015; Romanov, 2015; Dyldin et al., 2016, 2017; *Vodnaya...*, 2016; Dyldin and Orlov, 2018).

The above information on ichthyological research of Aniva Bay, for more than 200 years, to a greater extent (with the exception of Schmidt's works (1904, 1950) and publications with the participation of the first author of this article) is incomplete and fragmentary: it concerns individual findings and refers only to commercial species or individual parts of their biology. Thus, it is long overdue to summarize the accumulated data and present the most complete taxonomic list of the bay's fishes, taking into account the requirements of the modern nomenclature, a number of recent taxonomic revisions, and indication of the conservation status and ecological features.

**Table 1.** Number of descriptions of fish species from Aniva Bay and their modern taxonomic status

First description	Modern taxonomic status ( <i>Catalog of Fishes...</i> , 2017)
<i>Agonus rostratus</i> Tilesius, 1813	synonym of <i>Brachyopsis segaliensis</i> (Tilesius, 1809)
<i>Phalangistes fusiformis</i> Tilesius in Pallas, 1814	synonym of <i>Brachyopsis segaliensis</i> (Tilesius, 1809)
<i>Cottiusculus gonez</i> Schmidt, 1904	<i>Cottiusculus gonez</i> Schmidt, 1904
<i>Cottus amblystomopsis</i> Schmidt, 1904	<i>Cottus amblystomopsis</i> Schmidt, 1904
<i>Chloea aino</i> Schmidt, 1904	synonym of <i>Gymnogobius urotaenia</i> (Hilgendorf, 1879)
<i>Agonomalus jordani</i> Schmidt, 1904	synonym of <i>Agonomalus jordani</i> Jordan et Starks, 1904
<i>Eumicrotremus pacificus</i> Schmidt, 1904	<i>Eumicrotremus pacificus</i> Schmidt, 1904
<i>Lycenchelys brachyrhynchus</i> Schmidt, 1904	<i>Davidijordania brachyrhynchus</i> (Schmidt, 1904)
<i>L. fasciatus</i> Schmidt, 1904	<i>Lycodes fasciatus</i> (Schmidt, 1904)
<i>Acanthopsetta nadeshnyi</i> Schmidt, 1904	<i>Acanthopsetta nadeshnyi</i> Schmidt, 1904
<i>Microstomus stelleri</i> Schmidt, 1904	<i>Glyptocephalus stelleri</i> (Schmidt, 1904)
<i>Hippoglossoides dubius</i> Schmidt, 1904	<i>Hippoglossoides dubius</i> Schmidt, 1904
<i>Hippoglossus stenolepis</i> Schmidt, 1904	<i>Hippoglossus stenolepis</i> Schmidt, 1904
<i>Limanda schrenki</i> Schmidt, 1904	<i>Pseudopleuronectes schrenki</i> (Schmidt, 1904)
<i>Hippoglossoides propinquus</i> Hubbs, 1915	synonym of <i>Hippoglossoides robustus</i> Gill et Townsend, 1897
<i>Limanda asprella</i> Hubbs, 1915	synonym of <i>Limanda aspera</i> (Pallas, 1814)
<i>L. korigarei</i> Hubbs, 1915	synonym of <i>Limanda sakhalinensis</i> Hubbs, 1915
<i>L. sakhalinensis</i> Hubbs, 1915	<i>Limanda sakhalinensis</i> Hubbs, 1915
<i>Artediellus schmidti</i> Soldatov, 1915	synonym of <i>Artediellus dydymovi</i> Soldatov, 1915
<i>Gilbertidia ochotensis</i> Schmidt, 1916	synonym of <i>Eurymen gyrinus</i> Gilbert et Burke, 1912
<i>Stichaeus ochriamkini</i> Taranetz, 1935	<i>Stichaeus ochriamkini</i> Taranetz, 1935
<i>Triglops dorothy</i> Pietsch et Orr, 2006	<i>Triglops dorothy</i> Pietsch et Orr, 2006

## MATERIALS AND METHODS

The work is based on critically analyzed literary sources (books, publications, dissertations, scientific reports), electronic catalogs and databases (*Catalog of Fishes...*, 2017; *FishBase...*, 2017; *Global...*, 2017), personal reports from colleagues, research of authors and archival data of SakhNIRO and Anivsky department of ichthyology of Sakhalinrybvod.

The basic classification of higher taxa from class to family is adopted in accordance with the latest developments (van der Laan et al., 2014; Eschmeyer and Fong, 2017). For a number of species, information is given on samples of fish caught in Aniva Bay and stored in various scientific collections (Russia, Japan, and the United States), for which the following abbreviations have been adopted: CAS-SU—California Academy of Sciences, San Francisco, United States; HUMZ—Fish Collection of Hokkaido University, Hokkaido, Japan; USNM—National Museum of Natural History, Smithsonian Institution, Washington D.C., United States; UWFC—the University of Washington Fish Collection, United States; NSMT—Fish Collection of the National Museum of Nature and Science, Tokyo, Japan; KhMSF—Kholmsk Museum of the Sea Fauna, Kholmsk, Sakhalin Island, Russia; ZIN RAN—Zoological Institute of the Rus-

sian Academy of Sciences, St. Petersburg, Russia; SRM—Sakhalin Regional Museum.

All categories of taxa have their sequential numbering. Latin (scientific) names are given with reference to the author (authors) and the year of the original description. Scientific and common names in English are given in accordance with a number of recent publications (Amaoka et al., 2011; Dyldin, 2015; Dyldin et al., 2016, 2017; Dyldin and Orlov, 2016a, 2016b, 2017a, 2017b, 2018; *Catalog of Fishes...*, 2017) or the FishBase Internet resource (*FishBase...*, 2017). Information about each type is presented according to the following scheme.

The zoogeographical characteristics are mainly given in accordance with the latest developments of FAO (FAO Major..., 2017) and Eschmeyer et al. (*Catalog of Fishes...*, 2017), which adopted the following zoogeographical categories: Arctic, North Pacific, Northwestern Pacific etc., including such general categories as cosmopolitan and circumglobal. For freshwater species that are also noted in brackish and sea waters (for example, amphidromous or anadromous, and other species withstanding brackish water), the main common (native) regions of distribution (for example, Japan, China, and Russia) or directly the river basins (for example, the Amur River basin) are

given. In some cases of wider distribution, the general area is indicated as East Asia, Europe, Eurasia, etc.

After the sign of spacing (/), the abundance of a species in Aniva Bay (numerous, common, rare or very rare) is given. Following is the ecological characterization of the species (according to Sheiko and Fedorov, 2000; Sokolovsky et al., 2007), with the following categories: littoral—in the tidal zone to a depth of 20 m; neritic (neritopelagic)—in the water column, mainly within the shelf zone; sublittoral—at the bottom from the tidal zone to the lower boundary of the zone of algae growth (a depth of 0–50 m); elitoral—at the bottom, mainly on the shelf at depths of 50–200 m, less often up to 500 m; mesobenthal—at the bottom in the upper sections of the continental or island slopes at depths from 200 to 1500 m; epipelagic—in the water column of the ocean (sea) in the depth range of 0–200 m; anadromous—lives in waters with oceanic salinity, migrates to rivers for spawning; euryhaline (semi-anadromous)—dwells in coastal brackish waters and lower reaches of rivers. Depending on the ecological characteristics of the species in relation to the habitat, the following categories are distinguished: marine, brackish-water, anadromous, freshwater, amphidromous, and landlocked, which forms landlocked forms in fresh waters. Literary sources were used for marine species that are noted in brackish waters (Schmidt, 1904, 1950; Taranetz, 1937; Ueno, 1971; Lindberg and Krasnyukova, 1969, 1975, 1987; Lindberg and Fedorov, 1993; Uehara and Shimizu, 1996; Miyazaki et al., 2013; Dyldin et al., 2016, 2017; Dyldin and Orlov, 2016a, 2016b, 2017a, 2017b, 2018), collection materials specified in the Note and Samples sections, and our own unpublished data. At the end, information on the commercial importance is provided. In the case of its absence, the species is not commercial or does not have it due to rare occurrence.

For most species, taxonomic and other additional information is given in the Note section.

In order to exclude erroneous information on the distribution of a species within the Aniva Bay and adjacent water areas, information on the range is mainly based on specimens kept in various museums of the world, and the indication of the numbers and places of storage is in the Samples section.

Information on the conservation status of a species (if any) is presented in accordance with the Red List of the International Union for Conservation of Nature (IUCN). According to the latest developments (IUCN, 2012, 2015, 2017), the following categories have been adopted to characterize the conservation status of a species: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concern, Data Deficient, and Not Evaluated. Conservation status is also listed in accordance with the Red Book of the Sakhalin Oblast (2016): 0—probably extinct; 1—endangered; 2—declining in numbers; 3—rare; 4—with indefinite sta-

tus; 5—recoverable and recovering; 6—rare with irregular occurrences; 7—out of danger.

The following abbreviations were adopted: \*—according to our and literary data, the species is not noted for the Aniva Bay but is known from the adjacent water areas of the southern part of the Sea of Okhotsk and the Sea of Japan; \*\*—it was indicated for the studied region in the past, but it is not noted at the present time in the light of new data off the coast of Sakhalin and in the adjacent waters, where it was replaced by other species or, possibly, was incorrectly identified in the past; ?—the taxonomic status or identification is doubtful or the range is not clear, and also in cases where information on distribution, abundance, etc., needs to be clarified; i—introducent; ICZN—the International Code of Zoological Nomenclature; RBSO—Red Book of the Sakhalin Oblast.

## RESULTS AND DISCUSSION

Aniva Bay is located in the southern part of Sakhalin Island (Fig. 2) at the junction of two seas—the Sea of Okhotsk and the Sea of Japan—and is a semi-enclosed basin of relatively small size, with a zonally oriented open border. The area of the bay is more than 5000 km<sup>2</sup>. The total length of the coastline of the bay is more than 230 km. With the axial extent of Aniva Bay of approximately 80–110 km, its morphometry is characterized by a relatively small variability in the shoreline and insignificant differences in the relief of the bottom. The eastern shore of the bay is more subdued than the western shore. In the northern part of the bay, the depths are minimal and do not exceed 40 m; on the seaward boundary of the bay, in its relatively deep part, the depths increase to 100–110 m. The exception is the rocky area of the Kamen' Opasnosti to the southeast of Cape Cril'on (*Lotsiya...*, 1989).

More than 140 different watercourses flow into Aniva Bay, more than 80 of them are spawning grounds of salmonid fishes. Of the watercourses flowing into the bay, only 10 rivers have a length exceeding 20 km; the most extensive of them are the Lyutoga, Susuya, Taranay, and Uryum rivers (Table 2); the rest, although they are a site for spawning of anadromous fishes, do not exceed 10 km in length on average. The total spawning area of the rivers flowing into Aniva Bay reaches 2 million m<sup>2</sup>, but almost half of this area is the spawning ground of the Liutoga River, the largest river in the south of Sakhalin Island.

Due to its geographical location, Aniva Bay, together with the La Perouse Strait, is in the zone of active interaction between the waters of the Sea of Okhotsk and the Sea of Japan. In addition to the influence of tides and the influence of atmospheric conditions, the structure of the hydrophysical fields in Aniva Bay and the La Perouse Strait is largely determined by the presence and interaction of waters of various ori-



**Fig. 2.** Aniva Bay and the adjacent territories.

**Table 2.** Rivers with the length of 20 km and more, flowing into Aniva Bay from west to east (according to Sakhalinrybvod)

Name of the river	Length, km	Spawning area of the basin, km <sup>2</sup>
Lyutoga	134	942.7
Susuya	86	200.0
Taranay	57	118.7
Uryum	51	140.3
Srednyaya	37	9.4
Naicha (Tail) (Khvostovka)	32	118.5
Tambovka	31	160.0
Kura (Krestyanovka)	30	147.0
Ulyanovka	29	85.9
Tsunai	27	1.8

gins (Biryulin, 1954; Shelegova, 1958; Leonov, 1960; Moroshkin, 1966; Aota, 1970, 1984; Akagawa, 1977; Takizawa, 1982; Budaeva and Makarov, 1996, 1999; Ohshima et al., 2002). First of all, the hydrological regime of the water area under consideration is formed by the interaction of two currents: the cold East-Sakhalin current coming from the north and the warm Soya current, some streams of which come to the Sakhalin coast from the south, from the Japanese island of Hokkaido.

The bay's coasts lie in different climatic regions. The Cril'on Peninsula is under the influence of the branch of the warm Tsushima (Soya) current, as a result of which are the most snowy winter and warmest summer. The valley position of the Yuzhno-Sakhalin lowland determines the intensification of the continental climate, leading to the coldest winter within the southern part of the island. The Tonino-Aniva Peninsula is largely influenced by the cold waters of the Sea of Okhotsk, so it is cooler in summer but warmer in winter (*Atlas...*, 1967; Kaev et al., 2004).

