

Fishes of the Salish Sea: a compilation and distributional analysis

Theodore W. Pietsch
James W. Orr



September 2015



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Seattle, Washington

Cover image

The Salish Sea and surrounding basin, by Stefan Freelan (<http://staff.wvu.edu/stefan/SalishSea.htm>). Used with permission.

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Abstract—As part of a current effort to restore the Salish Sea, a 16,925-km² inland waterway shared by Washington State and British Columbia, a definitive, up-to-date list of the fishes that inhabit this marine ecosystem has been badly needed. The last such effort was published more than three decades ago. In response to this deficiency, we compiled information from various sources and identified 253 fish species observed in marine or brackish waters of the Salish Sea ecosystem, an increase of nearly 14% since the last published checklist. These 253 species, encompassing 1 myxiniid, 2 petromyzontids, 18 chondrichthyans, 2 chondrosteans, and 230 teleosts, are contained within 78 families and 31 orders. This comprehensive list of the Salish Sea ichthyofauna will serve as a foundation for determining the occurrence of new species and perhaps the disappearance of others, enabling the selection of species as indicators of ecosystem health, and will provide a basis for identifying the mechanisms responsible for marine animal declines.

Fishes of the Salish Sea: a compilation and distributional analysis

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Introduction

The Salish Sea, a fitting name for the inland marine waters of Washington State and British Columbia, is a coastal waterway that surrounds the southern end of Vancouver Island, including the Strait of Georgia to the north, with Desolation Sound and the Campbell River at its northern extremity (Fig. 1), and Puget Sound to the south, terminating at the mouth of the Deschutes River and the city of Olympia at the head of Budd Inlet (Fig. 2). Its western boundary is the entrance to the Strait of Juan de Fuca, defined as a line between Cape Flattery and Carmanah Point. In addition to the San Juan Islands, Gulf Islands, and southern margin of the Discovery Islands, the watershed contains the lower Fraser River Delta and the Puget Lowlands as well as Hood Canal, the Tacoma Narrows, and Deception Pass.

In recognition and tribute to the Salish people, with whom virtually all the indigenous tribes around Puget Sound and the straits of Georgia and Juan de Fuca have links and probably a common origin, the name Salish Sea was coined only in the late 20th century. It was first formally proposed in

1988 by marine biologist Bert Webber of Bellingham, Washington. He recognized the need for a single geographic term to encompass the entire ecosystem, spanning across the international border of the United States and Canada. Having a name to identify the entire area draws attention to the transborder commonality of water, air, wildlife, and history. Rather than a replacement for any of the existing names, the designation Salish Sea, as now recognized, is a collective term that unites the well-established and familiar names of the various water and land bodies of the region, including the Strait of Juan de Fuca, Strait of Georgia, Puget Sound, Gulf Islands, San Juan Islands, and many others.

In August 2009, the British Columbia Geographical Names Office approved a resolution recommending that the Geographical Names Board of Canada adopt the name Salish Sea, contingent on approval by the United States Board on Geographic Names. The name was endorsed by the Washington State Board on Geographic Names in late October 2009. It was approved in a unanimous vote by the United States Board on Geographic Names on 12 November 2009 and by British Columbia authorities

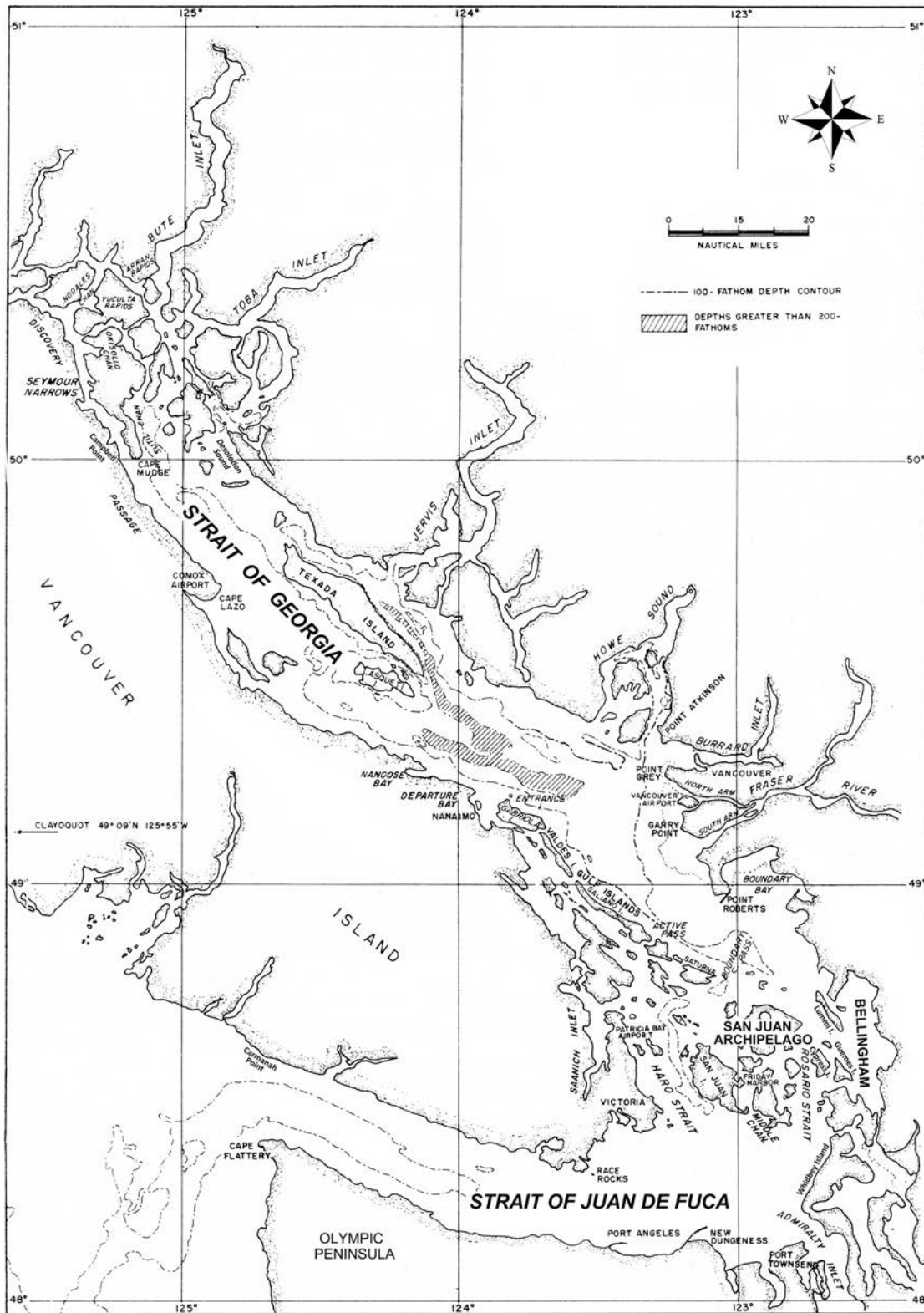


Figure 1

Northern part of the Salish Sea: the Strait of Juan de Fuca, defined as a line between Cape Flattery on the Washington coast and Carmanah Point on Vancouver Island to the western shore of the northern part of Whidbey Island; the San Juan Archipelago, made up of the roughly circular cluster of islands that separate the eastern end of the Strait of Juan de Fuca from the Strait of

Caption continued

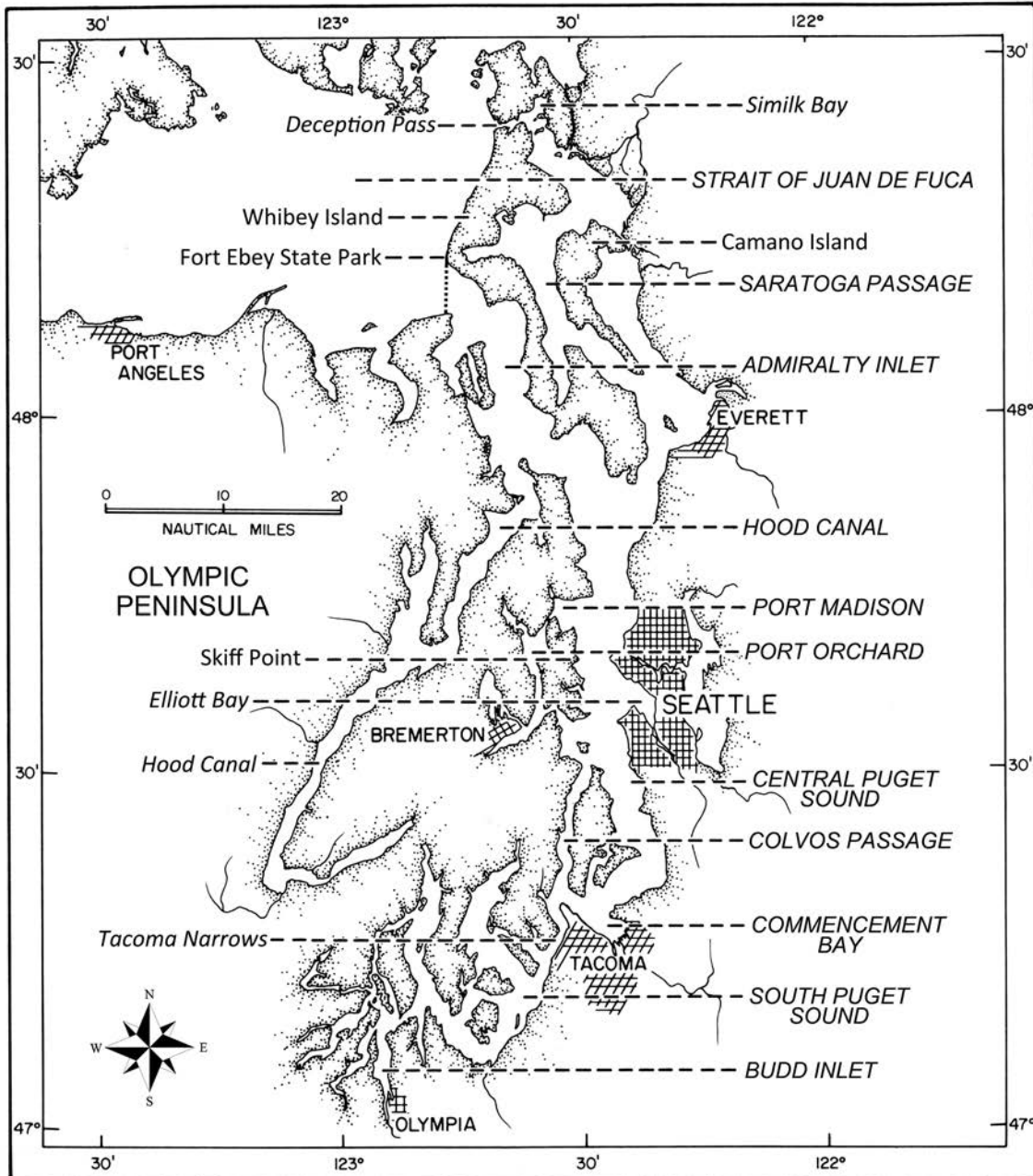


Figure 2

Southern part of the Salish Sea: Puget Sound, partially separated from the Strait of Juan de Fuca by Whibey Island and extending south from Similk Bay and the entrance to Admiralty Inlet, along a line between Fort Ebey State Park and Port Townsend, to Budd Inlet and Olympia, including Hood Canal. After DeLacy et al., 1972; courtesy of Robyn Ricks, Washington Sea Grant, used with permission.

Figure 1 (continued)

Georgia; Bellingham, the partially enclosed area that lies east of Lummi, Cypress, and Guemes islands and including Bellingham, Samish, and Padilla bays; and the Strait of Georgia, including the Gulf Islands and everything else north of the San Juan Archipelago to Desolation Sound (but excluding the narrow waterways in and around the Discovery Islands in the passage between Vancouver Island and mainland British Columbia; further division of the Strait of Georgia between north and south is set roughly along a line between Departure Bay and Burrard Inlet). After Waldichuk, 1957; courtesy of Eileen Evans-Nantais, Canadian Science Publishing, used with permission.

in February 2010. The name is now officially accepted internationally.

Covering 16,925 km² (6533 mi²) of sea surface and 7470 km (4639 mi) of shoreline—including some 419 islands that provide a total land area of 3660 km² (1413 mi²)—and with a maximum depth of 650 m (2132 ft), the Salish Sea and surrounding lowlands provide habitat for thousands of species of plants and animals, but exactly how many species is yet to be determined. The marine macroinvertebrate fauna of this region is very poorly known; no list of species exists and the only published estimate—about “3000” species (Gaydos and Brown, 2009)—is undoubtedly conservative (Gaydos¹). In contrast, the birds and mammals that depend on the Salish Sea ecosystem are well known: 172 bird and 37 mammal species are highly dependent on Salish Sea intertidal and/or marine habitat as well as on marine derived food (Gaydos and Brown, 2009; Gaydos and Pearson, 2011).

As for marine fishes, the number of recognized species has increased dramatically in the past 130 years. The earliest published list, compiled by David Starr Jordan and Charles Henry Gilbert (1881c), accounted for only 90 species. This estimate was followed by those of Carl Eigenmann and his wife and close collaborator Rosa Smith Eigenmann (1892), 106 species; Jordan and his student Edwin Chapin Starks (1895), 141 species; Starks (1911), 168 species; and Trevor Kincaid (1919), “at least 200 species.” Much more recently, Allan Clark DeLacy and colleagues (1972) estimated 211 species, and Bruce S. Miller and Steven F. Borton (1980) listed 218 species (note that most of these authors were considering only Puget Sound, the San Juan Archipelago, and the Strait of Juan de Fuca; however, the Strait of Georgia contains only a few additions to the ichthyofauna as a whole, and, with only one possible exception (the blackfin sculpin, *Malacocottus kincaidi*) no fish species is endemic to any one part or to the Salish Sea as a whole). Based on our analysis, the number of fish species recorded from marine habitats in the Salish Sea ecosystem (excluding the forkline sole, an intergeneric hybrid between the English sole, *Parophrys vetulus*, and starry flounder, *Platichthys stellatus*) is now 253, a nearly 14% increase over the most recently published figure (Miller and Borton, 1980; see also Garrison and Miller²). The total includes 1 myx-inid, 2 petromyzontids, 18 chondrichthyans, 2 chondrosteans, and 230 teleosts, distributed among 78 families and 31 orders (Table 1).

Since publication of the most recent checklist (Miller and Borton, 1980), the following 37 species have been added to the Salish Sea marine ichthyofauna: *Eptatretus*

stoutii, *Triakis semifasciata*, *Bathyraja interrupta*, *Raja inornata*, *Cyprinus carpio*, *Leuroglossus schmidti*, *Spirinchus starksi*, *Salmo salar*, *Salvelinus confluentus*, *Argyropelecus sladeni*, *Chauliodus macouni*, *Nannobranchium regale*, *Protomyctophum crockeri*, *Protomyctophum thompsoni*, *Lampris guttatus*, *Chilara taylori*, *Sebastes semicinctus*, *Cottus aleuticus*, *Cottus asper*, *Icelinus fimbriatus*, *Paricelinus hopliticus*, *Stellerina xyosterna*, *Xeneretmus leiops*, *Liparis mucosus*, *Liparis rutteri*, *Lipariscus nanus*, *Seriphus politus*, *Lycodapus parviceps*, *Lycodes beringi*, *Lycodes cortezianus*, *Lumpenella longirostris*, *Lumpenopsis hypochroma*, *Zaprora silenus*, *Lepidopsetta polyxystra*, *Limanda aspera*, *Pleuronichthys decurrens*, and *Symphurus atricaudus*. For the sake of completion, the forkline sole, the hybrid described as *Inopsetta ischyra* by Jordan and Gilbert (1880k), has also been added, listed alphabetically along with the other flatfishes.

The following valid species listed in previously published checklists, but without evidence of occurrence in our waters, have been removed from the Salish Sea ichthyofauna: *Raja stellulata*, *Artedius corallinus*, *Lycodes diapterus*, *Liparis beringianus*, and *Hyperprosopon argenteum* (see “Comments,” p. 72).

In applying this checklist, it should be recognized that plant and animal distributions are not static over time—that populations disperse and recede in response to large- as well as small-scale environmental changes, induced by humans and otherwise. In the case of Salish Sea fishes, a significant number of species included here are based on one or only a few observations made long ago—we have no way of knowing whether these forms still reside in our waters, let alone whether there was ever a breeding population. The result of the present effort is, therefore, not so much a picture of present-day fish biodiversity in the Salish Sea but rather an accumulation of records over time that together describe an ichthyofauna that has ebbed and, perhaps, waned over the years since records have been kept. Because it is extremely difficult, if not impossible, to say for certain that something does not live here anymore, we can only expect—in the absence of evidence for local extinction—that the list of Salish Sea fishes will grow in the future. We hope this comprehensive analysis of the ichthyofauna of the Salish Sea will serve as a foundation for determining the occurrence of new species and, perhaps, the disappearance of others, enabling selection of species as indicators of ecosystem health and providing a basis for identifying the mechanisms responsible for changes in marine biodiversity (Gaydos and Brown, 2009; Gaydos and Pearson, 2011).

Methods

The following accounts, providing information on the distribution of fishes recorded from the Salish Sea, are

¹ Gaydos, J. K. 2012. Personal commun., 23 April 2012. SeaDoc Society, Eastsound, WA 98245.

² Garrison, K. J., and B. S. Miller. 1982. Review of the early life history of Puget Sound fishes. Univ. Wash., Fish. Res. Inst. Rep. FRI-UW-8216, 729 p.

Table 1

Orders, families, and species of fishes (plus the forkline sole) recorded from marine habitats of the Salish Sea. JF=Strait of Juan de Fuca; SJ=San Juan Islands; BB=Bellingham Bay; SG=southern Strait of Georgia; NG=northern Strait of Georgia; NS=northern Puget Sound; SS=southern Puget Sound; HC=Hood Canal.

Taxon	Common name	JF	SJ	BB	SG	NG	NS	SS	HC
MYXINIFORMES	HAGFISHES								
Myxinidae	Hagfishes								
<i>Eptatretus stoutii</i>	Pacific hagfish	X					X		
PETROMYZONTIFORMES	LAMPREYS								
Petromyzontidae	Lampreys								
<i>Entosphenus tridentatus</i> ^a	Pacific lamprey	X	X	X	X	X	X	X	X
<i>Lampetra ayresii</i> ^c	Western river lamprey		X	X	X		X		
CHIMAERIFORMES	CHIMAERAS or RATFISHES								
Chimaeridae	Chimaeras or ratfishes								
<i>Hydrolagus collii</i>	Spotted ratfish	X	X	X	X	X	X	X	X
LAMNIFORMES	MACKEREL SHARKS								
Alopiidae	Thresher sharks								
<i>Alopias vulpinus</i>	Common thresher shark	X	X						
Cetorhinidae	Basking shark								
<i>Cetorhinus maximus</i>	Basking shark		X		X		X	X	
Lamnidae	Mackerel sharks								
<i>Lamna ditropis</i>	Salmon shark	X	X		X	X	X		
CARCHARHINIFORMES	GROUND SHARKS								
Scyliorhinidae	Cat sharks								
<i>Apristurus brunneus</i>	Brown cat shark		X		X		X	X	X
Triakidae	Hound sharks								
<i>Triakis semifasciata</i> ^a	Leopard shark			X					
Carcharhinidae	Requiem sharks								
<i>Prionace glauca</i>	Blue shark						X		
HEXANCHIFORMES	SIX-GILL SHARKS								
Hexanchidae	Cow sharks								
<i>Hexanchus griseus</i>	Bluntnose sixgill shark	X	X	X	X	X	X	X	X
<i>Notorynchus cepedianus</i> ^b	Broadnose sevengill shark				X			X	
SQUALIFORMES	DOGFISH SHARKS								
Squalidae	Dogfish sharks								
<i>Squalus suckleyi</i> ^b	Pacific spiny dogfish	X	X	X	X	X	X	X	X
Somniosidae	Sleeper sharks								
<i>Somniosus pacificus</i>	Pacific sleeper shark	X	X			X	X		
SQUATINIFORMES	ANGEL SHARKS								
Squatinaidae	Angel sharks								
<i>Squatina californica</i>	Pacific angel shark						X		
TORPEDINIFORMES	ELECTRIC RAYS								
Torpedinidae	Electric rays								
<i>Torpedo californica</i>	Pacific electric ray	X		X	X		X	X	X
RAJIFORMES	SKATES								
Rajidae	Skates								
<i>Bathyraja interrupta</i> ^a	Bering skate				X				
<i>Bathyraja kincaidii</i>	Sandpaper skate	X	X		X				
<i>Beringraja binoculata</i>	Big skate	X	X	X	X	X	X	X	X
<i>Raja inornata</i> ^a	California skate	X							
<i>Raja rhina</i>	Longnose skate	X	X	X	X	X	X	X	X
ACIPENSERIFORMES	STURGEONS								
Acipenseridae	Sturgeons								
<i>Acipenser medirostris</i>	Green sturgeon	X			X	X			
<i>Acipenser transmontanus</i>	White sturgeon	X			X	X	X	X	X
ANGUILLIFORMES	EELS								
Nemichthyidae	Snipe eels								
<i>Nemichthys scolopaceus</i>	Slender snipe eel	X			X		X		

Table continued

Table 1 (continued)

Taxon	Common name	JF	SJ	BB	SG	NG	NS	SS	HC
CLUPEIFORMES	HERRINGS								
Engraulidae	Anchovies								
<i>Engraulis mordax</i>	Northern anchovy	X	X	X	X	X	X	X	X
Clupeidae	Herrings and sardines								
<i>Alosa sapidissima</i> ^{c, d}	American shad	X	X	X	X	X	X	X	X
<i>Clupea pallasii</i>	Pacific herring	X	X	X	X	X	X	X	X
<i>Sardinops sagax</i>	Pacific sardine	X	X		X		X	X	X
CYPRINIFORMES	CARPS								
Cyprinidae	Minnnows and carps								
<i>Cyprinus carpio</i> ^{a, c, e}	Common carp				X				
ARGENTINIFORMES	MARINE SMELTS								
Bathylagidae	Deepsea smelts								
<i>Leuroglossus schmidti</i> ^a	Northern smoothtongue				X	X			
OSMERIFORMES	FRESHWATER SMELTS								
Osmeridae	Smelts								
<i>Allosmerus elongatus</i>	Whitebait smelt	X	X						
<i>Hypomesus pretiosus</i>	Surf smelt	X	X		X		X	X	X
<i>Mallotus villosus</i>	Capelin	X							
<i>Spirinchus starksi</i> ^a	Night smelt	X							
<i>Spirinchus thaleichthys</i> ^d	Longfin smelt		X	X	X	X	X	X	X
<i>Thaleichthys pacificus</i> ^d	Eulachon	X	X		X	X	X	X	
SALMONIFORMES	TROUTS								
Salmonidae	Trouts and salmons								
<i>Oncorhynchus clarkii</i> ^{b, d}	Cutthroat trout	X	X	X	X	X	X	X	X
<i>Oncorhynchus gorbuscha</i> ^d	Pink salmon	X	X	X	X	X	X	X	X
<i>Oncorhynchus keta</i> ^d	Chum salmon	X	X	X	X	X	X	X	X
<i>Oncorhynchus kisutch</i> ^d	Coho salmon	X	X	X	X	X	X	X	X
<i>Oncorhynchus mykiss</i> ^{b, d}	Steelhead	X	X	X	X	X	X	X	X
<i>Oncorhynchus nerka</i> ^d	Sockeye salmon	X	X	X	X	X	X	X	X
<i>Oncorhynchus tshawytscha</i> ^d	Chinook salmon	X	X	X	X	X	X	X	X
<i>Salmo salar</i> ^{a, c, d}	Atlantic salmon	X		X	X	X	X	X	X
<i>Salvelinus confluentus</i> ^{a, e}	Bull trout			X	X	X	X	X	X
<i>Salvelinus malma</i> ^{d, e}	Dolly Varden	X	X	X	X	X	X	X	X
STOMIIFORMES	DRAGONFISHES								
Sternoptychidae	Marine hatchetfishes								
<i>Argyropelecus sladeni</i> ^a	Lowcrest hatchetfish				X				
Stomiidae	Dragonfishes								
<i>Chauliodus macouni</i> ^a	Pacific viperfish	X			X				
AULOPIIFORMES	LIZARDFISHES								
Synodontidae	Lizardfishes								
<i>Synodus lucioceps</i>	California lizardfish	X					X		
Alepisauridae	Lancetfishes								
<i>Alepisaurus ferox</i>	Longnose lancetfish	X	X		X		X	X	
Paralepididae	Barracudinas								
<i>Arctozenus risso</i> ^b	White barracudina						X	X	
MYCTOPHIFORMES	LANTERNFISHES								
Myctophidae	Lanternfishes								
<i>Diaphus theta</i>	California headlightfish	X	X		X		X	X	X
<i>Nannobranchium regale</i> ^a	Pinpoint lampfish				X				
<i>Protomyctophum crockeri</i> ^a	California flashlightfish				X				
<i>Protomyctophum thompsoni</i> ^a	Northern flashlightfish		X						
<i>Stenobranchius leucopsarus</i>	Northern lampfish	X	X				X	X	
<i>Tarletonbeania crenularis</i>	Blue lanternfish		X						
LAMPRIIFORMES	OPAHS								
Lampridae	Opahs								
<i>Lampris guttatus</i> ^a	Opah	X					X		
Trachipteridae	Ribbonfishes								
<i>Trachipterus altivelis</i>	King-of-the-salmon	X	X		X				

Table continued

Table 1 (continued)

Taxon	Common name	JF	SJ	BB	SG	NG	NS	SS	HC
GADIFORMES	CODS								
Merlucciidae	Merlucciid hakes								
<i>Merluccius productus</i>	Pacific hake	X	X	X	X	X	X	X	X
Gadidae	Cods								
<i>Gadus chalcogrammus</i>	Walleye pollock	X	X	X	X	X	X	X	X
<i>Gadus macrocephalus</i>	Pacific cod	X	X	X	X	X	X	X	X
<i>Microgadus proximus</i>	Pacific tomcod	X	X	X	X	X	X	X	X
OPHIDIIFORMES	CUSK-EELS								
Bythitidae	Viviparous brotulas								
<i>Brosmophycis marginata</i>	Red brotula			X	X		X	X	X
Ophidiidae	Cusk-eels								
<i>Chilara taylora</i>	Spotted cusk-eel				X				
BATRACHOIDIFORMES	TOADFISHES								
Batrachoididae	Toadfishes								
<i>Porichthys notatus</i>	Plainfin midshipman	X	X	X	X	X	X	X	X
BELONIFORMES	NEEDLEFISHES								
Scomberesocidae	Sauries								
<i>Cololabis saira</i>	Pacific saury	X					X		
CYPRINODONTIFORMES	KILLIFISHES								
Cyprinodontidae	Pupfishes								
<i>Cyprinodon variegatus</i> ^{c,e}	Sheepshead minnow	X							
GASTEROSTEIFORMES	STICKLEBACKS								
Aulorhynchidae	Tube snouts								
<i>Aulorhynchus flavidus</i>	Tube snout	X	X	X	X	X	X	X	X
Gasterosteidae	Sticklebacks								
<i>Gasterosteus aculeatus</i> ^{d,e}	Threespine stickleback	X	X	X	X	X	X	X	X
Syngnathidae	Pipefishes								
<i>Syngnathus leptorhynchus</i> ^b	Bay pipefish	X	X	X	X	X	X	X	X
SCORPAENIFORMES	MAIL-CHEEKED FISHES								
Scorpaenidae	Scorpionfishes								
<i>Sebastes aleutianus</i>	Rougheye rockfish	X					X		
<i>Sebastes alutus</i>	Pacific ocean perch	X			X				
<i>Sebastes auriculatus</i>	Brown rockfish	X	X	X	X	X	X	X	X
<i>Sebastes babcocki</i>	Redbanded rockfish	X	X						X
<i>Sebastes brevispinis</i>	Silvergray rockfish		X					X	
<i>Sebastes caurinus</i>	Copper rockfish	X	X	X	X	X	X	X	X
<i>Sebastes crameri</i>	Darkblotched rockfish	X	X		X		X		
<i>Sebastes diploproa</i>	Splitnose rockfish	X	X		X		X		X
<i>Sebastes elongatus</i>	Greenstriped rockfish	X			X		X	X	X
<i>Sebastes emphaeus</i>	Puget Sound rockfish	X	X				X	X	X
<i>Sebastes entomelas</i>	Widow rockfish	X	X				X		
<i>Sebastes flavidus</i>	Yellowtail rockfish	X	X		X		X	X	
<i>Sebastes helvomaculatus</i>	Rosethorn rockfish		X				X		
<i>Sebastes maliger</i>	Quillback rockfish	X	X	X	X	X	X	X	X
<i>Sebastes melanops</i>	Black rockfish	X	X	X	X	X	X	X	X
<i>Sebastes miniatus</i>	Vermilion rockfish	X	X			X	X		X
<i>Sebastes mystinus</i>	Blue rockfish	X			X				
<i>Sebastes nebulosus</i>	China rockfish	X	X						
<i>Sebastes nigrocinctus</i>	Tiger rockfish	X	X		X		X		
<i>Sebastes paucispinis</i>	Bocaccio	X		X	X		X	X	X
<i>Sebastes pinniger</i>	Canary rockfish	X	X	X	X		X	X	X
<i>Sebastes proriger</i>	Redstripe rockfish	X	X	X	X		X	X	X
<i>Sebastes rosaceus</i>	Rosy rockfish	X					X		
<i>Sebastes ruberrimus</i>	Yelloweye rockfish	X	X	X	X	X	X	X	X
<i>Sebastes saxicola</i>	Stripetail rockfish	X			X		X	X	X
<i>Sebastes semicinctus</i> ^a	Halfbanded rockfish	X							
<i>Sebastes zacentrus</i>	Sharpchin rockfish	X			X		X	X	
<i>Sebastes alascanus</i>	Shortspine thornyhead	X	X				X	X	

Table continued

Table 1 (continued)

