

Fish species in Finland

Lauri Urho and Hannu Lehtonen



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Abstract

About 100 fish species (98 teleosteans, 1 cartilaginous fish and 3 lampreys) were found to be living in Finnish waters. This publication includes a checklist of Finnish fish species which lists the scientific, Finnish, Swedish and English names in a systematic table, and the occurrence of species in fresh and different brackish water areas in Finland is also recorded. Fifty-eight fish species can be considered to be native and resident. Annually, it is possible to find 67 bony fish and two lamprey species in Finnish waters. There are twenty-two marine fish species. More than one third of the species (24) have fresh and brackish water populations and also anadromous ones. The variable conditions (mainly temperature and salinity) have not made it easy for new species to naturalize into Finnish waters. The fish fauna was basically established about 4 000 years ago when the present Baltic Sea era started. Only four species were added to the species list during the last century but two new species were recognised in 2005. Fourteen new fish species have been imported and introduced into Finnish waters. Four of these species have naturalized, i.e. they have established reproductive and self-sustaining stocks after introductions into some water bodies, and four other species are maintained by repeated introductions, though there has been some reproduction success in a few exceptional cases.

Two lamprey species and 59 fish species are known to reproduce more or less every year in Finnish natural waters. One third of all species are either escapers or have been released from fish farms in neighbouring countries, or explorers that have migrated from the southern Baltic Sea or further away. Three species are extinct and anthropogenic changes affect fish fauna far more than all natural events. Dredging and damming of rivers have had the most significant impact on our fish stocks, mainly on anadromous species. At least 30 or maybe even as many as 47 salmon stocks have been lost and only six native stocks have survived. Similarly, only nine original sea trout stocks out of 62 rivers running from Finland to the Baltic Sea are viable. Acidification and eutrophication have also changed the structure of fish fauna in many water areas. Eleven species or their forms have been put into different classes of conservation depending on their vulnerability. Thirty-one fish species are considered to be commercially exploited. The estimated commercial and recreational fish catch in Finland annually is about 150 million kg. Scenarios on climate change and recent events predict significant changes in the structure of fish assemblages and the arrival of new fish species into Finland, e.g. it may be possible to catch the Chinese sleeper (*Percottus glenii*) or some explorer species migrating from the South or East in the near future.

Keywords: fish fauna, fish species checklist, native species, invaders, alien species, climate change, fish diversity

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Tiivistelmä

Nykyisen Suomen vesissä on tavattu noin 100 kalalajia (98 luukaloihin, 1 rustokaloihin ja 3 nahkiaisiin kuuluvaa lajia). Niiden tieteelliset, suomen-, ruotsin- ja englanninkieliset nimet luetellaan systemaattisessa taulukossa, jossa kerrotaan myös mm. lajien esiintymisestä sisävesissä ja rannikkovesissämme. Alkuperäisiä, vakinaisiksi katsottavia kalalajeja on 58. Vuosittain Suomen vesialueilla tavataan 67 luukalalajin ja 2 nahkiaislajin yksilöitä. Lajeista 22 on mereisiä. Yli kolmasosalla lajeista (24) on sisävesi- ja murtovesipopulaatioita sekä useimmilla myös merestä makeaan veteen vaeltavia populaatioita. Vesiemme vaihtelevat ympäristöolosuhteet, ensisijaisesti lämpötilan ja suolapitoisuuden vaihtelut eivät ole olleet helppoja uusien lajien asettumiselle. Kalastomme oli pääpiirteissään muotoutunut jo noin 4 000 vuotta sitten Itämeren nykyisen vaiheen alkaessa. Viime vuosisadalla tunnistettiin vain neljä, mutta tällä vuosikymmenellä on havaittu jo kaksi uutta lajia. Lisäksi Suomeen tuotiin viime vuosisadalla 14 kalalajia, joista neljä on muodostanut vakiintuneita luontaisesti lisääntyviä kantoja ja neljän muun lajin lisääntymistä on havaittu vain muutamissa paikoissa joinakin vuosina.

Vuosittain vesissämme lisääntyy 59 luukalalajia sekä kaksi nahkiaislajia. Kolmasosa Suomessa tavatuista lajeista on muualta tänne uineita, joko naapurimaiden viljelystä karaneita, istutettuja tai eteläiseltä Itämereltä vaeltaneita tunnustelijoita. Kolme lajia on hävinnyt. Ihmisen aiheuttamat muutokset kalastossa ovat huomattavasti luonnollisia muutoksia selvempiä. Merkittävämpiä muutoksia ovat aiheuttaneet vaelluskalajokien patoamiset, rakentamiset ja perkaukset. Vain kuusi alkuperäistä lohikantaa on jäljellä ja 30, ehkä jopa 47, on menetetty. Vastaavasti Itämereen Suomen alueelta laskeneesta 62 meritaimenjoesta vain yhdeksässä on jäljellä alkuperäinen taimenkanta. Happamoituminen ja rehevöityminen ovat myös muuttaneet kalaston rakennetta monissa vesistöissä. Eri uhanalaisuusluokissa on 11 lajia tai niiden muotoa. Kaupallisesti hyödynnettäviin kuuluu 31 lajia. Ammatti- ja vapaa-ajankalastajien vuosittain vesistämme ottama saalis on noin 150 miljoonaa kiloa. Ilmastonmuutosskenaarioiden ja viimeaikaisten havaintojen perusteella kalayhteisöjen lajisuhteisiin on odotettavissa suurehkoja muutoksia. Myös uusia lajeja, ensimmäisten joukossa ehkä rohmutoikko ja eräitä muita etelästä tai idästä levittäytyvien lajien edustajia, löydetään lähivuosina.

Asiasanat: ilmastonmuutos, kalat, lajit, tulokaslajit, Suomi

Urho, L. ja Lehtonen, H. 2008. Kalalajit Suomessa. *Riista- ja kalatalous – Selvityksiä* 1B/2008. 36 s.

Sammandrag

I nuvarande finländska vatten har man påträffat ungefär 100 fiskarter (98 arter tillhör benfiskarna, 1 är broskfisk och 3 arter tillhör nejonögonen). Deras vetenskapliga, finska, svenska och engelska namn finns uppsatta i en systematisk tabell, där också arternas förekomst i våra insjöar och kustvatten framgår. Antalet arter, som betraktas som ursprungliga och permanenta, är 58 st. Årligen påträffas i finländska vatten individer från 67 arter av benfiskar och två arter av nejonöga. 22 av arterna är marina. Över en tredjedel av arterna (24 st) har både insjö- och brackvattenpopulationer och de flesta av dem också populationer, som vandrar från havet till sött vatten. De skiftande miljöförhållandena i våra vatten, främst variationer i temperatur och salthalt, har gjort det svårt för nya arter att etablera sig. Vår fiskfauna var i huvuddrag utformad redan för ca. 4 000 år sedan, då det nuvarande skedet i Östersjöns utveckling påbörjades. Under förra århundradet identifierades endast fyra nya arter, däremot har man under detta årtionde redan iakttagit två nya arter. Under förra seklet infördes till Finland dessutom 14 fiskarter, av vilka fyra har bildat permanenta, naturligt reproducerande bestånd och fyra andra arter har konstaterats föröka sig bara på några platser under några år.