Waters of Aniva Bay are close to the waters of the subarctic structure and have a corresponding stratification character. In the vertical thermal structure of the bay waters, a cold intermediate layer (CIL) with negative values of the water temperature up to  $-1.5$  to  $1.6^{\circ}\text{C}$  is actively manifested. The indicator of the CIL renewal is, first of all, the minimum temperature in its core.

An analysis of the general circulation of water has shown that the regime of existing currents in Aniva Bay is seasonal (Budaeva et al., 1980; Budaeva and Makarov, 1996). In the western part of the bay (area of Cape Cril'on) in the spring-summer period, a slightly cyclonic vortex is observed, transferring water at a speed of 5 to 20 cm/s. In the central part of the bay, there is a whirlwind, the direction of rotation is seasonal: in the spring and autumn seasons, it is cyclonic, while it is anticyclonic in the summer. The rate of transport of water masses in the north of the bay varies

within 3–15 cm/s. The speed of the currents in the vortex located in the central part of the southern boundary of the bay grows throughout the year and varies from 5–10 cm/s (in spring) to 20–25 cm/s (in autumn).

## ANNOTATED LIST OF FISHES OF ANIVA BAY

### I. CLASS PETROMYZONTI—Lampreys

#### 1. ORDER PETROMYZONTIFORMES Berg, 1940—Lampreys

##### 1. Family PETROMYZONTIDAE Bonaparte, 1831—Northern lampreys

###### 1. Genus *LETHENTERON* Gray, 1851

1. *Lethenteron camtschaticum* (Tilesius, 1811)—Arctic lamprey. North Pacific, Arctic and adjacent northeastern Atlantic // Common, for spawning enters all major watercourses (data of Sakhalinrybvod), including Lyutoga, Susuya, Taranay, and Uryum rivers. Epipelagic. Anadromous, landlocked. Not commercial on Sakhalin, however, for example, with small fishery in lower part of Amur River (Dyldin and Orlov, 2016a).

Conservation status: IUCN (Least Concern).

### II. CLASS ELASMOBRANCHII—

#### Sharks and batoids

#### 2. ORDER HEXANCHIFORMES Garman, 1913—Cow sharks

##### 2. Family HEXANCHIDAE Gray, 1851—Cow sharks

###### 2. Genus *NOTORYNCHUS* Ayres, 1855

2. \* *Notorynchus cepedianus* (Péron, 1807)—Broadnose sevengill shark. Almost circumglobally, with exception of northern part of Atlantic Ocean // Not documented for Aniva Bay. Sublittoral. Marine.

Notes. The closest occurrence to the southern part of Sakhalin Island is in the southern part of the Sea of Okhotsk, near the northern and eastern part of Hokkaido Island, which does not exclude the presence of this species in Aniva Bay (Dyldin and Orlov, 2018).

Conservation status: IUCN (Data Deficient).

#### 3. ORDER LAMNIFORMES Garman, 1885—Mackerel sharks

##### 3. Family LAMNIDAE Bonaparte, 1835—Mackerel sharks

###### 3. Genus *CARCHARODON* Smith, 1838

3. *Carcharodon carcharias* (Linnaeus, 1758)—Great white shark. In all oceans, with exception of Arctic Ocean, mainly in temperate waters // Rare, is

reliably known by several specimens in 2007 near Uryum River and at Cape Cril'on in 2014 (Velikanov, 2010; Velikanov et al., 2016). Neritic. Marine, brackish-water.

Conservation status: IUCN (Vulnerable).

4. Genus *LAMNA* Cuvier, 1816

4. *Lamna ditropis* Hubbs et Follett, 1947—Salmon shark. North Pacific and, perhaps, the adjacent Arctic // Common. Epipelagic. Marine, brackish-water, including mouths and lower reaches of large Far East rivers. Is not fished but is possible to be used as by-catch in salmonids harvesting.

Conservation status: IUCN (Least Concern).

4. Family *ALOPIIDAE* Bonaparte, 1838—Thresher sharks

5. Genus *ALOPIAS* Rafinesque, 1810

5. \* *Alopias vulpinus* (Bonnaterre, 1788)—Thintail thresher. Circumglobally to moderate and cold waters // Not documented for Aniva Bay. Epipelagic. Marine, brackish-water.

Notes. It can perhaps enter Aniva Bay both from the Sea of Japan and from the Okhotsk Sea waters of Hokkaido Island (Dyldin and Orlov, 2018).

Conservation status: IUCN (Vulnerable).

4. ORDER *CARCHARHINIFORMES* Garman, 1913—Ground sharks

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

6. Genus *PRIONACE* Cantor, 1849

6. \* *Prionace glauca* (Linnaeus, 1758)—Blue shark. In tropical and temperate waters // No reliable information about capture in Aniva Bay. Epipelagic. Marine. Commercial species in more southern regions, for example, in Japan.

Notes. Was noted by Isii (1940) in the summer for the southern part of Sakhalin Island, where this species, when approaching the shore, follows the shoals of salmonids mixed together with *L. ditropis*. Currently, for the southern waters of Sakhalin, the presence of this species requires documentary evidence. However, its location in the bay is quite probable, as is noted in the adjacent waters along the Pacific coast of the South Kurils and the Okhotsk Sea coast of Hokkaido as well as in Peter the Great Bay (Savinykh, 1998; Sokolovsky et al., 2007, 2011; Shinohara et al., 2012).

Conservation status: IUCN (Near Threatened).

7. Genus *RHIZOPRIONODON* Whitley, 1929

7. \* *Rhizoprionodon acutus* (Rüppell, 1837)—Milk shark. Circumglobally in the tropical zone to temperate waters // Not documented for Aniva Bay. Benthopelagic. Marine, brackish-water.

Notes. The closest occurrence to the southern part of the island is in the southern part of the Sea of Okhotsk, and it was also observed in the Sea of Japan (Dyldin and Orlov, 2018), which does not exclude findings in Aniva Bay.

Conservation status: IUCN (Least Concern).

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

8. Genus *SPHYRNA* Rafinesque, 1810

8. \* *Sphyrna zygaena* (Linnaeus, 1758)—Smooth hammerhead. Circumglobally, mainly in temperate and tropical waters // No reliable information for Aniva Bay about captures. Nerito-pelagic. Marine, brackish-water.

Notes. It may well be observed in Aniva Bay, as there is information about its findings in the southern part of the Sea of Okhotsk, including the coast of Hokkaido (Ueno, 1971; Dyldin, 2015; Dyldin and Orlov, 2018).

Conservation status: IUCN (Vulnerable).

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

7. Family *SOMNIOSIDAE* Jordan, 1888—Sleeper sharks

9. Genus *SOMNIOSUS* Lesueur, 1818

9. *Somniosus pacificus* Bigelow et Schroeder, 1944—Pacific sleeper shark. North Pacific and adjacent Arctic // Abundance requires specification. Mesobenthal. Marine. Object of by-catch, meat is of little use due to some toxicity, unlike liver (Dyldin and Orlov, 2018).

Conservation status: IUCN (Data Deficient).

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

10. Genus *SQUALUS* Linnaeus, 1758

10. *Squalus suckleyi* (Girard, 1855)—North Pacific spiny dogfish. North Pacific and adjacent Arctic // Common. Elitoral. Marine, brackish-water. Forms large aggregations in summer time in open part of Aniva Bay (Rass et al., 1955). Is not fished; however, it is possible to be used as by-catch both in coastal fishery by stationary nets and in open part of the bay (Dyldin and Orlov, 2018). Up to 800 species were caught at once during experimental targeted fishing of this

species in the middle of the last century, in the southern part of the Sea of Okhotsk off the coast of Sakhalin (Rass et al., 1955).

Conservation status: IUCN (Least Concern).

11. ? *Squalus mitsukurii* Jordan et Snyder, 1903—Shortspine spurdog or Mitsukuri's spiny dogfish. Everywhere in tropical latitudes to temperate waters // Indicated by Tanaka (1908) on the basis of two records (without saving specimens) for Aniva Bay off the coast of Korsakov in the past. Elitoral. Marine.

Notes. Modern findings of this species in Aniva Bay are quite probable, where it is most likely simply not taken into account or mistakenly diagnosed as *S. suckleyi*. In addition, *S. mitsukurii* is observed off the Pacific coast of Hokkaido and the Korean Peninsula (Dyldin and Orlov, 2018).

Conservation status: IUCN (Data Deficient).

6. ORDER **RAJIFORMES** Muller et Henle, 1841—Skates

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

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

12. *Beringraja pulchra* (Liu, 1932)—Mottled skate. Northwestern Pacific // Abundance requires specification. Bottom sublittoral. Marine, brackish-water, brackish lakes of Sea of Okhotsk side of Hokkaido Island. Probably may be found as by-catch in fishery of other species.

Notes. A number of authors (Lindberg and Legeza, 1959; Sokolovsky et al., 2007; Antonenko et al., 2011) indicate it in the *Dipturus* or *Raja* genus; however, according to a recent revision (Ishihara et al., 2012), it should be given in the *Beringraja* genus (Last et al., 2016b).

Samples: ZIN RAN no. 35395—La Perouse Strait.

Conservation status: IUCN (Vulnerable).

12. Genus **OKAMEJEI** Ishiyama, 1958

13. *Okamejei kenojei* (Müller et Henle, 1841)—Ocellate spot skate. Northwestern Pacific // Abundance requires specification. Marine. Mesobenthal. Probably may be found as by-catch in fishery of other objects.

Conservation status: IUCN (Data Deficient).

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

13. Genus **ARCTORAJA** Ishiyama, 1958

14. *Arctoraja smirnovi* (Soldatov et Pavlenko, 1915)—Smirnov's skate. Northwestern Pacific // Common (in open waters of the bay). Sublittoral. Marine, brackish-water. Not fished; however, during fishery of other objects, its by-catch can be used both for food needs and processed for fish meal.

Notes. Another species, *Arctoraja parmifera* (Bean, 1881), Alaska skate or armored skate, is usually indicated for Aniva Bay and adjacent waters (Balanov, 2000; Velikanov and Stominok, 2004; Kim, 2007). This species is currently recognized as erroneous, since the range of *A. parmifera* is considered to be limited to the northeastern Pacific, the Bering Sea and the adjacent Arctic (Stevenson et al., 2007, 2008; Orr et al., 2011; Mecklenburg et al., 2016; Dyldin and Orlov, 2018). According to the results of recent molecular studies (Orr et al., 2011), the species under consideration is placed in the *Arctoraja* subgenus. We hold to the opinion expressed earlier (Dyldin, 2015; Dyldin and Orlov, 2018), placing it in the *Arctoraja* genus. According to the generally accepted opinion, the species in question is a representative of the *Bathyraja* genus (Last et al., 2016b).

Samples: ZIN RAN no. 12603—Korsakov, Aniva Bay, southern Sakhalin. Originally this specimen was identified in 1901 by Schmidt (1904) as *Raja binocolata* Girard, 1855; Later, Lindberg and Legeza (1959) gave it under the name *Breviraja smirnovi*. However, this specimen probably still belongs to another species and requires further study, because the minimum depth where the Smirnov's skate dwells is 100 m (Weigmann, 2016) and, if it can be observed in Aniva Bay, then only in the open, deepest waters (Dyldin and Orlov, 2018).

Conservation status: IUCN (Least Concern).

14. Genus **BATHYRAJA** Ishiyama, 1958

15. \* *Bathyraja aleutica* (Gilbert, 1896)—Aleutian skate. Northern Pacific // Not documented for Aniva Bay. Mesobenthal. Marine.

Notes. Based on a wide range of habitats in the water column from 15 to 1602 m (Dyldin and Orlov, 2018), the findings are probable in Aniva Bay. In addition, it is noted on the eastern coast of Sakhalin and in the southern part of the Sea of Okhotsk (Ueno, 1971; Balanov, 2000; Kim, 2007; Uchida, 2017; Dyldin and Orlov, 2018). In the past, this species was indicated in the *Breviraja*, *Raja*, or *Rhinoraja* genus (Dyldin, 2015).

Conservation status: IUCN (Least Concern).

16. \* *Bathyraja bergi* Dolganov, 1983—Berg's skate. Northwestern Pacific // Not documented for

the Aniva Bay, but the presence is probable. Mesobenthal. Marine.

**Notes.** It occurs at depths of 38 m (Panchenko et al., 2016), including the Russian part of the Sea of Japan, from which it can probably get into Aniva Bay across the La Perouse Strait.

**Conservation status:** IUCN (Least Concern).

**17. \* *Bathyraja violacea*** (Suvorov, 1935)—Okhotsk skate. North Pacific // No documentary information about its capture for Aniva Bay. Mesobenthal. Marine.

**Notes.** It is known from the waters of the Sea of Okhotsk and its southern part adjacent to the island, including the southeastern tip of Sakhalin and Hokkaido (Balanov, 2000; Kim, 2010; Amaoka et al., 2011; Grigorov et al., 2017). Based on the depths of habitat (23–1110 m) (Dyldin and Orlov, 2018), it may well come from the southern part of the Sea of Okhotsk into the open waters of Aniva Bay.