Taxon	Common name	JF	SJ	BB	SG	NG	NS	SS	HC
Anoplopomatidae	Sablefishes								
<i>Anoplopoma fimbria</i>	Sablefish	X	X	X	X	X	X	X	X
Hexagrammidae	Greenlings								
<i>Hexagrammos decagrammus</i>	Kelp greenling	X		X	X	X	X		
<i>Hexagrammos lagocephalus</i>	Rock greenling	X	X	X	X		X		
<i>Hexagrammos stelleri</i>	Whitespotted greenling	X	X		X		X	X	X
<i>Ophiodon elongatus</i>	Lingcod	X	X	X	X	X	X	X	X
<i>Oxylebius pictus</i>	Painted greenling	X	X		X	X	X	X	X
<i>Zaniolepis latipinnis</i>	Longspine combfish	X			X	X	X	X	X
Rhamphocottidae	Grunt sculpins								
<i>Rhamphocottus richardsonii</i>	Grunt sculpin	X	X	X	X	X	X	X	X
Cottidae	Sculpins								
<i>Artedius fenestralis</i>	Padded sculpin	X	X	X	X	X	X	X	X
<i>Artedius harringtoni</i>	Scalyhead sculpin	X	X	X	X	X	X	X	X
<i>Artedius lateralis</i>	Smoothhead sculpin	X	X	X	X	X	X	X	X
<i>Artedius notospilotus</i>	Bonyhead sculpin						X		
<i>Ascelichthys rhodorus</i>	Rosylip sculpin	X	X		X	X	X	X	
<i>Asemichthys taylori</i>	Spinynose sculpin	X	X		X				
<i>Chitonotus pugetensis</i>	Roughback sculpin	X	X	X	X	X	X	X	X
<i>Clinocottus acuticeps</i>	Sharpnose sculpin	X	X		X	X	X	X	X
<i>Clinocottus embryum</i>	Calico sculpin	X	X		X		X		
<i>Clinocottus globiceps</i>	Mosshead sculpin	X	X				X		
<i>Cottus aleuticus</i> ^{a,e}	Coastrange sculpin	X	X	X	X	X	X	X	X
<i>Cottus asper</i> ^{a,e}	Prickly sculpin	X	X	X	X	X	X	X	X
<i>Enophrys bison</i>	Buffalo sculpin	X	X	X	X		X	X	X
<i>Hemilepidotus hemilepidotus</i>	Red Irish lord	X	X	X	X	X	X	X	X
<i>Hemilepidotus spinosus</i>	Brown Irish lord	X					X		
<i>Icelinus borealis</i>	Northern sculpin	X	X		X	X	X	X	X
<i>Icelinus burchami</i>	Dusky sculpin				X				X
<i>Icelinus filamentosus</i>	Threadfin sculpin		X		X	X	X		X
<i>Icelinus fimbriatus</i> ^a	Fringed sculpin				X	X			
<i>Icelinus tenuis</i>	Spotfin sculpin				X	X	X	X	
<i>Jordania zonope</i>	Longfin sculpin	X	X		X	X	X		
<i>Leptocottus armatus</i>	Pacific staghorn sculpin	X	X	X	X	X	X	X	X
<i>Myoxocephalus polyacanthocephalus</i>	Great sculpin	X	X	X	X	X	X	X	X
<i>Oligocottus maculosus</i>	Tidepool sculpin	X	X	X	X	X	X	X	X
<i>Oligocottus rimensis</i>	Saddleback sculpin	X	X		X		X		
<i>Oligocottus snyderi</i>	Fluffy sculpin	X	X						
<i>Paricelinus hopliticus</i> ^a	Thornback sculpin				X	X			
<i>Radulinus asprellus</i>	Slim sculpin	X	X	X	X	X	X	X	X
<i>Radulinus boleoides</i>	Darter sculpin		X				X		
<i>Ruscarius meanyi</i> ^b	Puget Sound sculpin	X	X		X		X		
<i>Scorpaenichthys marmoratus</i>	Cabezon	X	X	X	X	X	X	X	X
<i>Synchirus gilli</i>	Manacled sculpin	X	X		X		X	X	X
<i>Triglops macellus</i>	Roughspine sculpin	X	X	X	X		X	X	X
<i>Triglops pingelii</i>	Ribbed sculpin	X	X	X	X		X		
Hemitripterae	Spiny sculpins								
<i>Blepsias cirrhosus</i>	Silverspotted sculpin	X	X	X	X		X	X	X
<i>Nautichthys oculoasciatus</i>	Sailfin sculpin	X	X	X	X	X	X	X	X
Agonidae	Poachers								
<i>Agonopsis vulsa</i> ^b	Northern spearnose poacher	X	X		X		X	X	X
<i>Anoplagonus inermis</i>	Smooth alligatorfish	X	X		X	X	X		
<i>Bathyagonus alascanus</i> ^b	Gray starsnout	X	X	X	X		X	X	
<i>Bathyagonus infraspinnatus</i> ^b	Spinycheek starsnout	X	X		X	X	X		X
<i>Bathyagonus nigripinnis</i>	Blackfin poacher		X		X		X	X	X
<i>Bathyagonus pentacanthus</i> ^b	Bigeye poacher	X	X		X		X	X	
<i>Bothragonus swanii</i>	Rockhead	X	X				X		

Table continued

Table 1 (continued)

Taxon	Common name	JF	SJ	BB	SG	NG	NS	SS	HC
<i>Chesnonia verrucosa</i> ^b	Warty poacher	X					X		
<i>Hypsogonus quadricornis</i>	Fourhorn poacher	X	X				X		
<i>Odontopyxis trispinosa</i>	Pygmy poacher	X	X		X		X	X	X
<i>Pallasina barbata</i>	Tubenose poacher	X	X	X	X		X		
<i>Podothecus accipenserinus</i> ^b	Sturgeon poacher	X	X	X	X		X	X	X
<i>Stellerina xyosterna</i> ^a	Pricklebreast poacher	X							
<i>Xeneretmus latifrons</i>	Blacktip poacher	X	X		X	X			
<i>Xeneretmus leiops</i> ^a	Smootheye poacher	X							
<i>Xeneretmus triacanthus</i>	Bluespotted poacher		X	X			X	X	X
Psychrolutidae	Fathead sculpins								
<i>Dasycottus setiger</i>	Spinyhead sculpin	X	X	X	X	X	X	X	X
<i>Malacocottus kincaidi</i>	Blackfin sculpin		X		X		X	X	X
<i>Psychrolutes paradoxus</i>	Tadpole sculpin	X	X	X	X		X	X	X
<i>Psychrolutes sigalutes</i> ^b	Soft sculpin	X	X	X	X		X	X	X
Cyclopteridae	Lumpfishes								
<i>Eumicrotremus orbis</i>	Pacific spiny lumpsucker	X	X		X		X	X	
Liparidae	Snailfishes								
<i>Careproctus melanurus</i>	Blacktail snailfish	X		X			X		
<i>Liparis callyodon</i>	Spotted snailfish	X	X		X	X	X		
<i>Liparis cyclopus</i>	Ribbon snailfish	X	X		X		X	X	
<i>Liparis dennyi</i>	Marbled snailfish	X	X	X	X	X	X	X	
<i>Liparis florum</i>	Tidepool snailfish	X	X		X	X	X		
<i>Liparis fucensis</i>	Slipskin snailfish	X	X		X		X	X	
<i>Liparis greeni</i> ^b	Lobefin snailfish	X	X	X	X				
<i>Liparis mucosus</i> ^a	Slimy snailfish	X	X						
<i>Liparis pulchellus</i>	Showy snailfish	X	X	X	X	X	X	X	X
<i>Liparis rutteri</i> ^a	Ringtail snailfish	X	X		X				
<i>Lipariscus nanus</i> ^a	Pygmy snailfish				X				
<i>Nectoliparis pelagicus</i>	Tadpole snailfish				X		X	X	X
PERCIFORMES	PERCHES								
Moronidae	Temperate basses								
<i>Morone saxatilis</i> ^c	Striped bass	X					X	X	
Carangidae	Jacks								
<i>Trachurus symmetricus</i>	Jack mackerel							X	
Bramidae	Pomfrets								
<i>Brama japonica</i>	Pacific pomfret						X		
Sciaenidae	Drums and croakers								
<i>Atractoscion nobilis</i>	White seabass	X				X	X		
<i>Genyonemus lineatus</i>	White croaker				X		X	X	
<i>Seriphys politus</i> ^a	Queenfish	X			X		X		
Embiotocidae	Surfperches								
<i>Brachyistius frenatus</i>	Kelp perch	X	X		X		X	X	X
<i>Cymatogaster aggregata</i>	Shiner perch	X	X	X	X	X	X	X	X
<i>Damalichthys vacca</i>	Pile perch	X	X	X	X		X	X	X
<i>Embiotoca lateralis</i>	Striped seaperch	X	X	X	X	X	X	X	X
<i>Hyperprosopon ellipticum</i>	Silver surfperch	X					X		
<i>Phanerodon furcatus</i>	White seaperch	X	X	X		X	X		X
Bathymasteridae	Ronquils								
<i>Ronquilus jordani</i>	Northern ronquil	X	X		X		X	X	X
Zoarcidae	Eelpouts								
<i>Lycodapus mandibularis</i>	Pallid eelpout				X		X	X	X
<i>Lycodapus parviceps</i> ^a	Smallhead eelpout	X			X				
<i>Lycodes beringi</i> ^a	Bering eelpout			X	X	X	X		X
<i>Lycodes brevipes</i>	Shortfin eelpout	X	X	X	X		X	X	
<i>Lycodes cortezianus</i> ^a	Bigfin eelpout	X	X	X			X		
<i>Lycodes pacificus</i> ^b	Blackbelly eelpout	X	X	X	X	X	X	X	X
<i>Lycodes palearis</i>	Wattled eelpout		X	X	X		X		X

Table continued

Table 1 (continued)

Taxon	Common name	JF	SJ	BB	SG	NG	NS	SS	HC
Stichaeidae	Pricklebacks								
<i>Anoplarchus insignis</i>	Slender cockscomb	X	X		X		X	X	
<i>Anoplarchus purpurescens</i>	High cockscomb	X	X		X	X	X	X	X
<i>Chirolophis decoratus</i> ^b	Decorated warbonnet	X	X	X	X	X	X	X	
<i>Chirolophis nugator</i>	Mosshead warbonnet	X	X		X		X	X	
<i>Leptoclinus maculatus</i> ^b	Daubed shanny	X	X	X	X		X		
<i>Lumpenella longirostris</i> ^a	Longsnout prickleback				X				
<i>Lumpenopsis hypochroma</i> ^a	Y-prickleback				X	X			
<i>Lumpenus sagitta</i>	Snake prickleback	X	X	X	X	X	X	X	X
<i>Phytichthys chirus</i>	Ribbon prickleback	X	X		X		X		
<i>Plectobranchnus evides</i>	Bluebarred prickleback				X		X	X	X
<i>Poroclinus rothrocki</i>	Whitebarred prickleback		X	X	X		X	X	X
<i>Xiphister atropurpureus</i>	Black prickleback	X	X		X		X		
<i>Xiphister mucosus</i>	Rock prickleback	X	X		X		X		
Cryptacanthodidae	Wrymouths								
<i>Cryptacanthodes aleutensis</i> ^b	Dwarf wrymouth	X	X		X		X	X	X
<i>Cryptacanthodes giganteus</i> ^b	Giant wrymouth	X	X	X	X	X	X		
Pholidae	Gunnels								
<i>Apodichthys flavidus</i>	Penpoint gunnel	X	X	X	X	X	X	X	X
<i>Apodichthys fucorum</i> ^b	Rockweed gunnel	X	X			X	X		
<i>Pholis clemensi</i>	Longfin gunnel	X	X		X	X	X		X
<i>Pholis laeta</i>	Crescent gunnel	X	X	X	X	X	X	X	X
<i>Pholis ornata</i>	Saddleback gunnel	X	X	X	X		X	X	X
<i>Pholis schultzi</i>	Red gunnel		X			X	X		
Anarhichadidae	Wolffishes								
<i>Anarhichthys ocellatus</i>	Wolf-eel	X	X	X	X		X	X	X
Ptilichthyidae	Quillfishes								
<i>Ptilichthys goodei</i>	Quillfish		X		X		X		X
Zaproridae	Prowfishes								
<i>Zaprora silenus</i> ^a	Prowfish	X			X			X	
Scytalinidae	Graveldivers								
<i>Scytalina cerdale</i>	Graveldiver	X	X						
Trichodontidae	Sandfishes								
<i>Trichodon trichodon</i>	Pacific sandfish	X	X	X	X				
Ammodytidae	Sand lances								
<i>Ammodytes personatus</i> ^b	Pacific sand lance	X	X	X	X		X	X	X
Icosteidae	Ragfishes								
<i>Icosteus aenigmaticus</i>	Ragfish	X	X				X	X	
Gobiesocidae	Clingfishes								
<i>Gobiesox maeandricus</i>	Northern clingfish	X	X		X	X	X		
Gobiidae	Gobies								
<i>Clevelandia ios</i>	Arrow goby	X	X	X	X	X	X	X	X
<i>Lepidogobius lepidus</i>	Bay goby	X	X	X	X	X	X	X	X
<i>Rhinogobiops nicholsii</i> ^b	Blackeye goby	X	X		X	X	X	X	X
Sphyraenidae	Barracudas								
<i>Sphyraena argentea</i>	Pacific barracuda	X	X				X	X	
Trichiuridae	Cutlassfishes								
<i>Benthodesmus pacificus</i> ^b	North Pacific frostfish	X					X		
Scombridae	Mackerels								
<i>Sarda chiliensis</i>	Pacific bonito	X			X		X	X	
<i>Scomber japonicus</i>	Pacific chub mackerel	X			X		X		
Stromateidae	Butterfishes								
<i>Peprilus simillimus</i>	Pacific pompano	X	X	X	X	X	X	X	X
PLEURONECTIFORMES	FLATFISHES								
Paralichthyidae	Sand flounders								
<i>Citharichthys sordidus</i>	Pacific sanddab	X	X	X	X	X	X	X	X
<i>Citharichthys stigmaeus</i>	Speckled sanddab	X	X	X	X	X	X	X	X

Table continued

Table 1 (continued)

Taxon	Common name	JF	SJ	BB	SG	NG	NS	SS	HC
Pleuronectidae	Righteye flounders								
<i>Atheresthes stomias</i>	Arrowtooth flounder	X	X	X	X	X	X	X	X
<i>Eopsetta jordani</i>	Petrale sole	X	X	X	X	X	X	X	X
<i>Glyptocephalus zachirus</i>	Rex sole	X	X	X	X	X	X	X	X
<i>Hippoglossoides elassodon</i>	Flathead sole	X	X	X	X	X	X	X	X
<i>Hippoglossus stenolepis</i>	Pacific halibut	X	X	X	X	X	X	X	X
<i>Isopsetta isolepis</i>	Butter sole	X	X	X	X	X	X	X	X
<i>Lepidopsetta bilineata</i>	Rock sole	X	X	X	X	X	X	X	X
<i>Lepidopsetta polyxystra</i> ^a	Northern rock sole	X	X	X	X	X	X	X	X
<i>Limanda aspera</i> ^a	Yellowfin sole		X						
<i>Lyopsetta exilis</i>	Slender sole	X	X	X	X	X	X	X	X
<i>Microstomus pacificus</i>	Dover sole	X	X	X	X	X	X	X	X
<i>Parophrys vetulus</i>	English sole	X	X	X	X	X	X	X	X
<i>Parophrys vetulus</i> × <i>Platichthys stellatus</i> ^a	Forkline sole				X		X	X	
<i>Platichthys stellatus</i>	Starry flounder	X	X	X	X	X	X	X	X
<i>Pleuronichthys coenosus</i>	C-O sole	X	X	X	X	X	X	X	X
<i>Pleuronichthys decurrens</i> ^a	Curlfin sole	X					X	X	
<i>Psettichthys melanostictus</i>	Sand sole	X	X	X	X	X	X	X	X
Cynoglossidae	Tonguefishes								
<i>Symphurus atricaudus</i> ^a	California tonguefish			X					
TETRAODONTIFORMES	PLECTOGNATHS								
Molidae	Molas								
<i>Mola mola</i>	Ocean sunfish	X	X			X	X		

^a Species (and hybrid) new to the marine ichthyofauna of the Salish Sea, added since the most recently published checklist (Miller and Borton, 1980).

^b Name changes introduced since the most recently published checklist (Miller and Borton, 1980).

^c Introduced species

^d Anadromous species

^e Primarily freshwater species

based on an analysis of data derived from several sources, including the published literature, unpublished logs and field notebooks, taxonomic and locality databases that provide access to collection records held by institutions around the world (FishBase, <http://www.fishbase.org>; FishNet2, <http://www.fishnet2.net>; Global Biodiversity Information Facility [GBIF], <http://www.gbif.org>; *Ocean Biogeographic Information System* [OBIS], <http://iobis.org>), preserved voucher specimens (archived primarily by the Burke Museum of Natural History and Culture, University of Washington, Seattle; Royal British Columbia Museum, Victoria, Canada; and Beaty Biodiversity Museum, University of British Columbia, Vancouver, Canada), and other verifiable evidence, such as photographs. In addition to the references given with each account, the following publications were consulted with respect to every species: Hart (1973), Miller and Borton (1980), Eschmeyer and Herald (1983), Mecklenburg et al. (2002), Love et al. (2005), and Love (2011). Authorship, dates of publication of original descriptions, type localities, taxonomic spelling, and synonyms were verified using Eschmeyer's (2013) online *Catalog of Fish-*

es. Scientific and common names are those provided by Page et al. (2013) and the phylogenetic arrangement of taxa follows Nelson (2006), unless otherwise explained in the species descriptions.

For ease of discussion, the Salish Sea is divided into five regions (following Miller and Borton, 1980): 1) the Strait of Juan de Fuca, defined as a line between Cape Flattery on the Washington coast and Carmanah Point on Vancouver Island to the western shore of the northern part of Whidbey Island; 2) the San Juan Archipelago, made up of the roughly circular cluster of islands that separate the eastern end of the Strait of Juan de Fuca from the Strait of Georgia; 3) Bellingham, the partially enclosed area that lies east of Lummi, Cypress, and Guemes islands, and includes Bellingham, Samish, and Padilla bays; 4) the Strait of Georgia, including the Gulf Islands and everything else north of the San Juan Archipelago to Desolation Sound (but excluding the narrow waterways in and around the Discovery Islands in the passage between Vancouver Island and mainland British Columbia; further division of the Strait of Georgia between north and south is set roughly along a line be-

tween Departure Bay and Burrard Inlet); and 5) Puget Sound, partially separated from the Strait of Juan de Fuca by Whidbey Island and extending south from Similk Bay and the entrance to Admiralty Inlet (along a line between Fort Ebey State Park and Port Townsend) to Olympia, including Hood Canal (further division of Puget Sound between north and south is set roughly along a line between Skiff and West points).

As emphasized by Miller and Borton (1980), a wide assortment of gear and methods has been employed in the collection of fishes included in this checklist, including but not limited to beach seines, bottom trawls, gill-nets, purse seines, traps, spearfishing, hook and lines, poisoning, stomach contents, underwater observations, and the occasional beach find. It has therefore not been possible to present meaningfully the relative sampling effort in the various areas. Certain areas and habitats (e.g., rocky reefs and rock walls) have been sampled less intensively than others, and for many species the frequency of reports no doubt underestimates the true size and geographic breadth of populations. Any additional information that readers may provide is welcome as we contemplate periodic updating of this list.

Species accounts

MYXINIFORMES

Myxinidae

Eptatretus stoutii (Lockington, 1878) Pacific hagfish

The Pacific hagfish is restricted to the eastern North Pacific Ocean, extending from Hecate Strait, British Columbia, to central Baja California at Punta San Pablo, Mexico. Two collections, said to have been made in southeastern Alaska—the first recorded in January 1931 from “S.E. Alaska” by the International Fish Commission, and the second documented in March 1950 from Clarence Strait in the Alexander Archipelago—have been discredited by Wisner and McMillan, and all physical evidence of these putative northernmost records has been lost. In the Salish Sea, it is represented by only two collections: four specimens taken in May 1956 just inside the mouth of the Strait of Juan de Fuca and a single individual collected in September 1926 in Holmes Harbor, Whidbey Island, in Puget Sound (a specimen identified as *Polistotrema deani*, in the collections of the California Academy of Sciences, was taken well off Cape Flattery and, therefore, cannot be included here). This species is rather common in offshore coastal waters, near or on the bottom at depths of 16 to 966 m, but rarely encountered except by those seeking them out for research purposes. (Fannin, 1898; Barraclough, 1948; Grinols, 1965; Miller and Lea, 1972; Quast and Hall, 1972; Knaggs et al., 1975; Wisner and McMillan, 1990; Love et al., 2005)

HAGFISHES

Hagfishes

Pacific hagfish

PETROMYZONTIFORMES

Petromyzontidae

Entosphenus tridentatus (Richardson, 1836)

The Pacific lamprey is a widely distributed species in Pacific coastal drainages of North America, ranging from the eastern Chukchi Sea to the eastern Aleutians (as far west as Seguam Pass between Seguam and Amlia islands), and south to Cedros Island, Baja California, with rare to occasional marine records from the Commander Islands, the Pacific coast of Kamchatka, and Hokkaido, Japan. Marine populations are usually found at depths of less than 250 m, but a maximum depth of 1508 m has been recorded. It has been commonly observed throughout the Salish Sea since it was first reported here by Jordan and Gilbert in 1881, but its abundance and distribution have declined significantly throughout its range over the past three decades. (Jordan and Gilbert, 1881d; Bean, 1883; Seale, 1895; Gilbert and Thompson, 1905; Creaser and Hubbs, 1922; Vladykov and Follett, 1958; Hubbs, 1967; McPhail and Lindsey, 1970; Patton et al., 1970; Vladykov and Kott, 1979; Beamish and Levings, 1991; Luzier et al.³; Renaud, 2011; Ward et al., 2012; Hayes et al., 2013)

Lampetra ayresii (Günther, 1870)

Western river lamprey

More narrowly distributed than the Pacific lamprey, the western river lamprey is endemic to the west coast of North America, ranging from just north of Juneau in southeastern Alaska to San Francisco Bay and the Sacramento–San Joaquin drainage in northern California. Sea-run adults remain near shore and apparently do not venture into deeper waters. No detailed distributional records exist for it in the Salish Sea, but this species probably occurs in most major river systems throughout the region. Sightings and captures have been reported for the Fraser River in the southern Strait of Georgia; the San Juan Islands and off Bellingham; and Port Susan, off Everett, Camano Island, the Ballard Locks, Elliot Bay, and the Duwamish River estuary. It appears to inhabit shallow, nearshore waters during the few months it spends at sea. (Creaser and Hubbs, 1922; Vladykov and Follett, 1958; Quast and Hall, 1972; Scott and Crossman, 1973; Vladykov and Kott, 1979; Beamish, 1980; Bond et al.,

³ Luzier, C. W., H. A. Schaller, J. K. Brostrom, C. Cook-Tabor, D. H. Goodman, R. D. Nelle, K. Ostrand, and B. Streif. 2011. Pacific lamprey (*Entosphenus tridentatus*) assessment and template for conservation measures, 282 p. U.S. Fish Wildl. Serv., Portland, OR. [Available at <http://www.fws.gov/pacific/Fisheries/sphabcon/Lamprey/pdf/USFWS%20Pacific%20Lamprey%20Assessment%20and%20Template%20for%20Conservation%20Measures%202011.pdf>.]

1983; Beamish and Youson, 1987; Beamish and Neville, 1995; Renaud, 2011)

CHIMAERIFORMES

Chimaeridae

Hydrolagus colliei (Lay and Bennett, 1839) (Fig. 3A)

Ranging from the western Gulf of Alaska, east of Kodiak Island, to southern Baja California at Punta Prieta, as well as the northern Gulf of California, the spotted ratfish is common off British Columbia, and extremely abundant in the Strait of Georgia and Puget Sound, where year-round, in terms of abundance and biomass, it dominates the fish fauna at depths of 80–160 m. Overall the species has a wide vertical range occurring to depths as great as 971 m, but it is occasionally found also in intertidal waters. An abundance of spotted ratfish has also been noted in deep waters immediately adjoining the Salish Sea, but it remains unclear whether this species is as common in similar habitats throughout the eastern North Pacific or if this super abundance is confined to the inland sea. (Jordan and Gilbert, 1881c, 1881d; Clemens and Wilby, 1961; Miller and Borton, 1980; Quinn et al., 1980; Didier and Rosenberger, 2002; Ebert, 2003; Palsson et al.⁴; Stevenson et al., 2007; Reum et al., 2008; Reum and Essington, 2011)

LAMNIFORMES

Alopiidae

Alopias vulpinus (Bonnaterre, 1788)

Pelagic and nearly cosmopolitan in tropical and temperate oceans and inland seas (including the Mediterranean, Black, Baltic, and North seas)—but somewhat more common in temperate waters—the common thresher shark is found most often in slope waters along continental and insular margins, extending from the surface to a depth of at least 572 m. In the eastern North Pacific, it ranges from southeastern Alaska near Sitka to Goose Bay and Johnstone Strait off British Columbia and farther south to Baja California, the Gulf of Panama, and Chile. Extremely rare in the Salish Sea, it has been taken off Otter Point near Sooke in the Strait of Juan de Fuca and in Saanich Inlet off the southeast end of Vancouver Island. A 3.7-m specimen caught on 24 May 1972 off Sucia Island in the San Juan Archipelago was stuffed and put on display at the Shrimp Shack in Bellingham, Wash-

RATFISHES

Shortnose chimaeras

Spotted ratfish

ington. (Gill, 1864b; Cowan, 1938; Clemens and Wilby, 1961; Miller and Borton, 1980; Cailliet and Bedford, 1983; Compagno, 1984, 2001; Scott and Scott, 1988; Bedford, 1992; Bussing and López, 1994; Eitner, 1995; McEachran and Fechhelm, 1998; Ebert, 2003; Stevenson et al., 2007)

Cetorhinidae

Cetorhinus maximus (Gunnerus, 1765)

Worldwide in cold seas, with only a few records from tropical latitudes, and ranging in depth from the surface down to 1264 m in the eastern Pacific, the distribution of the basking shark extends from the Aleutian Islands and Gulf of Alaska south to the Gulf of California and off Chile. It is rare in the Salish Sea, with fewer than 10 verifiable occurrences: published localities include Hammond Bay in the southern Strait of Georgia, off Richmond Beach, the entrance to Gig Harbor, off the mouth of Chambers Creek (north of Steilacoom), near Mukilteo, and the east waterway of the Duwamish River. Unpublished occurrences include both sightings and captures near Edmonds, off Kingston, and near Vashon and San Juan islands.

Prior to 1970, large aggregations of this shark were common seasonally off the coast and within the Salish Sea, but numbers have plummeted since then, with the decline attributed to directed fisheries for liver oil (1941–1947) and an eradication program that killed hundreds, perhaps thousands of individuals between 1945 and 1970. Off British Columbia, the minimum historical population reconstructed from documented kills was at least 750 individuals, whereas the current population is virtually zero, implying a rate of decline exceeding 90% within fewer than two generations. The basking shark is listed as a species of concern by the U.S. Federal Endangered Species Act and as endangered in British Columbia by Canada's Committee on the Status of Endangered Wildlife and Species at Risk Public Registry. (Green, 1891, 1893; Phillips, 1948; Castro, 1983; Compagno, 1984, 2001; Squire, 1990; Last and Stevens, 1994; Baduini, 1995; Ebert, 2003; Bueckert, 2007; Stevenson et al., 2007)

Lamnidae

Lamna ditropis Hubbs and Follett, 1947 (Fig. 3B)

The salmon shark is restricted to temperate and subarctic waters of the North Pacific Ocean, ranging from the Bering Sea and Aleutian Islands to the Sea of Okhotsk, Japan, and South Korea in the west, and to the Gulf of Alaska and south to central Baja California in the east (a waif has been recorded in the central Pacific near the

⁴ Palsson, W. A., S. Hoffmann, P. Clarke, and J. Beam. 2003. Results from the 2001 transboundary trawl survey of the southern Strait of Georgia, San Juan Archipelago and adjacent waters, 109 p. Wash. Dep. Fish Wildl., Mill Creek, WA. [Available at <http://wdfw.wa.gov/publications/01044/wdfw01044.pdf>.]

Basking shark

Basking shark

MACKEREL SHARKS

Thresher sharks

Common thresher shark

Mackerel sharks

Salmon shark

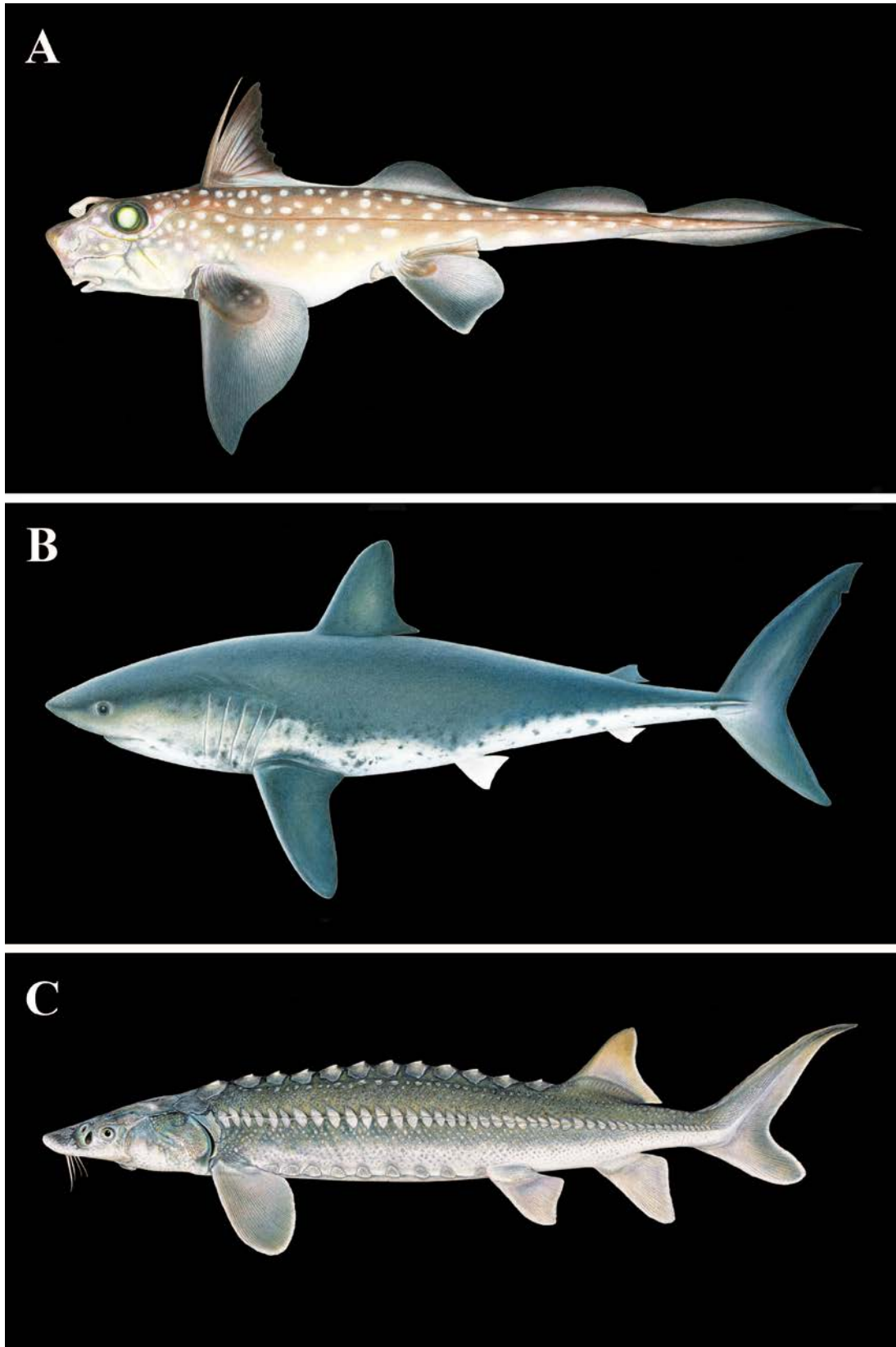


Figure 3

Fishes of the Salish Sea: (A) spotted ratfish (*Hydrolagus colleii*), (B) salmon shark (*Lamna ditropis*), and (C) white sturgeon (*Acipenser transmontanus*). © Joseph R. Tomelleri.