I våra vatten förökar sig årligen 59 arter av benfiskar samt två arter av nejonöga. En tredjedel av de arter som påträffas i Finland har simmat hit från annat håll, antingen som rymlingar från odling i grannländerna, utplanterade arter eller enstaka spanare, som vandrat från södra Östersjön. Tre arter har försvunnit. De förändringar i fiskfaunan, som orsakats av människan är betydligt mer påtagliga än de naturliga förändringarna. De mest betydande förändringarna har förorsakats genom uppdämning, utbyggnad och rensning av vandringsfiskens älvar. Endast sex ursprungliga laxstammar återstår och 30, kanske t.o.m. 47 st har gått förlorade. Likaså finns en ursprunglig öringsstam kvar i endast nio av de 62 öringsälvar, som rinner ut i Östersjön från finländskt område. Försurnig och eutrofiering har förändrat fiskfaunans sammansättning i många vattendrag. 11 arter eller deras olika former är indelade i klasser med olika utrotningsrisk. Till de sk. ekonomiskt nyttjade arterna hör 31 stycken. Yrkes- och fritidsfiskarna fångar årligen ungefär 150 miljoner kg fisk i våra vatten. Utgående från förväntade klimatförändringar och aktuella iakttagelser kan man vänta sig stora förändringar i fisksamhällenas artsammansättning. Också nya arter kommer sannolikt att upptäckas under de närmaste åren, bland de första kanske Amur sleeper (fi. rohmutoikko) och representanter för vissa andra arter, som breder ut sig från söder eller öster.

Nyckelord: klimatförändring, fisk, endemiska arter, främmande arter, fisk fauna

Urho, L. och Lehtonen, H. 2008. Fiskarterna i Finland. *Riista- ja kalatalous – Selvityksiä* 1B/2008. 36 s.

1. Introduction

About 100 fish species (98 teleosteans, 1 cartilaginous fish and 3 lampreys) were found to be living in Finnish waters. Sightings of four species: bluefin tuna (*Thunnus thynnus*), pollack (*Pollachius pollachius*), saithe (*Pollachius virens*), and greater pipefish (*Sygnathus acus*) have been reported but not verified (Lehtonen 2003). A porbeagle, *Lamna nasus* (B.) was found dead on the shore of Åland in 1871.

A couple of lists and several books on fish have been published in Finnish (Malmgren 1863, Mela 1882, Reuter 1893, Mela & Kivirikko 1909, Valle 1934, Kivirikko 1940, Pitkänen 1961, Varjo 1981, Koli 1988, 1997, 2002, Lehtonen 1990, 2003, 2006). A species list with an overview of Finnish fish species has hitherto never been published in English, though more extensive lists with scientific names and symbols referring to Finnish species do exist (Varjo 1981, Varjo et al. 2004). An up-to-date list of Finnish fish including the most recent species is presented in Table 1. The names used mostly follow international species lists e.g. the Catalog of Fishes by W.N. Eschmeyer (updated June 19, 2007) and can be used as a checklist for Finnish fish species.

2. Origins and changes in Finnish fish fauna

Fish started to colonize Finland when the climate started to warm up after the last glacial period about 14 500 years ago. Various periods in the Baltic history (Baltic Ice Lake 12 600 - 11 500 B.P, Yoldian Sea 11 500 - 10 900 B.P, Ancylus Lake 10 900 - 8 800 B.P, and Litorina Sea 8 800 - 5 200 B.P) shaped the emerging fish fauna into a mixture of diadromous, marine and freshwater species. The fish fauna was basically established about 4 000 years ago when the present Baltic Sea era started. Since then the natural changes in Finnish fish fauna have been quite small. Except for several introductions, only some small-sized species, such as alpine bullhead (*Cottus poecilopus*, in 1901), two-spotted goby (*Gobiusculus flavescens*, in 1904), common goby (*Pomatoschistus microps*, in 1947), and sunbleak (*Leucaspius delineatus*, in 1992) were detected and added to the list during the 20th century. The latest arrival, the round goby (*Neogobius melanostomus*), was first caught in 2005. Gibel carp (*Carassius auratus* m. *gibelio*) was recognized half a year later in 2005, though it was probably already here in 2001 (Urho, L. and Pennanen, J., unpublished). Gibel carp probably extended its distribution from Estonia into the Finnish side of the Gulf of Finland and the Archipelago Sea by itself.

Variable conditions have been unfavourable for the establishment of several new species. In the coastal area, even today salinity varies by some per mille within a season and from year to year. In the surface water the salinity increases from zero at the far ends of the Gulf of Finland and Gulf of Bothnia to 6-7 per mille in the northern part of the Main Baltic. Seasonal changes in the salinity gradients in areas offshore from river outlets and in inshore bays,



Figure 1. Perch (*Perca fluviatilis*) is the most common fish species in Finnish inland waters and it also occurs all over the coastal archipelago area. (Photo: L. Urho).



Figure 2. Two-spotted goby has been observed in a few locations in clear water areas along the southwestern coast. (Photo: L. Urho).

are often connected to the amount of precipitation. There is also a vertical gradient in salinity. During the last decades, the oxygen content on the sea bottom has been poor in deep areas. Freshwaters include streams, ponds, rivers and lakes (there are over 180 000 lakes larger than 0.05 ha and almost 30 000 lakes larger than 4 ha in Finland) which are often interconnected to form diverse watercourses. The lakes are mostly shallow and some signs of eutrophication are observed in 10 - 20% of them (Tammi et al. 1997, Rask et al. 2000). Different species react



Figure 3. Gibel carp is the only fish species that has already become naturalized in Finland after recently arriving of its own accord. The spread of gibel has often had an anthropogenic influence elsewhere in Europe. (Photo: L. Urho).



Figure 4. Vendace occurs in the bigger lakes of our waterways, in the Bothnian Bay, Bothnian Sea, Northern Quark and locally in the Gulf of Finland. It has been estimated that there are about 800-2500 vendace lakes in Finland. (Photo: L. Urho).

differently to eutrophication, for example, roach (*Rutilus rutilus*) and bream (*Abramis brama*) increase and burbot (*Lota lota*) and vendace (*Coregonus albula*) decrease in number along with eutrophication (Tammi et al. 1997). Some smaller lakes and rivers running through the excavated ancient Littorina Sea soils have experienced acidification problems which have had clear impacts on fish stocks. The water temperature ranges from 0 - 4 °C during the long winter period when it is covered by ice and peaks up to 20 - 24 °C during the short, light summer.



Figure 5. Herring is the biggest catch in Finland, and its fishing history extends as far back as the 14th century (Melander 1931). (Photo: L. Urho).

Therefore, the growth period for fish is rather short but varies depending on the species' temperature ranges for their optimum growth. The growth in length is typically quite fast during the first summer, but retards during the following ones; Parmanne (1998) gives an example concerning herring. Despite the fact that growth rate decreases with age, fish production, based on efficient resource use by larvae and juveniles, is good (Urho 2002).

Three species have come extinct; two species of sturgeon (*Acipenser sturio* and *A. oxyrinchus*; Ludwig et al. 2002, ref. to two different species) and the wels (*Silurus glanis*). Neither the reasons for extinction nor the status of the species before the extinction are well known. The distribution range of several species, such as the wels, extended further North over 4000 - 5000 B.P., when the climate was 1 – 3 degrees warmer than it is today (Nurminen 2006).

Increasing the numbers of species with stocking has been carried out for more than a hundred years (Halme 1961, 1962), and one or more non-native species were estimated to be stocked in one third of the Fennoscandian lakes (Tammi et al. 2003). Fourteen non-native fish species have been introduced into waters in Finland.