**Conservation status:** IUCN (Data Deficient).

7. ORDER MYLIOBATIFORMES Compagno, 1973—Stingrays

11. Family DASYATIDAE Jordan, 1888—Whiptail stingrays

15. Genus *BATHYTOSHIA* Whitley, 1933

**18. \* *Bathytoshia brevicaudata*** (Hutton, 1875)—Short-tail stingray. ? Circumglobally // No reliable information about findings in Aniva Bay, but occurrence quite possible. Elitoral. Marine.

**Notes.** A wide range of habitats in the water column (0–480 m) (Dyldin and Orlov, 2018) allows it to penetrate into the southern part of the Sea of Okhotsk from the Sea of Japan (where it is not rare) through the La Perouse Strait, as well as from the Pacific side of Hokkaido Island with the warming up of water. The closest occurrence to waters of Sakhalin is in the southern part of the Sea of Okhotsk near Abashiri (Hokkaido) in October 2007 (Nagao et al., 2011, as *Dasyatis matsubarai*). According to the latest data, *D. matsubarai* is synonymized with *B. brevicaudata*; furthermore, the generic name *Bathytoshia*, previously mentioned in synonymy with *Dasyatis*, is restored (Last et al., 2016a).

**Conservation status:** IUCN (Least Concern).

12. Family MYLIOBATIDAE Bonaparte, 1835—Eagle rays

16. Genus *MYLIOBATIS* Cuvier, 1817

**19. \* *Myliobatis tobijei*** Bleeker, 1854—Japanese eagle ray. Northwestern Pacific and the southern part of the Bering Sea // No reliable information about findings in Aniva Bay. Elitoral. Marine.

**Notes.** The distribution of this species in the water column (0–220 m) (Dyldin and Orlov, 2018) suggests the findings in Aniva Bay as well. Most closely to the southern coast of Sakhalin, it was found in the Pacific and Sea of Okhotsk waters of Hokkaido (Ueno and Abe, 1966; Ueno, 1971; Jeong et al., 2009; Amaoka et al., 2011). The collection specimen (HUMZ no. 144552) was found in the southern part of the Bering Sea, which is the most northern capture of this species (Dyldin and Orlov, 2018).

**Conservation status:** IUCN (Data Deficient).

III. CLASS ACTINOPTERI—Ray-finned fishes

8. ORDER ACIPENSERIFORMES Berg, 1940—Sturgeons

13. Family ACIPENSERIDAE Bonaparte, 1831—Sturgeons

17. Genus *ACIPENSER* Linnaeus, 1758

**20. *Acipenser mikadoi*** Hilgendorf, 1892—Sakhalin sturgeon. Northwestern Pacific // In the past, there were isolated findings on all the coasts of Sakhalin Island, including Aniva Bay (except for its northeastern part). Last capture in Aniva Bay dated to 1994 in area of Rybatskoye (Nikiforov et al., 1997). Rare in the past, currently not observed. Anadromous.

**Samples:** ZIN RAN no. 13171—Aniva Bay near Korsakov; SRM no. KP 217—Taranay River mouth, Aniva Bay.

**Conservation status:** IUCN (Critically Endangered), RBSO (category 1).

18. Genus *HUSO* Brandt et Ratzeburg, 1833

**21. *Huso dauricus*** (Georgi, 1775)—Kaluga. Northwestern Pacific // Extremely rare. Noted in 1988 near the Lyutoga River mouth (young specimen weighing 12 kg) and in 2014 at Uryum River mouth (young specimen). Anadromous, forms landlocked forms in Amur River basin.

**Conservation status:** IUCN (Critically Endangered), RBSO (category 2).

9. ORDER ANGUILLIFORMES Berg, 1940—Eels

14. Family MURAENESOCIDAE Kaup, 1859—Pike congers

19. Genus *MURAENESOX* McClelland, 1844

**22. *Muraenesox cinereus*** (Forsskål, 1775)—Dag-gertooth pike conger. Western Indo-Pacific // Rare. Littoral. Marine, brackish-water.

**Notes.** There is no documented information about the capture of this species in waters of Sakhalin. Nevertheless, one specimen, which was caught in 2006 in Aniva Bay, was found in the Sakhalin Regional

Museum. In addition, according to our survey data, fishermen occasionally visually observed it in waters of southern Sakhalin in summer.

Samples: SRM no. KP 7988—near the Busse channel mouth, Aniva Bay.

Conservation status: IUCN (Not Evaluated).

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

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

20. Genus **CLUPEA** Linnaeus, 1758

23. *Clupea pallasii* Valenciennes, 1847—Pacific herring. Arctic and North Pacific // Numerous, common. Neritic. Marine, brackish-water. Commercial.

Conservation status: IUCN (Not Evaluated).

21. Genus **KONOSIRUS** Jordan et Snyder, 1900

24. *Konosirus punctatus* (Temminck et Schlegel, 1846)—Dotted gizzard shad. Northwestern Pacific // Rare. Neritic. Marine, brackish-water.

Notes. According to the survey data, it was caught in August 2013 by fishermen (without saving a specimen) in a stationary seine near Cril'on.

Conservation status: IUCN (Not Evaluated).

22. Genus **SARDINOPS** Hubbs, 1929

25. *Sardinops melanostictus* (Temminck et Schlegel, 1846)—Japanese sardine. Northwestern Pacific // Common, numerous. Neritic. Marine, brackish-water (brackish lagoons, mouths of rivers). Fishing value acquired in periods of high numbers. Harvested until the 1990s in waters of western coast of Sakhalin; after more than 20 years, exploitable concentrations were not observed here and appeared again only since 2011 (Velikanov et al., 2012; Velikanov, 2016).

Notes. Information about this species off the coast of Sakhalin for the entire period of research is summarized in the works of Velikanov (Velikanov et al., 2012; Velikanov, 2016). Lindberg and Legeza (1965) and other authors earlier regarded it as a *S. sagax melanosticta* subspecies.

Conservation status: IUCN (Not Evaluated).

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

23. Genus **ENGRAULIS** Cuvier, 1816

26. *Engraulis japonicus* Temminck et Schlegel, 1846—Japanese anchovy. Western Pacific // Common. Neritic. Marine, brackish-water, also observed in brackish lagoons and mouths of rivers and brackish

lakes. Forms numerous clusters in certain years and can be an object of fishing (Velikanov, 2004).

Conservation status: IUCN (Not Evaluated).

11. ORDER **CYPRINIFORMES** Bleeker, 1859—Carps

17. Family **CYPRINIDAE** Rafinesque, 1815—Carps

24. Genus **CARASSIUS** Jarocki, 1822

27. *i Carassius gibelio* (Bloch, 1782)—Prussian carp. Eurasia: from basins of Northern and Baltic Seas to Amur Basin and northern Sakhalin // Common. Freshwater, also withstands brackish coastal waters. Removal by flood waters observed in area of Peschanskoye. Object of local fishing.

Notes. Native for Sakhalin in northern and central parts, acclimatized in southern part, where it is now common (Dyldin and Orlov, 2016b).

Conservation status: IUCN (Not Evaluated).

25. Genus **CYPRINUS** Linnaeus, 1758

28. *i Cyprinus rubrofasciatus* La Cepède, 1803—Amur carp. East Asia // Rare. Freshwater, withstands brackish waters. Object of amateur fishing.

Notes. Native for Sakhalin in northern part, introduced in southern part, where it naturalized and is currently not numerous (Dyldin and Orlov, 2016b).

Conservation status: IUCN (Least Concern).

26. Genus **TRIBOLODON** Sauvage, 1883

29. *Tribolodon brandtii* (Dybowski, 1872)—Pacific redbfin. Northwestern Pacific // Common. Nerito-pelagic. Anadromous, forms landlocked forms. Object of local fishing.

Conservation status: IUCN (Not Evaluated).

30. *Tribolodon hakonensis* (Günther, 1877)—Big-scaled redbfin. Northwestern Pacific // Common. Nerito-pelagic. Anadromous, forms landlocked forms. Object of local fishing.

Samples: HUMZ no. 179553—Aniva Bay, southern part of Sakhalin; CAS-SU no. 13351—Korsakov, Aniva Bay; UWFC no. 46397—east of Korsakov, Aniva Bay; UWFC no. 46390—southeastern side of Lake Maloe Chibisanskoe, Aniva Bay basin, UWFC no. 46387—Mereya River mouth, east of Korsakov, Aniva Bay.

Conservation status: IUCN (Not Evaluated).

31. ? *Tribolodon sachalinensis* (Nikolskii, 1889)—Sakhalin redbfin. Northwestern Pacific // Common.

Nerito-pelagic. Anadromous, freshwater (forms landlocked forms). Object of local fishing.

**Notes.** In most cases, Japanese and Russian researchers use different names for this species: *T. ezoe* Okada et Ikeda, 1937 or *T. hakuensis ezoe*. Nevertheless, Shed'ko (2005), relying on the ICZN priority rule, considers *T. ezoe* the junior synonym of *T. sachalinensis*. However, the name *T. sachalinensis* has not been used for almost 100 years. Therefore, in order to avoid confusion in the case of a special request to the ICZN commission, the name *T. sachalinensis* may be blocked (Dyldin and Orlov, 2016b).

**Samples:** UWFC (all samples are registered under the name *Tribolodon ezoe*) no. 46391—east of Korsakov, Aniva Bay, no. 44985—west side of Lake Maloe Chibisanskoe, 25 km east of Korsakov, Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

## 12. ORDER OSMERIFORMES—Smelts

### 18. Family OSMERIDAE Regan, 1913—Smelts

#### 27. Genus *HYPOMESUS* Gill, 1862

**32. *Hypomesus japonicus*** (Brevoort, 1856)—Shishamo smelt. Northwestern Pacific and the Bering Sea // Common. Neritic. Marine, brackish-water, including mouths of rivers. Commercial species, object of amateur fishing.

**Conservation status:** IUCN (Not Evaluated).

**33. *Hypomesus nipponensis*** McAllister, 1963—Japanese smelt. Northwestern Pacific // Common. Neritic. Anadromous, freshwater (landlocked lake and lake-river forms). Object of amateur fishing.

**Samples:** HUMZ no. 188415—Korsakov, Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

**34. *Hypomesus olidus*** (Pallas, 1814)—Pond smelt. Arctic and North Pacific // Common. Neritic. Anadromous, freshwater (landlocked lake and lake-river forms). Object of amateur fishing.

**Samples:** UWFC no. 46353—east of Korsakov, Aniva Bay; no. 46337—in the channel between Bol'shoe and Maloe Chibisanskoe lakes, north of Ozerskiy, Aniva Bay Basin.

**Conservation status:** IUCN (Least Concern).

#### 28. Genus *MALLOTUS* Cuvier, 1829

**35. ? *Mallotus villosus*** (Müller, 1776)—Capelin. Arctic (circumpolarly), North Atlantic and North Pacific // Common, numerous. Neritic. Marine, brackish-water, including mouths of rivers. Commercial, forms exploitable concentrations.

**Notes.** Based on the results of molecular and morphological analyzes, the subspecies *M. villosus catervarius* (Pennant, 1784)—Far Eastern capelin or uek with a range in the North Pacific and the adjacent Arctic is isolated as a separate species *M. catervarius* (Pennant, 1784) (Mecklenburg et al., 2016). Schultz (1937) came to such a conclusion in the past and wrote a redescription and substantiated the validity of this species. It should also be noted that Rumyantsev (1947), on the basis of some morphological differences (the number of scales above the lateral line and the length of the head), distinguished a special form from waters of British Columbia (Canada)—*M. villosus catervarius natio schultzi* Rumyantsev, 1947 (Andriyashev, 1954; Lindberg and Legeza, 1965). However, according to the current ICZN (International..., 2017), infrasubspecies do not have any taxonomic status.

**Conservation status:** IUCN (Not Evaluated).

#### 29. Genus *OSMERUS* Linnaeus, 1758

**36. *Osmerus dentex*** Steindachner et Kner, 1870—Arctic (Asian) rainbow smelt. North Atlantic, North Pacific and Arctic // Common. Neritic. Anadromous, freshwater. Commercial species, object of amateur fishing.

**Samples:** UWFC (as *Osmerus mordax* (Mitchill, 1814)) no. 46372—Lake Bol'shoe Vavaiskoe, east of Korsakov, Aniva Bay basin.

**Conservation status:** IUCN (Least Concern).

#### 19. Family SALANGIDAE Bleeker, 1859—Icefishes, noodlefishes

#### 30. Genus *SALANGICHTHYS* Bleeker, 1860

**37. *Salangichthys microdon*** (Bleeker, 1860)—Japanese icefish. Northwestern Pacific // Common. Nerito-pelagic. Marine, brackish-water, observed in the mouths of rivers, brackish lakes and lower reaches of rivers. Object of small-scale fishing and amateur fishing.