Hawaiian Archipelago). It is common off British Columbia, Washington, and Oregon, and in the straits of Juan de Fuca and Georgia, but this species is rarely seen in the San Juan Islands and Puget Sound, where it is represented by fewer than a half dozen verifiable records: between Eagle Point and Cattle Point on San Juan Island, in Rolling Bay (Bainbridge Island), and in Elliot Bay near Seattle. It is usually found offshore in continental waters to depths of 792 m, but it also ranges into shallow water just off beaches, occurring either singly or in schools or feeding aggregations of several individuals. (Clemens and Wilby, 1961; Miller and Borton, 1980; Castro, 1983; Ebert, 1992, 2003; Nakano and Nagasawa, 1996; Nagasawa, 1998; Compagno, 2001; Hulbert and Rice⁵; Hulbert et al., 2005; Weng et al., 2005, 2008; Stevenson et al., 2007; Goldman and Musick, 2008)

CARCHARHINIFORMES

GROUND SHARKS

Scyliorhinidae

Cat sharks

Apristurus brunneus (Gilbert, 1892) Brown cat shark

The brown cat shark is restricted to the eastern North Pacific Ocean, where it extends from southeast Alaska at Icy Point to central Baja California, inhabiting water as shallow as 33 m but generally preferring greater depths to a maximum of 1306 m. It is usually associated with soft muddy or sandy bottoms, but juveniles are sometimes taken in mid-water well off the substrate. Although it is relatively common in the southern Strait of Georgia and throughout Puget Sound (including Hood Canal), this species is rare everywhere else in the Salish Sea. There are no known records from the Strait of Juan de Fuca, and, in the San Juan Archipelago, there is only a single capture of three specimens off San Juan Island in May 1966. (Gilbert and Thompson, 1905; Kincaid, 1919; DeLacy and Chapman, 1935; Roedel and Ripley, 1950; Roedel, 1951; Clemens and Wilby, 1961; Miller and Borton, 1980; Compagno, 1984; Lamb and Edgell, 1986, 2010; Ebert, 2003; Stevenson et al., 2007)

Triakidae

Hound sharks

Triakis semifasciata Girard, 1855a Leopard shark

Endemic to the eastern North Pacific Ocean, the leopard shark is relatively common between Coos Bay, Oregon, and Mazatlán, Mexico, including the Gulf of California. It is most often encountered at depths less than 40 m. This species is represented in the Salish Sea by a single known specimen, a 170-cm female captured in 2 m of

water in Samish Bay, just south of Bellingham, Washington, in September 2007. (Talent, 1976, 1985; Compagno, 1984; Smith and Abramson, 1990; Cailliet, 1992; Ackerman et al., 2000; Ebert, 2003; Hopkins and Cech, 2003; Farrer, 2009; Love, 2011; Pietsch et al., 2012)

Carcharhinidae

Requiem sharks

Prionace glauca (Linnaeus, 1758)

Blue shark

The blue shark has perhaps the greatest geographic range of any elasmobranch and one of the broadest distributions of any marine vertebrate. It can be found almost anywhere in tropical and temperate waters from the surface down to a depth of at least 812 m, but it is most abundant from the surface to depths of more than 200 m. Although typically an oceanic species, it often ventures inshore, especially at night, and is sometimes found off oceanic islands or in areas with a narrow continental shelf. In the eastern Pacific, it ranges from Kodiak Island to Chile, including the Gulf of California, but it is extremely rare, if not absent, within the confines of the inland seas of Washington and British Columbia. The only record in the Salish Sea was published in 1881 by Jordan and Gilbert: “the jaws of an adult taken near Seattle are in the Museum of the University of Washington Territory.” But no physical evidence to support this claim can now be found, and the very few subsequent indications of the presence of the blue shark in the Salish Sea are most likely based on this single, most likely, erroneous record. (Jordan and Gilbert, 1881c, 1881d; Jordan and Starks, 1895; Kincaid, 1919; Compagno, 1984; Harvey, 1989; Last and Stevens, 1994; Ebert, 2003; Stevenson et al., 2007; Nakano and Stevens, 2008)

HEXANCHIFORMES

SIXGILL SHARKS

Hexanchidae

Cow sharks

Hexanchus griseus (Bonnaterre, 1788)

Bluntnose sixgill shark

Widely distributed in tropical and temperate waters of all three major oceans of the world, including the Mediterranean Sea, the bluntnose sixgill shark is found primarily on continental and insular shelves and upper slopes, from the surface down to a depth of at least 2500 m. In the eastern North Pacific, it ranges from the Aleutian Islands to the tip of Baja California and farther south to Chile. For such a large elasmobranch (attaining a maximum length of about 4.82 m), it is surprisingly common in the Salish Sea. Collections and sightings have been made in the Strait of Juan de Fuca, in the Strait of Georgia, from the San Juan Islands, and throughout Puget Sound from off Bellingham, Everett, and Seattle to Commencement Bay near Tacoma and in Hood Canal, Colvos Passage, and Hale Passage. It has been listed as a species of spe-

⁵ Hulbert, L. B., and S. D. Rice. 2002. Salmon shark, *Lamna ditropis*, movements, diet, and abundance in the eastern North Pacific Ocean and Prince William Sound, Alaska, x + 40 p. Exxon Valdez Oil Spill Restoration Project Final Report (Restoration Project 02396), NMFS Auke Bay Laboratory, Juneau, AK. [Available at <http://www.arlis.org/docs/vol1/52953248.pdf>.]

cial concern by the Government of Canada. (Jordan and Gilbert, 1880p; Miller and Greenfield, 1965; Compagno, 1984; Ebert, 1986a, 1986b, 1990, 2003; Last and Stevens, 1994; Gilbert and Williams, 2002; Stevenson et al., 2007; Gaydos and Brown, 2009)

***Notorynchus cepedianus* Broadnose sevengill shark
(Péron, 1807)**

Widely distributed primarily in temperate oceans and seas around the world, the broadnose sevengill shark is found mainly in shallow, inshore, coastal waters, including bays and estuaries, out onto the continental shelf at depths of at least 136 m. Although often found over sandy and mud bottoms, it seems to prefer rocky reef habitats where kelp beds thrive. In the eastern North Pacific, it ranges from southeast Alaska to Baja California, including the Gulf of California, but it is exceedingly rare within the restricted waters of the Salish Sea. It was first recorded from southern Puget Sound in 1863 by Gill, on the basis of the jaws of a specimen “presented at Nisqually to one of the representatives of the Exploring Expedition under Commodore Wilkes.” Although physical evidence of Gill’s specimen no longer exists, a 1.2-m-long female in the University of Washington Fish Collection from off South Beach, just south of Point Roberts in the Strait of Georgia, taken at a depth of 120 to 160 m, appears to be the only verifiable record in the Salish Sea. There are additional records from the southern Strait of Georgia, particularly in the vicinity of Pender Island, and one from south Puget Sound, off Walker Park, Hammersley Inlet, just east of Shelton. This species was previously known as *Notorynchus maculatus*. (Gill, 1863, 1864b; Jordan and Gilbert, 1881d; Compagno, 1984; Ebert, 1986b, 1989, 1990, 2003; Last and Stevens, 1994; Stevens and Last, 1998; Gilbert and Williams, 2002)

SQUALIFORMES DOGFISH SHARKS

Squalidae Dogfish sharks

***Squalus suckleyi* (Girard, 1855a) Pacific spiny dogfish**

The Pacific spiny dogfish is endemic to the North Pacific Ocean, occupying a wide depth range from very shallow in some areas down to depths of at least 1236 m. Its range extends from Korea and Japan, north to Kamchatka, the Sea of Okhotsk, and Sakhalin Island, east across the Bering Sea and the Aleutian Islands to the Gulf of Alaska, British Columbia, and Washington, and farther south to southern Baja California. In the eastern Pacific, it is extremely common off British Columbia and Washington but declines in abundance off the Oregon and California coasts. It can be found almost anywhere throughout the Salish Sea at depths ranging from the surface to more than 250 m. This species was previously

known as *Squalus acanthias* Linnaeus, 1758 (a valid species not found in the North Pacific). (Jordan and Gilbert, 1881c, 1881d; Kincaid, 1919; DeLacy and Chapman, 1935; Compagno, 1984; Ketchen, 1986; Saunders and McFarlane, 1993; Last and Stevens, 1994; Stevens and Last, 1998; Gilbert and Williams, 2002; Ebert, 2003; Stevenson et al., 2007; Palsson, 2009; Ebert et al., 2010; Verissimo et al., 2010)

Somniosidae Sleeper sharks

***Somniosus pacificus* Pacific sleeper shark
Bigelow and Schroeder, 1944**

The Pacific sleeper shark is restricted to the North Pacific Ocean, extending from Japan, along the Siberian coast and across the Bering Sea, to Alaska and south to Baja California. It is extremely rare in the Salish Sea, with less than a half dozen sightings. It was first recorded but not collected by Jordan and Gilbert in 1881, on the basis of “a specimen 8 feet in length seen by us at Victoria.” A stuffed specimen from Seattle “in the Museum of the Young Naturalists’ Society” was later recorded by Jordan and Starks. Additional published records include sightings in the San Juan Islands and off Comox in the Strait of Georgia. Typically a benthic species, it is usually found hovering over the bottom at depths ranging from 240 to 2000 m, but sometimes comes to the surface, even occasionally entering the intertidal. (Jordan and Gilbert, 1881c, 1881d; Jordan and Starks, 1895; Bigelow and Schroeder, 1948; Gotshall and Jow, 1965; Compagno, 1984; Ebert et al., 1987; Last and Stevens, 1994; Gilbert and Williams, 2002; Ebert, 2003; Yano et al., 2004; Stevenson et al., 2007)

SQUATINIFORMES ANGEL SHARKS

Squatinae Angel sharks

***Squatina californica* Ayres, 1859 Pacific angel shark**

The Pacific angel shark, a cold- to warm-temperate species restricted to the eastern Pacific Ocean, extending from southeastern Alaska to the Gulf of California and from off Ecuador to southern Chile, inhabits primarily the continental shelf at depths ranging from 3 to 100 m but may occasionally be found at depths of 183 m or more. It is often found in shallow bays, in estuaries, and around rocky reefs and kelp forests. Although primarily a benthic species, it has been reported to occur in mid-water at depths of 15–91 m off the bottom. It is extremely rare in the Salish Sea, known only from a single individual collected “near Seattle” in October 1931. (Schultz et al., 1932; Schultz and DeLacy, 1935; Miller and Borton, 1980; Compagno, 1984; Cailliet et al., 1992; Stevens and Last, 1998; Fouts and Nelson, 1999; Gilbert and Williams, 2002; Ebert, 2003)

TORPEDINIFORMES**Torpedinidae*****Torpedo californica* Ayres, 1855b**

The Pacific electric ray is found only in the North Pacific, from Japan in the west, and extending from northern British Columbia at Graham Island to Magdalena Bay, Baja California, in the east. It is most commonly found at depths of 3–30 m, but in southern parts of its range it occurs at much greater depths, down to at least 274 m. In the inland waters of the Salish Sea, records include collections and sightings from off Cape Flattery and Tatoosh Island near the mouth of the Strait of Juan de Fuca; off Cherry Point in the southern Strait of Georgia; from off Bellingham and Everett; throughout most of Puget Sound, including Admiralty Inlet, Port Ludlow, Hood Canal, Port Orchard, central Puget Sound; and in the South Sound, from off Tacoma and in Case and Carr Inlets. Three divers are said to have been shocked by this fish in 1972 off Seahurst Park, Burien, Washington. (Crawford, 1927b; DeLacy and Chapman, 1935; Bray and Hixon, 1978; Miller and Borton, 1980; Compagno, 1984; Last and Stevens, 1994; Stevens and Last, 1998; Neer and Cailliet, 2001; Gilbert and Williams, 2002; Ebert, 2003)

RAJIFORMES**Rajidae*****Bathyrāja interrupta***

(Gill and Townsend, 1897)

Ranging from the Bering Sea and eastern Aleutian Islands through the Gulf of Alaska to the Strait of Georgia, and found over soft bottoms at depths of 26–1050 m, the Bering skate is known in the Salish Sea from a single specimen trawled off the bottom at a depth of 183 m on the west side of Boundary Bay in the southern Strait of Georgia. This species was previously considered to be synonymous with the sandpaper skate, *Bathyrāja kincaidii* (Garman, 1908), but recent unpublished molecular work has confirmed its validity. (Garman, 1908, 1913; Eschmeyer and Herald, 1983; Ishihara and Ishiyama, 1985; Allen and Smith, 1988; Ebert, 2003; Stevenson, 2004; Love et al., 2005; Stevenson et al., 2007)

Bathyrāja kincaidii* (Garman, 1908)*Sandpaper skate**

Ranging from southeastern Alaska to northern Baja California and preferring soft bottoms, at depths of 18–500 m, the sandpaper skate was originally described in 1908 from a specimen collected at Friday Harbor, San Juan Island, and first recorded in British Columbia waters in 1936, on the basis of a specimen taken in Trincomali Channel, near Porlier Pass, in the southern Strait of

ELECTRIC RAYS***Torpedo electric rays*****Pacific electric ray**

Georgia. Additional material has since been collected off Neah Bay, off Protection Island, and west of McArthur Bank in the Strait of Juan de Fuca; between Skipjack Island and Turn Point, and northwest of Barnes Island, in the San Juan Archipelago; in Burrows Bay (Skagit County); and off Point Roberts in the southern Strait of Georgia. This species was previously considered to be synonymous with the Bering skate, *Bathyrāja interrupta* (Gill and Townsend, 1897), but recent unpublished molecular work has confirmed its validity. (Garman, 1913; Schultz and DeLacy, 1935; Ebert, 2003; Love et al., 2005; Stevenson et al., 2007; Love, 2011)

Beringrāja binocolata* (Girard, 1855a)*Big skate**

The big skate ranges from the southeastern Bering Sea and eastern Aleutian Islands, at least as far west as Unalaska, to central Baja California at Cedros Island and the Gulf of California. Although rare south of Point Conception, California, it is one of the most common skates in the Salish Sea, exceedingly abundant almost everywhere on soft bottoms, typically at depths of 2–100 m. This species has occasionally been confused with the starry skate, *Raja stellulata* Jordan and Gilbert, 1880c, and the Alaska skate, *Bathyrāja parmifera* (Bean, 1881b) (see “Comments,” p. 72). (Suckley, 1860; Jordan and Gilbert, 1881c, 1881d; Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Schultz and DeLacy, 1935; Miller and Borton, 1980; Ebert, 2003; Stevenson et al., 2007; Love, 2011; Ishihara et al., 2012)

Raja inornata

Jordan and Gilbert, 1881f

California skate

In sharp contrast to its close relative the big skate described above, the California skate is extremely rare in the Salish Sea, known only from a single specimen collected by Charles H. Gilbert in 1891 off Cape Flattery just inside the mouth of the Strait of Juan de Fuca. This locality also marks the northernmost extent of its range—from there it extends south to southern Baja California and the Gulf of California. It is generally found on soft bottoms, inshore and in shallow bays, at depths of 13–120 m, but occasionally taken as well in much deeper water, exceeding 1600 m. (Gilbert, 1896c; Schultz and DeLacy, 1935; Miller and Lea, 1972; Percy et al., 1982; Eschmeyer and Herald, 1983; Ebert, 2003; Love et al., 2005; Love, 2011)

Raja rhina* Jordan and Gilbert, 1880h*Longnose skate**

A deep-dwelling species, occupying soft bottoms at depths of 9–1294 m, but more often between 50 and 200 m, the longnose skate ranges from the southeastern Bering Sea and eastern Aleutian Islands to southern Baja California at Punta San Juanico and the Gulf of Califor-

nia. In the Salish Sea, it is exceedingly abundant and may be found in deep water almost anywhere throughout the straits of Georgia and Juan de Fuca, in and around the San Juan Archipelago, and the full length of Puget Sound, including Hood Canal. (Jordan and Gilbert, 1881c, 1881d; Starks and Morris, 1907; Starks, 1911; Kincaid, 1919; Schultz and DeLacy, 1935; Miller and Borton, 1980; Stevenson et al., 2007)

ACIPENSERIFORMES

Acipenseridae

Acipenser medirostris Ayres, 1854

The green sturgeon, perhaps the most widely distributed member of the family Acipenseridae, is found in nearshore marine waters throughout the eastern North Pacific Ocean, ranging from the Bering Sea and Gulf of Alaska to Washington and Oregon, and as far south as Ensenada on the Baja California peninsula. Asian records of this species—reported from Taiwan, Korea, Peter the Great Bay, Hokkaido, Sakhalin Island, and the Amur River—most likely represent the closely related Sakhalin sturgeon, *Acipenser mikadoi*. In marine habitats of the eastern North Pacific, the green sturgeon is best known from southern British Columbia, the west coast of Vancouver Island, and Willapa Bay, Washington, but it is rarely found in the Salish Sea. The earliest indication of its presence here was published in 1900 by Richard Rathbun in his “review of the fisheries in the contiguous waters of the state of Washington and British Columbia,” but since then there have been fewer than two dozen records. In the late 1970s, two specimens were observed, but apparently not collected, inside Dungeness Spit at the eastern end of the Strait of Juan de Fuca. Additional specimens have since been recorded from the Strait of Juan de Fuca, including in Discovery Bay and off Victoria, as well as in the Fraser River and northern end of the Strait of Georgia. It has been listed as threatened in northern parts of Puget Sound under the U.S. Federal Endangered Species Act and a species of special concern by Canada’s Committee on the Status of Endangered Wildlife and Species at Risk Public Registry. (Rathbun, 1900; Kincaid, 1919; Fowler, 1923; Clemens and Wilby, 1946; Moyle, 2002; Wydoski and Whitney, 2003; Adams et al., 2007; Benson et al., 2007; Colway and Stevenson, 2007; Erickson and Hightower, 2007; Heppell, 2007; Lindley et al., 2008)

Acipenser transmontanus

Richardson, 1836 (Fig. 3C)

In marine habitats, the white sturgeon ranges from the northern Gulf of Alaska to Ensenada, Mexico, but it apparently spawns only in large rivers from the Sacramento–San Joaquin system northward. At present, self-sustaining

STURGEONS

Sturgeons

Green sturgeon

spawning populations are known only in the Sacramento, Columbia, and Fraser rivers. In 1866, John Keast Lord, a naturalist for the North American Boundary Commission, was the first to indicate its presence in the Salish Sea, describing its biology and exploitation by Native Americans along the Fraser River. Since then, it has been recorded numerous times in the Strait of Georgia and the Fraser River estuary, throughout the Strait of Juan de Fuca, near Port Susan in the tidal waters of the Stillaguamish River, off Port Orchard and Seattle, and from southern Puget Sound, including Hood Canal. It has been listed as endangered in British Columbia by Canada’s Committee on the Status of Endangered Wildlife and Species at Risk Public Registry. (Lord, 1866; Jordan and Gilbert, 1881c, 1881d; Rathbun, 1900; Kincaid, 1919; Stevens and Miller, 1970; Haw and Buckley, 1971; Miller and Borton, 1980; Wang, 1986; Emmett et al., 1991; Schaffter, 1997; Moyle, 2002; Wydoski and Whitney, 2003)

ANGUILLIFORMES

Nemichthyidae

Nemichthys scolopaceus

Richardson, 1848

The snipe eel is the most common and geographically widespread of all the nemichthyids. Primarily a mesopelagic species, it is found occasionally at the surface and to depths as great as 4337 m. It ranges throughout tropical and temperate waters of the Atlantic Ocean between about 55° N and 50° S, including in the Caribbean, eastern Gulf of Mexico, and Mediterranean Sea; the Indian Ocean from the Arabian Sea and Bay of Bengal south to about 50° S; the western Pacific from Japan to New Zealand; and the eastern Pacific from the Gulf of Alaska to southern Chile, including the Gulf of California. But in the Salish Sea, which offers very little deepwater habitat, it is quite rare. Since this species was first recorded in 1881 (as *Nemichthys avocetta*) by Jordan and Gilbert, from the harbor of Port Gamble, Washington, only a very few specimens have been mentioned. The second known specimen was reported by Jordan in 1896, found on the beach at Beacon Hill, near Victoria; the third was reported by Gilbert in 1904—a 71-cm specimen taken during the summer of 1898, off Waldron Island in the southern part of the Strait of Georgia, “swimming on the surface of the water like a snake.” In February 2007, a 67-cm specimen was found on a dock at the Port Washington Marina in Bremerton, Washington, but whether the fish was actually resident there or brought in by someone from elsewhere is unknown. (Jordan and Gilbert, 1881a, 1881c, 1881d; Jordan, 1896; Gilbert, 1904; Peden, 1974; Nielsen and Smith, 1978; Nielsen, 1984; Smith and Nielsen, 1989; Wippelhauser et al., 1996; Smith, 1999, 2003; Smith and Tighe, 2002; Moore et al., 2003; Bilecenoglu et al., 2006)

EELS

Snipe eels

Slender snipe eel

CLUPEIFORMES**Engraulidae*****Engraulis mordax* Girard, 1854a**

The northern anchovy ranges from the Queen Charlotte Islands in northern British Columbia to Cape San Lucas, Baja California, with a center of abundance from San Francisco to Magdalena Bay and a few records off La Paz at the southernmost end of the Gulf of California. Primarily a coastal, nearshore species, it is usually found on or near the surface but known also to occupy depths greater than 200 m. It is present throughout the Salish Sea, with verifiable records in both straits, in the San Juan Islands, off Bellingham and Everett, and throughout most of Puget Sound from Admiralty Inlet to Olympia, including Hood Canal. (Suckley, 1860; Schultz and DeLacy, 1935; Kramer and Ahlstrom, 1968; Miller and Borton, 1980; Laroche and Richardson, 1983; Methot and Lo⁶; Whitehead, 1988; Burrridge, 2002; Penttila⁷; Miller and Kendall, 2009)

Clupeidae***Alosa sapidissima* (Wilson, 1811)**

A widely distributed, anadromous species, the American shad is native to the Atlantic coast of North America, from the St. Lawrence River and Nova Scotia southward to central Florida, often entering streams and rivers. Introductions in the Gulf of Mexico have apparently failed, but similar efforts along the Pacific coast by way of the Sacramento River, California, in 1871 (with subsequent shipments by the U.S. Fish Commission in 1873 and 1876–1880) were highly successful—the population soon spreading to other waters along the coast of the Pacific Northwest, with reports of mature fish in the Columbia River by 1876. Additional introductions were made in the Columbia River in 1885 and 1886. The species is now found from Kamchatka to Kodiak Island and British Columbia and south to Todos Santos Bay, Baja California. First caught in Puget Sound in August 1882, it has remained relatively uncommon, reported occasionally from the straits of Juan de Fuca and Georgia, the San Juan Islands, and Bellingham Bay and throughout most of Puget Sound south to the Tacoma Narrows and off Olympia, including Hood Canal. In freshwater, it is most abundant in the Fraser, Skagit, Stillaguamish, Snohomish, and Nooksack rivers. (Swan, 1883; Welander, 1940; Wendler⁸; Cheek, 1968; Dodson et al., 1972;

⁶ Methot, R. D., and N. C. H. Lo. 1987. Spawning biomass of the northern anchovy in 1987. SWFC Admin. Rep., La Jolla, California, LJ-87-14, 46 p.

⁷ Penttila, D. 2007. Marine forage fishes in Puget Sound. Puget Sound Nearshore Partnership Report 2007-03, Seattle District, U.S. Army Corps of Engineers, Seattle, WA, vi + 23 p

⁸ Wendler, H. O. 1967. The American shad of the Columbia River

HERRINGS**Anchovies****Northern anchovy**

Leggett and Whitney, 1972; Whitehead, 1985; Melvin et al., 1986; Quinn and Adam, 1996; Moyle, 2002; Wydoski and Whitney, 2003; Percy and Fisher, 2011; Hasselman et al., 2012)

Clupea pallasii* Valenciennes, 1847*Pacific herring**

The Pacific herring is widely distributed in the northern hemisphere: in the Arctic, from the White Sea eastward to the Chukchi and Beaufort seas; in the western Pacific from Anadyr Bay to the east coast of Kamchatka and the Aleutian Islands and south to Japan and the west coast of Korea; and in the eastern Pacific from Alaska, southward to San Diego and northern Baja California. A pelagic schooling species, it is commonly found in coastal and offshore regions at the surface to a depth of 250 m. The earliest Salish Sea record was made by John Keith Lord, who sent two skins to the British Museum in 1866 that were subsequently recorded (as *Clupea mirabilis*) by Albert Günther. Adults of this species are extremely abundant and widespread in bays and inlets throughout the Salish Sea. (Lord, 1866; Günther, 1868; Haist and Stocker, 1985; Hammond, 1887; Rounsefell, 1930; Fitch and Lavenberg, 1975; Miller and Borton, 1980; Morrow, 1980; Whitehead, 1985; Swift et al., 1993; Penttila⁷; Gaydos and Brown, 2009)

Sardinops sagax* (Jenyns, 1842)*Pacific sardine**

The Pacific sardine ranges from southern Japan and Kamchatka, east to southeastern Alaska, and south to Cape San Lucas, Baja California, and throughout the Gulf of California. Although first reported in Puget Sound in 1892, this species is rarely found in the Salish Sea—verifiable records are few, and it has never been established that it spawns here. Fewer than a dozen specimens each have been reported from the following localities: the Strait of Juan de Fuca and southern Strait of Georgia, the San Juan Islands, off Everett and Port Orchard, and Hood Canal. Nearly all that is known about the biology of this species is based on studies conducted off California. (Collins, 1892; Hubbs, 1929; Clark, 1935; Hildebrand, 1946; Svetovidov, 1952, 1963; Ahlstrom and Kramer, 1957; Miller and Lea, 1972; Fitch and Lavenberg, 1975; Whitehead, 1985; Parrish et al., 1989; Javor et al., 2011)

CYPRINIFORMES**CARPS****Cyprinidae****Carps and minnows*****Cyprinus carpio* Linnaeus, 1758****Common carp**

The common carp is primarily a freshwater species, widely introduced around the world, although it is Asi-

with a recommendation for management of the fishery, 22 p. Wash. Dep. Fish., Olympia, WA.

atic in origin. It was introduced as a food fish in many parts of the United States, especially in the years following the Civil War, and initially into Idaho, Oregon, and Washington in 1882. By 1894, it was well established in the lower Columbia River, but it has proved to be detrimental to native fish populations and has never become popular in our region, either as food or as a sport fish. It can now be found in lakes, ponds, reservoirs, rivers, and streams throughout the United States and across southern Canada from the St. Lawrence Valley to brackish water of the lower Fraser River. Its presence in the Salish Sea is based on a single specimen taken in June 1946 in brackish water off Point Grey near Vancouver and on what has been described as an “anomalous occurrence” in July 1967 of 13 juvenile specimens collected with a surface trawl in low salinity waters at the southern end of the Strait of Georgia between the mouth of the Fraser River and Saturna Island. These few records support the notion of carp dispersal and colonization of streams through short distances of salt water. (Carl et al., 1959; Barraclough and Robinson, 1971; Balon, 1995; Moyle, 2002; Wydoski and Whitney, 2003; Kottelat and Freyhof, 2007)

ARGENTINIFORMES

Bathylagidae

Leuroglossus schmidti
Rass, 1955

The northern smoothtongue is widespread around the northern parts of the Pacific Rim, from Northern Honshu, Japan, through the Okhotsk and Bering seas and the Gulf of Alaska and to British Columbia as far south as Vancouver Island. Although generally labeled a mesopelagic species—most commonly distributed at depths between 200 and 1000 m—juveniles and adults have been collected at various times near the surface, in depths less than 15 m, even during daylight hours. Such shallow-water occurrences have been recorded from Glacier Bay, Gulf of Alaska, and also in the Strait of Georgia where juveniles and adults are generally distributed throughout, from Hernando Island southeast to the 49th parallel. There are no known records farther south in the San Juan Islands and in Puget Sound, or in the Strait of Juan de Fuca. (Barraclough⁹; Borodulina, 1968; Peden, 1981c; Dunn, 1983; Mason and Phillips, 1985; Matarese et al., 1989; Moser and Ahlstrom, 1996; Sobolevsky and Sokolovskaya, 1996; Abookire et al., 2002)

⁹ Barraclough, W. E. 1967. Number, size, and food of larval and juvenile fish caught with an Isaacs-Kidd trawl in the surface waters of the Strait of Georgia, April 25–29, 1966. Fish. Res. Bd. Can. Manuscr. Rep. Ser. 926, 79 p. [Available at <http://www.dfo-mpo.gc.ca/Library/30481.pdf>.]