The anthropogenic influence on fish fauna and its environment has been much wider and more profound than natural changes (e.g. Lehtonen and Hildén 1980, Hildén et al. 1982, Hudd et al. 1986, Rapport 1989, Hildén and Rapport 1993, Hudd and Leskelä 1998, Lappalainen and Pesonen 2000, Lappalainen et al. 2000, Jurvelius and Auvinen 2001, Leppäkoski and Olenin 2001, Lehtonen 2002, Tammi et al. 2003). It is especially migratory species, mostly salmonid stocks that have experienced the biggest impact due to dredging and the damming of rivers. Only 6 native salmon (*Salmo salar*) stocks are left in the wild (Fig.25), and at least 30 but maybe as many as 47 have been lost. Salmon stocks in the rivers Tornionjoki and Simojoki have remained viable out of 19 previously well known and 17 possible or probable salmon rivers running down to the Baltic Sea. Only two stocks (River Tana and River Neiden, i.e. Tenojoki and Näätäjäjoki in Finnish) are left out of the five previous salmon stocks in rivers entering from Finland into the Barents Sea. Two landlocked salmon stocks (the rivers Pistojoeki and Hii-



Figure 6. Dredging, construction work and damming of rivers, poor water quality, global changes and mistargeted fishing continuously threaten our trout stocks. (Photo: L. Urho).

tolanjoki) out of the six former stocks are still known to have wild salmon. Sea trout (*Salmo trutta*) originally reproduced in almost all rivers or in at least 62 running from Finland to the Baltic Sea (Hurme 1962, 1970, Ikonen 1985, Juntunen et al. 1997, Saura 2001, Kallio-Nyberg et al. 2001, Kallio-Nyberg et al. 2002). Today, only nine native sea trout stocks remain. Several procedures are being carried out, such as restoration programmes, fisheries restrictions, introductions, restocking experiments and fish ways and ladders that aim to restore salmon and trout stocks are being constructed.

3. Reproductive fish species living in brackish and fresh water in Finland

Annually, it is possible to find 67 fish and two lamprey species (Table 1) in Finnish waters. There are 22 marine species which do not ascend to freshwater with the exception of the flounder (*Platichthys flesus*), which sometimes enters some rivers, and Lake Pulmankijärvi in northern Finland. Most freshwater species have also adapted to live in the coastal brackish water archipelago area. The number of fish species living in the easternmost part of the Gulf of Finland is 42, 51 in the Archipelago Sea, 39 in the Northern Quark and 29 in the northernmost part of the Bothnian Bay.

More than one third of the species (24) have fresh water and brackish water populations and also anadromous ones. Salmon, brown trout, river lamprey (*Lampetra fluviatilis*) and dace (*Leuciscus leuciscus*) are clearly anadromous, but have landlocked forms as well. In Finland, the vimba (*Vimba vimba*) is the only anadromous species, with no known freshwater form.



Figure 7. The native black goby, *Gobius niger*, (in photo) living in the southern and western coast of Finland may find that the recently arrived alien round goby will become a serious competitor. (Photo: L. Urho).

Salmon, sea trout and charr also migrate to northern rivers from the Barents Sea. A few species (bullhead, *Cottus gobio*; fourhorn sculpin, *Triglopsis quadricornis*; spined loach, *Cobitis taenia*) are not known to have any migratory populations, even though they occur and reproduce both in fresh and brackish water. In addition, there are eight freshwater species without any anadromous populations:

- brook lamprey, *Lampetra planeri*,
- brook stickleback, *Culaea inconstans*
- stone loach, *Barbatula barbatula*
- brown bullhead, *Ameiurus nebulosus*
- brook trout, *Salvelinus fontinalis*
- gudgeon, *Gobio gobio*
- alpine bullhead, *Cottus poecilopus*
- blue bream, *Abramis ballerus*

These species are only known to reproduce in freshwaters, many of them in flowing waters. Some gudgeons and blue bream have also been caught in brackish water. Fifty-eight fish and two lamprey species can be considered to be native and resident. To exclude misinterpretations, the lampreys were listed here, though not always classified as fish, since lampreys belong to a fish-like primitive vertebrate group called agnatha or cyclostomes.

Two lamprey species and 59 fish species are known to reproduce more or less every year in our natural waters. There are, however, a few borderline cases. Several recent observations of young-of-the-year garfish (*Belone belone*) indicate that it may have started to reproduce regularly in Finland. Brook stickleback was imported to Finland unintentionally more than

40 years ago and has survived in hatchery ponds and has been later introduced into a brook. The reproduction of the round goby (*Neogobius melanostomus*) is an unresolved issue in our coastal waters, since only one individual has been caught, so far. The sichel (*Pelecus cultratus*) has recently become more abundant near the eastern border of Finland, and has entered Lake Saimaa, but its reproduction has yet to be verified on the Finnish side. Although eel (*Anguilla anguilla*) and cod (*Gadus morhua*) are not able to reproduce in Finnish waters, they have always been considered as belonging to the fish fauna as they are caught annually. At the moment, the cod catches are low and the number of eels naturally ascending our rivers is minimal. Most of the eels caught nowadays are based on releases into fresh waters, approximately 65 000 eels per year.



Figure 8. Brown bullhead was imported to Finland during the 1920s and today there are several naturalized populations in southern and central Finland. (Photo: L. Urho).



Figure 9. The abundance and often also dominance of cyprinid fish in our waters depends not only on the high proportion of cyprinid species but also on their efficient reproduction and ability to benefit from eutrophication. (Photo: L. Urho).

Finnish fish fauna includes 19 cyprinid species (16 original). The numbers of several cyprinid species have increased both in fresh and brackish water along with eutrophication. In the southern coastal area, the dominance of cyprinids has also extended further away from the shore during the recent decades (Lappalainen et al. 2000, Ådjers et al. 2006).

4. Vagrants, explorers and introductions

One third of all species (33 out of 101) are not permanent or not annually occurring native species in Finnish waters. They have either escaped or been released from fish farms in neighbouring countries, or introduced to the sea, e.g.:

- Siberian sturgeon (*Acipenser baeri*)
- Russian sturgeon (*A. gueldenstaedti*)
- starry sturgeon (*A. stellatus*)
- broad whitefish (*Coregonus nasus*)
- coho salmon (*Oncorhynchus kisutch*)
- chum salmon (*O. keta*)
- pink salmon (*O. gorbuscha*)
- longnose sucker (*Catostomus catostomus*)

or explorers like:

- sea lamprey, *Petromyzon marinus*
- piked dogfish, *Squalus acanthias*
- allis shad, *Alosa alosa*
- twaite shad, *Alosa fallax*
- anchovy, *Engraulis encrasicolus*
- conger, *Conger conger*
- fourbeard rockling, *Rhinonemus cimbrius*
- hooknose, *Agonus cataphractus*
- seabass, *Dicentrarchus labrax*
- thinlip mullet, *Liza ramado*
- thicklip grey mullet, *Chelon labrosus*
- mackerel, *Scomber scombrus*
- bonito, *Sarda sarda*
- plaice *Pleuronectes platessa*
- dab, *Limanda limanda*

that extend their migrations into our waters from the southern Baltic Sea or Atlantic Ocean.



Figure 10. Twaite shad individuals have been caught more frequently over recent years in Finland. (Photo J. Pennanen)



Figure 11. Plaice is commonly targeted by fisheries in the southern Baltic Sea. However in Finland fewer than ten individuals have been registered, although many have probably remained unnoticed (Photo: L. Urho).

Fourteen new fish species have been imported and introduced into Finnish waters (Urho et al. 1995).