**Conservation status:** IUCN (Not Evaluated).

#### 13. ORDER SALMONIFORMES Rafinesque, 1810—Salmons or trouts

#### 20. Family SALMONIDAE Jarocki or Schinz, 1822—Salmons or trouts

#### 1. Subfamily SALMONINAE Jarocki or Schinz, 1822—Salmons

#### 31. Genus *ONCORHYNCHUS* Suckley, 1861

**38. *Oncorhynchus gorbuscha*** (Walbaum, 1792)—Pink salmon. North Pacific and adjacent Arctic // Numerous, nevertheless, observed in 2017 in Aniva

Bay only by individual specimens, which is associated with both global warming and marked overfishing in previous years. Perhaps, Aniva pink salmon went to spawn in other rivers of the northern part of Sea of Okhotsk. Thus, for example, an unprecedented catch of pink salmon was observed in Kamchatka in the same period, as in other rivers of the north of the Sea of Okhotsk. Epipelagic. Anadromous, no landlocked forms. Commercial species, object of amateur fishing.

Conservation status: IUCN (Not Evaluated).

**39. *Oncorhynchus keta*** (Walbaum, 1792)—Chum salmon. North Pacific and the adjacent Arctic // Numerous, as in case of pink salmon, mass approach not observed in 2017. Epipelagic. Anadromous, landlocked forms probably do not form. Commercial.

Conservation status: IUCN (Not Evaluated).

**40. *Oncorhynchus kisutch*** (Walbaum, 1792)—Coho salmon. North Pacific and adjacent Arctic // Not numerous. Epipelagic. Anadromous, landlocked, landlocked forms in some lakes in North America and Kamchatka. According to Sakhalinrybvod, by-catch was from 5.0 to 7.7% in some years (1994, 1997, 1998) when catching chum salmon.

Conservation status: IUCN (Not Evaluated).

**41. *Oncorhynchus masou*** (Brevoort, 1856)—Cherry salmon. Northwestern Pacific // Common. Epipelagic. Anadromous, landlocked forms everywhere. Insignificant object of local fishery and by-catch in fishery of other Pacific salmon. Object of amateur fishing.

Samples: UWFC nos. 46183, 46173—north of Kirillovo, western part of Aniva Bay.

Conservation status: IUCN (Not Evaluated).

**42. *i* *Oncorhynchus nerka*** (Walbaum, 1792)—Sockeye salmon. North Pacific and adjacent Arctic // In southern part of the island, in small volumes, it was artificially reproduced, where later individual specimens were caught in Aniva Bay, Lyutoga River, not observed in recent years (data of Sakhalinrybvod). Epipelagic. Anadromous, freshwater, freshwater forms in some lakes in Kamchatka, Southern Kurils (Iturup Island), and Japan.

Conservation status: IUCN (Least Concern).

32. Genus *PARAHUCHO* Vladykov, 1963

**43. *Parahucho perryi*** (Brevoort, 1856)—Japanese huchen or Sakhalin taimen. Northwestern Pacific // Not numerous, with a shrinking number. Neritic. Anadromous, can form landlocked forms in presence of natural obstacles in some rivers, such as, for example, on southwestern coast in Tiu River, Taynoe Res-

ervoir, Kholmskiy District (data of Sakhalinrybvod), and Ishikari River in Hokkaido, and some other locations in Japan (Fukushima et al., 2011). Commercial and amateur fishing prohibited.

Samples: USNM no. 124490—Korsakov (Otomari); UWFC no. 46190—east of Korsakov, Aniva Bay.

Conservation status: IUCN (Critically Endangered), RBSO (category 2).

33. Genus *SALVELINUS* Richardson, 1836

**44. *Salvelinus curilus*** (Pallas, 1814)—Kuril charr. Northwestern Pacific // Common. Epipelagic. Anadromous, freshwater; landlocked stream, lake-stream, and lake forms. Object of local and amateur fishing.

Notes. Different views on the systematic position of this species in the Sakhalin waters are described in detail in the previous publication of the first authors (Dyldin and Orlov, 2016b).

Conservation status: IUCN (Not Evaluated).

**45. *Salvelinus leucomaenis*** (Pallas, 1814)—Whitespotted charr. Northwestern Pacific and Bering Sea // Common, locally numerous. Neritic. Anadromous, landlocked forms (dwarf males). Object of local and amateur fishing.

Notes. In December 1988 and subsequently, there were repeated findings of the “pink” morph of the migratory whitespotted charr in the Lyutoga River and others rivers of Aniva Bay basin.

Conservation status: IUCN (Not Evaluated).

14. ORDER *GADIFORMES* Rafinesque, 1810—Cods

21. Family *GADIDAE* Rafinesque, 1810—Cods

34. Genus *ELEGINUS* Fischer, 1813

**46. *Eleginus gracilis*** (Tilesius, 1810)—Saffron cod. North Pacific and adjacent Arctic // Common. Elitoral. Marine, brackish-water, enters fresh waters of some lakes and mouths of rivers. Commercial species in winter, object of local and amateur fishing.

Conservation status: IUCN (Not Evaluated).

35. Genus *GADUS* Linnaeus, 1758

**47. *Gadus macrocephalus*** Tilesius, 1810—Pacific cod. North Pacific and adjacent Arctic // Common. Elitoral. Marine, brackish-water in brackish lakes of Hokkaido. Commercial.

Samples: USNM no. 160633—Aniva Bay, at Korsakov.

Conservation status: IUCN (Not Evaluated).

36. Genus *Theragra* Lucas, 1898

**48. *Theragra chalcogramma*** (Pallas, 1814)—Alaska pollock or walleye pollock. North Pacific and adjacent Arctic // Common. Elitoral. Marine, brackish lakes of Hokkaido Island. Commercial.

S a m p l e s: USNM nos. 150173, 150176, 150177—Aniva Bay, Korsakov.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

## 15. ORDER BELONIFORMES Berg, 1937—Needlefishes

## 22. Family SCOMBERESOCIDAE Bleeker, 1859—Sauries

37. Genus *Cololabis* Gill, 1896

**49. *Cololabis saira*** (Brevoort, 1856)—Pacific saury. North Pacific // Common. Epipelagic. Marine, brackish-water, brackish lakes of Sea of Okhotsk coast of Hokkaido Island. Fishing takes place at certain periods, when it enters the bay in appreciable amounts with warming up of water.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

## 23. Family BELONIDAE Bonaparte, 1835—Needlefishes

38. Genus *Strongylura* van Hasselt, 1824

**50. *Strongylura anastomella*** (Valenciennes, 1846)—Pacific needlefish. Northwestern Pacific // Rare, can enter Aniva Bay during southern migrations with warm water in summer. Found in July 1991 in a stationary seine off the coast 5–6 km to the south of Uryum River mouth. It was also noted in Aniva Bay in 2008 (A.A. Antonov, personal communication). Nerito-pelagic. Marine.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

## 24. Family HEMIRAMPHIDAE Gill, 1859—Halfbeaks

39. Genus *Hyporhamphus* Gill, 1859

**51. *Hyporhamphus sajori*** (Temminck et Schlegel, 1846)—Japanese halfbeak. Northwest Pacific // Rare, occasionally observed in bay during periods of warming. Neritic. Marine, brackish-water, brackish lakes of Sea of Okhotsk coast of Hokkaido Island.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

## 16. ORDER ZEIFORMES Rafinesque, 1810—Dories

## 25. Family ZEIDAE Rafinesque, 1815—Dories

40. Genus *Zeus* Linnaeus, 1758

**52. \* *Zeus faber*** Linnaeus, 1758—John dory. East Atlantic and western Indo-Pacific // Not observed in Aniva Bay. Elitoral. Marine.

N o t e s. The location near the southern part of Sakhalin and in Aniva Bay, as noted for the Sea of Okhotsk side of Hokkaido Island and the Sea of Japan, is possible (Ueno and Abe, 1966; Amaoka et al., 2011; Shinohara et al., 2012, 2014). Another closely related species, *Zenopsis nebulosa* (Temminck et Schlegel, 1845)—Mirror dory, is noted in Peter the Great Bay and along the Pacific side of the South Kurils and near Hokkaido (Fedorov and Parin, 1998; Sokolovsky et al., 2007, 2011; Amaoka et al., 2011; Shinohara et al., 2014), which also does not exclude the presence of this species in waters of the southern part of Sakhalin Island, including Aniva Bay.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

## 17. ORDER GASTEROSTEIFORMES Gill, 1872—Sticklebacks

## 26. Family HYPOPTYCHIDAE Steindachner, 1880—Sand eels

41. Genus *Hypoptychus* Steindachner, 1880

**53. *Hypoptychus dybowskii*** Steindachner, 1880—Dybowsky's sandeel. Northwestern Pacific // ?Common. Bottom, coastal, sublittoral. Marine, brackish-water, brackish lakes of Hokkaido Island.

S a m p l e s: ZIN RAN no. 12600—at Korsakov, Aniva Bay, extracted from stomach of an *E. gracilis*.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

## 27. Family GASTEROSTEIDAE Bonaparte, 1831—Sticklebacks

42. Genus *Gasterosteus* Linnaeus, 1758

**54. *Gasterosteus aculeatus*** Linnaeus, 1758—Three-spined stickleback. North Atlantic, North Pacific and the adjacent Arctic // Common, numerous. Neritic. Anadromous, marine, brackish-water and freshwater. Not fished.

N o t e s. It has a complex intraspecific structure, and usually Russian authors (Dyldin and Orlov, 2017a) consider the three-spined stickleback as a complex species—*G. aculeatus* complex.

C o n s e r v a t i o n s t a t u s: IUCN (Least Concern).

**55. *Gasterosteus nipponicus*** Higuchi, Sakai et Goto, 2014—Japanese three-spined stickleback. Northwestern Pacific // Abundance requires clarification, but

probably common. Neritic. Anadromous, but can form landlocked estuarine forms (Higuchi et al., 2014). Not fished.

Conservation status: IUCN (Not Evaluated).

43. Genus *PUNGITIUS* Coste, 1848

**56. ? *Pungitius pungitius*** (Linnaeus, 1758)—Ninespine stickleback. Europe, Asia and North America // Common. Neritic. Anadromous, forms landlocked forms. It is not fished.

**Notes.** The presence of this species in Aniva Bay requires further study (Dyldin and Orlov, 2017a). It is necessary to carry out a comparative analysis using both morphological and genetic data. It is possible that in the southern part of the island there is *P. sinensis*.

Conservation status: IUCN (Least Concern).

**57. *Pungitius sinensis*** (Guichenot, 1869)—Chinese ninespine stickleback. Northwestern Pacific // Common. Neritic. Anadromous, freshwater and brackish-water.

**Notes.** In the past, some authors (Lindberg, 1959, Lindberg and Legeza, 1965) gave it as a *P. pungitius sinensis* subspecies.

**Samples:** USNM no. 57469—Aniva Bay.

Conservation status: IUCN (Not Evaluated).

18. ORDER SYNGNATHIFORMES Berg, 1940—Pipefishes

28. Family SYNGNATHIDAE Bonaparte, 1831—Pipefishes

2. Subfamily SYNGNATHINAE Bonaparte, 1831—Pipefishes

44. Genus *SYNGNATHUS* Linnaeus, 1758

**58. \* *Syngnathus schlegeli*** Kaup 1853—Schlegel's pipefish or seaweed pipefish. Northwestern Pacific // Not documented for Aniva Bay. Neritic. Marine, brackish-water, brackish lakes of Sea of Okhotsk side of Hokkaido.

**Notes.** The closest occurrence to the southern part of the island is along the Sea of Okhotsk coast of Hokkaido (Ueno, 1971; Uchida, 2017). The name *S. schlegeli* is a replacement name for *S. tenuirostris* Temminck et Schlegel, 1847, according to ICZN, since the name *S. tenuirostris* was previously used by another author for another species, as *S. tenuirostris* Rathke, 1837 (Kottelat, 2013).

Conservation status: IUCN (Least Concern).

3. Subfamily HIPPOCAMPINAE Bonaparte, 1835—Seahorses

45. Genus *HIPPOCAMPUS* Rafinesque, 1810

**59. \* *Hippocampus mohnikei*** Bleeker, 1853—Japanese seahorse. Northwestern Pacific // Not documented for Aniva Bay. Isii (1940) indicated it as a rare species (most likely the southwestern part) in the past for the southern part of the island. According to the survey data, it is still observed by local residents for the southern part of the island. Bottom coastal, sublittoral. Marine, can probably also be noted in brackish coastal waters.

**Notes.** Usually for the Sea of Japan and the adjacent water areas, *H. japonicus* Kaup, 1856, (Lindberg and Legeza, 1965, Sokolovsky et al., 2007, 2011) was previously indicated. However, the latter is synonymous with *H. mohnikei* (Lourie et al., 2016).

Conservation status: IUCN (Data Deficient).

19. ORDER SCORPAENIFORMES Bloch, 1789—Mail-cheeked fishes

29. Family SEBASTIDAE Kaup, 1873—Rockfishes

4. Subfamily SEBASTINAE Kaup, 1873—Rockfishes

46. Genus *SEBASTES* Cuvier, 1829

**60. *Sebastes glaucus*** Hilgendorf, 1880—Gray rockfish. North Pacific // Common. Sublittoral. Marine. It may be a potential object for commercial fishing.