MARINE SMELTS

Deepsea smelts

Northern smoothtongue

OSMERIFORMES

Osmeridae

Allosmerus elongatus (Ayres, 1854) Whitebait smelt

The whitebait smelt ranges in shallow waters from the outer coast of Vancouver Island to San Francisco Bay, with a highly questionable record from farther south off San Pedro, California (a single specimen that may have been released as live bait). It is rare in the Salish Sea, but there are a number of verifiable records at several localities within the Strait of Juan de Fuca, including Neah Bay, off Sail Rock, and in Clallam and Sequim bays, as well as in East Sound in the San Juan Islands. There are no known occurrences in the Strait of Georgia or in Puget Sound. (Hubbs, 1925; Shelford et al., 1935; Smith, 1936; McAllister, 1963; Miller and Borton, 1980; Matarese et al., 1989; Moyle, 2002)

Hypomesus pretiosus (Girard, 1854c) Surf smelt

The surf smelt ranges from the north side of the Alaska Peninsula at Izembek Bay and the Gulf of Alaska south to Long Beach, California. Based on numerous published records, it is widely distributed throughout the southern part of the Salish Sea: from Burrard Inlet at the southern end of the Strait of Georgia, off Port Angeles and Dungeness at the eastern end of the Strait of Juan de Fuca, in and around the San Juan Islands, and south throughout most of Puget Sound as far south as Olympia. Areas of high abundance, apparently associated with established spawning grounds, are found in Birch, Bellingham, and Samish bays; in and around the San Juan Islands, Fidalgo Bay, Crescent Harbor, and Penn Cove; off the northern end and eastern margin of Camano Island; off Kilisnoe Harbor; Liberty Bay; off West Point and in Shilshole Bay; off the west coast of Bainbridge Island; in Dyes and Sinclair inlets; around Harbor Island and in the Duwamish waterway; at the southern end of Hood Canal off Hoodspout and along the shores of The Great Bend; and in Henderson, Budd, and Totten inlets. (Swan, 1881a; Hubbs, 1925; McAllister, 1963; Fitch and Lavenberg, 1975; Lee et al., 1980; Miller and Borton, 1980; Morrow, 1980; Matarese et al., 1989; Moyle, 2002; Penttila⁷)

Mallotus villosus (Müller, 1776) Capelin

The capelin is a circumboreal species, widespread throughout the northern part of the Pacific Rim, extending from Korea, Japan, and the Sea of Okhotsk and across southern Arctic Canada to Cape Cod in the western North Atlantic. In the eastern Pacific, it ranges from the Gulf of Alaska and the Aleutian Islands to Barkley Sound on the outer coast of Vancouver Island, but it very rarely enters the Salish Sea. The only verifiable record is

an observation of 50 or more individuals apparently occupying a spawning ground on the west side of Sequim Bay at the eastern end of the Strait of Juan de Fuca. It is usually found in shallow coastal waters but known to occupy depths of 80 m or more. (Hubbs, 1925; McAllister, 1963; Miller and Borton, 1980; Pahlke, 1985; Stergiou, 1989; Carscadden et al., 1994; Naumenko, 1996; Hay, 1998; Brown, 2002; Doyle et al., 2002; Moyle, 2002)

***Spirinchus starksi* (Fisk, 1913) Night smelt**

The night smelt is restricted to the eastern North Pacific Ocean from the southeastern Gulf of Alaska at Shelikof Bay to Southern California off Point Arguello. Its presence in the Salish Sea is based on six specimens, all collected in the eastern Strait of Juan de Fuca: a single individual collected in May 2003 in Discovery Bay and five more taken in July 2011 just to the west off Green Point, Washington. Usually found in near-surface waters and spawning in the surf at night, it is known to occupy depths of at least 128 m. (Dryfoos, 1961; McAllister, 1963; Fitch and Lavenberg, 1971; Matarese et al., 1989; Coad, 1995; Fritzsche and Cavanagh, 1995; Saruwatari et al., 1997; Moyle, 2002; Paquin et al., 2014)

***Spirinchus thaleichthys* (Ayres, 1860a) Longfin smelt**

The longfin smelt, an anadromous, shallow-water species, is found only in the eastern North Pacific Ocean, ranging from the west side of Kodiak Island in the Gulf of Alaska to Monterey Bay, California. It is relatively common and widespread throughout the Salish Sea, represented by published and otherwise well-documented records in the straits of Juan de Fuca and Georgia, the San Juan Islands, Bellingham Bay, and the full length of Puget Sound from Admiralty Inlet to Olympia, including Hood Canal. (Hubbs, 1925; Schultz and Chapman, 1934; Dryfoos, 1961, 1965; McAllister, 1963; Morrow, 1980; Stevens and Miller, 1983; Matarese et al., 1989; Chigbu and Sibley, 1994, 1998; Moyle, 2002; Wydoski and Whitney, 2003; Penttila⁷; Maslenikov et al., 2013)

***Thaleichthys pacificus* (Richardson, 1836) Eulachon**

The eulachon is found only in the eastern North Pacific Ocean, ranging from the Bering Sea west of St. Matthew Island to off Kuskokwim Bay and the Nushagak River, off Bowers Bank and the central Aleutian Islands, through the coastal Gulf of Alaska, and south to central California at Point Conception. An anadromous species found in shallow to moderately deep waters, it is common but found sporadically throughout the Salish Sea: from the eastern end of the Strait of Juan de Fuca, from Cape Lazo to Point Roberts in the Strait of Georgia, in and around the San Juan Islands, and from Camano Is-

land south to Carr Inlet and Commencement Bay off Tacoma in Puget Sound. In March 2010, the National Marine Fisheries Service listed southern eulachon (populations in Washington, Oregon, and California) as threatened under the Endangered Species Act. It is listed as endangered in British Columbia by Canada's Committee on the Status of Endangered Wildlife and Species at Risk Public Registry. (Swan, 1881b; Hubbs, 1925; McAllister, 1963; Morrow, 1980; Stevens and Miller, 1983; Wang, 1986; Matarese et al., 1989; Chigbu and Sibley, 1994; Hay, 1998; Moyle, 2002; Wydoski and Whitney, 2003; Shaffer et al., 2007; Gaydos and Brown, 2009)

SALMONIFORMES

Salmonidae

***Oncorhynchus clarkii*
(Richardson, 1836)**

The cutthroat trout is confined to the eastern North Pacific Ocean, from the Kenai Peninsula, Gulf of Alaska, southward along the Pacific coast of southeast Alaska to British Columbia, Washington, and Oregon (generally within 145 km, or 90 mi, of the coast and usually much closer), and farther south to the Eel River in northern California. It is widely distributed in the lower Columbia River and in most all coastal and Salish Sea drainages. This species was previously known as *Salmo clarkii*. (Morrow, 1980; Smith and Stearley, 1989; Behnke, 1992, 2002; Coad, 1995; Moyle, 2002; Wydoski and Whitney, 2003; Quinn, 2005)

***Oncorhynchus gorbuscha*
(Walbaum, 1792)**

The pink salmon is common throughout the North Pacific and Bering Sea to about 40° N, from northern Japan and North Korea to the Arctic drainages of Siberia (as far west as the Lena River), and from the Bering Strait, east to the Mackenzie River, British Columbia, and south to the Sacramento River, California. Successful introductions have been made in the upper Great Lakes, but attempts in Atlantic drainages of North America have failed. Several introductions into rivers tributary to the White and Barents seas of northern Europe have succeeded, with the stocks now maintained by both natural spawning and additional stocking; they are well established in rivers from the Ob (Russia) to Finmark (Norway), with some straying farther south. The species is common throughout the Salish Sea. In Puget Sound, the largest runs occur in the Stillaguamish, Skagit, Snohomish, Puyallup, and Nooksack watersheds. (Craig and Haldorson, 1986; Emmett et al., 1991; Heard, 1991; Behnke, 2002; Moyle, 2002; Wydoski and Whitney, 2003; Quinn, 2005)

TROUTS

Trouts and salmon

Cutthroat trout

Pink salmon

***Oncorhynchus keta* (Walbaum, 1792) Chum salmon**

Widely distributed in the North Pacific, the chum salmon ranges from southern Japan (Kyushu Island), Korea, and Kamchatka to the Arctic coast of Siberia (as far west as the Lena River), east to the Beaufort Sea and Yukon River in Alaska, and south to the Sacramento River, northern California, with strays as far south as Del Mar near the Mexican border. Several attempts have been made to introduce this species into rivers tributary to the White and Barents seas of northern Europe, but all have been unsuccessful. In British Columbia and Washington, it is found in all coastal drainages, throughout the Salish Sea, and up the Columbia River to the Wind River, just upstream from the Bonneville Dam. Because of its sensitivity to human activities and natural events, the summer run in Hood Canal has been listed as threatened under the Federal Endangered Species Act. (Bakkala, 1970; Morrow, 1980; Coad, 1995; Behnke, 2002; Moyle, 2002; Wydoski and Whitney, 2003; Quinn, 2005; Gaydos and Brown, 2009)

***Oncorhynchus kisutch* (Walbaum, 1792) Coho salmon**

The coho salmon is common throughout the North Pacific and Bering Sea to about 40° N, from Korea, northern Japan, and Kamchatka to Arctic Alaska and south to Monterey Bay, California, with strays as far south as Chamalu Bay, Baja California. Introductions in the Great Lakes have been successful, particularly in Lake Michigan. It has also been introduced into the northern rivers of France where it has been moderately successful. Spawning adults are found in most streams of the lower Columbia River drainage, in Washington and British Columbia coastal drainages, and all the larger rivers and streams of the Salish Sea. In the Strait of Georgia and Puget Sound, it has been listed as a species of concern by the U.S. Fish and Wildlife Service. (Buckley and Haw, 1978; Craig and Haldorson, 1986; Sandercock, 1991; Behnke, 2002; Moyle, 2002; Wydoski and Whitney, 2003; Quinn, 2005; Gaydos and Brown, 2009)

***Oncorhynchus mykiss* (Walbaum, 1792) Steelhead**

The steelhead is widely distributed in the North Pacific, from northern Japan to Kamchatka, the Bering Sea, and coastal waters and drainages of Alaska and south to northern Baja California (anadromous populations now extend only as far south as Los Angeles County, California). Introduced in temperate waters throughout the world, the nonmigratory or inland strain of this species (rainbow trout) is now widely distributed far beyond its historical range through extensive stocking into lakes and streams of the Pacific Northwest and other parts of the United States. In British Columbia and Washington, it is present in most coastal streams, the lower Columbia

River, and in all the larger drainages of the Salish Sea. Previously known as *Salmo gairdneri* Richardson, 1836, this species is listed as threatened in Puget Sound under the Endangered Species Act. (Andrich and Smaldino, 1971; Smith and Stearley, 1989; Behnke, 1992, 2002; Busby et al., 1996; Moyle, 2002; Wydoski and Whitney, 2003; Quinn, 2005; Gaydos and Brown, 2009; Bell et al., 2011)

Oncorhynchus nerka* (Walbaum, 1792)*Sockeye salmon**

The sockeye salmon is broadly distributed in the North Pacific, ranging from northern Japan and Siberia to the Bering Sea and Yukon River in Alaska, and south to Southern California, but it is rare in streams south of the Columbia River system. Widely introduced in other parts of the world, it is common throughout all the larger drainages of the Salish Sea, especially in the Fraser River. (Craig and Haldorson, 1986; Burgner, 1991; Behnke, 2002; Moyle, 2002; Wydoski and Whitney, 2003; Quinn, 2005; Gaydos and Brown, 2009)

Oncorhynchus tshawytscha* (Walbaum, 1792)*Chinook salmon**

The Chinook salmon is widely distributed in the North Pacific, from northern Japan, the Russian Far East, Kamchatka, the Bering Sea, and Alaska as far north as Point Hope, with rare strays farther north along the Chukchi and Beaufort coasts and south to San Diego, California, but is rare in freshwater south of the Sacramento–San Joaquin River system. It has been introduced into the Great Lakes, New Zealand, Chile, and elsewhere. In our region, spawning adults are found in most of the larger streams of the Columbia River, and in coastal and Salish Sea drainages. It has been listed as a candidate for concern in Puget Sound by the Washington Fish and Wildlife Commission and as threatened under the Endangered Species Act. It has also been listed as threatened in British Columbia by Canada's Committee on the Status of Endangered Wildlife and Species at Risk Public Registry. (Allen and Hassler, 1986; Craig and Haldorson, 1986; Healey, 1991; Behnke, 2002; Moyle, 2002; Wydoski and Whitney, 2003; Quinn, 2005; Gaydos and Brown, 2009)

Salmo salar* Linnaeus, 1758*Atlantic salmon**

Native to both sides of the Atlantic Ocean, the Atlantic salmon ranges from the Barents Sea and northern Norway to the Baltic and south to northern Portugal, but it is absent in the Mediterranean, around Iceland and southern Greenland, and west to the coasts of Canada and North America as far south as the Connecticut River. It is now widely distributed in the eastern Bering Sea, the Gulf of Alaska, and south to Washington State, as a

result of fish-farming—the reported number of escapees from aquaculture pens in British Columbia and Washington into the marine environment, from 1996 through 2010, exceeds 1.1 million. A few naturally reproducing populations have already been documented in British Columbia. Although no specific localities have yet been documented, occurrences in the Salish Sea can be expected almost anywhere and will most likely increase in the future. (McKinnell and Thomson, 1997; Alverson and Ruggerone¹⁰; Volpe et al., 2000; Waknitz¹¹; Behnke, 2002; Waknitz et al., 2002; Wydoski and Whitney, 2003; Quinn, 2005; Thompson¹²)

***Salvelinus confluentus* (Suckley, 1859) Bull trout**

The precise boundaries of the historical range of the bull trout are unknown because of confusion in the past with the Dolly Varden (*Salvelinus malma*, see below), but its present range extends from the headwaters of the Mackenzie and Yukon rivers in the north to north-central Nevada in the south. It is present throughout the Columbia River basin and west to Montana, the Klamath River basin, mainland coastal drainages of Washington and British Columbia, and the Salish Sea. Although mostly found in freshwater, individuals spend two months or so in saltwater, moving back and forth between mouths of rivers and streams where their cryptic coloration is a good match for shallow inshore habitats. Because of its sensitivity to human activities and natural events, the species has been listed as threatened in most areas of Washington State, including in Puget Sound, under the Endangered Species Act, and designated of special concern in British Columbia by Canada's Committee on the Status of Endangered Wildlife and Species at Risk Public Registry. (Cavender, 1978; Goetz¹³; Haas and McPhail, 1991; Behnke, 1992, 2002; Mongillo, 1993; Stearley and Smith, 1993; Baxter et al., 1997, 1999; Leary and Allendorf, 1997; Rieman and Allendorf, 2001; Moyle, 2002; Leary et al., 2003; Wydoski and Whitney, 2003; Quinn, 2005; Gaydos and Brown, 2009)

¹⁰Alverson, D. L., and G. T. Ruggerone. 1997. Escaped farm salmon: environmental and ecological concerns. Part B. In *Salmon Aquaculture Review Report*, vol. 3. Technical Advisory Team Discussion Papers, p. B-i-B-95. Environmental Assessment Office, British Columbia, Vancouver, Canada. [Available at http://a100.gov.bc.ca/appsdata/epic/html/deploy/epic_document_20_6047.html.]

¹¹Waknitz, F. W. 2000. The influence of escaped Atlantic salmon on native salmon in Washington State, 25 p. Northwest Fish. Sci. Cent., Nat. Mar. Fish. Serv., Manchester, WA.

¹²Thompson, J. 2008. Farmed Atlantic salmon: potential invader in the Pacific Northwest? Science Findings. Issue 100, 5 p. Pac. Northwest Res. Stn., For. Serv. USDA, Portland, OR. [Available at <http://www.fs.fed.us/pnw/sciencef/scifi100.pdf?>]

¹³Goetz, F. 1989. Biology of the bull trout, *Salvelinus confluentus*, a literature review, 53 p. Willamette Natl. For., For. Serv., USDA, Eugene, OR.

***Salvelinus malma* (Walbaum, 1792) Dolly Varden**

The Dolly Varden is broadly distributed in the North Pacific, extending from Hokkaido, Sakhalin Island, and the Asiatic mainland (as far south as Korea) east to the Kuril, Commander, and Aleutian islands, and from the Alaska Peninsula south to British Columbia and throughout most of the Salish Sea. But it is apparently absent in and around the San Juan Archipelago. (Cavender, 1978; Haas and McPhail, 1991; Behnke, 1992, 2002; Brown, 1992; Stearley and Smith, 1993; Baxter et al., 1997, 1999; Baker et al., 2003; Wydoski and Whitney, 2003; Quinn, 2005)

STOMIIFORMES

Sternoptychidae

***Argyropelecus sladeni*
Regan, 1908**

The lowcrest hatchetfish—often confused with *Argyropelecus lychnus* Garman, 1899, and less often with *Argyropelecus olfersii* (Cuvier, 1829)—is widespread throughout tropical and temperate waters of all three major oceans of the world. In the Pacific, it ranges from the Bering Sea to New Zealand in the west and off southern Chile in the east. It is commonly taken in deepwater pelagic trawls off British Columbia, Washington, and Oregon but is extremely rare inside the restricted waters of the Salish Sea. There are only two verifiable records, both from the Strait of Georgia: a specimen captured on 13 June 1935, in a shrimp trawl, in 55 m of water off Jericho Beach in English Bay, Burrard Inlet; and a second, on 14 March 1953, also taken in a shrimp trawl, at a depth of 75 m, off the mouth of the Fraser River. Primarily a mesopelagic, diel-migrating species, it occurs at depths of about 100 to 375 m at night and 350 to 600 m during the day. (Clemens and Wilby, 1946; Barraclough and Waldichuk, 1954; Barraclough, 1956; Schultz, 1961; Baird, 1971; Balanov, 1992; Harold, 1993; Shinohara et al., 1994)

Stomiidae

***Chauliodus macouni* Bean, 1890b**

The Pacific viperfish is another broadly distributed, primarily mesopelagic species, commonly taken in mid-water trawls from the Bering Sea to the Gulf of California and across the North Pacific to Kamchatka, the Kuril Islands, and Japan. But there are only three known records in the Salish Sea: two from the Strait of Georgia at the mouth of the Fraser River—one captured in April 1947, in a shrimp trawl in 73 m of water, and the other on 4 March 1951, off Canoe Pass buoy, at depths between 106 and 109 m—and one at mid-channel in the Strait of Juan de Fuca, collected on 5 May 2007 in 194

DRAGONFISHES

Marine hatchetfishes

Lowcrest hatchetfish

Dragonfishes

Pacific viperfish

m of water. (Barraclough, 1950, 1954; Barraclough and Waldichuk, 1954; Fitch and Lavenberg, 1968; Parin and Novikova, 1974; Allen and Smith, 1988; Willis et al., 1988; Mecklenburg et al., 2002)

AULOPIFORMES

Synodontidae

Synodus lucioceps (Ayres, 1855b) California lizardfish

A relatively warm-water fish, found primarily on muddy or sandy bottoms at depths ranging from 1 to 230 m, the California lizardfish is most commonly observed off Southern California, but its full distribution extends from San Francisco to central Baja California and inside the Gulf of California as far north as Guaymas, Mexico. During El Niño events in the 1980s, however, individuals, probably non-breeding expatriates, were recorded as far north as Cape Beale on the southwest coast of Vancouver Island, and a few (all relatively large adults, measuring 34.5–44.5 cm standard length) were collected in the Strait of Juan de Fuca and Puget Sound, with records at the mouth of Discovery Bay, off Jefferson Point, at Port Orchard, and in Elliot and Dumas bays. (Fitch and Lavenberg, 1971; Miller and Borton, 1980; Fulton and LeBrasseur 1985; Gonyea and Burton, 1985; McAllister, 1990; Lea and Rosenblatt, 2000; Love, 2011)

Alepisauridae

Alepisaurus ferox Lowe, 1833 Longnose lancetfish

The longnose lancetfish is widely distributed in the warmer waters of the Atlantic, Pacific, and Indian oceans, although individuals are occasionally found in cooler, northern waters, even as far north as Greenland and the Bering Sea. In the Pacific, it ranges from the Bering Sea and Aleutian Islands to the Sea of Okhotsk, the Kuril Archipelago, and Japan in the west, and to southern Chile in the east. It is primarily a deepwater oceanic species (taken at depths exceeding 1800 m), but it is often found close to shore and occasionally found washed up after storms on sandy beaches at localities throughout the Salish Sea. This species was first recorded in our region by Gill in 1862 (as *Alepidosaurus borealis*)—and later by Jordan and Gilbert—additional published or vouchered records are from Cape Flattery and Tatoosh Island, off Salt Creek in the Strait of Juan de Fuca, Oyster Bay in the Strait of Georgia, Point Lawrence in the San Juan Islands, Admiralty Bay off Whidbey Island, off Edmonds, the south end of the Tacoma Narrows near Day Island, and off Browns Point in Commencement Bay. (Gill, 1862a; Jordan and Gilbert, 1881c, 1881d; Crawford, 1925, 1927b; Schultz, 1930; Walker, 1953; Larkins, 1964; Wilimovsky, 1964; Miller and Borton, 1980; Peden et al., 1985; Maslenikov et al., 2013)

LIZARDFISHES

Lizardfishes

Lancetfishes

Paralepididae

Arctozenus risso (Bonaparte, 1840)

The white barracudina is found worldwide in cold, temperate, and tropical waters (at depths of 50–2200 m). Pacific populations of the white barracudina range from the Bering Sea and Aleutian Islands to Kamchatka, the Sea of Okhotsk, and Japan in the west and to Baja California in the east. Although first described from our waters by Jordan and Gilbert in 1881 (as *Paralepis coruscans*), on the basis of a specimen from Port Townsend, this species is extremely rare in the Salish Sea, known only from two additional occurrences, a specimen collected at Point Defiance near Tacoma on 21 November 1939 and another taken from the stomach of a Chinook salmon caught off Point No Point on the Kitsap Peninsula in summer 1986. This species was previously known as *Notolepis coruscans* or *Notolepis rissoi*. (Jordan and Gilbert, 1881b, 1881c, 1881d; Taylor, 1967; Post, 1968, 1987; Miller and Borton, 1980; Hughes, 1981; Balanov et al., 1995; Il'inskiy et al., 1995; Maslenikov et al., 2013)

Barracudinas and daggertoosths

White barracudina

MYCTOPHIFORMES

Myctophidae

Diaphus theta Eigenmann and Eigenmann, 1890

The California headlightfish is widely distributed in epipelagic and mesopelagic waters throughout subarctic and temperate waters of the Pacific, ranging from the southern Bering Sea along the northern margin of the Aleutian island chain and throughout the Gulf of Alaska, to the Okhotsk Sea and Japan in the west and to Chile in the east. Rarely caught in the Salish Sea, it has been taken in the Strait of Juan de Fuca, in English Bay in the Strait of Georgia, off Flattop Island in the San Juan Islands, off the east coast of Vashon Island, in the Tacoma Narrows near Point Defiance, and off Chinom Point in Hood Canal. A partially digested specimen, 45 mm standard length, was recovered from the stomach of a Chinook salmon caught by hook and line at Point Defiance on 11 February 1948. (Clemens and Wilby, 1946; Shimada, 1948; DeLacy et al., 1972; Peden, 1974; Wisner, 1976; Miller and Borton, 1980; Becker, 1983; Willis et al., 1988; Shinohara et al., 1994; Love et al., 2005)

LANTERNFISHES

Lanternfishes

California headlightfish

Nannobranchium regale (Gilbert, 1892)

This lanternfish is broadly distributed in the subarctic North Pacific, extending from the Bering Sea to Hokkaido, Japan, in the west to the Gulf of Alaska, to south-

Pinpoint lampfish

ern Baja California at Magdalena Bay in the east. An epi- and mesopelagic species, with a maximum depth of 1500 m, it migrates vertically to within about 50 m of the surface at night. Relatively common off the coasts of northern British Columbia, Washington, and Oregon, its presence in the Salish Sea is based on a single known specimen (now in rather poor condition) collected on 8 April 1968 in the southern Strait of Georgia at 49° N, 123° W. (Gilbert, 1915; Aron¹⁴; Grinols, 1965; Taylor, 1968; Collard, 1970; Wisner, 1976; Willis et al., 1988; Moser and Ahlstrom, 1996; Love et al., 2005)

***Protomyctophum crockeri* California flashlightfish
(Bolin, 1939)**

The California flashlightfish ranges from northern Japan and southern British Columbia to Baja California and farther south to Chile. Primarily a mesopelagic species, recorded to a depth of 950 m, it is occasionally taken on the surface at night. Although it is relatively common off the coasts of Washington and Oregon, its presence in the Salish Sea is based solely on two specimens found dead on the beach at Tilley Point, South Pender Island, in the southern Strait of Georgia on 3 April 2000. (Aron¹⁵; Grinols, 1965; Wisner, 1976; Peden and Hughes, 1986; Willis et al., 1988; Matarese et al., 1989; Pequeño, 1989; Nakabo, 2002; Love et al., 2005)

***Protomyctophum thompsoni* Northern flashlightfish
(Chapman, 1944)**

The northern flashlightfish is widespread in the subarctic North Pacific, especially north of 40° N, ranging from the southern Bering Sea and across the North Pacific to northern Japan in the west and central California in the east. Like its close relative the California flashlightfish, it is primarily a mesopelagic species, recorded to a depth of 1370 m, but usually taken between 200 and 500 m. It is relatively common off the coasts of northern British Columbia, Washington, and Oregon, but its presence in the Salish Sea is based on a single specimen collected by nightlight from the dock at the University of Washington Friday Harbor Laboratories, San Juan Island, on 28 June 1979. (Chapman, 1939; Grinols, 1965; Wisner, 1976; Masuda et al., 1984; Peden et al., 1985; Peden and Hughes, 1986; Willis et al., 1988; Moser and Ahlstrom, 1996; Love et al., 2005)

¹⁴Aron, W. 1958. Preliminary report of midwater trawling studies in the North Pacific Ocean. Univ. Wash. Dep. Oceanogr., Tech. Rep. 58, 64 p. [Available at <http://hdl.handle.net/1773/15990>.]

¹⁵Aron, W. 1960. The distribution of animals in the eastern North Pacific and its relationship to physical and chemical conditions. Univ. Wash. Dep. Oceanogr., Tech. Rep. 63, 156 p. [Available at <http://hdl.handle.net/1773/15997>.]

***Stenobranchius leucopsarus* Northern lampfish
(Eigenmann and Eigenmann, 1890)**

The northern lampfish is widely distributed at epi- and mesopelagic depths in the Bering Sea; throughout the Gulf of Alaska and south to Baja California in the east; and across the North Pacific to Kamchatka, the Kuril Archipelago, Sea of Okhotsk, and Japan in the west. Published and vouchered records in the Salish Sea include specimens from the Strait of Juan de Fuca, Friday Harbor in the San Juan Islands, off Point Jefferson in Central Puget Sound, and off Point Defiance near Tacoma. The partially digested remains of 16 specimens, 10–25 mm standard length, were recovered from the stomach of a Chinook salmon caught by hook and line at Point Defiance on 11 February 1948. Much more recently, on 8 July 2015, a pink salmon was caught in about 30 m of water off Cyprus Island in the San Juan Archipelago with its stomach full of undigested individuals of the northern lampfish; five of these specimens (38–64 mm standard length) are now preserved in the UW Burke Museum Fish Collection. Early records of *Myctophum californiense* [equals *Symbolophorus californiensis* (Eigenmann and Eigenmann, 1889)] in Puget Sound, published by Jordan and Starks and later by Kincaid, are most probably based on specimens collected off the outer coast of Vancouver Island. (Jordan and Starks, 1895; Kincaid, 1919; Clemens and Wilby, 1946; Shimada, 1948; Peden, 1974; Wisner, 1976; Miller and Borton, 1980; Willis et al., 1988; Shinohara et al., 1994; Brodeur et al., 1999; Sinclair et al., 1999; Abookire et al., 2002)

***Tarletonbeania crenularis* Blue lanternfish
(Jordan and Gilbert, 1880j)**

The blue lanternfish is widely distributed at epi- and mesopelagic depths throughout subarctic North Pacific waters, ranging from the Aleutian Islands to Japan in the west and to the Gulf of Alaska and south to Mexico in the east. In our region, it has been commonly caught in Queen Charlotte Sound and off the outer coasts of Vancouver Island, Washington, and Oregon, but records in the Salish Sea are doubtful. Trevor Kincaid, in his 1919 “annotated list of Puget Sound fishes,” did not state explicitly that the blue lanternfish is found in Puget Sound but only (in passing, while comparing it to another species of lanternfish) that it is “known from a few examples taken at widely separated points.” Schultz and DeLacy were unable to confirm its presence in our waters. Chapman’s 1940 claim of a specimen taken in the Strait of Juan de Fuca (accepted by Clemens and Wilby and later by Hart) was clearly collected far out to sea off the Washington coast and cannot be considered from the Salish Sea. The only known occurrences in the Salish Sea are two specimens from San Juan Island, both caught while nightlighting at the University of Washington Friday Harbor Laboratories

on 15 June 1953 and 13 August 1965; the latter specimen is archived at Tulane University. (Bean, 1881a; Kincaid, 1919; Schultz and DeLacy, 1936a; Chapman, 1940; Clemens and Wilby, 1946; DeLacy et al., 1972; Hart, 1973; Miller and Borton, 1980)

LAMPRIFORMES

Lampridae

Lampris guttatus (Brünnich, 1788)

The opah occurs worldwide in temperate and tropical seas. In the North Pacific it ranges from the Gulf of Alaska and Aleutian Islands, to Cape San Lucas, Baja California, and the Gulf of California in the east and to Japan in the west. An oceanic, pelagic species, it occupies a rather broad vertical distribution, found near the surface to depths of about 500 m. Common in open water off the coasts of Vancouver Island, Washington, and Oregon, it is very seldom seen in the Salish Sea. There are only two known records: a specimen collected on 1 January 1935, at Neah Bay, in the Strait of Juan de Fuca, and another found on 8 January 1995, washed up at Eglon Beach, about 4.8 km north of Kingston on Bainbridge Island. (Bell and Kask, 1936; Cowan, 1938; Herald, 1939; Clemens and Wilby, 1946; Larkins, 1964; Grinols, 1965)

Trachipteridae

Trachipterus altivelis Kner, 1859 King-of-the-salmon

The king-of-the-salmon is found in offshore waters from the surface to a depth of about 640 m; primarily a mesopelagic species, it ranges from the southeastern Bering Sea to the Gulf of Alaska and south to at least Valparaiso, Chile. It is commonly observed off British Columbia, Washington, and Oregon. Salish Sea records include several in the Strait of Juan de Fuca, including off Neah Bay, Sherringham Point, Sooke Harbour, and Morse Creek near Port Angeles; in the San Juan Islands, including in Haro Strait and on the beach at Mud Bay (Lopez Island) and San Juan Park (San Juan Island); in the Strait of Georgia, washed up on the beach at Pender Island and off the mouth of the Fraser River; and in Puget Sound off Titlow Park in the Tacoma Narrows. (Kincaid, 1919; Fowler, 1923; Schultz and DeLacy, 1936a; Clemens and Wilby, 1946; Walker, 1953; Fitch, 1964; Miller and Borton, 1980)

GADIFORMES

Merlucciidae

Merluccius productus (Ayres, 1855b)

The Pacific hake is a pelagic, oceanic and coastal species, with a broad vertical distribution, ranging from the surface to depths exceeding 900 m. It ranges from the eastern Bering Sea and the Aleutians at Attu Island to the

OPAHS

Opahs

Opah

Gulf of Alaska and south to southern Baja California. Exceedingly common off the coasts of British Columbia, Washington, and Oregon, it was once abundant as well throughout the Salish Sea—drastic declines in recent years, however, have resulted in its listing as a species of concern in Puget Sound under the provisions of the Endangered Species Act. (Grinols, 1965; Nelson and Larkins, 1970; Quast and Hall, 1972; Miller and Borton, 1980; Inada, 1981; Carlson et al.¹⁶; Allen and Smith, 1988; Cohen et al., 1990; Gaydos and Brown, 2009; Maslenikov et al., 2013)

Gadidae

Gadus chalcogrammus Pallas, 1814 Walleye pollock

The walleye pollock is widely distributed in the boreal and temperate North Pacific Ocean, ranging from the eastern Bering Sea and along the Aleutian arc, around Kamchatka and the Sea of Okhotsk, to the southern Sea of Japan in the west and from the Gulf of Alaska to central California off Carmel in the east. Typically benthopelagic, it generally occupies depths between 30 and 400 m (recorded to 950 m) but often appears near the surface. It is currently common everywhere off British Columbia, Washington, and Oregon, as well as throughout the Salish Sea (but listed as a candidate for concern in Washington State by the Washington Fish and Wildlife Commission). We follow the generic reallocation of this species, from *Theragra* to *Gadus*, as recommended in the latest edition of the *Common and Scientific Names of Fishes from the United States, Canada, and Mexico*. (Jordan and Gilbert, 1893; Schultz and Welander, 1935; Smith, 1936; Greenwood, 1957; Miller and Borton, 1980; Cohen et al., 1990; Coulson et al., 2006; Carr and Marshall, 2008; Gaydos and Brown, 2009; Page et al., 2013)

Gadus macrocephalus Tilesius, 1810 Pacific cod

The Pacific cod, a benthopelagic species found in near-surface waters to depths of 875 m, ranges around the Pacific Rim, from the eastern Chukchi Sea, Bering Strait, and Aleutian Islands to the Russian Far East and the Yellow Sea, off Manchuria, China, in the west, and to Southern California off Santa Monica in the east. Like the Pacific hake, it was once extremely abundant nearly everywhere in our region, often collected and observed in large numbers throughout the Salish Sea, but recent declines have resulted in its listing as a species of concern in Puget Sound by the Endangered Species Act. (Swan, 1887; Schultz and Welander, 1935; Miller and Borton,

¹⁶Carlson, H. R., R. E. Haight, and K. J. Krieger. 1982. Species composition and relative abundance of demersal marine life in waters of southeastern Alaska, 1969–81. Northwest Alaska Fish. Cent., NWAFC Processed Rep. 82-16, 106 p. [Available at <http://www.afsc.noaa.gov/Publications/ProcRpt/PR1982-16.pdf>.]