- Largemouth bass (*Micropterus salmoides*)
- smallmouth bass (*Micropterus dolomieu*)
- sterlet (*Acipenser ruthenus*)
- chinook/king salmon (*Oncorhynchus tshawytscha*)
- sockeye salmon (*Oncorhynchus nerca*)
- grass carp (*Ctenopharyngodon idella*)

have never reproduced in Finland after introduction and vanished after some recordings.



Figure 12. Grass carp (above) together with carp (below) is cultivated and used for water area management purposes in many countries in Europe, but the import of grass carp to Finland in the 1970s led to only one stocking experiment. (Photo: L. Urho).



Figure 13. One-summer-old rainbow trout caught in the River Vantaa, a rare find in Finnish waters. (Photo: L. Urho).

Some species, such as

- lake trout (*Salvelinus namaycush*)
- rainbow trout (*Oncorhynchus mykiss*)
- peled whitefish (*Coregonus peled*)
- carp (*Cyprinus carpio*)

are maintained by repeated introductions. The three last mentioned species have had some reproduction success in a few exceptional cases, but only the reproduction of peled whitefish in two reservoirs and one natural lake has led to an increase in catches afterwards (Sutela et al. 2004).

On the other hand,

- brook stickleback (*Culaea inconstans*)
- brown bullhead (*Ameiurus nebulosus*)
- brook trout (*Salvelinus fontinalis*)
- sunbleak (*Leucaspis delineatus*)

have formed reproductive and self-sustaining stocks after introductions in some water bodies.

None of the species introduced have yet been considered as a threat to the native fish species. Brook trout, however, has replaced native brown trout in some streams, e.g. in the upper reaches of the River Kemijoki (Korhonen et al. 1996). Questions have also been raised about the possible effects of the continuous introduction of rainbow trout into streams inhabited by the native brown trout.



Figure 14. Rainbow trout has become a popular species for introductions for direct recreational fishing purposes. It has been the most important species in fish farming with a harvest of 12 million kg for human consumption in 2006. (Photo: L. Urho).



Figure 15. Sunbleak is said to have been imported from Russia to the Kotka area about a hundred years ago but it is only during recent decades that it has been introduced into some new places in southern Finland. (Photo: L. Urho).



Figure 16. Tens of naturally reproducing brook trout populations are known from small spring containing river systems. Brook trout individuals often remain small. (Photo: L. Urho).



Figure 17. Fishing-size brook trouts are also introduced to some fishing areas. (Photo: L. Urho).

5. Extinct, threatened and near-threatened species and forms

In the latest evaluation (in 2000) the status of sixty-six species or stocks was estimated. Eleven species which were not well enough known or seldom caught, remained unclassified. Eleven species, or their forms, were put into different classes depending on their vulnerability (Rassi et al. 2001) (listed in Table 1).

Sturgeon and wels are extinct, and landlocked salmon was considered to be extinct in the wild (EW). Anadromous salmon and brown trout stocks were classified as endangered (EN) (Rassi et al. 2001). The charr in Lake Saimaa was considered critically endangered (CR) and charr elsewhere as near-threatened (NT). *Cobitis taenia* living in the northern border of its distribution range and found in three places, was considered endangered (EN), asp and two

forms of whitefish (*Coregonus lavaretus*) were considered vulnerable (VU). Other whitefish forms, river lamprey, grayling and vimba were classified as near threatened.

In addition to these, grayling stocks in the Baltic Sea are critically endangered or at least endangered; they are barely reproductive today (Alanära et al. 2006). Eel catches have gone down all over Europe and the number of ascending eels is low in Finnish rivers, too. The status of asp in the last evaluation was raised following successful activities in cultivation and introductions into original and new water courses (Pennanen 2001).



Figure 18. Due to the large scale introductions it is often difficult to estimate from catches how threatened or vulnerable the stocks of trout, whitefish and some rare species are. (Photo: L. Urho).



Figure 19. Stripping of eggs and sperm from brood fish in the wild, incubation until the asp larvae is newly hatched (in photo), further cultivation in ponds with natural food supply and introductions into several waters have diminished the risk of the asp becoming extinct. (Photo: L. Urho).

6. Commercial and recreational use of fish resources

Thirty-one species are considered commercially exploited; however, some of them are nowadays very rare in the fish trade. There are about 1 000 professional fishermen, 2 000 part-time fishermen and almost 2 million recreational fishermen in Finland. In 2006, the marine catch by Finnish commercial fishermen totalled 103 million kg (Riista- ja kalatalouden tutkimuslaitos 2007a). The bulk of the catch consisted of Baltic herring (79.4 million kg), followed by sprat (*Sprattus sprattus*) (19.0 million kg), perch (*Perca fluviatilis*) (0.9 million kg), whitefish (0.7 million kg), cod (0.7 million kg) and zander (*Sander lucioperca*) (0.5 million kg). In 2006, the inland catch by commercial fishermen was about 4.5 million kg (Riista- ja kalatalouden tutkimuslaitos 2007b). The main species caught were vendace (*Coregonus albula*) (2.5 million kg), roach (*Rutilus rutilus*) (0.5 million kg), perch (0.3 million kg), smelt (*Osmerus eperlanus*) (0.2 million kg) and bream (*Abramis brama*) (0.2 million kg) (Riista- ja kalatalouden tutkimuslaitos 2007b).

The total catch by recreational fishermen in 2006 exceeded 42 million kg, 75% of which was from inland waters (Riista- ja kalatalouden tutkimuslaitos 2007c). Perch (13.4 million kg) and pike (*Esox lucius*) (10.5 million kg) made up >50% of the catch, followed by roach (5.0 million kg), zander (2.8 million kg), whitefish (2.5 million kg), bream (2.1 million kg), vendace (1.5 million kg), brown trout (1.0 million kg) and burbot (*Lota lota*) (0.7 million kg). Fifty-five per cent of the total recreational catch was made with gill nets, fish traps and trap nets and forty-three per cent with a rod and line.



Figure 20. Zander is a popular and rather common catch both in fresh and coastal brackish waters. Warm years have produced good zander year classes. Eight million zander are also introduced annually. (Photo: L. Urho).



Figure 21. The five million kg roach catch by Finnish fishermen is likely to become much bigger in the future, even though today this is an undesired development. Roach from clear water lakes (in photo) clearly differ in appearance from those caught in turbid coastal waters (see in fig. 9). (Photo: L. Urho).

7. Future scenario

Global change scenarios indicate that in the near future changes will be more pronounced and accelerated. This is because most of our fish species live at the boarder of their distribution range. Increased temperatures and changes in precipitation may also affect fish populations over large areas of the northern hemisphere (Eaton and Scheller 1996). Climate models for northern Europe indicate that mild and wet winters will occur up to five times more frequently in the following decades than they do today (Palmer and Räisänen 2002). Possible changes in distribution, habitats and interactive processes between fish species will alter the composition of fish assemblages. Fishes live within complex webs of interactions and processes, which include predator-prey interactions, competition and reproduction (Lehtonen 1996). The impact of indirect processes, e.g. increased vegetation may alter the competitive prerequisites of different species and hence the species and size composition of fish assemblages (DeAngelis and Cushman 1990).

The ability of fish to adapt to changing environments is highly species-specific. The predicted climate change will, however, be so rapid that not all fish populations will be able to adapt. Accordingly, three options exist: (i) fish may change their ranges, (ii) fish may disappear from their present home range or (iii) fish may change genetically within the limits of their inheritance. It is likely that all three alternatives will occur (Lehtonen et al. 1992). From a population point of view the best alternative would be adaptation. A general rule is that populations living in varying environments can adapt better than those living in stable environments (Matthews and Zimmerman 1990).