**Samples:** ZIN RAN no. 43918—Aniva Bay, Sea of Okhotsk.

Conservation status: IUCN (Not Evaluated).

**61. \* *Sebastes inermis*** Cuvier, 1829—Dark-banded rockfish. Northwest Pacific // Not documented for Aniva Bay. Sublittoral. Marine, brackish-water, brackish lakes of Hokkaido Island.

**Notes.** The closest occurrence to waters of the southern part of Sakhalin is in the Sea of Okhotsk side of Hokkaido (Ueno, 1971), and it is still observed in Hokkaido (*Fishes of Japan...*, 2002; Amaoka et al., 2011).

Conservation status: IUCN (Not Evaluated).

**62. \* *Sebastes itinus*** (Jordan et Starks, 1904)—Willow rockfish. Northwestern Pacific // Presence in Aniva Bay needs clarification. Bottom, elitoral. Marine.

**Notes.** For Aniva Bay, it is mentioned in the work of Parin et al. (2014) with an indication of the depths of habitat from 200 to 400 m. However, the depth of Aniva Bay does not exceed 110 m and is mainly 90 m. Therefore, it probably occurs only along the southwestern or southeast side of the island.

Conservation status: IUCN (Not Evaluated).

**63. *Sebastes minor*** Barsukov, 1972—Minor rockfish. Northwestern Pacific // Common. Sublittoral. Marine. It is not fished.

S a m p l e s: ZIN RAN nos. 12419, 42812, 43614—Aniva Bay, Sea of Okhotsk.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

**64. \* *Sebastes nivosus*** Hilgendorf, 1880—Hokkaido rockfish or snowy rockfish. Northwestern Pacific // No documentary information about the capture in Aniva Bay. Sublittoral. Marine, brackish-water, brackish lakes of Hokkaido Island.

N o t e s. It is observed in the southern part of Sakhalin as well as in the adjacent Okhotsk Sea waters of Hokkaido (Ueno, 1971; *Fishes of Japan...*, 2002; Amaoka et al., 2011).

C o n s e r v a t i o n s t a t u s: IUCN (Data Deficient).

**65. \* *Sebastes owstoni*** (Jordan et Thompson, 1914)—Owston's red rockfish. Northwestern Pacific // No reliable information about capture in Aniva Bay. Bottom sublittoral. Marine, brackish-water, observed in brackish lakes of Hokkaido. It is caught along southwestern coast of Sakhalin in coastal fisheries.

N o t e s. It is common on the southwestern coast of Sakhalin (Kim, 2001, Velikanov et al., 2007), and is observed in the southern part of the Sea of Okhotsk and in Hokkaido, Japan (*Fishes of Japan...*, 2002; Amaoka et al., 2011). A wide range of habitats in the water column (depths of 20–400 m) allows us to guess its findings also in Aniva Bay.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

**66. *Sebastes schlegelii*** Hilgendorf, 1880—Schlegel's black rockfish. Northwestern Pacific // Common. Bottom sublittoral. Marine, brackish-water, brackish lakes of Hokkaido, mouths of rivers and brackish lagoons of Sakhalin. Object of amateur fishing.

S a m p l e s: ZIN RAN no. 12417—Busse Lagoon near Sheshkevicha River, Aniva Bay, Sea of Okhotsk; USNM no. 117905 — Korsakov, Aniva Bay.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

**67. *Sebastes steindachneri*** Hilgendorf, 1880—Yellowgray or Steindachner's rockfish. Northwestern Pacific // Common. Elitoral. Marine. Target fishing not carried out, caught only as by-catch.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

**68. *Sebastes taczanowskii*** Steindachner, 1880—White-edged rockfish. Northwestern Pacific // Common. Elitoral. Marine, brackish-water, observed in brackish lakes and mouths of rivers. Target fishing not carried out, object of only amateur fishing.

N o t e s. In the past, Schmidt (1904) defined it for the Aniva Bay as *S. ciliatus* (Tilesius, 1813); in addition, Schmidt considered *S. taczanowskii* as the junior synonym of *S. ciliatus*. At present, the range of the latter is limited to the northeastern Pacific and the Bering Sea, while *S. taczanowskii* is recognized as a valid species (Parin et al., 2014).

S a m p l e s: ZIN RAN no. 12419 (according to Schmidt (1904)—*S. ciliatus*)—Korsakov, Aniva Bay; nos. 31649, 31652—Aniva Bay, Sea of Okhotsk.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

**69. *Sebastes trivittatus*** Hilgendorf, 1880—Threestripe rockfish. Northwestern Pacific // Common. Sublittoral. Marine. Fished as by-catch.

S a m p l e s: ZIN RAN no. 12450—at Korsakov, Aniva Bay.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

**70. *Sebastes wakiyai*** (Matsubara, 1934) — Wakiya's or marvelous rockfish. Northwestern Pacific // Rare, first discovered in Aniva Bay relatively recently (Velikanov, 2006; Velikanov et al., 2007). Marine.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

30. Family **TRIGLIDAE** Rafinesque, 1815—Searobins or gurnards

47. Genus **LEPIDOTRIGLA** Günther, 1860

**71. *Lepidotrigla microptera*** Günther, 1873—Redwing gurnard. Northwest Pacific // Rare. Sublittoral. Marine, brackish-water, brackish lakes of Hokkaido.

N o t e s. It was caught for the first time in Aniva Bay in 2007 near the Lyutoga River mouth (Gudkov, 2010). In the adjacent waters of Hokkaido, other species of this family, *Chelidonichthys spinosus* (McClelland, 1844)—Spiny red gurnard (*Fishes of Japan...*, 2002; Amaoka et al., 2011), was found, which does not exclude its presence in waters of southern Sakhalin and Aniva Bay.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

31. Family **HEXAGRAMMIDAE** Jordan, 1888—Greenlings

5. Subfamily **HEXAGRAMMINAE** Jordan, 1888—Greenlings

48. Genus **HEXAGRAMMOS** Tilesius, 1810

**72. ? *Hexagrammos agrammus*** (Temminck et Schlegel, 1843)—Spotbelly greenling. Northwestern Pacific // Presence of this species in Aniva Bay requires documentary evidence. Bottom, coastal, sub-

littoral. Marine, brackish-water, brackish lakes of Hokkaido.

**Notes.** It was indicated for Aniva Bay in Rutenberg's work (1962), which is quite possible, as it was given for Hokkaido (Amaoka et al., 2011).

**Conservation status:** IUCN (Not Evaluated).

**73. *Hexagrammos lagocephalus*** (Pallas, 1810)—Rock greenling. North Pacific // The presence of this species in the Aniva Bay requires clarification. Elitoral. Marine, brackish-water.

**Conservation status:** IUCN (Not Evaluated).

**74. *Hexagrammos octogrammus*** (Pallas, 1814)—Masked greenling. North Pacific // Numerous. Sublittoral. Marine, brackish-water. In Aniva Bay, is not commercial fishing.

**Samples:** ZIN RAN no. 12524 (Schmidt (1904) defined it as *H. lagocephalus*, but after Schmidt (1950) has redefined it to the *H. octogrammus*)—Korsakov, Aniva Bay; no. 12527—Korsakov, Aniva Bay; USNM no. 160600—Korsakov, Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

**75. *Hexagrammos otakii*** Jordan et Starks, 1895—Otaki's greenling. Northwestern Pacific // ? Common. Bottom, coastal, sublittoral. Marine, brackish-water, brackish lakes of Hokkaido. Fished as by-catch.

**Samples:** ZIN RAN no. 12529—Korsakov, Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

**76. *Hexagrammos stelleri*** Tilesius, 1810—Whitespotted greenling. North Pacific and adjacent Arctic // Numerous. Elitoral. Marine, brackish-water, including Lyutoga River mouth. Fished as by-catch, object of amateur fishing.

**Samples:** ZIN RAN no. 12532—Korsakov, Aniva Bay; no. 12531—at Lyutoga River mouth, Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

6. Subfamily **PLEUROGRAMMINAE** Rutenberg, 1954—Atka mackerels

49. Genus **PLEUROGRAMMUS** Gill, 1861

**77. *Pleurogrammus azonus*** Jordan et Metz, 1913—Arabesque greenling. Northwestern Pacific // Numerous. Elitoral (in the first year of life—epipelagic). Marine, brackish-water. In Aniva Bay, is not commercial fishing.

**Conservation status:** IUCN (Not Evaluated).

32. Family **COTTIDAE** Bonaparte, 1831—Sculpins

50. Genus **ARGYROCOTTUS** Herzenstein, 1892

**78. *Argyrocottus zanderi*** Herzenstein, 1892—Zander's sculpin. Northwest Pacific // Common. Sublittoral. Marine. Nonexploited.

**Notes.** The species is described from Aniva Bay at Korsakov—holotype of ZIN RAN no. 9679, subsequently lost.

**Samples:** ZIN RAN no. 9679 (holotype, lost)—Korsakov, Aniva Bay; USNM no. 119868—Korsakov market.

**Conservation status:** IUCN (Not Evaluated).

51. Genus **ARTEDIELLUS** Jordan, 1885

**79. *Arctediellus aporosus*** Soldatov, 1922—Poreless sculpin. Northwestern Pacific // Rare. Elitoral. Marine. Nonexploited.

**Notes.** In the past for Aniva Bay and the southern part of the Sea of Okhotsk, was given by some authors (Schmidt, 1904, part) under the name *A. pacificus* Gilbert, 1896, and later (Schmidt, 1950; Ueno, 1971) as *A. miacanthus* Gilbert et Burke, 1912. Currently, these species are not included in the composition of the ichthyofauna of Sakhalin, since they are distributed much further north, in the Bering Sea and in the northern Kuril Islands (Parin et al., 2014).

**Conservation status:** IUCN (Not Evaluated).

**80. \*\* *Arctediellus camchaticus*** Gilbert et Burke, 1912—Clownfin sculpin. Northwestern Pacific and the Bering Sea // The presence of this species in Aniva Bay requires documentary confirmation. Elitoral. Marine. Nonexploited.

**Notes.** It is indicated by Schmidt (1927, as *A. ochotensis* morfa *camchaticus* Gilbert et Burke (1912)) for the southern part of Aniva Bay. Schmidt (1950) also gave it for Aniva Bay as *A. camchaticus*, which was subsequently reflected in the work of Parin et al. (2014). Isii (1940) indicated *A. ochotensis camchaticus* for this region. In addition, the closest occurrence to the island is in the adjacent waters of the Japan Sea coast of Japan (Amaoka et al., 2011, Shinohara et al., 2014), which raises some doubts about the prevalence of the species in more northern regions. Since the collection material confirming the above findings is not preserved, there is a high probability that they belong to another closely related species, *A. ochotensis*.

**Conservation status:** IUCN (Not Evaluated).

**81. *Arctediellus dydymovi*** Soldatov, 1915—Dydymov's hooker sculpin. Northwestern Pacific // Not numerous. Elitoral. Marine, brackish-water, Amur Liman. Nonexploited.

**Notes.** Probably, *A. schmidti* Soldatov, 1915, described from Aniva Bay is the junior synonym of *A. dydymovi* (Dyldin and Orlov, 2017a).

**Samples:** USNM nos. 74486–74488 at Korsakov, Aniva Bay; CAS-SU no. 22240—Aniva Bay; ZIN RAN (all as *A. schmidti*) no. 12190—Aniva Bay (where the lectotype was given as a male, and the paralectotype was given as a female) according to Lindberg and Krasnyukova (1987, p. 236); no. 44590—Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

**82. *Artediellus ochotensis*** Gilbert et Burke, 1912 — Okhotsk hooker sculpin. Sublittoral. Northwestern Pacific, the Bering Sea and the adjacent Arctic // Common. Marine, brackish-water, Amur Liman. Nonexploited.

**Notes.** In the past, some authors (Schmidt, 1950, Lindberg, 1959) considered it as an *A. pacificus ochotensis* subspecies.

**Samples:** ZIN RAN nos. 44562, 44563, 44568, 44573—Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

#### 52. Genus *ASTROCOTTUS* Bolin, 1936

**83. \* *Astrocottus leprops*** Bolin, 1936—Tsugaru sculpin. Northwestern Pacific // Not documented in Aniva Bay. Marine, brackish-water.

**Notes.** The closest occurrence to Aniva Bay waters is in the Mombetsu district, Hokkaido (NSMT no. 34091—Okhotsk Sea, off the mouth of Omu-gawa River).

**Conservation status:** IUCN (Not Evaluated).

**84. \* *Astrocottus regulus*** Tsuruoka, Maruyama et Yabe, 2008—Regulus sculpin. Northwestern Pacific // Not documented for Aniva Bay. Marine, brackish-water.

**Notes.** The closest occurrence to Aniva Bay waters is northern Hokkaido (Tsuruoka et al., 2008). In addition, it is noted in waters adjacent to Aniva Bay, in the area of Mombetsu (CAS no. 225634 paratypes, off Oumu, Okhotsk coast of Hokkaido).