1980; Allen and Smith, 1988; Cohen et al., 1990; Barber et al., 1997; Gaydos and Brown, 2009)

***Microgadus proximus* (Girard, 1854b) Pacific tomcod**

Generally restricted to coastal waters, over sandy bottoms at depths of 25–260 m, the Pacific tomcod extends from the southeastern Bering Sea and eastern Aleutians at Unalaska, through the Gulf of Alaska, and south to central California off Point Sal. It is common everywhere off British Columbia, Washington, and Oregon, as well as throughout the Salish Sea. (Schultz and Welander, 1935; Smith, 1936; Wilimovsky, 1964; Isaacson, 1965; Anderson and Chew, 1972; Miller and Borton, 1980; Cohen et al., 1990)

OPHIDIIFORMES

Bythitidae

***Brosmophycis marginata*
(Ayres, 1854) (Fig. 4A)**

The red brotula, a secretive benthic species generally found on rocky bottoms, and in caves and crevices at depths of 3–256 m, is primarily confined to the coastal margins, ranging from southeast Alaska off Petersburg to northern Baja California at Ensenada. Previously known only from the vicinity of San Francisco, it was first recorded in the Salish Sea by Gilbert and Thompson in 1905, on the basis of a single, 177-mm-long specimen collected at some unknown locality in Puget Sound. The earliest British Columbia record is based on a specimen collected in October 1941 in English Bay, near Vancouver. Since then, it has been recorded at several additional localities in the southern part of the Strait of Georgia, from off Bellingham, and throughout most of Puget Sound, from off Everett to Commencement Bay, the southern end of Case Inlet off Taylor Bay, and including Hood Canal. (Gilbert and Thompson, 1905; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Grinols, 1965; Miller and Lea, 1972; Miller and Borton, 1980; Lamb and Edgell, 1986, 2010; Nielsen et al., 1999)

Ophidiidae

***Chilara taylori* (Girard, 1858b)**

The spotted cusk-eel ranges from the Strait of Georgia to southern Baja California and Ecuador, but it is relatively uncommon north of Mendocino, California. Although usually found in the intertidal zone on sandy bottoms at depths between 30 and 190 m, it has been recorded to a depth of 731 m. The previous northernmost occurrence was Willapa Bay, Washington, but two specimens have been collected recently in the southern Strait of Georgia: one in May 2004, in a prawn trap set at a depth of about 109 m, in Silva Bay on the east end of Gabriola

Island, and another as part of a shrimp-trawl survey, on 28 June 2007, at a depth of 78 m, from the northwest side of Bowen Island in Howe Sound. (Jordan and Gilbert, 1881c, 1881d; Fitch and Lavenberg, 1968; Eschmeyer and Herald, 1983; Balart et al., 1995; Ambrose, 1996; Lea and Béarez, 1999; Nielsen et al., 1999; Love et al., 2005; Bradburn et al., 2011; Love, 2011)

BATRACHOIDIFORMES

Batrachoididae

***Porichthys notatus*
Girard, 1854b**

Distributed from southern British Columbia at Smith Sound to southern Baja California at Magdalena Bay, the plainfin midshipman resides on sand or mud bottoms, sometimes partially buried, from the intertidal zone to depths of at least 366 m, but it is more commonly taken at depths of less than 250 m. Described by Jordan and Gilbert in 1881 as “exceedingly abundant” along the entire length of the Pacific coast, the plainfin midshipman is one of the more common species in the Salish Sea, represented by numerous records throughout the straits of Juan de Fuca and Georgia, the San Juan Archipelago, Bellingham Bay, and the full length and breadth of Puget Sound, including Hood Canal. (Jordan and Gilbert, 1881c, 1881d; Starks and Morris, 1907; Hubbs and Schultz, 1939; Quast and Hall, 1972; Miller and Borton, 1980; Lamb and Edgell, 1986, 2010; Walker and Rosenblatt, 1988)

BELONIFORMES

Scomberesocidae

***Cololabis saira* (Brevoort, 1856)**

The Pacific saury is a surface-living species, generally found in large schools offshore throughout the southern Bering Sea and North Pacific Ocean from Japan to the Gulf of Alaska and south to the Revillagigedo Islands. It is common off the coasts of British Columbia (the earliest record was published in 1915 by Gilbert, on the basis of a specimen taken off the west coast of Vancouver Island), Washington, and Oregon, but extremely rare within the restricted waters of the Salish Sea. Only three records are known: two from the east end of the Strait of Juan de Fuca (mid-channel southwest of Sooke Harbour, and off Ediz Hook, Port Angeles) and one specimen collected in November 1940 in Saratoga Pass off Everett. (Gilbert, 1915; Schultz et al., 1932; Wilimovsky, 1954; Grinols, 1965; Hubbs and Wisner, 1980; Miller and Borton, 1980; Brodeur, 1988)

TOADFISHES

Toadfishes

Plainfin midshipman

NEEDLEFISHES

Sauries

Pacific saury

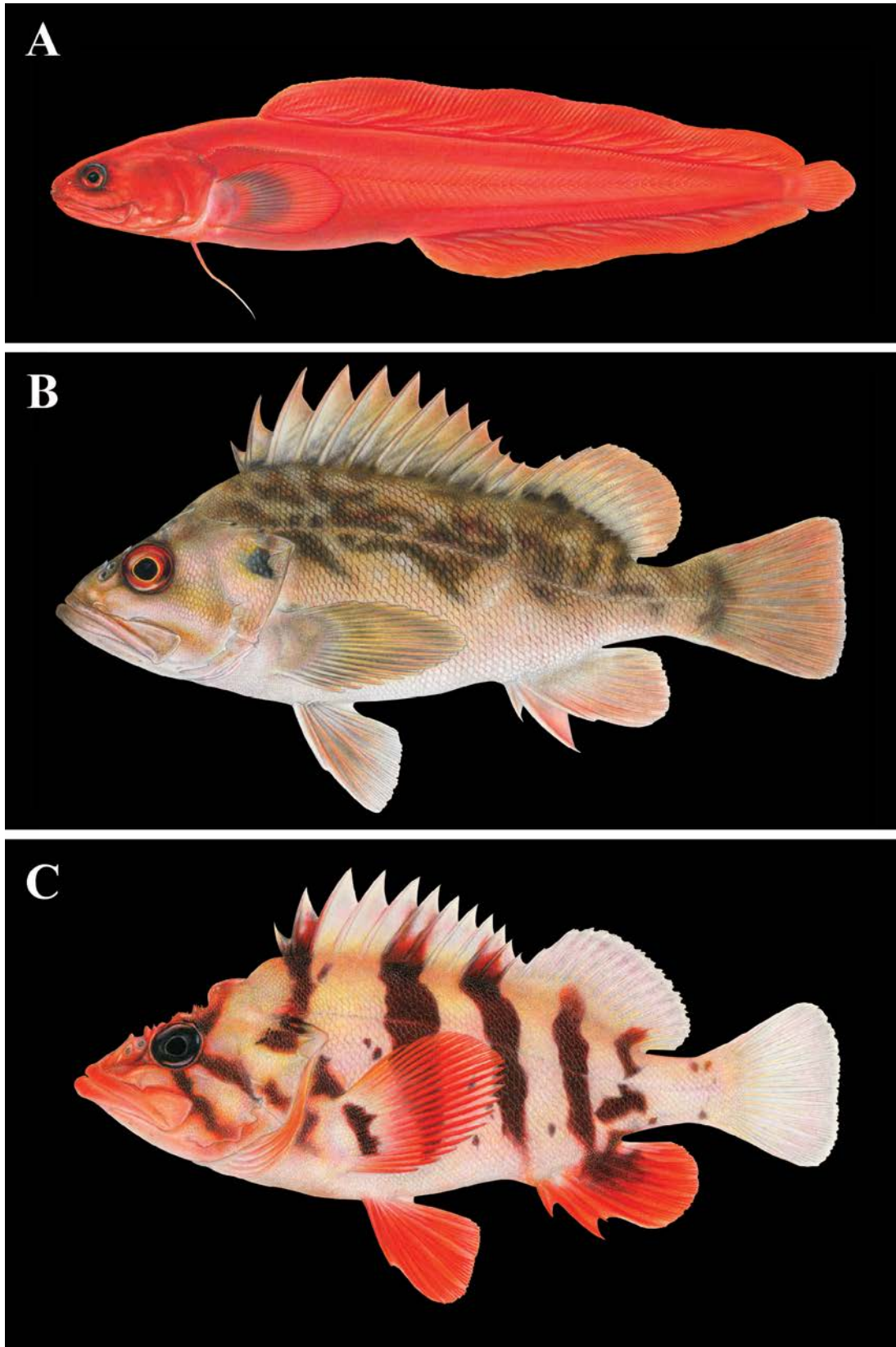


Figure 4

Fishes of the Salish Sea: (A) red brotula (*Brosmophycis marginata*), (B) brown rockfish (*Sebastes auriculatus*), and (C) tiger rockfish (*Sebastes nigrocinctus*). © Joseph R. Tomelleri.

CYPRINODONTIFORMES**Cyprinodontidae**

Cyprinodon variegatus
Lacepède, 1803

Killifishes are found in most tropical and warm-temperate freshwaters, but all can tolerate some salinity and many of them live in marine habitats—typically bays, estuaries, and salt marshes near shore, at depths of no more than 3 or 4 m—or move back and forth between fresh and salt water. The sheepshead minnow is a western Atlantic species, ranging from Cape Cod to south Florida, the Bahamas, and the northern Gulf of Mexico south to Cuba, Jamaica, Yucatan, and Venezuela. Its presence would, therefore, not be expected in the Pacific Northwest; nevertheless, 28 individuals (23 of which are preserved in the UW Burke Museum Fish Collection; the remaining five were sent to the University of Michigan), 19–33 mm standard length, were collected in summer 1949 in an estuary near the mouth of the Dungeness River, near Sequim, in the Strait of Juan de Fuca. Despite a concerted effort following this initial discovery, no additional specimens of this species or any other cyprinodontid have ever been taken in the Salish Sea. It can only be concluded that its presence in the Salish Sea was the result of an introduction that failed to produce a breeding population. (Greenfield and Grinols, 1965; Miller and Borton, 1980; Carlton, 1985; Robins et al., 1986; Wonham et al., 2000)

GASTEROSTEIFORMES**Aulorhynchidae**

Aulorhynchus flavidus Gill, 1861a

The tubesnout has a typical eastern North Pacific distribution—usually forming schools in eelgrass, kelp forests, rocky areas, and over sand, near or on the surface to a depth of 30 m—everywhere abundant from the Alaska Peninsula at Pavlof Bay to Kodiak Island, the Gulf of Alaska, and south to Clipperton Island, off the southwest coast of Mexico. It is common throughout the Strait of Juan de Fuca, the Strait of Georgia (especially in Burrard Inlet during winter months), the San Juan Islands, Bellingham Bay, and nearly everywhere in Puget Sound, including Hood Canal. (Jordan and Gilbert, 1881c, 1881d; Schultz and DeLacy, 1936a; Wilimovsky, 1954; Limbaugh, 1962; Miller and Borton, 1980; Blackburn and Jackson¹⁷; Lamb and Edgell, 1986, 2010)

¹⁷Blackburn, J. E., and P. B. Jackson. 1982. Seasonal composition and abundance of juvenile and adult marine finfish and crab species in the nearshore zone of Kodiak Island's eastside during April 1978 through March 1979. NOAA, OCSEAP Final Rep. 54(1987):377–570. [Available at <http://www.arlis.org/docs/vol1/OCSEAP2/authorindex.html>.]

KILLIFISHES**Pupfishes**

Sheepshead minnow

Gasterosteidae

Gasterosteus aculeatus
Linnaeus, 1758

The threespine stickleback is a large complex of highly differentiated populations, many of which are adapted morphologically and behaviorally to local environmental conditions. It has a broad circumpolar distribution in the Northern Hemisphere, extending from Baffin Island and Hudson Bay to North Carolina in the western Atlantic; from the Beaufort, Chukchi, and Bering seas to Korea and to Monterey Bay, central California, in the Pacific (but in freshwater, considerably farther south to northern Baja California); and from Arctic Europe and Asia to Syria. It is commonly found in marine, brackish, and freshwaters (anadromous and resident freshwater forms), with both benthic and pelagic populations in shallow vegetated areas of lakes, ponds, rivers, streams, and marshes, usually over mud or sand, to a depth of 27 m. Often taken near the surface far from land, it has been recorded to about 800 km offshore. It is extremely common in the Pacific Northwest, found in great numbers in coastal regions of British Columbia, Washington, and Oregon and throughout the Salish Sea basin. (Girard, 1856; Jordan and Gilbert, 1881c, 1881d; Wilimovsky, 1954, 1964; McPhail and Lindsey, 1970; Coad, 1981; Bell and Foster, 1994; Taylor and McPhail, 2000; Foster et al., 2008)

Syngnathidae

Syngnathus leptorhynchus
Girard, 1854c

The bay pipefish is found close to shore, on or near the surface to depths of about 3 m, most often in eelgrass, in quiet, protected bays and sloughs (but also around docks and pilings), from the northern Gulf of Alaska at Prince William Sound to southern Baja California at Santa Maria Bay. It is abundant everywhere along the coasts of Vancouver Island, Washington, and Oregon, as well as within the restricted waters of the Salish Sea. This species is often confused with the kelp pipefish, *Syngnathus californiensis* Storer, 1845 (Bodega Bay to southern Baja California); *Syngnathus griseolineatus* Ayres, 1854, is a junior synonym. (Jordan and Gilbert, 1881c, 1881d; Swain, 1883; Starks, 1896, 1911; Schultz and DeLacy, 1936a; Kendall, 1966; Anderson and Chew, 1972; Fritzsche, 1980; Miller and Borton, 1980; Dawson, 1985)

SCORPAENIFORMES**Scorpaenidae**

Sebastes aleutianus
(Jordan and Evermann, 1898a)

Ranging from the Bering Sea and Aleutians to the Commander Islands and northern Hokkaido, Japan, in the

Sticklebacks

Threespine stickleback

Pipefishes and seahorses

Bay pipefish

MAIL-CHEEKED FISHES**Scorpionfishes**

Rougheye rockfish

west and to Southern California at San Diego in the east, the rougheye rockfish is a deepwater species, typically found on the outer continental shelf at depths of 45–439 m. It is uncommon in the Salish Sea, found only in deeper waters of the western Strait of Juan de Fuca, the Whidbey Basin, and north of Elliott Bay. A closely related species, the blackspotted rockfish, *Sebastes melanostictus*, was recently recognized as distinct from *S. aleutianus* and earlier records of rougheye rockfish may refer to either species. Although *S. melanostictus* is common in deep waters off the coast, only *S. aleutianus* has been documented in the Salish Sea. It has been listed as a species of special concern in British Columbia by Canada's Committee on the Status of Endangered Wildlife and Species at Risk Public Registry. (Starks, 1911; Kincaid, 1919; Alverson and Welander, 1952; Clemens and Wilby, 1961; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Orr and Hawkins, 2008; Palsson et al.¹⁸)

***Sebastes alutus* (Gilbert, 1890) Pacific ocean perch**

The Pacific ocean perch is an abundant and commercially fished species found on the outer continental shelf near the surface to a depth of 825 m, most typically from 100 to 400 m. It is common throughout the Bering Sea and Aleutians, with a range that extends to the Commander Islands, Sea of Okhotsk, and southern Japan in the west, and to central Baja California at Punta Blanca in the east. In the Salish Sea, it is confined to scattered records in deeper waters of the Strait of Juan de Fuca (especially the western end near the outer coast) and the southern Strait of Georgia. (Gilbert, 1896c; Evermann and Goldsborough, 1907; Clemens and Wilby, 1961; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011)

***Sebastes auriculatus* Brown rockfish
Girard, 1854a (Fig. 4B)**

An inshore, sedentary species, the brown rockfish is one of the most common rockfishes in the Salish Sea. It is found nearly everywhere in appropriate habitat—especially in central and southern Puget Sound, as well as in Saanich Inlet, Maple Bay, Stuart Channel, and Burrard Inlet in the southern Strait of Georgia. Recent studies indicate that populations south of Port Townsend are genetically distinct from those of the northern Sound. It is highly associated with rocky habitats and found to depths of at least 146 m, from the northern Gulf of Alaska at Prince William Sound to

central Baja California at San Hipolito Bay. Concerns about population stability have resulted in its listing as a species of special concern in Washington State. (Jordan and Gilbert, 1881c, 1881d; Eigenmann and Beeson, 1895; Kincaid, 1919; Clemens and Wilby, 1961; Miller and Borton, 1980; Orr et al., 2000; Stout et al., 2001; Love et al., 2002; Buonaccorsi et al., 2005; Palsson et al.¹⁹; Love, 2011)

***Sebastes babcocki* Redbanded rockfish
(Thompson, 1915)**

Named for British Columbia fisheries biologist John Pease Babcock, the redbanded rockfish is a distinctive, deep-dwelling species that ranges from the Bering Sea and Amchitka Island in the Aleutians to Southern California at San Diego at depths from 49 m to at least 1145 m. In the Salish Sea it is known from only four localities: mid-channel between Sekiu and the mouth of the Jordan River in the Strait of Juan de Fuca; at Friday Harbor on San Juan Island; off Waldron Island, in the San Juan Archipelago; and off Hoodspport in southern Hood Canal. (Alverson and Welander, 1952; Rosenblatt and Chen, 1963; Miller and Borton, 1980; Allen and Smith, 1988; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁹; Love, 2011)

***Sebastes brevispinis* (Bean, 1884a) Silvergray rockfish**

A pelagic species found more commonly off the outer coast, ranging from the southeastern Bering Sea to central Baja California at Sebastian Vizcaino Bay, at depths from 25 m to at least 580 m (most typically between 100 and 300 m), the silvergray rockfish is very rarely seen in the Salish Sea—only four localities are known: off Friday Harbor and Lime Kiln Light on San Juan Island, off Reid Rock in San Juan Channel, and in Carr Inlet in southern Puget Sound. (Alverson and Welander, 1952; Snytko and Fedorov, 1974; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011)

***Sebastes caurinus* Richardson, 1844 Copper rockfish**

An inshore, sedentary species strongly associated with rocky habitats and found in the intertidal zone at high tide to a depth of at least 185 m, the copper rockfish ranges from the western Gulf of Alaska, east of Kodiak Island, to central Baja California at the San Benito Islands. It is one of the most common rockfishes in the Salish Sea, found in abundance throughout our inland waters, especially in and around the San Juan Islands, the Strait of Georgia (at least as far north as Denman Island), and central and southern Puget Sound. Recent unpublished studies indicate that populations south of Port Townsend are genetically distinct from those of more northern waters. It is listed in Washington State as a species of spe-

¹⁸Palsson, W. A., T.-S. Tsou, G. G. Bargmann, R. M. Buckley, J. E. West, M. L. Mills, Y. W. Cheng, and R. E. Pacunski. 2009. The biology and assessment of rockfishes in Puget Sound. Wash. Dep. Fish Wildl. Rep. FPT 09-04, 208 p. [Available at <http://wdfw.wa.gov/publications/00926/wdfw00926.pdf>.]

cial concern. (Jordan and Gilbert, 1881c, 1881d; Cramer, 1895; Gilbert, 1896c; Starks, 1896, 1911; Kincaid, 1919; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011)

***Sebastes crameri* Darkblotched rockfish**
(Jordan, in Gilbert, 1897)

A coastal species, common at depths of 100–350 m (but reported to 915 m), the darkblotched rockfish ranges from the eastern Bering Sea southeast of Zemchug Canyon, and the Aleutians off Tanaga Island, to Southern California at Santa Catalina Island and Laguna Beach. It is extremely rare in the Salish Sea, represented by only a few scattered records in deeper waters of the straits of Juan de Fuca (at Waadah Island, west of Protection Island, and off MacArthur Bank) and Georgia (Saanich Inlet) and in Whidbey Basin in Puget Sound (off Mukilteo). Because of recent declines, it has been listed as a species of special concern in British Columbia by Canada's Committee on the Status of Endangered Wildlife. (Alverson and Welander, 1952; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Kramer and O'Connell, 2003; Palsson et al.¹⁸; Love, 2011)

***Sebastes diploproa* (Gilbert, 1890) Splitnose rockfish**

The splitnose rockfish is a small, deep-dwelling, pelagic species, often associated as juveniles with drift mats of vegetation and, when larger, with muddy and rocky bottoms. Its range extends from the Sanak Islands in the western Gulf of Alaska to central Baja California at Cedros Island, at depths of 45–924 m, most commonly between 150 and 450 m. Relatively uncommon in the Salish Sea, it has been collected (almost always as young of the year, often found in floating kelp) in the Strait of Juan de Fuca, off Cape Flattery and between Sekiu and Tongue Point; in the San Juan Archipelago, between Upright Head (Lopez Island) and Foster Point (Orcas Island); in the southern Strait of Georgia, near Nanaimo and in English Bay; in central Puget Sound off Port Madison, Elliot Bay, and Seahurst; and in Hood Canal off Dabob Bay, Ayock Point, Hoodspout, and the Skokomish River delta, and near Union. (Evermann and Goldsborough, 1907; Hubbs, 1928; Clemens and Wilby, 1961; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011; Maslenikov et al., 2013)

***Sebastes elongatus* Ayres, 1859 Greenstriped rockfish**

Ranging from the western Gulf of Alaska off Chirikof Island to central Baja California at Cedros Island, the greenstriped rockfish is found primarily over sandy or silty bottoms, inshore and offshore, at depths of 12–495 m, most commonly between 100 and 250 m. It is one of

the more common rockfishes in the Salish Sea and along the outer coasts of Vancouver Island and Washington. It has been collected in the Strait of Juan de Fuca off Ediz Hook near Port Angeles and in mid-channel northwest of Dungeness Spit; in San Juan Channel west of Neck Point; in the Strait of Georgia from Saanich Inlet, off Nanaimo, and Gabriola Island to Burrard Inlet, Pender Harbour, and Baynes Sound; and in Puget Sound from Saratoga Passage, Holmes Harbor, and Possession Sound to Alki Point, with a single isolated record farther south in Case Inlet between Stretch and Herron islands. There are numerous records as well throughout the length of Hood Canal, from Quilcene and Dabob bays to Union and Sister Point inside the entrance to The Great Bend. It has been listed in Washington State as a species of special concern. (Rathbun, 1894; Hubbs, 1928; Smith, 1936, 1937; Clemens and Wilby, 1961; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011)

***Sebastes emphaeus* Puget Sound rockfish**
(Starks, 1911)

First described by Edwin Chapin Starks from specimens collected in the San Juan Islands, the Puget Sound rockfish is a small schooling species, ranging from the northern Gulf of Alaska, along the outer coast of the Kenai Peninsula and Prince William Sound, to central California off Point Sur. It is usually associated with rocky and kelp habitats, particularly at steep drop-offs, at depths of 3–455 m. Common in the Salish Sea, but not often collected because of its small size, it has been recorded from off Victoria in the Strait of Juan de Fuca, at scattered localities throughout the San Juan Islands, and in northern and central Puget Sound from off Keystone Jetty at the entrance to Admiralty Inlet to Port Madison and Elliot Bay. It is also known from numerous records in Hood Canal and at least one locality in southern Puget Sound. (Kincaid, 1919; DeLacy et al., 1972; Miller and Borton, 1980; Eschmeyer and Herald, 1983; Beckmann et al., 1998; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011).

***Sebastes entomelas* Widow rockfish**
(Jordan and Gilbert, 1880e)

Ranging from the western Gulf of Alaska at Albatross Bank to northern Baja California off Todos Santos Bay, at depths of 120–375 m (but said to extend down to 800 m), the widow rockfish is a pelagic schooling species, common off the outer coasts of Vancouver Island, Washington, and Oregon where it is targeted by large-scale commercial fisheries. It is very rarely seen, however, inside the restricted waters of the Salish Sea. Only three widely separated localities have been reported: off Port Renfrew in the Strait of Juan de Fuca, along the southern

margin of San Juan Island (where some 20 specimens were caught by hook and line at Eagle Point in August 1974—apparently a one-time occurrence), and off Marrowstone Island in Admiralty Inlet. It has been listed as a species of special concern in Washington State. (McAllister and Westrheim, 1965; Miller and Borton, 1980; Wilkins, 1986; Ralston and Pearson, 1997; Orr et al., 2000; Stanley et al., 2000; Love et al., 2002, 2005; Pals-son et al.¹⁸; Love, 2011)

***Sebastes flavidus* (Ayes, 1862) Yellowtail rockfish**

Another pelagic schooling species common off our coasts and targeted by large-scale commercial fisheries, the yellowtail rockfish is often associated with rocky and kelp habitats, particularly at steep drop-offs at depths of 50–549 m. It ranges from the Gulf of Alaska and the eastern Aleutians south of Unalaska Island to northern Baja California at San Martin Island. In the Salish Sea it has been collected (but almost exclusively as juveniles) at scattered localities along the length of the Strait of Juan de Fuca, from off Cape Flattery, Sooke, and Port Angeles to Discovery Bay and West Beach off the northwest shore of Whidbey Island; off San Juan Island and the north end of Lopez Island as well as to the east off Allan Island, Williamson Rocks, Lummi Island and in Samish Bay. In the Strait of Georgia it has been taken from Saanich Inlet, off Cowichan, Departure Bay, Nanoose Bay, and Baynes Sound. In Puget Sound, it has been collected from Useless Bay and Saratoga Passage to Golden Gardens, Elliot Bay, and Alki Point, with a sport catch of some 50 individuals in the Tacoma Narrows reported by Haw and Buckley in 1971. There are also a few reports of catches in Hood Canal, from Dabob Bay and off Seabeck to near Union at the mouth of The Great Bend. In Washington State it is listed as a species of special concern. (Eigenmann and Beeson, 1895; Hubbs, 1928; Hubbs and Schultz, 1933; Schultz and DeLacy, 1936a; Haw and Buckley, 1971; Miller and Borton, 1980; Stanley et al., 1999; Orr et al., 2000; Love et al., 2002, 2005; Pals-son et al.¹⁸; Williams et al., 2010; Love, 2011)

***Sebastes helvomaculatus* Rosethorn rockfish
Ayes, 1859**

The rosethorn rockfish is a solitary deepwater species, known from the western Gulf of Alaska east of Sitkinak Island to central Baja California at Banco Ranger where it occupies the upper continental slope at depths of 59–1145 m. Extremely rare in the Salish Sea, it is known only from two collections, both recorded in 1975: one off the west side of Henry Island in the San Juan Archipelago and the other from off Point Monroe, Bainbridge Island, in central Puget Sound. (Miller and Borton, 1980; Rocha-Olivares and Vetter, 1999; Kendall, 2000; Orr et al., 2000; Love et al., 2002, 2005; Pals-son et al.¹⁸; Love, 2011)

***Sebastes maliger* Quillback rockfish
(Jordan and Gilbert, 1880m)**

An inshore, sedentary species, the quillback rockfish ranges from the Shumagin Islands in the western Gulf of Alaska to Southern California at Anacapa Passage, and is found at depths of 5–274 m. It is one of the most common rockfishes in the Salish Sea, abundant almost everywhere, especially in the Strait of Georgia, in and around the San Juan Islands, and throughout Puget Sound, including Hood Canal. Three distinct population segments have been found in Washington waters: one south of Admiralty Inlet and east of Deception Pass, another in the eastern Strait of Juan de Fuca, and another west of Cape Flattery off the coast. It is listed as threatened in Canada and a species of special concern in Washington State. (Jordan and Gilbert, 1881c, 1881d; Kincaid, 1919; Fowler, 1923; Hubbs and Schultz, 1933; Schultz and DeLacy, 1936a; Clemens and Wilby, 1946; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Pals-son et al.¹⁸; Love, 2011; Maslenikov et al., 2013)

***Sebastes melanops* Girard, 1856 Black rockfish**

The black rockfish is a pelagic schooling species ranging from a single record off Japan, to the southern Bering Sea and Aleutians at Amchitka Island and south to northern Baja California. It is most often associated with rocky and kelp habitats, particularly at steep drop-offs, recorded from the surface to a maximum depth of 549 m. One of the more common rockfishes in shallow waters of the Salish Sea, it is abundant almost everywhere in appropriate habitat, especially in and around the San Juan Islands, in Bellingham Bay, and in northern and central Puget Sound, as far south as the Tacoma Narrows where a sport catch of more than 50 individuals was reported by Haw and Buckley in 1971. In Hood Canal, it has been recorded from Dabob Bay to the mouth of The Great Bend. In Washington State it is considered a species of special concern. (Suckley, 1860; Jordan and Gilbert, 1881c, 1881d; Fannin, 1898; Hubbs and Schultz, 1933; Schultz and DeLacy, 1936a; Haw and Buckley, 1971; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Orr and Blackburn, 2004; Pals-son et al.¹⁸; Williams et al., 2010; Love, 2011; Kai et al., 2013)

***Sebastes miniatus* Vermilion rockfish
(Jordan and Gilbert, 1880b)**

Ranging from Prince William Sound in the Gulf of Alaska to central Baja California off the San Benito Islands, the vermilion rockfish prefers rocky habitats at depths of 183–274 m. Rarely seen in the Salish Sea, there are only six known localities: Discovery Bay in the Strait of Juan de Fuca, off Friday Harbor and in Upright Channel in the San Juan Archipelago, near Deep Bay in the Strait of Georgia, and in Port Susan and Elliot Bay in Puget

Sound (as well as underwater observations in Hood Canal). (Jordan and Gilbert, 1881c, 1881d; Rathbun, 1894; Smith, 1936; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011)

Sebastes mystinus* **Blue rockfish**
(Jordan and Gilbert, 1881e)

Extending from Chatham Strait and Kruzof Island off southeast Alaska to Santo Tomas in northern Baja California, the blue rockfish is found on the surface to a maximum depth of 300 m. It is rather common along the outer coast of British Columbia, Washington, and Oregon but known from only a very few localities in the Salish Sea: collections from off Tatoosh Island and underwater observations in Neah Bay in the Strait of Juan de Fuca; in the San Juan Channel; and in English Bay in the southern Strait of Georgia, including underwater observations off Whytecliffe Park just north of Burrard Inlet. (Jordan and Gilbert, 1881c, 1881d; Jordan, 1884; Cramer, 1895; Eigenmann and Beeson, 1895; Kincaid, 1919; Fowler, 1923; Clemens and Wilby, 1946; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011)

***Sebastes nebulosus* Ayres, 1854** **China rockfish**

The distinctive and beautiful China rockfish is a sedentary species, preferring rocky reefs and rocky inshore areas along exposed coasts at depths of 9–247 m, ranging from the western Gulf of Alaska at Kodiak Island to Southern California at Redondo Beach and San Nicholas Island. Uncommon in the Salish Sea, there are only a few known localities: off Seal Rock, Waadah Island, and Third Beach Pinnacle near Neah Bay; the northwest end of Whidbey Island; and the west side of San Juan Island. It is listed in Washington State as a species of special concern. (Jordan and Gilbert, 1881c, 1881d; Jordan 1884; Kincaid, 1919; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011; Maslenikov et al., 2013)

Sebastes nigrocinctus **Tiger rockfish**
Ayres, 1859 (Fig. 4C)

The tiger rockfish is a solitary species, typically dwelling in sheltering holes in shallow rocky reefs at depths as great as 274 m; its range extends from the northern Gulf of Alaska to Southern California at Tanner and Cortes banks. In the Salish Sea it has been taken near Skagway and Seal rocks off Neah Bay in the Strait of