Global warming will probably shift Finnish fish assemblages to cyprinid dominance together with the decrease or collapse of salmonid and other coldwater fish populations (Lehtonen 1996). Some observations show that changes are already taking place in the spawning and hatching times of certain coldwater species, like burbot and whitefish.

The escalated appearance of new species in the Baltic Sea, e.g. with ballast water, means that future changes in the fish fauna will also be more significant. For instance, Chinese sleeper (*Percottus glenii*) has become more abundant in the eastern part of the Gulf of Finland and is expected to disperse further, and to be found in Finnish coastal waters very soon. The range of some fish species has got so close to Finnish territorial waters that it will be possible to catch or observe some individuals in Finnish waters in the near future.



Figure 22. Reproduction and especially larvae survival are most important when it comes to populations and species adjusting and adapting to environmental changes. (Photo: L. Urho).



Figure 23. The survival probability of whitefish larvae may be much lower in future in the southern Finnish coastal area, especially if the warmer winters result in hatching too early in the spring. (Photo: L. Urho).

Such fish species are e.g.

- tubenose goby (*Proterorhinus marmoratus*)
- stone moroko (*Pseudorasbora parva*)
- swordfish (*Xiphias gladius*)
- whiting (*Merlangius merlangus*)
- ling (*Molva molva*)
- grey gurnard (*Eutrigla gurnardus*)
- brill (*Scophthalmus rhombus*)
- gilthead seabream (*Sparus aurata*)
- Atlantic horse mackerel (*Trachurus trachurus*)
- haddock (*Melanogrammus aeglefinus*)



Figure 24. Haddock is never likely to be a common catch in Finland but it may be possible to catch some individuals in our coastal waters as it is already found off the coast of Latvia. The species only becomes common in the Kattegat and Skagerrak area. (Photo: L. Urho).

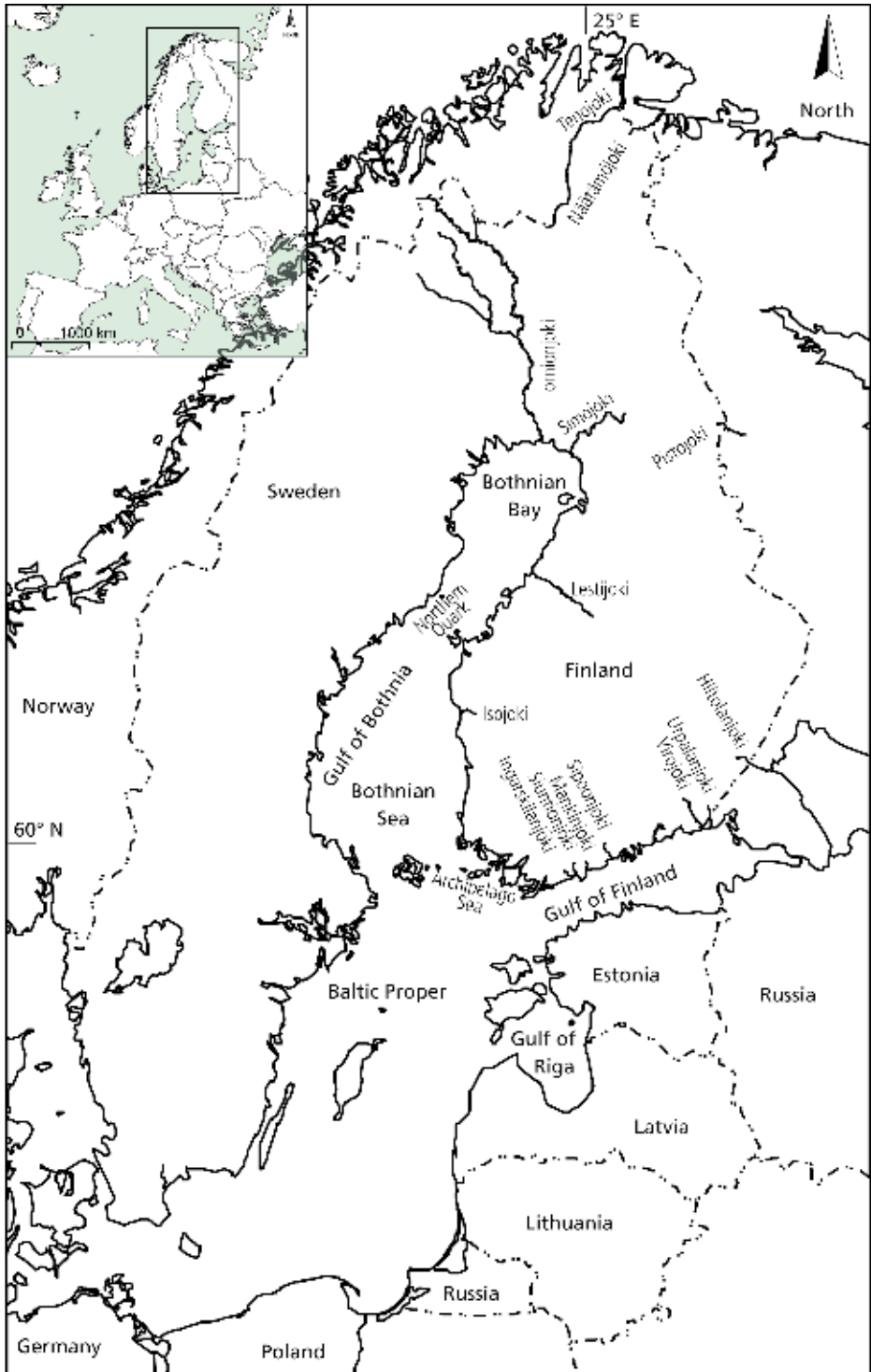


Figure 25. A map of the Baltic Sea with the subareas referred in the table 1 and the six native salmon and nine native sea trout rivers left in the wild.

Table 1. Checklist of Finnish fish species with scientific names. Names in Finnish, Swedish and English are also listed in a systematic table, where species occurrence in Finnish fresh and different brackish water areas, reproduction, commercial species and conservation status in Finland are also recorded.

LUOKKA, CLASS

Lahko, Order

Alalahko, Suborder

Heimo, Family

Alaheimo, Subfamily

4. *Squalus acanthias* (L.) = not annually occurring or introduced, nonnative species

11. *Clupea harengus* L. = indigenous, established species

- = not present/observed;

(†) = found dead;

(F) = has been observed in freshwaters;

(Re) = can reproduce in some years, locally;

AS = Archipelago Sea

B = occurs in brackish water, in the Baltic Sea;

B('GF') = is rare or may occur in the Gulf of Finland;

B(GF) = occurs in brackish water (in the Gulf of Finland):

B(GF,AS,BS,Q,BB) = occurs in brackish water (areas)

B1 = caught once in brackish water;

B10+ = caught more than 10 times in brackish water;

B5+ = caught at least five times in brackish water;

BB = Bothnian Bay;

Bi = introduced into brackish water.