**Conservation status:** IUCN (Not Evaluated).

#### 53. Genus *BERO* Jordan et Starks, 1904

**85. *Bero elegans*** (Steindachner, 1881)—Elegant sculpin. Northwestern Pacific // Not documented for Aniva Bay. Bottom, coastal, sublittoral. Marine.

**Notes.** According to the collected specimens (HUMZ nos. 179423–179425, 186920, 186993, 187088, 187090) and the published data (Taranetz, 1937; Ueno, 1971), it is noted both along the southeastern (Starodubskoye) and southwest (Kholmsk)

coast of Sakhalin. Taking into account the depths of habitation from surface waters down to 40 m (*Fish-Base...*, 2017), it should be noted in Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

#### 54. Genus *COTTIUSCULUS* Schmidt in Jordan et Starks, 1904

**86. *Cottiusculus gonez*** Schmidt in Jordan et Starks, 1904—“Gonets” sculpin. Northwestern Pacific // Common. Bottom sublittoral. Marine.

**Notes.** It has now been established that the type locality for this species is Aniva Bay (Kai and Nakabo, 2009). It was earlier considered (Lindberg and Krasnyukova, 1987, p. 238) that the lectotype was determined from other samples collected by P.Yu. Schmidt in the Peter the Great Bay and kept by him in ZIN RAN under no. 12742. The authorship of the original should belong to Schmidt not Jordan and Starks (1904a). The latter used part of the description (text) and five samples (CAS-SU no. 7713—Aniva Bay), sent to them personally by P.Yu. Schmidt, which the authors (Jordan and Starks, 1904a, P. 298–299) directly indicate in the text and the authorship is left for P.Yu. Schmidt. This also applies directly to the authorship of the generic name, which, in their opinion, belongs to P.Yu. Schmidt, which corresponds to Art. 50.1. ICZN (International..., 2017).

**Samples:** no. CAS-SU no. 7713 (lectotype)—Aniva Bay; ZIN RAN no. 12737—Aniva Bay; USNM nos. 74629, 74633—at Korsakov, Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

**87. *Cottiusculus schmidti*** Jordan et Starks, 1904—Kinkazan Island sculpin. Northwestern Pacific // Not documented for Aniva Bay. Bottom, sublittoral. Marine.

**Notes.** It was noted for the southwestern part of Sakhalin (Lindberg, 1959) as well as in the adjoining waters of the Okhotsk Sea coast of Hokkaido (HUMZ nos. 98144, 98168, 98200, 98093, 98729, etc.). Taking into account the depths of 20 m (*FishBase...*, 2017), findings of this species in Aniva Bay are quite likely. It should also be noted that a new species, *C. nihonkaiensis* Kai et Nakabo, 2009, with distribution from the waters of the Korean Peninsula to the northern part of Hokkaido, which is close to *C. schmidti* Jordan et Starks, 1904, has recently been described from waters of the Sea of Japan, but it differs from the latter genetically and in some diagnostic features (Kai and Nakabo, 2009). Finding of this species in Aniva Bay is also likely.

**Conservation status:** IUCN (Not Evaluated).

55. Genus *COTTUS* Linnaeus, 1758

**88. *Cottus amblystomopsis*** Schmidt, 1904—Sakhalin sculpin. Northwestern Pacific // Common. Bottom sublittoral. Amphidromous (marine, brackish-water, freshwater). Object of secondary amateur fishing.

**Notes.** Described by Schmidt (1904) on the specimen from the Lyutoga River, flowing into Aniva Bay.

**Samples:** ZIN RAN no. 12763 (holotype)—approximately 13 km from the mouth upwards on the Lyutoga River, at the village Petropavlovskoe, southern Sakhalin Island; HUMZ nos. 156105, 156107, 156108—Lyutoga River, Aniva Bay basin; UWFC no. 46300—north of Kirillovo, western part of Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

56. Genus *ENOPHRYS* Swainson, 1839

**89. ? *Enophrys diceraus*** (Pallas, 1787)—Antlered sculpin. Northern Pacific and the adjacent Arctic // Common. Elitoral. Marine, brackish water (estuary of the Amur River and mouths of rivers of Peter the Great Bay) (Schmidt, 1904, 1950). Fished as by-catch.

**Notes.** Formally, *E. diceraus* has been indicated in the past in synonymy with *E. lucasi* (Jordan et Gilbert, 1898), but now (Mecklenburg et al., 2002, 2011) it is recognized as a valid species. In the past (Jordan and Starks, 1904a; Tanaka, 1908; Isii, 1940; Lindberg, 1959), other species, *Ceratocottus namiyei* Jordan et Starks, 1904—Namiye's sculpin or an *Enophrys diceraus namiyei* subspecies, were also indicated for Aniva Bay and the southern part of Sakhalin Island. The latter is currently considered by some authors (Tokranov and Sheiko, 2009) in synonymy with *E. diceraus*.

**Samples:** USNM no. 74755—at Korsakov, Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

57. Genus *GYMNOCANTHUS* Swainson, 1839

**90. *Gymnocanthus detrisus*** Gilbert et Burke, 1912—Purplegray sculpin. Northwestern Pacific and the Bering Sea // Common. Elitoral. Marine. Fished as by-catch.

**Samples:** USNM nos. 74704, 74705; CAS-SU no. 22283—at Korsakov, Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

**91. ? *Gymnocanthus galeatus*** Bean, 1881—Armorhead sculpin. North Pacific // Rare. Elitoral. Marine.

**Notes.** The range of *G. galeatus* in waters of Russia is limited to the northern part of the Sea of Okhotsk, the Pacific side of the Northern Kurils, eastern Kamchatka and the Bering Sea (Parin et al., 2002,

2014). According to other data, it is found in the southern part of the Sea of Okhotsk near Hokkaido (Amaoka et al., 2011). However, before additional studies of specimens from the southwestern part of Sakhalin and Aniva, indicated by Schmidt (1904) (if preserved) under the name *G. galeatus* (ZIN RAN no. 12230–12232, 12234, 12274), we include Aniva Bay and the southern part of the Sea of Okhotsk in the range of *G. galeatus*.

**Conservation status:** IUCN (Not Evaluated).

**92. *Gymnocanthus herzensteini*** Jordan et Starks, 1904—Blackedged sculpin. Northwestern Pacific // ? Common. Elitoral. Marine, brackish-water, brackish lakes of Hokkaido. Fished as by-catch.

**Conservation status:** IUCN (Not Evaluated).

**93. *Gymnocanthus intermedius*** (Temminck et Schlegel, 1843)—Intermediate sculpin. Northwestern Pacific // Common. Sublittoral. Marine. Fished as by-catch.

**Conservation status:** IUCN (Not Evaluated).

**94. *Gymnocanthus pistilliger*** (Pallas, 1814)—Threaded sculpin. Northwestern Pacific and the Bering Sea // Common. Marine, brackish-water, Amur Liman and brackish lakes of Hokkaido. Fished as by-catch.

**Notes.** *Cottus ventralis* Cuvier, 1829, is now recognized as the junior synonym of *G. pistilliger*. Nevertheless, Schmidt (1950) distinguished a *G. p. ventralis* subspecies as part of *G. pistilliger*, which was considered as the so-called southern form.

**Samples:** ZIN RAN nos. 12216, 12848—Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

58. Genus *HEMILEPIDOTUS* Cuvier, 1829

**95. *Hemilepidotus gilberti*** Jordan et Starks, 1904—Gilbert's Irish lord. Northwestern Pacific and the Bering Sea // Common. Marine. Fished as by-catch.

**Samples:** ? ZIN RAN no. 12858—Aniva Bay. This specimen was defined by Schmidt (1904) as *H. hemilepidotus* (Tilesius, 1811), later (Lindberg and Krasnyukova, 1987) was identified as *H. gilberti*, which requires additional study of this specimen, which can refer to other species, *H. jordani* Bean, 1881.

**Conservation status:** IUCN (Not Evaluated).

**96. ? *Hemilepidotus jordani*** Bean, 1881—Yellow Irish lord. North Pacific and the adjacent Arctic // Abundance and presence of this species in Aniva Bay needs clarification. Elitoral. Marine.

**Notes.** Schmidt (1904) believed that Aniva Bay and other parts of Sakhalin Island are inhabited by

*H. hemilepidotus* (Tilesius, 1811), and *H. jordani* is only its variation; therefore, he indicated all Irish lords in this region under the name *H. hemilepidotus*. Subsequently, he regarded the species under consideration (Schmidt, 1950) as a subspecies of the latter, *H. h. jordani*. In accordance with modern views (*Catalog of Fishes...*, 2017), *H. hemilepidotus* is distributed much further north. In this connection, specimens (ZIN RAN no. 12219, 12858), indicated by Schmidt for Aniva Bay, which we have previously referred to *H. jordani*, require additional research.

Samples: ZIN RAN nos. 12219, 12858—Aniva Bay.

Conservation status: IUCN (Not Evaluated).

**97. *Hemilepidotus papilio*** (Bean, 1880)—Butterfly sculpin. Northwestern Pacific, Bering Sea and adjacent Arctic // Common. Sublittoral. Marine, brackish-water, Amur Liman. Fished as by-catch.

Samples: HUMZ no. 103366—Aniva Bay.

Conservation status: IUCN (Least Concern).

#### 59. Genus *ICELUS* Krøyer, 1845

**98. *Icelus cataphractus*** (Pavlenko, 1910)—Thorny sculpin. Northwestern Pacific // Common. Elitoral. Marine, brackish-water, mouths of rivers of the Peter the Great Bay.

Notes. A number of authors (Schmidt, 1904, 1950, Andriyashev, 1937, Lindberg, 1959, Ueno, 1971, Lindberg and Krasnyukova, 1987, Sokolovsky et al., 2007) referred to it as *I. spiniger* Gilbert, 1896 or as an *I. s. cataphractus* subspecies. At present, the range of *I. spiniger* is limited by more northern waters—the northern part of the Sea of Okhotsk and the Bering Sea (Parin et al., 2014)—and more southerly regions are the range of *I. cataphractus*.

Samples: ZIN RAN nos. 12222–12224 (identified in the past by Schmidt (1904) as *I. spiniger*), 33597—Aniva Bay; USNM nos. 74561, 74566—at Korsakov, Aniva Bay; HUMZ nos. 102051, 102065, 103341, 103352—Aniva Bay.

Conservation status: IUCN (Not Evaluated).

**99. *Icelus gilberti*** Taranetz, 1936—Gilbert's scaly sculpin. Northwestern Pacific // ? Rare. Elitoral. Marine.

Notes. In describing this species, Taranetz (1936) used specimens from the Sea of Japan and the Sea of Okhotsk, including those captured at Cape Aniva.

Conservation status: IUCN (Not Evaluated).

#### 60. Genus *MEGALOCOTTUS* Gill, 1861

**100. *Megalocottus taeniopterus*** (Kner, 1868)—Southern flathead sculpin. Northwestern Pacific // Common. Sublittoral. Marine, brackish-water, fresh-water—enters the lower reaches of the Amur River. Serves as the object of by-catch and amateur fishing.

Notes. This species was usually indicated in the past as an *M. platycephalus taeniopterus* or *Myoxocephalus platycephalus taeniopterus* subspecies and was also given in synonymy with *Megalocottus platycephalus* (Pallas, 1814). At present, this species is recognized as valid (Bogutskaya et al., 2008; Dyldin and Orlov, 2017a).

Samples: ZIN RAN no. 12205—Sheshkevicha River mouth, Busse Lagoon, Aniva Bay; no. 12256—Lytoga River mouth, Aniva Bay; no. 12257—Vtoraya Pad' at Korsakov, Aniva Bay; no. 42548—Aniva Bay, Sea of Okhotsk; UWFC no. 46308—Uryum River basin, west side of Aniva Bay.

Conservation status: IUCN (Not Evaluated).

#### 61. Genus *MYOXOCEPHALUS* Tilesius, 1811

**101. *Myoxocephalus brandtii*** (Steindachner, 1867)—Snowy or Brandt's sculpin. Northwestern Pacific // Common. Sublittoral. Marine, brackish-water, brackish lakes of Hokkaido, mouth of Amur, etc. Fished as by-catch.

Samples: ZIN RAN nos. 12195, 12284—at Korsakov, Aniva Bay; nos. 12196, 12287—near Sheshkevicha River, Busse Lagoon, Aniva Bay.

Conservation status: IUCN (Not Evaluated).

**102. *Myoxocephalus jaok*** (Cuvier, 1829)—Plain or Kamchatka sculpin. North Pacific and adjacent Arctic // Numerous. Elitoral. Marine, brackish-water, Amur Liman, estuaries of rivers of Peter the Great Bay, brackish lakes of Hokkaido. Fished as by-catch.

Samples: CAS-SU no. 18644—at Korsakov, Aniva Bay.

Conservation status: IUCN (Not Evaluated).

**103. *Myoxocephalus polyacanthocephalus*** (Pallas, 1814)—Great sculpin. North Pacific and adjacent Arctic // Numerous. Elitoral. Marine, brackish-water, noted in brackish lagoons of Sakhalin and brackish lakes of Hokkaido. Fished as by-catch.