Juan de Fuca; from numerous localities along the east side of San Juan Island and throughout the southern Strait of Georgia (including Saanich Inlet, Saltspring and Saturna islands, English Bay, Howe Sound, Pender Harbour, and Pearson and Martin islands in Malaspina Strait); and in mid-channel off West Point in central Puget Sound. It is listed in Washington State as a species of special concern. (Jordan and Gilbert, 1881c, 1881d; Jordan and Jouy, 1881; Kincaid, 1919; Clemens and Wilby, 1961; Miller and Borton, 1980; Murie et al., 1994; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011)

***Sebastes paucispinis* Ayres, 1854** **Bocaccio**

Once the target of commercial fisheries in the Straits of Juan de Fuca and Georgia, the bocaccio is now considered endangered, threatened, and a species of special concern by the United States, Canada, and Washington State, respectively, because of overfishing and other environmental stresses. Ranging from the western Gulf of Alaska to central Baja California at Punta Blanca, at depths of 50–475 m, it is uncommon in the Salish Sea but known from scattered records in the Strait of Juan de Fuca (Swiftsure Bank at Neah Bay, off Port Renfrew, Port Angeles, Protection Island, and Sequim and Discovery bays); in Bellingham Bay; in the southern Strait of Georgia in Howe Sound; and in Puget Sound from lower Port Susan and off Everett to Port Orchard and Alki Point, with several unspecified localities and two survey events in Hood Canal, the latter in Appletree Cove near Kingston in 1972 and in the Tacoma Narrows in 1971, each yielding some 50 individuals. Salish Sea populations are thought to be genetically distinct from coastal populations. (Rathbun, 1894; Eigenmann and Beeson, 1895; Schmitt et al., 1915; Clemens and Wilby, 1961; Haw and Buckley, 1971; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Williams et al., 2010; Love, 2011)

***Sebastes pinniger* (Gill, 1864a)** **Canary rockfish**

The canary rockfish ranges from the Pribilof Islands in the Bering Sea to northern Baja California at Punta Colnett; it is found at depths of 50–425 m. One of the more common rockfishes in the Salish Sea, it was first recorded in Puget Sound in 1881 by Jordan and Gilbert and later, in 1891, in the vicinity of Victoria by Ashdown Green. Since then it has been collected in Neah Bay, off Port Angeles, and in Discovery Bay in the Strait of Juan de Fuca; off San Juan, Brown, Shaw, and Orcas islands in

*Note added in proof: Frable et al. (2015) described a new species, *Sebastes diaconus* (the deacon rockfish), on the basis of specimens previously identified as *Sebastes mystinus* from off southern Vancouver Island to Morro Bay, California, including a few

records in the Salish Sea. *Sebastes mystinus*, as currently recognized, is apparently unknown in the Salish Sea, the northernmost confirmed records being from off Oregon.

the San Juan Archipelago; throughout Bellingham Bay; off Bowen Island in the Strait of Georgia; and at scattered localities throughout Puget Sound from Skagit Bay to Golden Gardens and Blakely Harbor on the east side of Bainbridge Island, with a record from off Holly in Hood Canal and a large sport catch of more than 50 individuals from the Tacoma Narrows reported by Haw and Buckley in 1971. Salish Sea populations of the canary rockfish are thought to be genetically distinct from coastal populations. Because of overfishing and other environmental factors, it is considered threatened by both the United States and Canada and a species of special concern in the state of Washington. (Jordan and Gilbert, 1881c, 1881d; Green, 1891, 1893; Evermann and Goldsborough, 1907; Kincaid, 1919; Schultz and DeLacy, 1936a; Clemens and Wilby, 1961; Haw and Buckley, 1971; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011; Maslenikov et al., 2013)

***Sebastes proriger* Redstripe rockfish
(Jordan and Gilbert, 1880n)**

Ranging from the southeastern Bering Sea and the Aleutians at Amchitka Island to southern Baja California at depths of 100–425 m, the redstripe rockfish has been reported from numerous scattered localities nearly everywhere in the Salish Sea: from west of McArthur Bank in the eastern Strait of Juan de Fuca; off Lopez and Orcas islands in the San Juan Archipelago; near Alden Bank and Post Point off Bellingham; in Departure Bay, off the mouth of the Fraser River, and off Whytecliffe Park in the Strait of Georgia; and in Puget Sound from off Camano Head and Gedney Island to the Tacoma Narrows and Drayton Passage. In Hood Canal, it has been collected off Ayock Point and off Brinnon at the mouth of Dabob Bay. In Washington State, the redstripe rockfish is listed as a species of special concern. (Starks, 1911; Kincaid, 1919; Schultz and DeLacy, 1936a; Clemens and Wilby, 1961; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011)

***Sebastes rosaceus* Girard, 1854c Rosy rockfish**

The rosy rockfish is primarily a southern offshore species with a narrow distribution extending from the Strait of Juan de Fuca to southern Baja California at Tortugas Bay, found at depths of 7–263 m. This species is extremely rare in the Salish Sea; there are only two known localities: off Third Beach Pinnacle in Neah Bay (on the basis of underwater photographs), and in Puget Sound just inside Admiralty Inlet at Marrowstone Point on the basis of two specimens reported in 1907 by Evermann and Goldsborough. In 1855, William Ayres reported *Sebastes rosaceus*, along with a number of other species,

from “at or near Cape Flattery,” but his conclusion was based on misidentified material of *Sebastes pinniger*. (Ayres, 1855c; Rathbun, 1894; Evermann and Goldsborough, 1907; Starks and Morris, 1907; Schultz and DeLacy, 1936a; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011)

***Sebastes ruberrimus* Yelloweye rockfish
(Cramer, 1895)**

Extending from the eastern Aleutians, south of Umnak Island, to northern Baja California at Ensenada, the yelloweye rockfish occupies deep, rocky reef habitat at depths of 50–475 m. In the Salish Sea it has been collected off Cape Flattery, off Victoria, in Discovery Bay, and off West Beach along the northwest margin of Whidbey Island; off San Juan and Orcas islands, with a large sport catch of some 50 individuals taken off Sucia Island in 1972; and at numerous scattered localities in and around Bellingham Bay. In the Strait of Georgia it is known from Porlier Pass, Deep Bay, English Bay north to Pender Harbour, and Pearson Island in Malaspina Strait. In Puget Sound, records indicate a range from the south end of Saratoga Passage and off Everett to Golden Gardens and Elliot Bay, with additional isolated records off Minter Point in Henderson Bay and numerous localities from central Hood Canal to The Great Bend. Once a target of commercial and recreational fisheries in the Salish Sea, the yelloweye rockfish is now listed as threatened under United States federal regulations and as a species of special concern in Canada and Washington State. (Jordan, 1884; Jordan and Starks, 1895; Kincaid, 1919; Schultz and DeLacy, 1936a; Smith, 1936; Clemens and Wilby, 1961; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Williams et al., 2010; Love, 2011)

***Sebastes saxicola* (Gilbert, 1890) Stripetail rockfish**

The stripetail rockfish, usually found well offshore over soft bottoms at depths of 25–547 m (most commonly between 100 and 350 m), ranges from the eastern Gulf of Alaska at Yakutat Bay to southern Baja California at Punta Rompiente. Uncommon in the Salish Sea, it is represented by only a few scattered collections: in the Strait of Juan de Fuca west of Smith Island, and mid-channel about halfway between Clallam and Crescent bays; in the southern Strait of Georgia at Porlier Pass and Indian Arm; and in Puget Sound off the southern end of Camano Island, off Gedney Island, Carkeek Park, and Alki Point, and in Hale Passage north of Fox Island. There are also records from Hood Canal near Carlson Point, off Holly, and at Hoodspout. (Evermann and Goldsborough, 1907; Starks and Morris, 1907; Smith, 1936, 1937; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011)

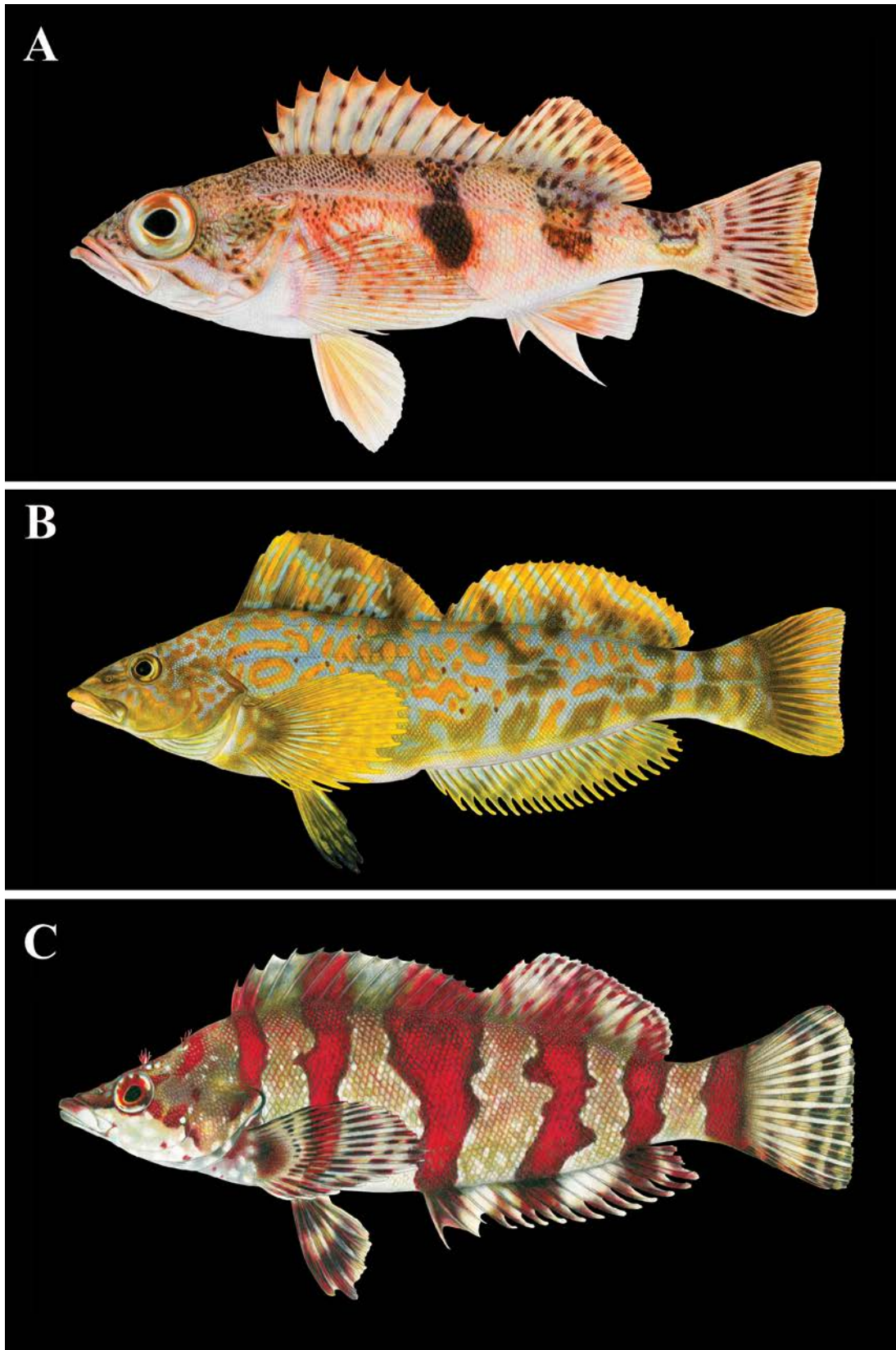


Figure 5

Fishes of the Salish Sea: (A) halfbanded rockfish (*Sebastes semicinctus*), (B) kelp greenling (*Hexagrammos decagrammus*), and (C) painted greenling (*Oxylebius pictus*). © Joseph R. Tomelleri.

Sebastes semicinctus **Halfbanded rockfish**
(Gilbert, 1897) (Fig. 5A)

The halfbanded rockfish is a small coastal species, with a narrow geographic distribution, extending from the Strait of Juan de Fuca to southern Baja California at Asuncion Bay. It is found at depths of 15–402 m. Much more common to the south (especially between central and Southern California), it has only recently been documented in the Salish Sea: two specimens were collected in May 2003 off the mouth of the Sekiu River in the western Strait of Juan de Fuca at a depth of 88 m. (Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011).

***Sebastes zacentrus* (Gilbert, 1890)** **Sharpchin rockfish**

The sharpchin rockfish is a common, widespread rockfish known from the eastern Bering Sea and the Aleutians at Attu Island, to Southern California at San Diego, at depths of 25–660 m. Rarely observed in the Salish Sea, it has been recorded from only a few scattered localities: in the Strait of Juan de Fuca, mid-channel about halfway between Clallam and Crescent bays; in Upright Channel between Shaw and Lopez islands; in the southern Strait of Georgia off Nanaimo and in Burrard Inlet; and in Puget Sound from the south end of Port Susan, off Gedeney Island, from Meadow Point and Golden Gardens to Carkeek Park, from Duwamish Head to Alki Point, and off Seahurst. (Starks, 1911; Kincaid, 1919; Clemens and Wilby, 1961; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011)

Sebastolobus alascanus **Shortspine thornyhead**
Bean, 1890b

Typically a deepwater species found at depths of 300–2000 m, the shortspine thornyhead ranges from the Bering Sea and Aleutian Islands to Kamchatka and the seas of Okhotsk and Japan in the west and to southern Baja California at Boca de Santo Domingo in the east. Rare in the Salish Sea, it is more or less restricted to a few localities at depths greater than 152 m: off Cape Flattery, mid-channel between Clallam and Crescent bays, and off the mouth of the Jordan River in the Strait of Juan de Fuca; in President Channel between Orcas and Waldron islands; in English Bay in the southern Strait of Georgia; and in Puget Sound off Possession Point, mid-channel between Skiff and West points, in Nisqually Reach, and at least one record from central Hood Canal. (Gilbert, 1896c; Hubbs, 1926c; Clemens and Wilby, 1961; Miller and Borton, 1980; Orr et al., 2000; Love et al., 2002, 2005; Palsson et al.¹⁸; Love, 2011)

Anoplopomatidae **Sablefishes**

***Anoplopoma fimbria* (Pallas, 1814)** **Sablefish**

The sablefish is broadly distributed in the North Pacific, extending from the Bering Sea, south of St. Lawrence

Island, and the Aleutians to the Commander Islands and Japan in the west and from the Gulf of Alaska to central Baja California off Cedros Island in the east. Wide-ranging and often migratory, adults are generally found near or on muddy bottoms at depths of 300 to 900 m, but much deeper captures are on record to at least 1800 m. Juveniles are typically found in shallower waters and often nearshore. In our region, the species is abundant almost everywhere (and almost exclusively taken as juveniles); it is found in large numbers off the coasts of Vancouver Island, Washington, and Oregon, as well as throughout the Salish Sea. (Jordan and Gilbert, 1881c, 1881d; Swan, 1885; Smith, 1936; Greenwood, 1957; Haw and Buckley, 1971; DeLacy et al., 1972; Miller and Borton, 1980; Allen and Smith, 1988)

Hexagrammidae

Greenlings

Hexagrammos decagrammus
(Pallas, 1810) (Fig. 5B)

Kelp greenling

Ranging from the Bering Sea and the Aleutians at Attu Island to Southern California off La Jolla, the kelp greenling typically inhabits rocky reefs and kelp beds to depths of about 50 m. It is common in British Columbia waters, especially off the west coast of Vancouver Island. First reported from the Strait of Georgia in 1860 and from Puget Sound in 1881, it is now known to occur throughout the Strait of Juan de Fuca, from Cape Flattery to Dungeness Bay, with numerous records from off Cape Flattery, the mouth of the Jordan River, off Sooke and Saxe Point near Victoria, and off Port Angeles; in the Strait of Georgia at least as far north as Malaspina Strait off Martin, Pearson, and Texada islands, with occurrences at Qualicum Beach on Vancouver Island, Howe Sound near Keats and Bowyer islands, Departure Bay, and Saturna and Pender islands; throughout the San Juan Islands; off Bellingham; and in Puget Sound from Admiralty Inlet south to at least Port Orchard, off Alki Point, and the south end of Bainbridge Island. (Günther, 1860; Jordan and Gilbert, 1881c, 1881d; Jordan and Jouy, 1881; Evermann and Goldsborough, 1907; Haw and Buckley, 1971; Miller and Borton, 1980; Kendall and Vinter, 1984; Maslenikov et al., 2013)

Hexagrammos lagocephalus
(Pallas, 1810)

Rock greenling

From the Bering Sea and throughout the Aleutians to the Commander Islands, the Sea of Okhotsk, Japan, and the Yellow Sea in the west and to central California off Point Conception in the east, the rock greenling is found primarily in shallow rocky areas, especially along exposed coasts, to depths of about 80 m (most often found in less than 20 m). Relatively uncommon in the Salish Sea, there are isolated records from off Cape Flattery

and Neah Bay, Port Renfrew, Sooke, and Pillar Point and in Sequim Bay in the Strait of Juan de Fuca; from Departure and English bays in the southern Strait of Georgia; off Bellingham and San Juan and Lopez islands; and in Puget Sound, from Similk and Skagit bays, off Port Townsend, Port Madison, and Port Orchard, and Duwamish Head and Alki Point near Seattle. (Jordan and Gilbert, 1881c, 1881d; Bean, 1884b; Schultz and DeLacy, 1936a; Clemens and Wilby, 1946; Wilimovsky, 1964; Quast, 1965; Miller and Borton, 1980; Kendall and Vinter, 1984)

Hexagrammos stelleri **Whitespotted greenling**
Tilesius, 1810

The whitespotted greenling ranges from the Beaufort, southern Chukchi, and Bering seas and the Aleutians to the Commander Islands and Sea of Japan in the west, and to the Gulf of Alaska, off the Washington coast, and Puget Sound in the east. Reports from off Oregon and northern California remain unsupported by voucher specimens. It is abundant throughout the Salish Sea, with numerous records from the Strait of Juan de Fuca, the Strait of Georgia at least as far north as Departure Bay and Burrard Inlet, the San Juan Islands, and the full length of Puget Sound, including Hood Canal. It typically inhabits rocky areas and kelp beds from the intertidal zone to depths of 175 m, but it is most often found in less than 100 m. (Girard, 1858b; Suckley, 1860; Jordan and Gilbert, 1881c, 1881d; Roedel, 1953; Wilimovsky, 1964; Quast and Hall, 1972; Allen and Smith, 1988)

***Ophiodon elongatus* Girard, 1854a** **Lingcod**

Distributed throughout the western Gulf of Alaska from off the Shumagin Islands to northern Baja California off Punta San Carlos, the lingcod is found near or on the bottom in rocky areas and kelp beds, especially in areas of strong tidal currents. Juveniles are often found in eelgrass. First recorded in the Salish Sea in 1877, on the basis of a specimen from the Strait of Juan de Fuca, and subsequently from an observation made at Victoria in 1881, it has since been found in great abundance almost everywhere in our inland waters. (Hallock, 1877; Jordan and Gilbert, 1881c, 1881d; Rathbun, 1894; Starks, 1896; Fowler, 1923; Schultz and DeLacy, 1936a; Lamb and Edgell, 1986, 2010; Allen and Smith, 1988)

Oxylebius pictus **Painted greenling**
Gill, 1862b (Fig. 5C)

The painted greenling extends from Prince William Sound (a record farther west off Kodiak Island is apparently in error) to central Baja California at San Benito Island. It typically occupies rocky reefs from the intertidal zone to a depth of about 50 m. It is occasionally

also found around pilings and under wharves. Uncommon in the Salish Sea relative to other greenlings, it is known from scattered records off Victoria and Saanich Arm, from Friday Harbor and Limestone Point on San Juan Island, and in the Strait of Georgia, from Departure Bay, off the mouth of the Fraser River, and north at least to the northern tip of Texada Island. In Puget Sound it has been collected in Penn Cove, in Saratoga Passage between Whidbey and Camano islands; off Everett; at Port Madison and in Port Orchard Bay; in Elliot Bay, off Shilshole and Alki; and south to Point Defiance and in Case Inlet off Taylor Bay and Whiteman Cove, with a few widely separated captures in Hood Canal. (Starks and Morris, 1907; Fowler, 1923; Schultz and DeLacy, 1936a; Clemens and Wilby, 1946; Peden and Wilson, 1976; Miller and Borton, 1980; Orsi et al., 1991; Humann, 1996)

Zaniolepis latipinnis **Longspine combfish**
Girard, 1858a

Ranging from Vancouver Island to southern Baja California, the longspine combfish is especially abundant from San Francisco Bay to central Baja California at Sebastian Vizcaino Bay. Primarily a benthic species, it is usually found on soft muddy bottoms at depths of 35–200 m. It was first collected in the Strait of Georgia in 1889 and later, in 1890, near Victoria, but it was known in Puget Sound, from Port Steilacoom, at least as early as 1858. In 1895, Jordan and Starks noted that “two specimens obtained by Prof. O. B. Johnson are in the Museum of the Young Naturalists’ Society.” Subsequent collections of this species have been made in Discovery Bay at the eastern end of the Strait of Juan de Fuca and along the east coast of Vancouver Island as far north as Fanny Bay and extending south to Nanoose Bay, off Nanaimo, and in Saanich Inlet. There are no known records from the San Juan Islands and only one in Bellingham Bay. In Puget Sound it has been taken from widely scattered localities: from Saratoga Passage and Holmes Harbor, off Everett and Port Madison, in Elliot Bay, along the west side of Bainbridge Island, and south to Carr and Case inlets. Several collections have also been made at both ends of Hood Canal as well as at the northern extremity of The Great Bend. (Girard, 1858a, 1858b; Suckley, 1860; Jordan and Starks, 1895; Fannin, 1898; Evermann and Goldsborough, 1907; Johnson and Adams, 1970; Miller and Borton, 1980; Coleman¹⁹; Essington et al., 2013)

¹⁹Coleman, B. A. 1988. The 1986 Pacific west coast bottom trawl survey of groundfish resources: estimates of distribution, abundance, length, and age composition, NOAA Tech. Memo. NMFS F/NWC-152, 136 p. [Available at <http://www.st.nmfs.noaa.gov/tm/nwc/nwc152.pdf>.]

Rhamphocottidae**Grunt sculpins*****Rhamphocottus richardsonii*
Günther, 1874****Grunt sculpin**

The bizarre looking grunt sculpin is named for its habit of emitting a surprisingly loud, half-grunt, half-hissing sound when removed from the water. It ranges from the eastern Aleutians at Unalaska Island to the Gulf of Alaska and Southern California at Santa Monica Bay and Tanner Bank, but it is also found in Japan. It typically inhabits rocky bottoms and sandy areas mixed with rubble, from the intertidal zone to a depth of at least 250 m. It is well known also for seeking shelter within rocky cracks and crevices as well as empty barnacle shells. This species is relatively common along the entire outer coast of British Columbia, Washington, and Oregon, and there are numerous records in the Salish Sea as well: in the Strait of Juan de Fuca off Sooke, Port Angeles, and Victoria; throughout the San Juan Islands; in Burrows Bay and Chuckanut Bay off Bellingham; in the Strait of Georgia at its northernmost extent in Bute Inlet as well as south to Howe Sound and Departure Bay near Nanaimo, English Bay and Burrard Inlet, off Saturna Island, and south of Cherry Point; and in Puget Sound from Admiralty Inlet to Case Inlet and to Hood Canal at the mouth of The Great Bend. (Eigenmann and Eigenmann, 1892; Johnson, 1918; Fowler, 1923; Schultz and DeLacy, 1936b; Wilimovsky, 1954; Miller and Borton, 1980; Masuda et al., 1984; Lamb and Edgell, 1986, 2010; Maslenikov et al., 2013)

Cottidae**Sculpins*****Artedius fenestralis*
Jordan and Gilbert, 1883a****Padded sculpin**

Members of the genus *Artedius* are among the most common tidepool inhabitants along the Pacific coast of North America. Ranging from the Aleutian Islands, as far west as Unalaska, to Southern California at Diablo Cove, the padded sculpin occupies the intertidal to a depth of 55 m, but it is more often found in depths less than 20 m. It generally prefers rocky coastal regions, but can be found as well on sandy bottoms, especially in eelgrass, and often within tidepools. It was first recorded in British Columbia waters in 1881 (as *Artedius notospilosus*) on the basis of a single specimen collected in Drew Harbour, Quadra Island, at the northernmost end of the Strait of Georgia, but it is now known to occur in appropriate habitat throughout the Salish Sea. (Bean, 1882b; Starks, 1911; Bean and Weed, 1920; Clemens and Wilby, 1946; DeLacy et al., 1972; Miller and Borton, 1980; Norton, 1991; Monaco et al., 1992; Love, 2011)

***Artedius harringtoni* (Starks, 1896) Scalyhead sculpin**

The scalyhead sculpin is usually found in tidepools and rocky inter- and subtidal areas, but also around pilings and under wharves, to a depth of about 20 m. It ranges from the Aleutian Islands as far west as Unalaska to the Gulf of Alaska (including Kodiak Island), and south to Southern California at San Miguel Island. Abundant everywhere off coastal British Columbia and Washington, it is common as well throughout the Salish Sea. This species has been confused with the closely related, but more southerly distributed, coralline sculpin, *Artedius corallinus* (see "Comments," p. 72). (Starks, 1911; Bean and Weed, 1920; Hubbs, 1926a; Schultz and DeLacy, 1936a; Bolin, 1937; Miller and Lea, 1972; Eschmeyer and Herald, 1983; Ragland and Fischer, 1987; Gilbert and Williams, 2002; Love, 2011)

***Artedius lateralis* (Girard, 1854c) Smoothhead sculpin**

The smoothhead sculpin has very similar habitat requirements and almost the same geographic range as do other members of the genus *Artedius*, occurring in tidepools and the intertidal zone to a depth of about 14 m, from the western Gulf of Alaska at Sanak Island to northern Baja California at San Quintin Bay. It is also abundant in appropriate habitat throughout the Salish Sea. (Jordan and Gilbert, 1881c, 1881d; Jordan and Jouy, 1881; Starks, 1911; Bean and Weed, 1920; Schultz and DeLacy, 1936b; Miller and Borton, 1980; Love, 2011)

***Artedius notospilotus* Girard, 1856 Bonyhead sculpin**

The bonyhead sculpin is another sculpin typically found in the intertidal zone and in rocky reef areas, to a depth of about 52 m, but its geographic range is considerably restricted compared to its congeners described previously. With no Alaskan nor verifiable Canadian records, its northernmost limit appears to be Puget Sound where it is nevertheless extremely rare. It was first recorded in the Salish Sea in 1858 by Girard, on the basis of a specimen collected at Port Townsend by Captain Murden in July 1856. The identification of an additional Puget Sound specimen, recorded in 1881 by Jordan and Gilbert, was verified by Carl Hubbs. The southernmost limit of this species is Punta Rocosa, central Baja California. (Girard, 1857, 1858b; Suckley, 1860; Jordan and Gilbert, 1881c, 1881d; Hubbs, 1926a; Schultz and DeLacy, 1936b; Miller and Borton, 1980; McAllister, 1990; Love, 2011)

Ascelichthys rhodorus**Rosylip sculpin****Jordan and Gilbert, 1880i**

Easily distinguished from all other eastern Pacific sculpins by lacking pelvic fins, the rosylip sculpin is distributed from Prince William Sound at the head of Olsen Bay, and from southeastern Alaska at Sitka, to central

California at Pillar Point Harbor. It occurs most often in tidepools, along rocky shores and gravel beaches, and in eel grass, but it is also common from subtidal depths to a maximum of 15 m. It is occasionally found under rocks at low tide. In the Salish Sea it has been collected at numerous localities in the Strait of Juan de Fuca—from Waadah Island and Neah Bay to Victoria and Sequim and Discovery bays; off Lopez, San Juan, and Stuart islands in the San Juan Archipelago; and as far north as Comox in the Strait of Georgia, with additional records from Departure Bay and off Saturna Island. In Puget Sound it is known from a few scattered localities including Deception Pass, Skagit and Similk bays, off Port Ludlow, Scatchet Head at the southern tip of Whidbey Island, off Richmond Beach, and the Tacoma Narrows. (Jordan and Gilbert, 1881c, 1881d; Jordan and Jouy, 1881; Bean, 1882a; Jordan and Starks, 1895; Starks, 1896, 1911; Schultz and DeLacy, 1936b; Miller and Borton, 1980)

***Asemichthys taylori* Gilbert, 1912 Spinynose sculpin**

The secretive, rarely seen spinynose sculpin has a relatively narrow geographic distribution, ranging from southeastern Alaska off Fillmore Island to the Salish Sea. It is usually found on sandy or shelly bottoms near rocky outcroppings at depths ranging from 5 to 18 m, although it has been reported as deep as 50 m. It was initially collected sometime prior to 1910 in Departure Bay by George W. Taylor, the first director of the Pacific Biological Station at Nanaimo, for whom this species was later named by Gilbert. Subsequent collections in the Salish Sea have been made off Sooke and Saxe Point near Victoria in the Strait of Juan de Fuca; off San Juan, Shaw, and Bell islands in the San Juan Archipelago; and in Burrard Inlet and off Keats, Bowen, and Boyer islands in the southern Strait of Georgia. There are no known records in Puget Sound. (Wilby, 1936; Clemens and Wilby, 1946; Peden and Wilson, 1976; Eschmeyer and Herald, 1983; Lamb and Edgell, 1986, 2010; Norton, 1991; Coffee, 1998; Marliave et al., 2010)

***Chitonotus pugetensis* Roughback sculpin
(Steindachner, 1876)**

The roughback sculpin ranges from northern British Columbia at Brundige Inlet to southern Baja California. It is found on sandy, silty, and muddy bottoms from the intertidal zone to a depth of 142 m but more commonly observed at depths of 8–73 m. Initially described from a specimen collected off Fox Island near Steilacoom in southern Puget Sound, this species has subsequently been collected nearly everywhere in Puget Sound including Hood Canal, but is apparently unknown in the Strait of Juan de Fuca west of Sekiu, with records as well in Sequim and Discovery bays. It is relatively abundant throughout

the San Juan Islands, as well as in the southern Strait of Georgia in and around Howe Sound, Burrard Inlet, and Departure Bay, but less common farther north, where there is one verifiable record from Sechelt Inlet and several from Bute Inlet at the extreme northern end of this strait. (Bean and Weed, 1920; Fowler, 1923; Bolin, 1944; DeLacy et al., 1972; Peden and Wilson, 1976; Miller and Borton, 1980; Norton, 1991; Humann, 1996)

***Clinocottus acuticeps* Sharpnose sculpin
(Gilbert, 1896a)**

Extending from the Aleutian Islands to central California at Big Sur River, the small, scaleless sharpnose sculpin inhabits the intertidal zone to a depth of about 20 m, but it also has been observed in sheltered tidepools in the upper intertidal zone, on rocky and sandy bottoms or in eelgrass and seaweed. It is often found in waters of low salinity and rarely seen in freshwater. The earliest record in the Salish Sea is a specimen collected in Departure Bay by the United States Fish Commission steamer *Albatross* in 1890, but this species is now known from scattered localities in the Strait of Juan de Fuca, the San Juan Islands, the Strait of Georgia (at least as far north as Qualicum Beach and the entrance to Jervis Inlet), and throughout Puget Sound, including Hood Canal. (Gilbert and Burke, 1912; Hubbs, 1926b; Schultz and DeLacy, 1936b; Green, 1971; Miller and Borton, 1980; Morrow, 1980; Alofs, 2004)