Bi2 = introduced and caught twice in brackish water;

BS = Bothnian Sea

C = commercially exploited

F = occurs in fresh water;

F1 = caught once in fresh water;

Fi = introduced into fresh water;

FS2+ = caught at least twice in fresh water;

GF = Gulf of Finland

nr = no reproduction observed in Finland;

Q = Northern Quark,

Re = reproduces but not annually;

Rea = reproduces annually in Finland;

Status in the last threat classification (Rassa et al. 2001)

*not the whole species but some form;

CR = critically endangered,

En = endangered,

EW = extinct in the wild,

Ex = extinct,

NT = near threatened;

Vu = vulnerable

Systematic position In Finnish, in English	Scientific name	Finnish name	English name
LUOKKA, CLASS	YMPYRÄSUISET, CEPHALASPIDOMORPHI		
Lahko, Order	Nahkiaiskalat, Petromyzontiformes		
Heimo, Family	Nahkiaispetromyzontidae		
	1. <i>Lampetra fluviatilis</i> (L.)	Nahkiainen	River lamprey
	2. <i>Lampetra planeri</i> (Bloch)	Pikkunahkiainen	Brook lamprey
	3. <i>Petromyzon marinus</i> L.	Merinahkiainen	Sea lamprey
LUOKKA, CLASS	RUSTOKALAT, CHONDRICHTHYES		
Lahko, Order	Sillihaitkalat, Lamniformes		
Heimo, Family	Sillihait Lamnidae		
	(<i>Lamna nasus</i> (B.))	Sillihai	Porbeagle
Lahko, Order	Piikkihaikalat, Squaliformes		
Heimo, Family	Piikkihait Squalidae		
	4. <i>Squalus acanthias</i> L.	Piikkihai	Piked dogfish
LUOKKA, CLASS	LUUKALAT, OSTEICHTHYES		
Lahko, Order	Sampikalat, Acipenseriformes		
Heimo, Family	Sammet Acipenseridae		
	5. <i>Acipenser sturio</i> L.	Sampi	Sturgeon
	6. <i>Acipenser oxyrinchus</i> Mitchell	Sinisampi	Atlantic sturgeon
	7. <i>Acipenser ruthenus</i> L.	Sterletti	Sterlet
	8. <i>Acipenser baerii</i> Brandt	Siperiansampi	Siberian sturgeon
	9. <i>Acipenser gueldenstaedtii</i> Brandt & Ratzeburg	Venäjänsampi	Russian sturgeon
	10. <i>Acipenser stellatus</i> Pallas	Tähtisampi	Starry sturgeon
Lahko, Order	Sillikalat, Clupeiformes		
Heimo, Family	Sillit Clupeidae		
	11. <i>Clupea harengus</i> L.	Silakka	Herring
	12. <i>Sprattus sprattus</i> (L.)	Kilohaili	Sprat
	13. <i>Alosa alosa</i> (L.)	Pilkkusilli	Allis shad
	14. <i>Alosa fallax</i> (Lac.)	Täpläsilli	Twaite shad
Heimo, Family	Sardellit Engraulidae		
	15. <i>Engraulis encrasicolus</i> (L.)	Sardelli	Anchovy
Lahko, Order	Ankeriaskalat, Anguilliformes		
Heimo, Family	Ankeriaat Anguillidae		
	16. <i>Anguilla anguilla</i> (L.)	Ankerias	(European) Eel
Heimo, Family	Meriankeriaat Congridae		
	17. <i>Conger conger</i> (L.)	Meriankerias	(European) Conger
Lahko, Order	Haukikalat, Esociformes		
Heimo, Family	Hauet Esocidae		
	18. <i>Esox lucius</i> L.	Hauki	(Northern) Pike
Lahko, Order	Lohikalat, Salmoniformes		
Heimo, Family	Lohet Salmonidae		
Alaheimo, Subfamily	Salmonidae		
	19. <i>Salmo salar</i> L.	Lohi	(Atlantic) Salmon
	20. <i>Salmo trutta</i> L.	Taimen	Brown Trout
	21. <i>Oncorhynchus mykiss</i> (Walbaum)	Kirjolohi	Rainbow trout
	22. <i>Oncorhynchus gorbusha</i> (Walbaum)	Kyttyrälöhi	Pink salmon
	23. <i>Oncorhynchus keta</i> (Walbaum)	Koiralohi	Chum salmon
	24. <i>Oncorhynchus kisutch</i> (Walbaum)	Hopealohi	Coho salmon

Swedish name	Occurrence Freshwater	Occurrence Brackishwater (areas)	Repro- duction	Conservation Status	Commercial use
Nejonöga, Flodnejonöga	F	B (GF,AS,BS,Q,BB)	Rea	NT	C
Bäcknejonöga	F	-	Rea		
Havsnejonöga	F2+	B10+(GF,AS,BS,Q)	nr		
Sillhaj, Håbrand		B1(t)			
Pigghaj	-	B2('AS','BS')	nr		
Stör	(F)	B('GF','BS','Q')	nr	EX	
Atlantstör	(F)	B('GF','BS',?)	nr	EX	
Sterlett	(Fi)	B2('GF','Q')	nr		
Sibirisk stör	-	Bi10+(('GF','AS','BS','Q'))	nr		
Rysk stör	-	Bi10+(('GF','AS','BS','Q'))	nr		
Stjärnstör	-	Bi10+(('GF','AS','BS'))	nr		
Strömming, Sill	-	B (GF,AS,BS,Q,BB)	Rea		C
Skarpsill, Vassbuk	-	B (GF,AS,BS,Q,BB)	Rea		C
Majfisk	F1	B1('AS')	nr		
Staksill	-	B10+(('GF','AS','BS','BB'))	nr		
Ansjovis	-	B10+(('GF','AS'))	nr		
Äl	F	B (GF,AS,BS,Q,BB)	nr		C
Havsäl	-	B(1-3)(('GF','BB'))	nr		
Gädda	F	B (GF,AS,BS,Q,BB)	Rea		C
Lax	F	B (GF,AS,BS,Q,BB)	Rea	EW*	C
Öring	F	B (GF,AS,BS,Q,BB)	Rea	EN,NT*	C
Regnbåge, Regnbågslax	Fi	Bi (GF,AS,BS,Q,BB)	(Re)		C
Puckellax	(Fi)	Bi('GF')	(Re)		
Hundlax, Keta	(Fi)	Bi('GF')	(Re)		
Silverlax	-	Bi('GF','BS')	nr		