Notes. Currently, *Ainocottus ensiger* Jordan et Starks, 1904, previously given (Ueno, 1971) for brackish lakes in Hokkaido, is considered as the junior synonym of *M. polyacanthocephalus* (Dyldin and Orlov, 2017a).

Samples: ZIN RAN no. 13958—Aniva Bay, Sea of Okhotsk.

Conservation status: IUCN (Not Evaluated).

**104. *Myoxocephalus stelleri*** Tilesius, 1811—Steller's sculpin. Northwestern Pacific and Bering Sea // Numerous. Sublittoral. Marine, brackish-water, Amur Liman, Ozyornaya River mouth (Kamchatka), brackish lakes of Hokkaido, mouths of rivers of southern Sakhalin. Fished as by-catch.

S a m p l e s: ZIN RAN no. 12266—at Korsakov, Aniva Bay; no. 12267—Lyutoga River mouth, Aniva Bay; no. 12203—Busse Lagoon, Aniva Bay; no. 12269—at Sheshkevicha River, Busse Lagoon, Aniva Bay; HUMZ nos. 179356, 179547—Aniva Bay.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

62. Genus *OCYNECTES* Jordan et Starks, 1904

**105. \* *Ocynectes maschalis*** Jordan et Starks, 1904—Wakanoura sculpin. Northwestern Pacific // Not documented for Aniva Bay. Elitoral. Marine.

N o t e s. It can be observed in Aniva Bay, as indicated for the southern part of Sakhalin Island (Jordan et al., 1913—without the exact place of capture), as well as its southeastern and southwestern parts (Ueno, 1971). In addition, the closest occurrence to the island is in Sea of Okhotsk near the Shiretoko Peninsula, Hokkaido (Shinohara et al., 2012).

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

63. Genus *POROCOTTUS* Gill, 1859

**106. *Porocottus japonicus*** Schmidt, 1935—Japanese fringed sculpin. Northwestern Pacific // Abundance requires specification. Sublittoral. Marine, brackish-water, is noted in the lower reaches of rivers of Sakhalin. Fished as by-catch.

N o t e s. To date, according to the samples of the ZIN RAN nos. 26309–26315, 26317, this species, was known along the west coast of Sakhalin in the Sea of Japan. But the samples of the HUMZ, for the first time allow it is added to the list of ichthyofauna of Aniva Bay, Sea of Okhotsk. According to the ZIN RAN lectotype no. 26314 (Lindberg and Krasnyukova, 1987. P. 222), the type locality is Shirokaya Pad', western Sakhalin, Tatar Strait, northern Sea of Japan, Russia (originally given as “Chikhachev [De-Kastri] Bay and western coast of Sakhalin”).

S a m p l e s: HUMZ nos. 179346, 182891–182893—Aniva Bay, the southern part of Sakhalin Island.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

**107. *Porocottus minutus*** (Pallas, 1814)—Okhotsk fringed sculpin. Northwestern Pacific // Abundance requires specification. Sublittoral. Marine. Can be fished as by-catch.

N o t e s. In the past, it was not known for Sakhalin (Neelov, 1976). However, under this name, it is pre-

sented in two collections for both the southern and northern part (UWFC no. 44804—northern part of Sakhalin Island, west side of Cape Elizabeth) of the island, including Aniva Bay, although the range of this species is confined mainly to the more northern waters.

S a m p l e s: HUMZ nos. 185267, 185268—at Korsakov, Aniva Bay.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

**108. *Porocottus tentaculatus*** (Kner, 1868)—Southern fringed sculpin. Northwestern Pacific // Abundance requires clarification, but probably not numerous. Sublittoral. Marine, brackish-water, including lower course of some rivers of Sakhalin. Fished as by-catch.

N o t e s. Schmidt (1904) pointed out that Singapore, as a type locality, is undoubtedly wrong and is associated with confusion in the labels and, most likely, a type locality was the De-Kastri Bay, which later found confirmation in the work of Neelov (1976).

S a m p l e s: ZIN RAN no. 38277—Aniva Bay; HUMZ nos. 179347, 179348 — eastern part of Aniva Bay; no. 188408 — at Korsakov, Aniva Bay.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

64. Genus *STELGISTRUM* Jordan et Gilbert, 1898

**109. *Stelgistrum stejnegeri*** Jordan et Gilbert, 1898—Furseal sculpin. Northwestern Pacific // Common. Sublittoral. Marine, brackish-water, near mouths of rivers.

N o t e s. A number of authors consider *S. mororane* Jordan et Seale, 1906, in the synonymy with *S. stejnegeri* (Lindberg and Krasnyukova, 1987; Amaoka et al., 2011). According to other data (Tsuruoka et al., 2009), *S. mororane* is a valid species with an area in the Sea of Okhotsk off Hokkaido, which does not exclude the presence of the latter in the Aniva Bay.

S a m p l e s: ZIN RAN nos. 12932, 44166, 44167—Aniva Bay; CAS-SU no. 7577—Aniva Bay, Sakhalin Island.

C o n s e r v a t i o n s t a t u s: IUCN (Not Evaluated).

65. Genus *TAUROCOTTUS* Soldatov et Pavlenko, 1915

**110. \* *Taurocottus bergii*** Soldatov et Pavlenko, 1915—Berg's sculpin. Northwestern Pacific // Not documented for Aniva Bay. Elitoral. Marine.

N o t e s. It is observed both off the southeastern and southwestern coasts of Sakhalin (Lindberg, 1959; Ueno, 1971) as well as off Hokkaido (Amaoka et al., 2011). Taking into account the depths of 25–200 m

(Amaoka et al., 2011), findings in the Aniva Bay are quite possible.

Conservation status: IUCN (Not Evaluated).

66. Genus *TRIGLOPS* Reinhardt, 1830

**111. *Triglops dorothea*** Pietsch et Orr, 2006—Dorothea's sculpin. Northwestern Pacific // Abundance requires specification. Elitoral. Marine.

Notes. A recently described species, the holotype of which was a specimen from Aniva Bay waters, samples by the "Albatross" expedition in 1906 (Pietsch and Orr, 2006).

Sample: USNM no. 74578 (holotype)—Korsakov, Aniva Bay.

Conservation status: IUCN (Not Evaluated).

**112. *Triglops jordani*** (Schmidt, 1904)—Jordan's sculpin. Northwestern Pacific // Common. Elitoral. Marine, brackish-water, Amur Liman, brackish lagoons of Sakhalin.

Notes. Comments on the authorship of the description of this species are given earlier (Dyldin and Orlov, 2017a). Schmidt (1904) initially identified specimens from Aniva Bay, kept in the ZIN (see below), as *Prionistius macellus* Bean, 1884, which were subsequently redefined by him (Schmidt, 1950) as *T. jordani*.

Samples: ZIN RAN nos. 12237–12239, 12854, 12928 (from Schmidt (1904) under the name *Prionistius macellus* Bean, 1884)—Aniva Bay; USNM no. 74729—Aniva Bay approaching Korsakov.

Conservation status: IUCN (Not Evaluated).

**113. ? *Triglops pingelii*** Reinhardt, 1837—Ribbed sculpin. Arctic (circumpolarly), North Atlantic and North Pacific // Abundance requires specification. Elitoral. Marine.

Notes. Isii (1940) indicated *T. beani* Gilbert, 1896, for waters of southern Sakhalin. The latter at the present time (*Catalog of Fishes...*, 2017) is considered as the junior synonym of *T. pingelii*.

Samples: ZIN RAN nos. 12854, 21471, 44354—Aniva Bay.

Conservation status: IUCN (Not Evaluated).

**114. \* *Triglops scepticus*** Gilbert, 1896—Spectacled sculpin. North Pacific // Not documented for Aniva Bay waters. Elitoral. Marine.

Notes. Catches in the southwestern part of Sakhalin Island and the Sea of Okhotsk coast of Hokkaido are confirmed by publications (Lindberg, 1959; Ueno, 1971, Lindberg and Krasnyukova, 1987; Amaoka et al., 2011) and collection material (NSMT no. 68885—off eastern Hokkaido, Sea of Okhotsk), in connection

with that the findings in the open part of Aniva Bay, are quite likely.

Conservation status: IUCN (Not Evaluated).

33. Family **HEMITRIPTERIDAE** Gill, 1865—Sea ravens or sailfin sculpins

67. Genus *BLEPSIAS* Cuvier, 1829

**115. *Blepsias bilobus*** Cuvier, 1829—Crested sculpin. North Pacific and the adjacent Arctic // Abundance requires specification. Elitoral. Marine.

Notes. Some authors (Schmidt, 1904; Lindberg and Krasnyukova, 1987) consider it as part of the *Histiocottus* genus. According to other data (Dyldin and Orlov, 2017a), the *Histiocottus* genus is indicated in synonymy with *Blepsias*. Can probably also be observed in brackish waters similarly to the closely related *B. cirrhosus* species.

Conservation status: IUCN (Not Evaluated).

**116. *Blepsias cirrhosus*** (Pallas, 1814)—Silverspotted sculpin. North Pacific // Common. Elitoral. Marine, brackish-water, brackish lagoons and mouths of rivers of Sakhalin.

Samples: ZIN RAN nos. 12193, 12326—at Korsakov, Aniva Bay; no. 12328—near the Sheshkevicha river, Busse Lagoon, Aniva Bay; no. 12953—Aniva Bay; HUMZ nos. 179343, 179344—eastern part of Aniva Bay; USNM no. 119863—Korsakov market, southern Sakhalin.

Conservation status: IUCN (Not Evaluated).

68. Genus *HEMITRIPTERUS* Cuvier, 1829

**117. *Hemitripterus villosus*** (Pallas, 1814)—Sea raven or shaggy sculpin. North Pacific // Common. Sublittoral. Marine, brackish-water, mouths of rivers of Sakhalin Island and Kamchatka as well as brackish lakes of Hokkaido. Fished as by-catch.

Samples: ZIN RAN no. 12206—Aniva Bay.

Conservation status: IUCN (Not Evaluated).

69. Genus *NAUTICHTHYS* Girard, 1858

**118. *Nautichthys pribilovius*** (Jordan et Gilbert, 1898)—Eyeshade sculpin. Northwestern Pacific, Bering Sea, and adjacent Arctic // Abundance requires specification. Elitoral. Marine, brackish-water. Amur Liman and near mouths of rivers of Kamchatka and Sakhalin.

Samples: ZIN RAN nos. 12218, 12841, 44152, 4415—Aniva Bay.

Conservation status: IUCN (Not Evaluated).

34. Family **PSYCHROLUTIDAE** Günther, 1861—Fathead sculpins

70. Genus **DASYCOTTUS** Bean, 1890

**119.** *Dasycottus setiger* Bean, 1890—Spinyhead sculpin. North Pacific // Common. Mesobenthal. Marine.

**Notes.** In the past, for Sakhalin waters, in addition to *D. setiger*, they indicated another species, *D. japonicus* Tanaka, 1914—Japanese spinyhead sculpin, first described from the Niigata area (Japan), which is observed in the waters of Sakhalin in the La Perouse Strait (Ueno, 1971; Lindberg and Krasnyukova, 1987). In recent reports (Parin et al., 2002, 2014), it is given in synonymy with *D. setiger*, which requires a comparative analysis. A significant distance separating the type localities of *D. setiger* (described from the waters of Alaska, United States) and *D. japonicus* (central part of Honshu Island, Japan) makes us doubt the conspecificity of these species.

**Conservation status:** IUCN (Not Evaluated).

71. Genus **EURYMEN** Gilbert et Burke, 1912

**120.** *Eurymen gyrinus* Gilbert et Burke, 1912—Smooth-cheek sculpin. North Pacific and the adjacent Arctic // Abundance requires specification. Elitoral. Marine.

**Notes.** The species *Gilbertidia ochotensis* Schmidt, 1916, described from Aniva Bay, is now recognized (Parin et al., 2014; *Catalog of Fishes...*, 2017) as a synonym of *E. gyrinus*.

**Samples:** ZIN RAN no. 19105 (holotype of *G. ochotensis*)—Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

72. Genus **PSYCHROLUTES** Günther, 1861

**121.** *Psychrolutes paradoxus* Günther, 1861—Tadpole sculpin. North Pacific // Common. Elitoral. Marine.

**Samples:** ZIN RAN no. 12226—Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

35. Family **AGONIDAE** Swainson, 1839—Poachers

7. Subfamily **AGONINAE** Swainson, 1839—Poachers

73. Genus **FREEMANICHTHYS** Kanayama, 1991

**122.** *Freemanichthys thompsoni* (Jordan et Gilbert, 1898)—Cockscomb poacher. Northwestern Pacific // Common. Sublittoral. Marine, brackish-water, Amur Liman and mouths of rivers of Peter the Great Bay.

**Samples:** ZIN RAN nos. 31678, 31679, 31720, 33083, 44967—Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

74. Genus **PODOTHECUS** Gill, 1861

**123.** *Podothecus accipenserinus* (Tilesius, 1813)—Sturgeon poacher. North Pacific and adjacent Arctic // Abundance requires specification. Elitoral. Marine.