***Clinocottus embryum* Calico sculpin
(Jordan and Starks, 1895)**

The calico sculpin is distributed throughout the Aleutian Islands and south to northern Baja California at Punta Banda. Like many other sculpins, it is found on sandy, gravelly, and rocky bottoms in tidepools, and in intertidal and shallow subtidal zones, often among algae and shell fragments. Rarely encountered in the Salish Sea, most of the known localities are from San Juan, Lopez, and Orcas islands in the San Juan Archipelago. The remaining records, no more than a half dozen, are from Clallam Bay near Sekui and off Victoria, in the Strait of Juan de Fuca; Departure Bay in the Strait of Georgia; and off Port Ludlow, West Point near Seattle, and Manchester Rocks off the southern end of Bainbridge Island in Puget Sound. (Starks, 1896, 1911; Bean and Weed, 1920; Hubbs, 1926b; Schultz and DeLacy, 1936b; Wilimovsky, 1964; Green, 1971; DeLacy et al., 1972; Yoshiyama, 1981; Pfister, 2006)

***Clinocottus globiceps* Mosshead sculpin
(Girard, 1858b)**

Extending from the western Gulf of Alaska at Chernabura and Kodiak islands to Southern California at Gaviota,

Gardens. This species is often misidentified as the red Irish lord. (Ayres, 1855d; Eigenmann and Eigenmann, 1892; Starks and Morris, 1907; Hubbs, 1928; Schultz and Welander, 1934; Peden, 1978; Miller and Borton, 1980; Lamb and Edgell, 1986, 2010; Love, 2011; Essington et al., 2013)

***Icelinus borealis* Gilbert, 1896a Northern sculpin**

The northern sculpin ranges from Bristol Bay and the Aleutian Islands off Attu to Vancouver Island and southern Puget Sound. It prefers muddy, sandy, and gravelly bottoms at depths between 4 and 250 m. It is extremely abundant throughout the San Juan Islands, and there are several records in the Strait of Juan de Fuca—west of the Jordan River, off Victoria, and in mid-channel off Port Angeles. It has also been collected in the southern Strait of Georgia, especially in and around Departure Bay, Burrard Inlet, and Howe Sound, and at least as far north as Pender Harbour. It is represented as well at scattered localities throughout the full length of Puget Sound, including Hood Canal. (Starks, 1896, 1911; Gilbert and Thompson, 1905; Miles, 1918; Bolin, 1936; Schultz and DeLacy, 1936a; Miller and Borton, 1980; Norton, 1991)

***Icelinus burchami* Evermann
and Goldsborough, 1907 Dusky sculpin**

A deep-dwelling sculpin, the dusky sculpin is known from southeastern Alaska to Southern California at La Jolla. It is usually found on gravelly and rocky bottoms at depths ranging from 60 to 570 m. Seldom collected in the Salish Sea, the species is represented at several localities in the southern Strait of Georgia, including Burrard Inlet, Howe Sound, and off Five Finger Island at the mouth of Departure Bay, but it is apparently unknown in the San Juan Archipelago and represented by only a single occurrence in the Strait of Juan de Fuca. The single known Puget Sound record is a specimen reported in 1928 by Carl Hubbs from off Holly in central Hood Canal. (Hubbs, 1928; Bolin, 1936, 1944; Schultz and DeLacy, 1936a; Wilimovsky, 1954; Barraclough and Butler, 1965; Peden, 1981a; Lamb and Edgell, 1986, 2010; Maslenikov et al., 2013)

***Icelinus filamentosus* Gilbert, 1890 Threadfin sculpin**

Extending from the Gulf of Alaska near Chirikof Island and south of the Kenai Peninsula, to Southern California at Point Loma and Cortes Bank, the threadfin sculpin is found on muddy, sandy, or gravelly bottoms at depths of 18–420 m. The earliest British Columbia record is based on a specimen collected in 1903 off Bowen Island in the Strait of Georgia. Since then a number of additional specimens have been taken in the same general area—in Burrard Inlet and Malaspina Strait—but also to the west

near Porlier Pass and south to Active Pass. There are numerous records throughout the Strait of Juan de Fuca but only a single locality in the San Juan Archipelago, off the east end of Orcas Island. There are a number of collections from scattered localities in Puget Sound—from Possession Sound and Saratoga Passage to Point Monroe on Bainbridge Island, Golden Gardens, Duwamish Head, and Alki Point, as well as in Hood Canal. (Gilbert and Thompson, 1905; Evermann and Goldsborough, 1907; Hubbs, 1928; Bolin, 1936; Smith, 1937; Clemens and Wilby, 1946; Day, 1967; Pearcy et al., 1989)

***Icelinus fimbriatus* Gilbert, 1890 Fringed sculpin**

Another deepwater sculpin, the fringed sculpin is narrowly distributed between Vancouver Island, at least as far north as Bamfield, to southern Baja California at Tortugas Bay. It prefers soft muddy or sandy bottoms at depths of 50–265 m. Records in the Salish Sea are rare and, as far as we know, restricted to the Strait of Georgia. Collections have been made off Patricia Bay in Saanich Inlet, in Satellite Channel, in Departure and Nanose bays near Nanaimo, off Snake Island, in Pendrell Sound, and off Gifford Island in Desolation Sound. (Bolin, 1936, 1944; McPhail, 1969; Horn and Allen, 1978; Eschmeyer and Herald, 1983; Peden, 1984; Rodriguez-Romero et al., 2008)

***Icelinus tenuis* Gilbert, 1890 Spotfin sculpin**

The spotfin sculpin ranges from Ketchikan and west of Noyes Island (southeastern Alaska) to central Baja California off the San Benito Islands. It is found most often on sandy and silty bottoms, but sometimes in rocky areas as well, at depths of 7–375 m but more commonly between 60 and 100 m. There are apparently no records from the Strait of Juan de Fuca and the San Juan Islands, but its presence is well documented throughout the Strait of Georgia from off the north side of Tumbo Island to Baker Passage and Bute Inlet, including Departure Bay and Burrard Inlet. It is also found at scattered localities in Puget Sound—from off Port Susan, in Saratoga Pass and Possession Sound, off Port Madison, in Fletcher Bay, at Shilshole Bay and Golden Gardens, off Duwamish Head to Alki Point, and south to Tramp Harbor and Colvos Passage. There are records also from Hood Canal—off Holly, Anderson Cove, and Hoodspout. (Evermann and Goldsborough, 1907; Hubbs, 1928; Bolin, 1936; Eschmeyer and Herald, 1983; Lamb and Edgell, 1986, 2010; Humann, 1996; Love, 2011)

***Jordania zonope* Longfin sculpin
Starks, 1895 (Fig. 6A)**

The longfin sculpin ranges from Prince William Sound at Danger Island and southeastern Alaska at Baranof Island

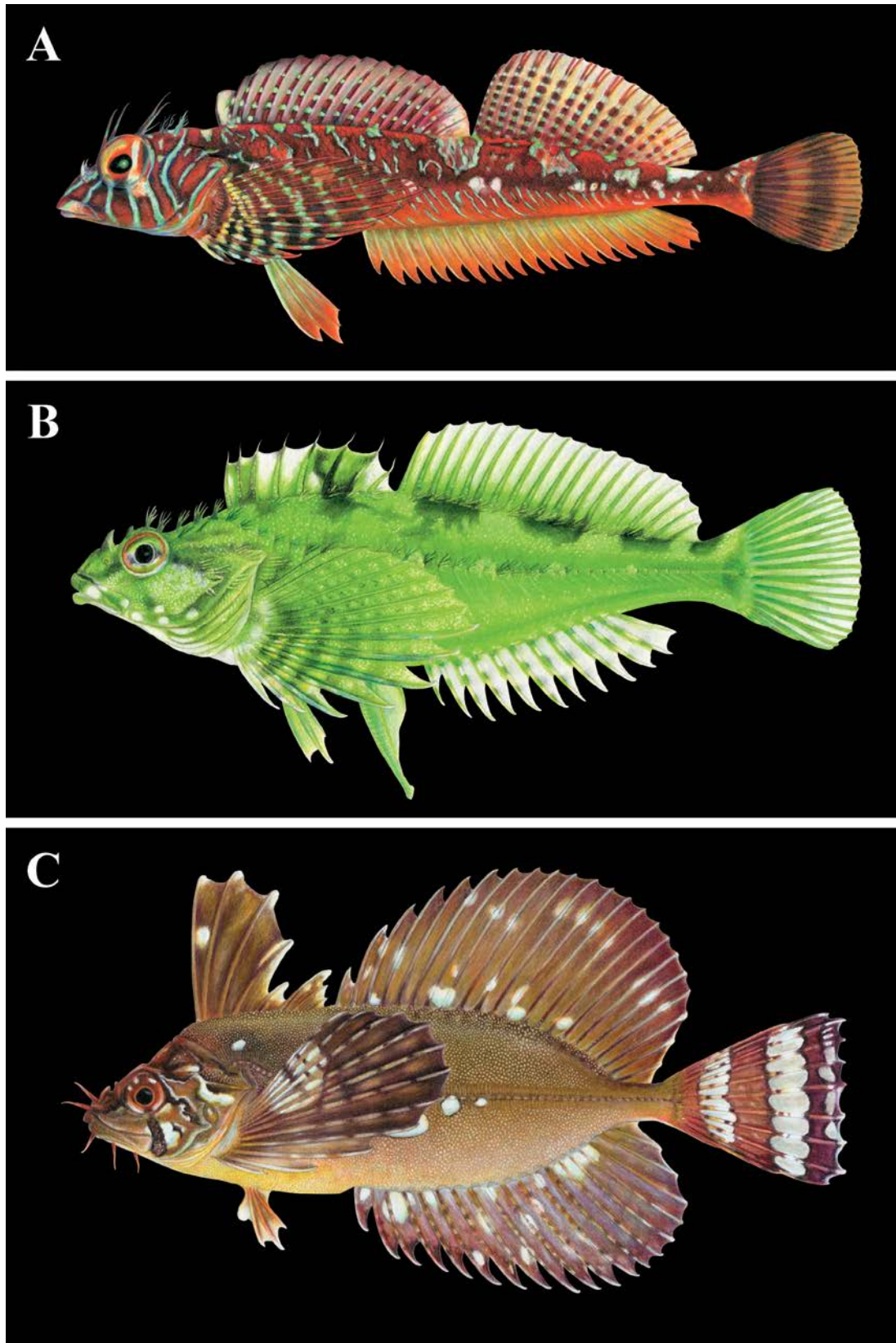


Figure 6

Fishes of the Salish Sea: (A) longfin sculpin (*Jordania zonope*), (B) fluffy sculpin (*Oligocottus snyderi*), and (C) silverspotted sculpin (*Blepsias cirrhosis*). © Joseph R. Tomelleri.

to central California at Diablo Canyon. It prefers rocky bottoms where it is often associated with kelp, but sometimes is observed as well clinging vertically to the sides of rock faces, at intertidal depths to about 40 m. Originally described from three specimens—"taken in channel rocks at Point Orchard, near Seattle, by Miss Maud Parker and Mr. Adam Hubbert, members of the Young Naturalists' Society"—it is relatively common in our waters, especially in rocky habitats. Most of the known records in the Salish Sea are from the San Juan Archipelago off San Juan, Brown, Orcas, Lopez, and Shaw islands. There are a few records in the Strait of Juan de Fuca off Sooke, Saxe Point near Victoria, and Tongue Point in the Salt Creek Recreation area on the eastern margin of Crescent Bay. In the Strait of Georgia, it has been collected at Burrard Inlet, at several localities in and around Howe Sound, off Pearson Island, in Pender Harbour, in Jervis Inlet, and at the north end of Texada Island near Sturt Bay. In Puget Sound there are only four known localities: off Washington Park in Anacortes, off Langley Point at the south end of Langley Bay, in Admiralty Inlet off Port Townsend (underwater observations have been recorded off Keystone Jetty as well), and at Orchard Point near Manchester, Washington. (Jordan and Starks, 1895; Bean and Weed, 1920; Schultz, 1930; Bolin, 1937; Clemens and Wilby, 1946; Wilkie, 1963; Peden and Wilson, 1976; Miller and Borton, 1980)

***Leptocottus armatus* Pacific staghorn sculpin
Girard, 1854a**

The Pacific staghorn sculpin, a scaleless sculpin noted for its long antler-like preopercular spine, ranges from the southeastern Bering Sea at Port Moller to northern Baja California at Punta Bay. It is commonly found in tidepools and in intertidal and subtidal regions of bays and estuaries, to a maximum depth of at least 188 m. It generally prefers muddy, sandy, and broken-shell bottoms and is often associated with eelgrass. Unusually tolerant of freshwater, it sometimes enters lower reaches of coastal rivers and streams. Perhaps our most widespread and commonly collected cottid, it is found in abundance along the entire outer coast and throughout the Salish Sea. (Suckley, 1860; Gilbert 1896c; Evermann and Goldsborough, 1907; Hubbs, 1921; Smith, 1936, 1937; Jones, 1962; Miller and Borton, 1980; Armstrong et al., 1995)

***Myoxocephalus polyacanthocephalus* Great sculpin
(Pallas, 1814)**

The great sculpin is distributed from the Bering Sea and Aleutian Islands to the Sea of Okhotsk and eastern Sea of Japan in the west and to Vancouver Island and southern Puget Sound in the east. It is found primarily on sandy and muddy bottoms from the intertidal zone to a depth of 200 m, but it is common as well between 200 and 300 m

and reported to a maximum known depth of 775 m. It is abundant along the entire outer coast of British Columbia and throughout the Salish Sea. (Lord, 1866; Jordan and Gilbert, 1881c, 1881d; Gilbert, 1896c; Evermann and Goldsborough, 1907; Fowler, 1923; Miller and Borton, 1980; Lamb and Edgell, 1986, 2010; Love, 2011)

***Oligocottus maculosus* Girard, 1856 Tidepool sculpin**

Another scaleless sculpin, the tidepool sculpin ranges from the southeastern Bering Sea at the Pribilof Islands to Southern California at Palos Verdes Peninsula. It is exceedingly abundant, especially in the northern part of its distribution (from the Gulf of Alaska to San Francisco Bay) in sheltered intertidal and shallow subtidal areas, including tidepools, but it has also been observed at depths as great as 9 m. It is abundant along the outer coast of British Columbia, including Vancouver Island, and almost everywhere in appropriate habitat throughout the Salish Sea. (Günther, 1860; Evermann and Goldsborough, 1907; Bean and Weed, 1920; Green, 1971; Howe and Richardson²¹; Miller and Borton, 1980; Cross, 1981; Pfister, 2006; Love 2011)

***Oligocottus rimensis* Saddleback sculpin
(Greeley, 1899)**

Ranging from southeastern Alaska at Kakul Narrows to northern Baja California, the saddleback sculpin prefers tidepools and shallow, rocky, and gravelly intertidal areas often associated with kelp, to a depth of 6 m. It is relatively uncommon in the Salish Sea, but it is best known from the San Juan Archipelago, where collections have been made off San Juan, Stuart, Shaw, and Lopez islands. There are a few records in the Strait of Juan de Fuca—in tidepools west and south of Slip Point Light in Clallam Bay, at Tongue Point on the eastern margin of Crescent Bay, off the mouth of the Jordan River, and off Sooke and Victoria—but only two known localities in the Strait of Georgia, at Saturna and Gabriola islands, and three localities in Puget Sound, off Admiralty Head, Carkeek Park, and Golden Gardens. (Evermann and Goldsborough, 1907; Hubbs, 1928; Schultz, 1930; Clemens and Wilby, 1946; Peden and Wilson, 1976; Miller and Borton, 1980; Love, 2011)

***Oligocottus snyderi* Greeley, in Fluffy sculpin
Jordan and Evermann, 1898b (Fig. 6B)**

The fluffy sculpin ranges from the western Gulf of Alaska at Chernabura Island, and southeastern Alaska at

²¹Howe, K. M., and S. L. Richardson. 1978. Taxonomic review and meristic variation in marine sculpins (Osteichthyes:Cottidae) of the northeast Pacific Ocean, 142 p. Final report, NOAA-NMFS contract 03-78-MO2-120, 1 January 1978 to 30 September 1978. Northwest Alaska Fish. Cent., Natl. Mar. Fish. Serv., Seattle, WA.

Samsing Cove, near Sitka, to northern Baja California at Punta Cono. It prefers sheltered tidepools and shallow rocky areas, often closely associated with algae, to a depth of 6 m or more. It is relatively common along the outer coast of British Columbia (in and around the Queen Charlotte Islands and off Vancouver Island), Washington, and Oregon but rarely observed in the Salish Sea. It has been collected in Neah, Clallam, Crescent, and Sequim bays along the southern margin of the Strait of Juan de Fuca and off San Juan Island and the southern end of Lopez Island. There are no known records from the Strait of Georgia or Puget Sound. (Bean and Weed, 1920; Hubbs, 1926b, 1928; Quast, 1968; DeLacy et al., 1972; Lamb and Edgell, 1986, 2010; Gilbert and Williams, 2002; Love, 2011)

***Paricelinus hopliticus* Eigenmann Thornback sculpin
and Eigenmann, 1889**

The thornback sculpin is distributed from the Gulf of Alaska to Southern California at Cortes Bank off San Diego. It generally prefers rocky bottoms, from near shore to a depth of at least 183 m. Uncommon throughout its range, it is extremely rare in the Salish Sea. With the exception of four unvouchered captures in the western Strait of Juan de Fuca, it is known in the Salish Sea from fewer than a half dozen specimens, all collected from the southern Strait of Georgia in Saanich Inlet, off Porteau in Howe Sound, and the south side of Pearson Island in Malaspina Strait. (Eigenmann and Eigenmann, 1892; Starks and Morris, 1907; Bolin, 1937, 1944; Barraclough and Ketchen, 1963; Day, 1967; Eschmeyer and Herald, 1983; Lamb and Edgell, 1986, 2010; Maslenikov et al., 2013)

***Radulinus asprellus* Gilbert, 1890 Slim sculpin**

The slim sculpin extends from the Bering Sea near the Pribilof Islands, the Aleutians as far west as Unalaska Island, and the western Gulf of Alaska off Kodiak Island, to northern Baja California off the Coronado Islands. It is usually found on soft, muddy bottoms at depths of 18–283 m. The earliest British Columbia record dates from 1903, on the basis of a specimen collected near Nanaimo by the *Albatross*. It is now well known throughout coastal British Columbia, Washington, and Oregon, and numerous collections have been made throughout the San Juan Islands, the Strait of Georgia at least as far north as Comox, and nearly everywhere in Puget Sound, including Hood Canal. It is represented as well along the full length of the Strait of Juan de Fuca, including 24 specimens collected in May 1992 in Discovery Bay. (Evermann and Goldborough, 1907; Smith, 1937; Hubbs and Schultz, 1941; Bolin, 1944; Grinols, 1965; Quast and Hall, 1972; Simenstad

et al.²²; Miller and Borton, 1980; Blackburn and Jackson¹⁷; Maslenikov et al., 2013)

***Radulinus boleoides* Gilbert, Darter sculpin
in Jordan and Evermann, 1898a**

The darter sculpin, uncommon throughout its range, extends from east of Kodiak Island to Southern California at Santa Catalina Island and Tanner Bank. Little is known about its ecology, but it is generally collected in rather deep water; the few available collections indicate depths between 15 and 146 m. Extremely rare in the Salish Sea, there are apparently only seven specimens in collections around the world: five from San Juan, Shaw, and O'Neal islands in the San Juan Archipelago and two from Elliott Bay, near Seattle, in Puget Sound. (Starks, 1911; Kincaid, 1919; Hubbs, 1928; Schultz and DeLacy, 1936b; Bolin, 1944; McPhail, 1969; Eschmeyer and Herald, 1983; Brodeur and Rugen, 1994)

***Ruscarius meanyi* Puget Sound sculpin
Jordan and Starks, 1895**

Another uncommon cottid, the Puget Sound sculpin extends from Unimak Pass and southeastern Alaska at Fillmore Island to northern California at Cordell Bank, although larvae have been collected from the eastern Aleutian Islands and western Gulf of Alaska, suggesting a much wider distribution than indicated by known adults. It generally inhabits intertidal and subtidal areas, often associated with large rocks or vertical rock faces, to a maximum depth of 82 m, but it is more often confined to depths of 1–20 m. Originally described on the basis of two specimens collected in Puget Sound (presumably at or near Orchard Point on Bainbridge Island) and “named for Mr. Edmond Meany, Secretary of the University of Washington, in recognition of his work in the Young Naturalists' Society,” this species has since rarely been collected in the Salish Sea. In addition to the type specimens from Puget Sound, records are limited to off Sooke in the Strait of Juan de Fuca; Shaw and Turn islands in the San Juan Archipelago; and Saanich Peninsula, Howe Sound, and off the south side of Pearson Island in the southern Strait of Georgia. This species was earlier known as *Artedius meanyi*. (Kincaid, 1919; Rosenblatt and Wilkie, 1963; Peden, 1972; Lea, 1974; Begle, 1989; Love et al., 2005; Love, 2011; Maslenikov et al., 2013)

***Scorpaenichthys marmoratus* (Ayres, 1854) Cabezon**

One of the few eastern Pacific sculpins of commercial importance, the cabezon ranges from southeastern Alaska

²²Simenstad, C. A., J. S. Isakson, and R. E. Nakatani. 1977. Marine fish communities. In *The environment of Amchitka Island, Alaska* (M. L. Merritt and R. G. Fuller, eds.), p. 451–492. TID-26712. Natl. Tech. Inf. Serv., Springfield, VA.

near Sitka to central Baja California at Point Abrejos. It prefers hard rocky bottoms from the intertidal zone to a depth of 76 m, although smaller individuals are sometimes found in tidepools. The adults move inshore at high tide to feed, primarily on crustaceans and mollusks. First recorded in British Columbia waters in 1881 by Jordan and Gilbert, who reported seeing specimens at Victoria, it is very abundant along the outer coasts of Vancouver Island, Washington, and Oregon. There are numerous records as well along the full length of the Strait of Juan de Fuca; throughout the San Juan Islands; the southern Strait of Georgia at least as far north as Frolander Bay in Malapsina Strait; and in Puget Sound, including Hood Canal. (Jordan and Gilbert, 1881c, 1881d; Collins, 1892; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Peden and Wilson, 1976, Miller and Borton, 1980; Cope and Key²³)

***Synchirus gilli* Bean, 1890a** **Manacled sculpin**

Named for having the pectoral fins fused across the breast, a character that readily distinguishes it from all other eastern Pacific cottids, the manacled sculpin ranges from Unalaska Island in the Aleutians and the western Gulf of Alaska to Southern California at San Miguel Island. It is commonly observed in tidepools and shallow inter- and subtidal waters, often associated with kelp, and sometimes seen clinging to pilings, rocks, and other objects. Although apparently common in parts of its range, it is seldom collected in the Salish Sea. There are a few records off Sooke and Saxe Point in the Strait of Juan de Fuca; near San Juan, Brown, Shaw, and Stuart islands in the San Juan Archipelago; from scattered localities in the southern Strait of Georgia, including Departure Bay, Howe Sound, and Saturna, Gabriola, Popham, and Texada islands; and in Puget Sound, including Port Townsend, North Beach, Alki Point, West Seattle, Point Defiance, and off Bangor in Hood Canal. (Evermann and Goldsborough, 1907; Schultz, 1930; Chapman and DeLacy, 1933; Miller and Erdman, 1948; Walker, 1953; Eschmeyer and Herald, 1983; Orsi et al., 1991)

***Triglops macellus* (Bean, 1884a)** **Roughspine sculpin**

The roughspine sculpin ranges from the eastern Bering Sea, from just north of St. Matthew and Nunivak islands, to the Aleutians as far west as the Near Islands, and extending southeast to the Gulf of Alaska, British Columbia, and Washington at Grays Harbor. It is generally found on flat, soft bottoms in middle-shelf regions at

depths ranging from 18–350 m. Uncommon in the Salish Sea, it has been recorded at widely scattered localities in the Strait of Juan de Fuca (off Clallam Bay and Port Angeles), in the San Juan Archipelago (San Juan, Orcas, and Lopez islands), off Bellingham, in the southern Strait of Georgia (Burrard Inlet, English Bay, and Howe Sound), and in Puget Sound (Saratoga Passage, Possession Sound, Agate Pass, Port Madison, Golden Gardens, Duwamish Head to Alki Point, and Colvos Passage at Camp Sealth), including Hood Canal at Big Beef Harbor. (Starks, 1911; Chapman and DeLacy, 1933; DeLacy et al., 1972; Quast and Hall, 1972; Miller and Borton, 1980; Allen and Smith, 1988; Pietsch, 1993; Maslenikov et al., 2013)

***Triglops pingelii* Reinhardt, 1837** **Ribbed sculpin**

The ribbed sculpin is a wide-ranging circumpolar species, known throughout the coastal shelf regions of the Arctic and north Atlantic and Pacific oceans. On the Pacific side it ranges from the Beaufort, Chukchi, and Bering seas, and throughout the Aleutian Islands as far west as Stalemate Bank, to the Sea of Japan off Hokkaido in the west and to the Gulf of Alaska, British Columbia, and Puget Sound in the east. A benthic species preferring flat soft bottoms, it occupies a wide vertical distribution, ranging from 4–482 m but more commonly taken at depths of 20–150 m. The earliest records in the Salish Sea are based on at least two specimens collected in 1891 by the *Albatross* near Victoria. Since then, additional individuals have been taken off Victoria and other nearby localities at the eastern end of the Strait of Juan de Fuca, including Sooke, Esquimalt, and Port Angeles. It is known as well from scattered localities throughout the San Juan Archipelago and at nearby James and Mandarte islands, as well as in Hale Passage and Bellingham Bay. In Puget Sound, localities include in Deception Pass, off Admiralty Head, near Marrowstone Island, in Mutiny Bay, off Gedney Island, at Port Ludlow, between Point No Point and Possession Point, in Agate Pass, in Port Orchard Bay, and off Golden Gardens. There are no known records in the Strait of Georgia north of Birch Bay, Washington. (Gilbert, 1896c; Starks, 1896; Evermann and Goldsborough, 1907; Fowler, 1923; Clemens and Wilby, 1946; Quast and Hall, 1972; Miller and Borton, 1980; Allen and Smith, 1988; Pietsch, 1993)

Hemitripterae **Spiny sculpins**

Blepsias cirrhosus **Silverspotted sculpin**
(Pallas, 1814) (Fig. 6C)

Perhaps the most beautiful of all the cottids, the silverspotted sculpin ranges from the southeastern Bering Sea, and the Aleutians at Attu Island, to the Kuril Islands and the seas of Okhotsk and Japan in the west

²³Cope, J. M., and M. Key. 2009. Status of cabezon (*Scorpaenichthys marmoratus*) in California and Oregon waters as assessed in 2009, 418 p. Fish. Res. Analysis Mon. Div., Northwest Fish. Sci. Cent., Natl. Mar. Fish. Serv., Seattle, WA. [Available at http://www.pcouncil.org/wp-content/uploads/Cabezoon09_FINAL.pdf.]

and to British Columbia and central California off San Simeon in the east. Found on rocky bottoms and often associated with algae, it occupies intertidal and subtidal depths to a maximum of about 37 m. It is relatively common along the outer coast of Vancouver Island and wide spread in the Salish Sea—ranging from Cape Flattery to Clallam Bay, Tongue Point, Sooke, Victoria, Port Angeles, and Sequim Bay in the Strait of Juan de Fuca; almost everywhere in and around the San Juan Islands; in the southern Strait of Georgia as far north as Burrard Inlet at the mouth of Beaver Creek; and in Puget Sound as far south as the Tacoma Narrows, with a single known record from off Hood Head in Hood Canal. (Steindachner, 1876; Jordan and Gilbert, 1881c, 1881d; Jordan and Jouy, 1881; Starks, 1896; Evermann and Goldsborough, 1907; Wilimovsky, 1964; Isakson et al.²⁴)

Nautichthys oculofasciatus **Sailfin sculpin**
(Girard, 1858a) (Fig. 7A)

Another beautiful sculpin, the sailfin sculpin extends from the Shumagin Islands in the eastern Aleutians to Southern California at San Miguel Island. It is found on rocky bottoms, often associated with algae, in tidepools and the intertidal zone to a depth of 110 m. It is common along the outer coast of Vancouver Island and abundant almost everywhere in the Salish Sea, including the Strait of Juan de Fuca, the San Juan Archipelago, the Strait of Georgia at least as far north as Jervis Inlet, and the full length of Puget Sound, including Hood Canal. (Suckley, 1860; Steindachner, 1876; Jordan and Gilbert, 1881c, 1881d; Starks, 1896; Fowler, 1923; Bolin, 1944; Peden and Wilson, 1976; Miller and Borton, 1980; Yabe et al., 1983; Maslenikov et al., 2013)

Agonidae **Poachers**

Agonopsis vulsa (Jordan and Gilbert, 1880a) **Northern spearnose poacher**

The northern spearnose poacher ranges from the northern Gulf of Alaska at Kachemak Bay to Southern California off Point Loma. It usually inhabits soft and muddy or sandy bottoms at depths of 5–393 m (more commonly between 10 and 180 m). The species is sometimes found as well in the intertidal zone and less often in tidepools. It is very abundant throughout the San Juan Archipelago but less so in other parts of the Salish Sea. In the Strait of Juan de Fuca, it has been collected off Esquimalt and Victoria and in Sequim Bay. In the Strait of Georgia, it has been found off Saturna and Mayne islands and in Burrard Inlet, English Bay, and Howe Sound. It has also been taken at scattered localities throughout most

of Puget Sound, including Hood Canal. This species was previously known as *Agonopsis emmelane* (Jordan and Starks, 1895). (Jordan and Starks, 1895; Starks, 1896, 1911; Evermann and Goldsborough, 1907; Bean and Weed, 1920; Fowler, 1923; Smith, 1936, 1937; DeLacy et al., 1972; Miller and Borton, 1980)

Anoplagonus inermis **Smooth alligatorfish**
(Günther, 1860)

The smooth alligatorfish is distributed from the Aleutian Islands at Petrel Bank to northern California off Point Arena. It is usually found on sandy, gravelly, or rocky bottoms, often near rock outcropping, at depths from 2 m to at least 114 m. Common throughout the San Juan Archipelago and in and around Burrard Inlet and Howe Sound in the southern Strait of Georgia, with a few more northern records in Nanoose Bay and off the south side of Pearson Island in the Malaspina Strait, it is relatively rare almost everywhere else in the Salish Sea. Known localities in the Strait of Juan de Fuca include off Sooke, Victoria, Saxe Point, Port Angeles, and Dungeness Bay and in Puget Sound, off Port Ludlow, the mouth of Hood Canal, Point No Point, and near Seattle off the entrance to the Ballard Locks. (Gilbert, 1896c; Starks, 1896, 1911; Evermann and Goldsborough, 1907; Clemens and Wilby, 1946; Miller and Borton, 1980; Kanayama, 1991; Love, 2011)

Bathyagonus alascanus **Gray starsnout**
(Gilbert, 1896a)

One of several members of the genus *Bathyagonus* named for the conspicuous cluster of spines at the extreme tip of the snout, the gray starsnout ranges from the southeastern Bering Sea west of the Pribilofs and the Andreanof Islands in the central Aleutians to northern California. It is usually found on sandy or muddy bottoms at depths of 18–252 m. This species is relatively common in and around Burrard Inlet, in English Bay, and Howe Sound in the southern Strait of Georgia—with a single record farther north off Maude Island in Skidgate Inlet and another to the south off Saturna Island—but there have been fewer than a dozen captures in the San Juan Islands, and it is rare almost everywhere else in the Salish Sea. There are only three known localities in the Strait of Juan de Fuca—off Cape Flattery, west of Race Rocks, and in Discovery Bay. Only eight localities are known in Puget Sound—off Useless Bay at the southern end of Whidbey Island, Port Madison, Fletcher Bay on the west side of Bainbridge Island, off Golden Gardens, West Point, Alki Point, Seahurst, and Des Moines. This species was known earlier as *Asterotheca alascana*. (Miles, 1918; Kincaid, 1919; Shelford et al., 1935; Wilimovsky, 1954; Grinols, 1965; Delacy et al., 1972; Fitch, 1973; Miller and Borton, 1980; Kanayama, 1991; Maslenikov et al., 2013)

²⁴Isakson, J. S., J. P. Houghton, D. E. Rogers, and S. S. Parker. 1986. Fish use of inshore habitats north of the Alaska Peninsula: June–September 1984 and June–July 1985. NOAA, OCS&P Final Rep. 55(1988):1–380.