Systematic position In Finnish, in English	Scientific name	Finnish name	English name
	25. <i>Oncorhynchus nerka</i> (Walbaum)	Punalohi	Sockeye salmon
	26. <i>Oncorhynchus tshawytscha</i> (Walbaum)	Kuningaslohi	Chinook salmon
	27. <i>Salvelinus alpinus</i> (L.)	Nieriä	(Arctic) Charr
	28. <i>Salvelinus namaycush</i> (Walbaum)	Harmaanieriä	Lake trout
	29. <i>Salvelinus fontinalis</i> (Mitchill)	Puronieriä	Brook trout
Alaheimo, Subfamily	Coregoninae		
	30. <i>Coregonus albula</i> (L.)	Muikku	Vendace
	31. <i>Coregonus lavaretus</i> (L.)	Siika	Whitefish
	32. <i>Coregonus peled</i> (Gmelin)	Peledsiika	Peled
	33. <i>Coregonus nasus</i> (Pallas)	Pyörökuonosiika	Broad whitefish
Alaheimo, Subfamily	Thymallinae		
	34. <i>Thymallus thymallus</i> (L.)	Harjus	Grayling
Lahko, Order	Kuorekalat, Osmeriformes		
Heimo, Family	Kuoret Osmeridae		
	35. <i>Osmerus eperlanus</i> (L.)	Kuore	Smelt
Lahko, Order	Karpikalat, Cypriniformes		
Heimo, Family	Särkikalat Cyprinidae		
	36. <i>Rutilus rutilus</i> (L.)	Särki	Roach
	37. <i>Leuciscus leuciscus</i> (L.)	Seipi	Dace
	38. <i>Leuciscus cephalus</i> (L.), (<i>Squalius cephalus</i> (L.))	Turpa	Chub
	39. <i>Leuciscus idus</i> (L.)	Säyne	Ide
	40. <i>Phoxinus phoxinus</i> (L.)	Mutu	Minnow
	41. <i>Scardinius erythrophthalmus</i> (L.)	Sorva	Rudd
	42. <i>Ctenopharyngodon idella</i> (Val.)	Ruohokarppi	Grass carp
	43. <i>Aspius aspius</i> (L.)	Toutain	Asp
	44. <i>Tinca tinca</i> (L.)	Suutari	Tench
	45. <i>Gobio gobio</i> (L.)	Törö	Gudgeon
	46. <i>Alburnus alburnus</i> (L.)	Salakka	Bleak
	47. <i>Leucaspis deloneatus</i> (Heckel)	Allikkosalakka	Sunbleak
	48. <i>Blicca bjoerkna</i> (L.), (<i>Abramis bjoerkna</i> (L.))	Pasuri	White bream
	49. <i>Abramis brama</i> (L.)	Lahna	Bream
	50. <i>Abramis ballerus</i> (L.), (<i>Ballerus ballerus</i> (L.))	Sulkava	Zope, Blue bream
	51. <i>Vimba vimba</i> (L.)	Vimpa	Vimba
	52. <i>Pelecus cultratus</i> (L.)	Miekkasärki	Sichel, Ziege, (Razorfish)
	53. <i>Carassius carassius</i> (L.)	Ruutana	Crucian carp
	54. <i>Carassius auratus m. gibelio</i> (L.)(<i>C. gibelio</i>)	Hopearuutana	Gibel carp, Prussian carp
	55. <i>Cyprinus carpio</i> L.	Karppi	Carp
Heimo, Family	Imukarpi Catostomidae		
	56. <i>Catostomus catostomus</i> (Forster)	Imukarppi	Longnose sucker
Heimo, Family	Nuoliaiset (Kivenuoliaiset) Balitoridae		
	57. <i>Barbatula barbatula</i> (L.)	Kivenuoliainen	Stone loach
Heimo, Family	Piikkinuoliaiset Cobitidae		
	58. <i>Cobitis taenia</i> L.	Rantanuoliainen	Spined loach
Lahko, Order	Monnikalat, Siluriformes		
Heimo, Family	Monnit Siluridae		
	59. <i>Silurus glanis</i> L.	Monni	Wels, (sheatfish)

Swedish name	Occurrence Freshwater	Occurrence Brackishwater (areas)	Repro- duction	Conservation Status	Commercial use
Indianlax	(Fi)	-	nr		
Kungslax	(Fi)	Bi (GF,AS,BS,Q,BB)	nr		
Röding	F		Rea	CR,NT*	C
Kanadaröding	Fi	Bi('BB')	(nr)?		C
Bäckröding	Fi	-	Rea		C
Siklöja	F	B (GF,AS,BS,Q,BB)	Rea		C
Sik	F	B (GF,AS,BS,Q,BB)	Rea	VU,NT*	C
Peled	Fi	Bi('GF')	Re		C
Krumnossik	-	B1('BS')	nr		
Harr	F	B ('GF',BS,Q,BB)	Rea	NT*	C
Nors	F	B (GF,AS,BS,Q,BB)	Rea		C
Mört	F	B (GF,AS,BS,Q,BB)	Rea		C
Stäm	F	B (GF,AS,BS,Q,BB)	Rea		
Färna	F	B ('GF','AS','BS')	Rea		
Id	F	B (GF,AS,BS,Q,BB)	Rea		C
Elritsa	F	B (GF,AS,BS,Q,BB)	Rea		
Sarv	F	B (GF,AS,BS,Q)	Rea		
Gräskarp	(Fi)	-	nr		
Asp	F	B ('GF','BS')	Rea	VU	C
Sutare	F	B (GF,AS,BS)	Rea		C
Sandkrypare	F	B' ('GF','AS','Q')	Rea		
Löja	F	B (GF,AS,BS,Q,BB)	Rea		
Groplöja	Fi	B' (GF)?	Rea		
Björkna	F	B (GF,AS,BS,'Q')	Rea		
Braxen	F	B (GF,AS,BS,Q,BB)	Rea		C
Faren	F	B' ('GF','AS')	Rea		
Vimma	F	B (GF,AS,BS,'Q','BB')	Rea	NT	C
Skärkniv	F	B (GF,'AS','BS','Q','BB')	(Re)		
Ruda	F	B (GF,AS,BS,Q)	Rea		
Silver ruda	F	B (GF,AS)	Rea		
Karp	Fi	Bi (GF,'AS'?,',BS'?,',Q')	(Re)		C
Sugkarp	-	Bi2('GF')	nr		
Grönlång	F	-	Rea		
Nissöga	F	B (GF)	Rea	EN	
Mal	F	B (GF)	Rea	EN	

Systematic position In Finnish, in English	Scientific name	Finnish name	English name
Heimo, Family	Piikkimonnit Ictaluridae		
	<i>60. Ameiurus nebulosus</i> (Lesueur)	Piikkimonna	Brown bullhead, Catfish
Lahko, Order	Turskakalat, Gadiformes		
Heimo, Family	Turskat Gadidae		
	<i>61. Gadus morhua</i> L.	Turska	Cod
Heimo, Family	Mateet Lotidae		
	<i>62. Lota lota</i> (L.)	Mate	Burbot
	<i>63. Enchelyopus cimbrius</i> (L.), (<i>Rhinonemus cimbrius</i> (L.))	Neliviiksimade	Fourbeard rockling
Lahko, Order	Nokkakalat, Beloniformes		
Heimo, Family	Nokkakalat Belonidae		
	<i>64. Belone belone</i> (L.)	Nokkakala	Garpike, Garfish
Lahko, Order	Putkisuukalat, Syngnathiformes		
Heimo, Family	Merineulat Syngnathidae		
	<i>65. Nerophis ophidion</i> (L.)	Siloneula	Straightnose pipefish
	<i>66. Syngnathus typhle</i> L.	Särmäneula	Broad-nosed/Deep-snouted pipefish
Lahko, Order	Piikkikalat, Gasterosteiformes		
Heimo, Family	Piikkikalat Gasterosteidae		
	<i>67. Gasterosteus aculeatus</i> L.	Kolmipiikki	Three-spined stickleback
	<i>68. Pungitius pungitius</i> (L.)	Kymmenpiikki	Ninespine stickleback
	<i>69. Culaea inconstans</i> (Kirtland)	Viisipiikki	Brook stickleback
	<i>70. Spinachia spinachia</i> (L.)	Vaskikala	Fifteen-spined stickleback
Lahko, Order	Simppukat, Scorpaeniformes		
Heimo, Family	Simput Cottidae		
	<i>71. Cottus gobio</i> L.	Kivisimppu	Bullhead
	<i>72. Cottus poecilopus</i> Heckel	Kirjoeväsipppu	Alpine bullhead
	<i>73. Taurulus bubalis</i> (Euphrasen)	Piikkisimppu	Longspined bullhead, Sea scorpion
	<i>74. Trigloporus quadricornis</i> (L.)	Härkäsipppu	Fourhorn(ed) sculpin
	<i>75. Myoxocephalus scorpius</i> (L.)	Isosimppu	Shorthorn sculpin, (bullrout)
Heimo, Family	Partasimput Agonidae		
	<i>76. Agonus cataphractus</i> (L.)	Partasimppu	Hooknose
Heimo, Family	Imukat Cyclopteridae		
	<i>77. Cyclopterus lumpus</i> L.	Rasvakala	Lumpsucker
	<i>78. Liparis liparis</i> (L.)	Imukala	(Striped) Sea snail
Lahko, Order	Ahvenkalat, Perciformes		
Alalahko, Suborder	Percoidei		
Heimo, Family	Ahvenet Percidae		
	<i>79. Perca fluviatilis</i> L.	Ahven	Perch
	<i>80. Sander lucioperca</i> (L.)	Kuha	Zander, Pikeperch
	<i>81. Gymnocephalus cernuus</i> (L.)	Kiiski	Ruffe
Heimo, Family	Bassit Moronidae		
	<i>82. Dicentrarchus labrax</i> (L.)	Meribassi	Bass, (European) Seabass
Heimo, Family	Aurinkoahvenet Centrarchidae		
	<i>83. Micropterus dolomieu</i> Lac.	Pikkubassi	Smallmouth bass
	<i>84. Micropterus salmoides</i> (Lac.)	Isobassi	Largemouth bass
Alalahko, Suborder	Mugilodei		
Heimo, Family	Keltit Mugilidae		
	<i>85. Liza ramado</i> (Risso)	Ohuthuulikeltti	Thinlip mullet
	<i>86. Chelon labrosus</i> (Risso)	Paksuhuulikeltti	Thicklip grey mullet