**Conservation status:** IUCN (Not Evaluated)

**124.** \* *Podothecus hamlini* Jordan et Gilbert, 1898—Hamlin's poacher. Northwestern Pacific // Not documented in Aniva Bay. Elitoral. Marine.

**Notes.** It is observed in waters of eastern Sakhalin, along the Sea of Okhotsk coast of Hokkaido, and in the northern part of the Sea of Japan (Kanayama, 1991a, 1991b; Parin et al., 2002; Sheiko and Mecklenburg, 2004; Amaoka et al., 2011; Shinohara et al., 2012), so findings in Aniva Bay are quite possible. In the past, some authors (Schmidt, 1904; Lindberg and Krasnyukova, 1987) considered it in synonymy with *P. gilberti* (Collette, 1895), while others (Mecklenburg et al., 2002) in synonymy with *P. veterinus* Jordan et Starks, 1895. Contrary to these views, most authors (Kanayama, 1991a, 1991b; *Fishes of Japan...*, 2002; Parin et al., 2002; Sheiko, Mecklenburg, 2004) recognize *P. hamlini* as a valid species.

**Conservation status:** IUCN (Not Evaluated).

**125.** *Podothecus sachi* (Jordan et Snyder, 1901)—Sailfin poacher. Northwest Pacific // Rare. Elitoral. Marine.

**Notes.** It is observed in the adjacent waters of Hokkaido (Amaoka et al., 2011).

**Conservation status:** IUCN (Not Evaluated).

**126.** *Podothecus sturioides* (Guichenot, 1869)—Hawk poacher. Northwestern Pacific // Common. Elitoral. Marine, brackish-water, Amur River mouth.

**Notes.** Tanaka (1908) indicated it for waters of Sakhalin as *P. accipiter* Jordan et Starks, 1895, which, along with *P. gilberti* (Collett, 1895) is considered in synonymy with *P. sturioides* at the present time (*Catalog of Fishes...*, 2017).

**Samples:** ZIN RAN (all as *P. gilberti*) nos. 12297, 31677, 31719, 43508, 44808, 44809, 44814, 44816, 46128—Aniva Bay; USNM nos. 148834, 148835, 149580—at Korsakov, Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

75. Genus **SARRITOR** Cramer, 1896

**127.** *Sarritor knipowitschi* Lindberg et Andriasev, 1937—Knipowitsch's poacher. Northwestern Pacific // Common. Elitoral. Marine.

**Notes.** In the past, it was indicated in synonymy with *S. leptorhynchus* (Gilbert, 1896) or as its subspecies, *S. l. knipowitschi* (Lindberg, 1959; Lindberg and Krasnyukova, 1987; Kanayama, 1991a). With the recovery of the validity of *S. knipowitschi* (Parin et al., 2002, 2014; Sheiko and Mecklenburg, 2004), it is necessary to specify the range of a closely related *S. leptorhynchus* (Gilbert, 1896), since the latter is distributed to the north (in the Bering Sea and the adjacent Arctic), and its southern boundary is waters of the central part of the Kuril Islands (Tokranov and Orlov, 2013), and *S. knipowitschi* is distributed to the south (in the southern part of the Sea of Okhotsk and the Sea of Japan). A number of authors (Kanayama, 1991a; Mecklenburg et al., 2002; *Fishes of Japan...*, 2002; Amaoka et al., 2011; Shinohara et al., 2011, 2014; Tohkairin et al., 2015) view this species as belonging to the *Leptagonus* genus; furthermore, some of them (Amaoka et al., 2011, Shinohara et al., 2011, 2014 Tohkairin et al., 2015), moreover, give it under the name *Leptagonus leptorhynchus*, which, is erroneous in our opinion.

**Samples:** ZIN RAN no. 44794—Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

8. Subfamily **ANOPLAGONINAE** Gill,  
1861—Alligatorfishes

76. Genus *ASPIDOPHOROIDES* La Cepède, 1801

**128. ? *Aspidophoroides bartoni*** Gilbert, 1896—Aleutian or Barton's alligatorfish. North Pacific and adjacent Arctic // Common. Elitoral. Marine, brackish-water, Amur Liman, brackish lakes of Hokkaido.

**Notes.** According to several authors (Kanayama, 1991a; Mecklenburg et al., 2002, 2011; Amaoka et al., 2011), *A. bartoni* is the junior synonym of *A. monopterygius* (Bloch, 1786), in which case the range of the latter also includes the waters of the North Pacific. Other authors (Parin et al., 2002; Tokranov and Orlov, 2005; Glubokov and Orlov, 2008; Balykin and Tokranov, 2010) indicate *A. bartoni* for Far Eastern waters. It should be noted that, if *A. bartoni* is isolated into a separate *A. monopterygius* species, it will not be part of the ichthyofauna of the Northern Pacific.

**Samples:** ZIN RAN nos. 12291, 12896, 31821, 31823–31826—Aniva Bay; USNM (as *A. monopterygius*) no. 149891—at Korsakov, Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

9. Subfamily **BRACHYOPSINAE** Jordan et  
Evermann, 1898—Brachyopsins

77. Genus *BRACHYOPSIS* Gill, 1861

**129. *Brachyopsis segaliensis*** (Tilesius, 1809)—Longsnout poacher. Northwestern Pacific // Com-

mon. Sublittoral. Marine, brackish-water, river mouths, brackish lagoons and lakes of Sakhalin and Hokkaido, including Amur Liman, mouths of rivers of Peter the Great Bay.

**Notes.** A number of authors (Schmidt, 1904; Ueno, 1971; Lindberg and Krasnyukova, 1987; *Fishes of Japan...*, 2002, Yamauchi et al., 2008; Amaoka et al., 2011) for Aniva Bay and adjacent waters give another species, *B. rostratus* (Tilesius, 1813), which is considered by other authors (Schmidt, 1950; Kanayama, 1991a, Parin et al., 2002; Sheiko and Mecklenburg, 2004) as a synonym of the first species. Schmidt (1950) noted that Tilesius described the same species under four different names (*B. segaliensis*, *B. rostratus*, *Phalangistes fusiformis* Tilesius in Pallas, 1814, and *Agonus laevigatus* Tilesius, 1813). According to the priority rule, the only valid name among the indicated ones is *B. segaliensis*, and all others should be considered as its junior synonyms. Description of *Agonus rostratus* Tilesius, 1813, is based on samples from waters of Aniva Bay and the Kuril Islands.

**Samples:** ZIN RAN nos. 12320, 12321, 31801–31803—Aniva Bay; USNM no. 148841—Korsakov market.

**Conservation status:** IUCN (Not Evaluated).

78. Genus *OCCELLA* Jordan et Hubbs, 1925

**130. *Ocella dodecaedron*** (Tilesius, 1813)—Bering poacher. Northwestern Pacific, Bering Sea and adjacent Arctic // Common. Sublittoral. Marine, brackish-water, Amur Liman.

**Samples:** ZIN RAN nos. 12876, 31807–31809—Aniva Bay.

**Conservation status:** IUCN (Not Evaluated).

**131. \* *Ocella kasawae*** (Jordan et Hubbs, 1925)—Saddled or Kasawa's poacher. Northwestern Pacific // Not documented in Aniva Bay. Sublittoral. Marine, brackish-water.

**Notes.** The closest occurrence to the island is along the Sea of Okhotsk coast of Hokkaido and the South Kurils (Shikotan, Kunashir and Iturup Islands) (Lindberg, 1959; Lindberg and Krasnyukova, 1987; Kanayama, 1991a; Parin et al., 2002; Sheiko and Mecklenburg, 2004; Amaoka et al., 2011; Shinohara et al., 2012). Therefore, findings in Aniva Bay are quite possible. It should be noted that, in addition to this species, in the southern part of Sakhalin Island and Aniva Bay, one can observe another representative of this genus, *O. iburia* (Jordan et Starks, 1904) — Dun poacher, which is known from the Sea of Japan and along the Pacific and Sea of Okhotsk coasts of Hokkaido (Ueno, 1971; Kanayama, 1991a; Yamamura, 2003; Sheiko, Mecklenburg, 2004; Amaoka et al., 2011; Shinohara et al., 2012, 2014).

Conservation status: IUCN (Not Evaluated).

79. Genus *PALLASINA* Cramer, 1895

**132. *Pallasina barbata*** (Steindachner, 1876)—Tubenose poacher. North Pacific and adjacent Arctic // Common. Sublittoral. Marine, brackish-water, including Amur Liman and mouths of rivers of Peter the Great Bay.

Samples: ZIN RAN nos. 12308, 12309, 12894; USNM no. 148796; CAS-SU no. 26762 (as *P. barbata* subsp. *barbata*) – Korsakov market, Sakhalin.

Conservation status: IUCN (Not Evaluated).

80. Genus *TILESINA* Schmidt, 1904

**133. *Tilesina gibbosa*** Schmidt, 1904—Humpback or demon poacher. Northwestern Pacific // Common. Elitoral. Marine, brackish-water, brackish lakes of Hokkaido.

Samples: ZIN RAN no. 31701—Aniva Bay.

Conservation status: IUCN (Not Evaluated).

10. Subfamily **HYPAGONINAE** Gill, 1861—Hypsagonins

81. Genus *AGONOMALUS* Guichenot, 1866

**134. *Agonomalus jordani*** Jordan et Starks, 1904—Jordan's poacher. Northwestern Pacific // Common. Sublittoral. Marine, brackish-water, brackish lakes of Hokkaido.

Notes. According to the ICZN priority rule, most likely, the authorship belongs to Jordan and Starks (1904b), since their publication was issued in late February 1904 (see comments for the publication date: Eschmeyer et al. (*Catalog of Fishes...*, 2017)), and Schmidt's (1904) description of *A. jordani*, which included samples from Aniva Bay, was probably published later. Jordan and Starks (1904b), when describing a new species, used a sample of Dr. Bashford Dean, captured in the Shiraoi area, Hokkaido, Japan.

Samples: ZIN RAN nos. 12869, 31786–31788—Aniva Bay.

Conservation status: IUCN (Not Evaluated).

**135. *Agonomalus proboscidalis*** (Valenciennes, 1858)—Proboscidean poacher. Northwestern Pacific // Abundance requires specification. Elitoral. Marine, brackish-water, Amur Liman.

Notes. A number of authors (Kanayama, 1991a; *Fishes of Japan...*, 2002; Amaoka et al., 2011; Shinohara et al., 2012) believe that the generic name *Agonomalus* is the junior synonym of *Hypsagonus* Gill, 1861.

Samples: ZIN RAN nos. 31715, 31716—Aniva Bay.  
Conservation status: IUCN (Not Evaluated).

82. Genus *HYPAGONUS* Gill, 1861

**136. ? *Hypsagonus corniger*** Taranetz, 1933—Horned poacher. Northwestern Pacific // Abundance requires specification. Elitoral. Marine.

Notes. A number of authors (Schmidt, 1950; Andriyashev, 1954; Lindberg, 1959; Lindberg and Krasukova, 1987; Sheiko and Mecklenburg, 2004), for the Sea of Japan and the southern part of the Sea of Okhotsk, distinguish a *H. quadricornis corniger* subspecies or an independent *H. corniger* species, which farther north, from the northern part of the Sea of Okhotsk to the Chukchi Sea and the coast of Washington State (United States) in the eastern part of the Pacific Ocean, is replaced by another closely related species, *H. quadricornis* (Valenciennes, 1829). To clarify the current boundaries of the ranges of *H. quadricornis* and *H. corniger*, additional studies are required. Shinohara et al. (2011, 2014) indicate *H. quadricornis* for waters of Japan. Lindberg (1959) gave both species (*H. quadricornis* and *H. corniger*) for the southern part of Sakhalin Island, which, with the validity of *H. corniger*, is probably still erroneous.

Samples: ZIN RAN nos. 12825, 12826, 13108, 31813—Aniva Bay; USNM no. 149573—at Korsakov, Sakhalin Island.

Conservation status: IUCN (Not Evaluated).

83. Genus *PERCIS* Scopoli, 1777

**137. *Percis japonica*** (Pallas, 1769)—Japanese dog poacher. North Pacific // Common. Elitoral. Marine. Not fished, by-catch also not used despite certain exploitability (Tokranov and Orlov, 2008).

Samples: ZIN RAN no. 44791—Aniva Bay.

Conservation status: IUCN (Not Evaluated).

## ACKNOWLEDGMENTS

In order to clarify some controversial issues concerning the taxonomy of a number of fishes of Aniva Bay and other important information, the first author made a trip to the study area in November and early December 2017 in which additional material was collected and the archival data of SakhNIRO and Anivsky Department of Ichthyology of Sakhalinrybvod were studied. The success of this trip would have been impossible without the help of D.S. Vorobyev (Biological Institute of Tomsk State University, Tomsk) and V.Yu. Zharikova (SakhNIRO). Comprehensive travel assistance was also provided by N.V. Lotin, M.E. Pak, and A.V. Ryazantsev (Anivsky

Department of Ichthyology of Sakhalinrybvod). We express sincere gratitude to all the colleagues listed.

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Translated by S. Avodkova