Swedish name	Occurrence Freshwater	Occurrence Brackishwater (areas)	Repro- duction	Conservation Status	Commercial use
Dvärgmal	Fi	B('GF')	Rea		
	-				
Torsk		B (GF,AS,BS,'Q','BB')	nr		C
Lake	F	B (GF,AS,BS,Q,BB)	Rea		C
Fyrtömmad skärlänga	-	B10+('GF')	nr		
Näbbgädda	-	B(GF,AS,BS,'Q')	Re		(C)
Mindre havsnål	-	B (GF,AS,BS,Q,BB)	Rea		
Kantnål, Tängsnälla	-	B (GF,AS,BS,'Q')	Rea		
Storspigg	F	B (GF,AS,BS,Q,BB)	Rea		
Småspigg	F	B (GF,AS,BS,Q,BB)	Rea		
Bäckspigg	Fi	-	Rea		
Tångspigg	-	B (GF,AS,BS)	Rea		
Stensimpa	F	B (GF,AS,BS,Q,BB)	Rea		
Bergsimpa	F	B('BB')	Rea		
Dvärgsimpa	-	B (GF,AS,BS)	Rea		
Hornsimpa	F	B (GF,AS,BS,Q,BB)	Rea		C
Rötsimpa	-	B (GF,AS,BS,Q,'BB')	Rea		
Skäggsimpa		B2('GF')	nr		
Sjurygg	-	B (GF,AS,BS,Q,BB)	Rea		
Ringbuk	-	B (GF,AS,BS,'Q')	Rea		
Abborre	F	B (GF,AS,BS,Q,BB)	Rea		C
Gös	F	B (GF,AS,BS,Q,'BB')	Rea		C
Gärs	F	B (GF,AS,BS,Q,BB)	Rea		C
Havsabborre	-	B4('GF','AS','BS')	nr		
Svartabborre	Fi	-	nr		
Öring(s)abborre	Fi	-	nr		
Tunnläppad mulle	-	B3('GF','BS','BB')	nr		
Tjockläppad mulle	F1	B1('Q')	nr		

Systematic position In Finnish, in English			
	Scientific name	Finnish name	English name
Alalahko, Suborder	Blennioidei		
Heimo, Family	Elaskat Stichaeidae		
	87. <i>Lumpenus lampretaeformis</i> (Walbaum)	Elaska	Snakeblenny
Heimo, Family	Teistit Pholidae		
	88. <i>Pholis gunnellus</i> (L.)	Teisti	Rock gunnel, Gunnel, (Butterfish)
Alalahko, Suborder	Ammodytoidei		
Heimo, Family	Tuulenkalat Ammodytidae		
	89. <i>Hyperoplus lanceolatus</i> (Le Sauvage)	Isotuulenkala	Great sandeel
	90. <i>Ammodytes tobianus</i> L.	Pikkutuulenkala	Small sandeel
Alalahko, Suborder	Gobioidei		
Heimo, Family	Tokot Gobiidae		
	91. <i>Gobius niger</i> L.	Mustatokko	Black goby
	92. <i>Pomatoschistus microps</i> (Krøyer)	Liejutokko	Common goby
	93. <i>Pomatoschistus minutus</i> (Pallas)	Hietatokko	Sand goby
	94. <i>Gobiusculus flavescens</i> (Fabricius)	Seitsenruototokko	Two-spotted goby
	95. <i>Neogobius melanostomus</i> (Pallas), (<i>Apollonia melanostoma</i> (Pallas))	Mustakitatokko	Round goby
Alalahko, Suborder	Scombroidei		
Heimo, Family	Makrillit Scombridae		
	96. <i>Scomber scombrus</i> L.	Makrilli	Mackerel
	97. <i>Sarda sarda</i> (Bloch)	Sarda	(Atlantic) Bonito
Alalahko, Suborder	Zoarcoidei		
Heimo, Family	Kiviniikat Zoarcidae		
	98. <i>Zoarces viviparus</i> (L.)	Kiviniikka	Eelpout, Viviparous blenny
Lahko, Order	Kampelakalat, Pleuronectiformes		
Heimo, Family	Piikkikampelat Scophthalmidae		
	99. <i>Psetta maxima</i> (L.), (<i>Scophthalmus maximus</i> (L.))	Piikkikampela	Turbot
Heimo, Family	Oikeasilmäkampelat Pleuronectidae		
	100. <i>Platichthys flesus</i> (L.)	Kampela	Flounder
	101. <i>Pleuronectes platessa</i> L.	Punakampela	Plaice
	102. <i>Limanda limanda</i> (L.)	Hietakampela	Dab

Swedish name	Occurrence Freshwater	Occurrence Brackishwater (areas)	Repro- duction	Conservation Status	Commercial use
Spetsstjärtat långebarn	-	B (GF,AS,BS,Q,'BB')	Rea		
Tejstefisk	-	B (GF,AS,BS,'Q')	Rea		
Tobiskung, Havstobis	-	B (GF,AS,BS)	Rea		
Kusttobis	-	B (GF,AS,BS,Q,BB)	Rea		
Svart smörbult	-	B (GF,AS,BS)	Rea		
Lerstubbs	-	B (GF,AS,BS,Q)	Rea		
Sandstubbs	-	B (GF,AS,BS,Q,BB)	Rea		
Sjustrålig smörbult	-	B (GF,AS)	Rea		
Svartmunnad smörbult	-	B1('AS')	(nr)?		
Makrill	-	B10+('GF','AS','BS','Q','BB')	nr		
Ryggstrimmig pelamid, Belamida	-	B1('AS')	nr		
Tånglake	-	B (GF,AS,BS,Q,BB)	Rea		
Piggvar	-	B (GF,AS,BS,Q)	Re(a)		C
Flundra, krubbskädda	'F'	B (GF,AS,BS,Q,'BB')	Rea		C
Rödspätta	-	B7('GF','AS','BS')	nr		
Sandskädda	-	B2+('GF','AS')	nr		

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