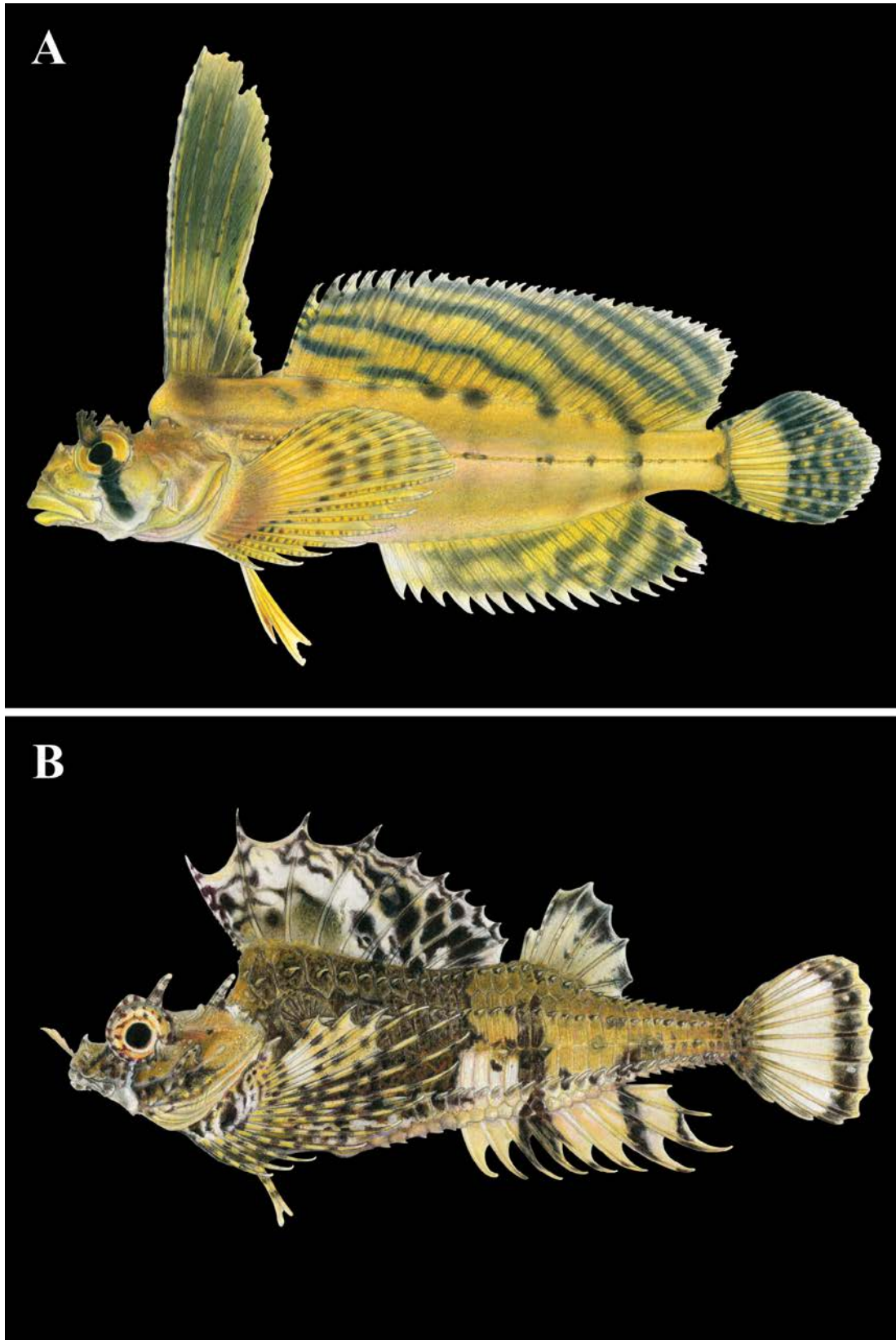


Figure 7

Fishes of the Salish Sea: (A) sailfin sculpin (*Nautichthys oculo-fasciatus*) and (B) fourhorn poacher (*Hypsagonus quadricornis*). © Joseph R. Tomelleri.

Bathyagonus infraspinatus **Spinycheek starsnout**
(Gilbert, 1904)

The spinycheek starsnout is another relatively rare poacher in the Salish Sea. It ranges from the southeastern Bering Sea near the Pribilofs and Islands of Four Mountains to northern California near Eureka, and it inhabits sandy and muddy bottoms at depths of 6–183 m. The earliest British Columbia record is based on a specimen collected in 1913 at Nanoose Bay in the Strait of Georgia. Additional Canadian collections have since been made south of Cherry Point, in and around Departure Bay, Burrard Inlet, and English Bay, and the northernmost locality is apparently Baynes Sound northwest of Denman Island. In the San Juan Archipelago most of the known material is from East Sound and off the east side of Lopez Island, with only a few individuals taken near Friday Harbor on San Juan Island. In Puget Sound it has been taken in Skagit Bay, off Penn Cove, in Saratoga Pass, and in Point Gardner Bay; off Port Madison near Agate Pass; Carkeek Park, Golden Gardens, and Meadow Point; and off Thorn-dike and Dabob bays in Hood Canal. With the exception of a few specimens collected off Cape Flattery, there are no known localities in the Strait of Juan de Fuca. This species was previously known as *Asterotheca infraspinata*. (Gilbert and Thompson, 1905; Starks, 1911; Kincaid, 1919; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Fitch, 1973; Miller and Borton, 1980; Kanayama, 1991)

Bathyagonus nigripinnis **Blackfin poacher**
Gilbert, 1890

The blackfin poacher is widely distributed, ranging from the Bering Sea and Aleutians to the Commander Islands, southeastern Kamchatka, the Kuril Islands, and central Honshu, Japan, in the west and to northern California off Eureka in the east. One of the few deepwater poachers, it generally occupies soft and sandy or muddy bottoms, most often on outer shelf and upper slopes, at depths from 18 m to at least 1250 m, and most often found between 50 and 800 m. The vast majority of records in the Salish Sea are from northeastern Puget Sound, concentrated in waters between the mainland and Camano Island and the southern end of Whidbey Island, in Port Susan, Tulalip Bay, off Gedney Island, and Possession Sound and south to Mukilteo. Significant numbers have also been taken in Saratoga Passage, from off Penn Cove and Point Demock, and south to Langley and Camano Head, but it is surprisingly rare everywhere else. There are a few records farther south in Puget Sound, one near Point Jefferson and three in Dabob Bay and off Holly in Hood Canal, and there are several known localities in the southern Strait of Georgia, including in Nanaimo Harbour, Burrard Inlet, and English Bay. The

single recorded capture in the San Juan Islands is a specimen taken in Deadman Bay on the west side of San Juan Island in spring 1977. There are no known localities in the Strait of Juan de Fuca. (Gilbert, 1896a; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Kendall, 1966; Quast and Hall, 1972; Miller and Borton, 1980; Kanayama, 1991)

Bathyagonus pentacanthus **Bigeye poacher**
(Gilbert, 1890)

Another deep-dwelling poacher, the bigeye poacher extends from the Near Islands in the western Aleutians and the western Gulf of Alaska near Chirikof Island to Cortes Bank near San Diego, California. It usually occupies muddy or sandy bottoms at depths of 100–375 m, but it has been reported to a depth of 910 m. Rare in the Salish Sea, there are only a few, widely scattered records—off the mouth of the Jordan River and north-east of Dungeness Spit in the Strait of Juan de Fuca; in Eagle Cove and Friday Harbor on the west side of San Juan Island; off Galiano Island in the southern Strait of Georgia; and in Puget Sound at the mouth of Hood Canal, off Meadow Point on the east side of Bainbridge Island, near Golden Gardens, between Duwamish Head and Alki Point, and off Seahurst. This species was previously known as *Asterotheca pentacantha*. (Evermann and Goldsborough, 1907; Starks and Morris, 1907; Schultz and DeLacy, 1936b; Clemens and Wilby, 1961; Quast and Hall, 1972; Fitch, 1973; Miller and Borton, 1980; Lamb and Edgell, 1986, 2010; Kanayama, 1991; Maslenikov et al., 2013)

Bothragonus swanii (Steindachner, 1876) **Rockhead**

Another rare poacher in the Salish Sea, the rockhead ranges from the western Gulf of Alaska at Kodiak Island to central California at Lion Rock, San Luis Obispo County. It is usually found along exposed coasts in the intertidal zone to a depth of about 18 m, but often in rocky or pebbly tidepools, and associated with algae, sponges, and various other small organisms. Known localities in the Salish Sea are limited to Tongue Point and off Victoria in the Strait of Juan de Fuca; various collecting sites on the west side of San Juan Island and off Iceberg Point on Lopez Island; and off Port Townsend in Puget Sound. (Eigenmann and Eigenmann, 1892; Jordan and Starks, 1895; Kincaid, 1919; Bean and Weed, 1920; Hubbs, 1928; Schultz, 1930; Schultz and DeLacy, 1936b; Walker, 1953; Leipertz, 1988)

Chesnonia verrucosa **Warty poacher**
(Lockington, 1880c)

The warty poacher is an extremely rare resident of the Salish Sea, extending from the southeastern Bering

Sea at Bristol Bay, the eastern Gulf of Alaska at Shelikof Bay, and southern British Columbia off Vancouver Island to central California off Point Montara. It is found on soft, muddy bottoms at depths of 18–274 m. Only three localities in the Salish Sea have been recorded: one from off Rosario Beach near Deception Pass (on the basis of an underwater photograph), another from off Port Madison, and a third from off the northern tip of West Point near Seattle. This species was known earlier as *Ocella verrucosa*. (Jordan and Evermann, 1898a; Barraclough, 1947; Dryfoos, 1961; Gruchy, 1969; Bailey and Gruchy, 1970; Quast and Hall, 1972; Allen and Smith, 1988)

***Hypsagonus quadricornis* Fourhorn poacher**
(Valenciennes, 1829) (Fig. 7B)

One of the most ornate of the North Pacific poachers, perhaps eclipsed only by the extraordinary dragon poacher, *Percis japonica*, of the western North Pacific, the fourhorn poacher ranges from the northeastern Chukchi Sea, Bering Sea, and the western Aleutians at Attu Island to the Commander Islands and the Sea of Okhotsk and northern Sea of Japan in the west and to British Columbia and Puget Sound in the east. It prefers sandy, gravelly, or rocky bottoms at depths of 15–452 m but is more commonly found at shallower depths of 200 m or less. In the Salish Sea, it is common throughout the San Juan Islands but rare everywhere else. There are a few records at the eastern end of the Strait of Juan de Fuca off Victoria, Port Angeles, and Admiralty Head, and in Puget Sound at the east end of Deception Pass and off the northern tip of Marrowstone Island. There are no known localities in the Strait of Georgia. (Gilbert, 1896a; Evermann and Goldsborough, 1907; Heath, 1910; Starks, 1911; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Miller and Borton, 1980; Kanayama, 1991; Jensen, 2005; Love, 2011; Maslenikov et al., 2013)

***Odontopyxis trispinosa* Pygmy poacher**
Lockington, 1880b

The pygmy poacher ranges from the southeastern Bering Sea and the Gulf of Alaska at Prince William Sound to Baja California off Cedros Island. It inhabits muddy or sandy bottoms at depths of 5–373 m. In the Salish Sea, this species has been collected off Ediz Hook, near Port Angeles; at numerous localities throughout the San Juan Archipelago; in the southern Strait of Georgia in Pylades Channel between Gabriola and Link islands, Departure Bay near Nanaimo, Burrard Inlet, and off Bowen Island; and throughout Puget Sound, including Hood Canal. It is especially abundant off Port Madison, the west side of Bainbridge Island, between Duwamish Head and Alki Point, and in Case and Eld inlets. (Jordan and Starks,

1895; Gilbert, 1896b; Starks, 1896, 1911; Shelford et al., 1935; Wismer and Swanson, 1935; Kendall, 1966; Peden and Wilson, 1976; Miller and Borton, 1980; Kanayama, 1991; Busby and Ambrose, 1993)

***Pallasina barbata* Tubenose poacher**
(Steindachner, 1876)

Extending from the eastern Chukchi and Bering seas, St. Lawrence Island, and the Aleutians to the Commander Islands and southern Kamchatka through the Kuril Islands and Okhotsk and Japan seas to Wonsan, South Korea, in the west and to northern California at Bodega Bay in the east, the tubenose poacher is usually found in inter- and subtidal regions to a depth of 128 m and is often associated with algae and eelgrass over sandy or gravelly bottoms. One of the few poachers that consistently and actively swims well off the bottom, it is relatively uncommon in the Salish Sea. There are a few records from the Strait of Juan de Fuca, from off the mouth of the Jordan River to Port Angeles, Victoria, and Sequim and Dungeness bays; in the southern Strait of Georgia, just south of Cherry Point; in the Bellingham area off Lummi Bay, Wildcat Cove, and Padilla Bay; and from Puget Sound, in Kilisut Harbor and off Port Ludlow and Edwards Point. The vast majority of known records in the Salish Sea, however, come from the San Juan Archipelago where numerous collections have been made off San Juan, Lopez, Shaw, and St. Johns islands. (Starks, 1896, 1911; Powers, 1921; Schultz and DeLacy, 1936b; Miller and Borton, 1980; Lamb and Edgell, 1986, 2010; Kanayama, 1991; Love, 2011)

***Podothecus accipenserinus* Sturgeon poacher**
(Tilesius, 1813)

One of the more common and widely distributed North Pacific poachers, the sturgeon poacher ranges from the Bering Sea and Aleutian Islands at Attu to the Commander Islands, the Sea of Okhotsk, southwestern Kamchatka, and the Kuril Islands in the west and to northern California at Point Reyes in the east. It typically occupies soft bottoms at depths of 2–300 m. Common along the coast of British Columbia, Washington, and Oregon, it has been collected at both ends of the Strait of Juan de Fuca, especially in Port Angeles Harbor, Sequim Bay, west and southwest of Protection Island, in open water west of McArthur Bank, and off West Beach on the northern end of Whidbey Island. It is abundant in and around the San Juan Islands, in Bellingham and Padilla bays, in the southern Strait of Georgia at least as far north as Departure Bay and Burrard Inlet, and nearly everywhere in Puget Sound, including Hood Canal. This species was previously called *Agonus acipenserinus*. (Günther, 1860; Gill, 1861b; Jordan and Gilbert, 1881c, 1881d; Gilbert, 1896a; Fowler, 1923; Miller and Borton,

1980; Lamb and Edgell, 1986, 2010; Kanayama, 1991; Love, 2011)

***Stellerina xyosterna* Pricklebreast poacher
(Jordan and Gilbert, 1880f)**

The pricklebreast poacher extends from Icy Bay, Alaska, and off Fife Point on the northeast coast of the Queen Charlotte Islands to central Baja California at San Carlos Bay. It is usually found on muddy or sandy bottoms at depths of 5–75 m. Its presence in the Salish Sea is based on a single 83-mm standard-length specimen collected on 2 February 1965 by William E. Barraclough at a depth of 91 m off Sheringham Point Lighthouse on the southern coast of Vancouver Island in the Strait of Juan de Fuca. (Jordan et al., 1930; Schultz and DeLacy, 1936b; Freeman, 1951; Bond, 1959; Gruchy, 1970; Miller and Lea, 1972; Barraclough and Peden, 1977; Peden and Jamieson, 1988)

***Xeneretmus latifrons* (Gilbert, 1890) Blacktip poacher**

The blacktip poacher extends from the northern Queen Charlotte Islands at Rennell Sound and Skidegate Channel to northern Baja California off Cape Colnett. It prefers sandy and muddy bottoms at depths of 18–400 m. It is extremely abundant in appropriate habitat throughout Puget Sound, including Hood Canal, but rare almost everywhere else in the Salish Sea. In the Strait of Juan de Fuca it has apparently been collected only in Discovery Bay, and there is only a single record in the San Juan Archipelago—three specimens said to have been collected off the dock at the University of Washington Friday Harbor Laboratories on San Juan Island. In the southern Strait of Georgia it has been collected off Gabriola Island, in Burrard Inlet, off Bowen Island, in Pendrell Sound, in Narrows Inlet, and off Popham and Denman islands. (Evermann and Goldsborough, 1907; Starks and Morris, 1907; Starks, 1911; Schultz and DeLacy, 1936b; Smith, 1937; Percy, 1978; Miller and Borton, 1980; Leipertz, 1985; Kanayama, 1991; Busby and Ambrose, 1993)

***Xeneretmus leiops* Gilbert, 1915 Smootheye poacher**

Rarely encountered throughout its range, the smootheye poacher extends from the northern Gulf of Alaska to Southern California off Santa Catalina Island. It is usually found on soft bottoms at depths of 37–400 m. Although represented at several localities off the outer coasts of Vancouver Island, Washington, and Oregon, its presence in the Salish Sea is based on a single specimen reported by Barraclough and Peden from the Strait of Juan de Fuca. A record of a specimen said to have been taken off Stanley Park near Vancouver in May 1963 was based on a cataloging error. Another individual cited by Leipertz from Neah Bay was actually collected far out to

sea, southwest of La Pérouse Bank, and cannot be considered part of the ichthyofauna of the Salish Sea. (Bolin, 1937; Fitch, 1966, 1973; Miller and Lea, 1972; Ginn and Bond, 1973; Barraclough and Peden, 1977; Leipertz, 1985; Peden and Jamieson, 1988; Percy et al., 1989; Kanayama, 1991; Maslenikov et al., 2013)

***Xeneretmus triacanthus* Bluespotted poacher
(Gilbert, 1890)**

Ranging from northern British Columbia at Kwatna Inlet to northern Baja California at Punta Baja, this poacher inhabits sandy and muddy bottoms at depths of 73–373 m. It is fairly common in Puget Sound, known from scattered localities that extend from Saratoga Passage to the southern end of Case Inlet, with a single record in Hood Canal off Brinnon, but extremely rare or absent everywhere else in the Salish Sea. There is a single recorded capture in the San Juan Channel off Friday Harbor and another in Bellingham Bay, but there are no known occurrences in the straits of Juan de Fuca or Georgia. (Jordan and Starks, 1895; Wismer and Swanson, 1935; Schultz and DeLacy, 1936b; Freeman, 1951; Peden and Gruchy, 1971; Miller and Borton, 1980; Leipertz, 1985; Kanayama, 1991)

**Psychrolutidae Fathead sculpins
Dasycottus setiger Bean, 1890b Spinyhead sculpin**

The spinyhead sculpin is a widely distributed North Pacific species, ranging from the Bering Sea (at Navarin Canyon) and Aleutians to the Commander Islands, the Okhotsk Sea, Sea of Japan, and the Pacific coast of northern Honshu in the west and to Washington State in the east. It prefers soft silty bottoms at depths of 15–850 m but is more often concentrated on mid- to upper shelf regions at depths of 50–300 m. There are numerous vouchered localities throughout the San Juan Archipelago (especially in East and West sounds off Orcas Island); in Bellingham Bay; throughout the Strait of Georgia, from Cowichan Bay in the west and Cherry Point in the east to Comox and Bute Inlet in the far north; and in Puget Sound from Skagit Bay to Case Inlet, including several scattered records in Hood Canal. In the Strait of Juan de Fuca it has been taken off Green Point, in Sequim and Discovery bays, and off the west end of Protection Island. (Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Starks, 1911; Wismer and Swanson, 1935; Smith, 1936, 1937; Clemens and Wilby, 1946; Lamb and Edgell, 1986, 2010; Love, 2011)

***Malacocottus kincaidi* Blackfin sculpin
Gilbert and Thompson, 1905**

The blackfin sculpin has a remarkably narrow geographic distribution, extending only from British Columbia to

Puget Sound. Although it has been reported several times from Alaska, all relevant material has since been re-located to the closely related darkfin sculpin, *Malacocottus zonurus*. Not much is known about the ecology of the blackfin sculpin, but it is most often trawled off flat muddy bottoms at depths of 18–468 m. This species was originally described in 1905 from specimens collected by Trevor Kincaid off Brinnon in central Hood Canal, and that part of Puget Sound, from Dabob Bay to the mouth of The Big Bend, has been the major source of collections of this species since then. Additional Puget Sound localities are few and far between: Skagit Bay, Saratoga Passage, Port Gamble, and Carr Inlet. In the San Juan Archipelago there are only two known records: from San Juan Island off Friday Harbor and in San Juan Channel west of Jones Island. In the Strait of Georgia it has been taken off Entrance Island near Nanaimo and at numerous points in and around Burrard Inlet, English Bay, and Howe Sound. There are apparently no known occurrences in the Strait of Juan de Fuca. (Gilbert and Thompson, 1905; Hubbs, 1928; Schultz and DeLacy, 1936b; Smith, 1936, 1937; Clemens and Wilby 1946; Lamb and Edgell, 1986, 2010; Vogt, 1987; Stevenson, 2015)

***Psychrolutes paradoxus* Günther, 1861 Tadpole sculpin**

The tadpole sculpin ranges from the Bering Sea at Norton Sound, and the western Aleutian Islands, to Cape Olyutorskiy, the Commander Islands, the Okhotsk Sea, and Sea of Japan in the west, and to Puget Sound in the east. It inhabits soft or rocky bottoms at depths of 9–240 m. The species is rather common throughout the Salish Sea, known from numerous collection sites throughout the San Juan Archipelago; in Bellingham, Samish, and Padilla bays; and in Puget Sound from Admiralty Inlet and Similk and Skagit bays south to Carr Inlet, including Hood Canal at least as far south as Lilliwaup. In the Strait of Juan de Fuca it has been taken in Neah Bay, off the mouth of the Jordan River, at Port Angeles, off West Beach, and on the northwest side of Whidbey Island just south of the entrance to Deception Pass; and in the Strait of Georgia, near Cherry Point, off Pender and Saturna islands, and in Burrard and Skidegate inlets. (Jordan and Gilbert, 1881c, 1881d; Bean, 1882a, 1890b; Gilbert, 1896c; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Stein and Bond, 1978; Miller and Borton, 1980; Maslenikov et al., 2013)

***Psychrolutes sigalutes* (Jordan and Starks, 1895) Soft sculpin**

The soft sculpin extends from the Aleutians off Adak to the Commander Islands in the west and southern Puget Sound in the east. It prefers rocky bottoms, from near shore to depths of at least 225 m, where it is often associated with sponges and algae. Uncommon in the Salish

Sea, it has been collected off Port Angeles in the Strait of Juan de Fuca; at scattered localities throughout the San Juan Islands; in Bellingham Bay; in English Bay and Howe Sound in the southern Strait of Georgia; and in Puget Sound, at scattered localities from Saratoga Passage and Port Susan south to Case Inlet, with a single record in Hood Canal off Chinom Point. This species was previously known as *Gilbertidia sigalutes*. (Evermann and Goldsborough, 1907; Starks, 1911; Hubbs, 1928; Shelford et al., 1935; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Wilimovsky, 1964; Peden and Wilson, 1976; Miller and Borton, 1980)

Cyclopteridae

***Eumicrotremus orbis* (Günther, 1861)**

Extending from the northern Bering Sea at the Gulf of Anadyr to the Sea of Okhotsk and Hokkaido, Japan, in the west, and to Puget Sound in the east, the Pacific spiny lumpsucker is found most often on sandy or pebbly bottoms, usually at a depth of 200 m or less but reported to a depth of 575 m. In the Salish Sea, it is most abundant in and around the San Juan Archipelago, and in the southern Strait of Georgia where localities include James and Saturna islands, Porlier Pass, Departure Bay, Burrard Inlet, and English Bay. There are numerous records in the western Strait of Juan de Fuca, as well as off Sooke and Esquimalt and in Sequim Bay and in Puget Sound, from widely scattered localities that include Similk and Skagit bays, Admiralty Inlet at Mutiny Bay and the mouth of Hood Canal, Colvos Passage near Tacoma, Carr Inlet east of Cutts Island, off Stretch Island, Devils Head, and in Cormorant Passage near Ketron Island. (Jordan, 1884; Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Schultz and DeLacy, 1936b; Miller and Borton, 1980; Lamb and Edgell, 1986, 2010; Allen and Smith, 1988)

Liparidae

***Careproctus melanurus* Gilbert, 1892 (Fig. 8A)**

A common snailfish typically found in waters deeper than 400 m on the upper continental slope, the blacktail snailfish extends from the Bering Sea and Aleutian Islands to northern Honshu, Japan, in the west, and to Baja California in the east, at depths of 61 to 2286 m. It is relatively abundant off the coasts of British Columbia, Washington, and Oregon but known from only a very few scattered records in the Salish Sea: off Cape Flattery and Neah and Makah bays; in Bellingham Bay; and off Three Tree Point (Point Pully) in central Puget Sound. (Burke, 1930; Clemens and Wilby, 1961; Miller and Borton, 1980; Love et al., 2005; Love, 2011)

Lumpfishes

Pacific spiny lumpsucker

Snailfishes

Blacktail snailfish

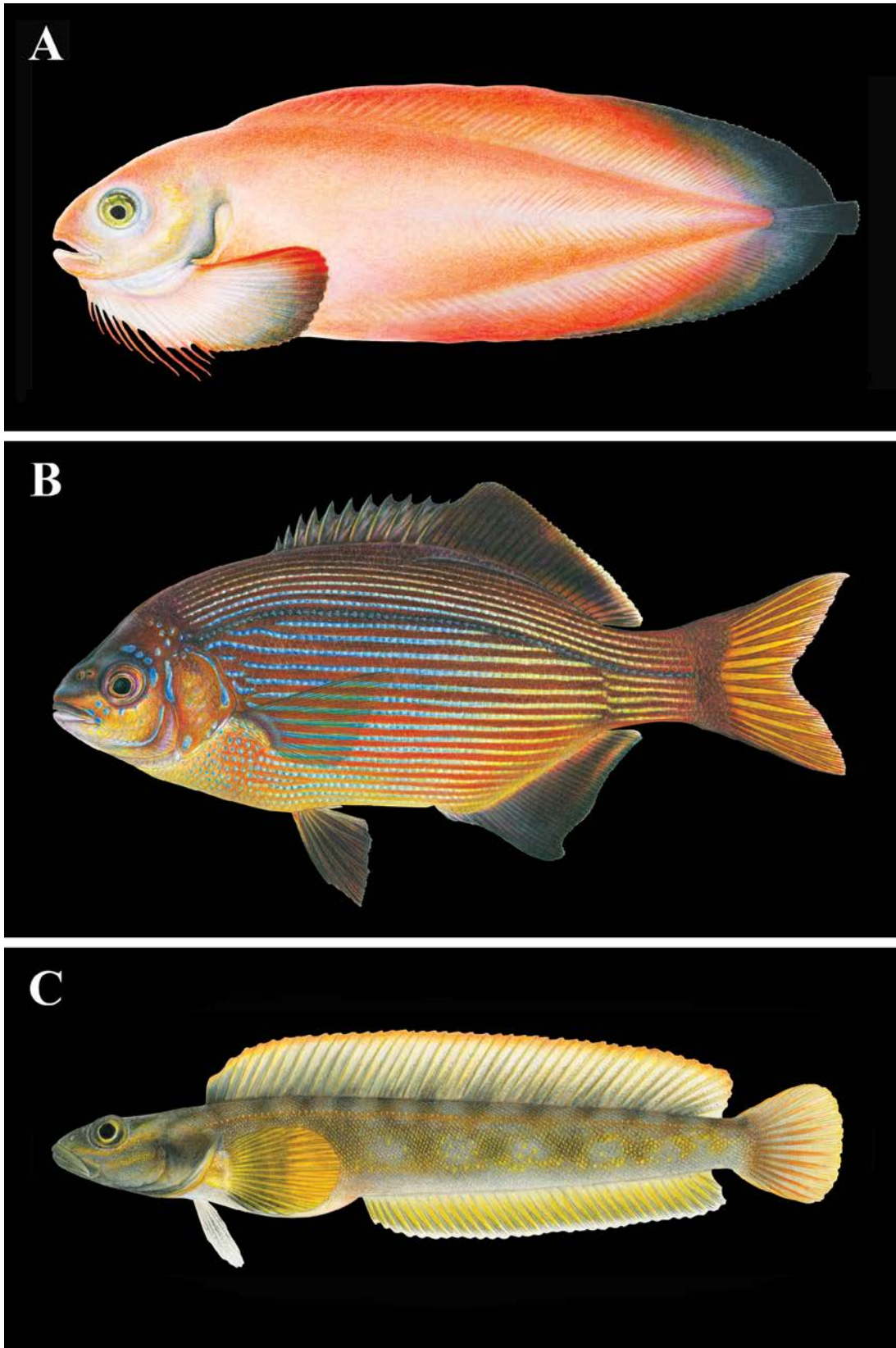


Figure 8

Fishes of the Salish Sea: (A) blacktail snailfish (*Careproctus melanurus*), (B) striped seaperch (*Embiotoca lateralis*), and (C) northern ronquil (*Ronquilus jordani*). © Joseph R. Tomelleri.

***Liparis callyodon* (Pallas, 1814) Spotted snailfish**

The spotted snailfish ranges from the northern Bering Sea and the Aleutians to the Commander and Kuril islands in the west, and to Oregon in the east. It is typically found on rocky shores in tidepools and the intertidal zone to a maximum depth of 20 m. In the Salish Sea it is abundant in the San Juan Archipelago, especially around San Juan Island and the southern tip of Lopez Island, but rarely encountered elsewhere. There are scattered records in the Strait of Juan de Fuca off Sooke, Victoria, and Port Angeles; in the Strait of Georgia between Satellite and Stuart islands and in the far north at Discovery Passage and Bute Inlet; and in Puget Sound off Port Townsend and in Deception Pass. (Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Starks, 1911; Bean and Weed, 1920; Burke, 1930; Schultz and DeLacy, 1936b; Clemens and Wilby, 1961; Miller and Borton, 1980; Love et al., 2005)

***Liparis cyclopus* Ribbon snailfish
Günther, 1861**

Extending from the southeastern Bering Sea and throughout the Aleutian Islands to the Commander Islands and Kamchatka at Petropavlovsk in the west, and to Oregon in the east, the ribbon snailfish is found in tidepools and the intertidal to a depth of 183 m. Like its close relative, the spotted snailfish, it has been collected at numerous localities throughout the San Juan Archipelago and in Puget Sound (from Port Townsend and the entrance to Hood Canal to Point Defiance and Eld Inlet) but found less frequently in other parts of the Salish Sea. In the Strait of Juan de Fuca there are records off Sooke, Esquimalt Harbour, Victoria, Port Angeles, Discovery Bay, and Smith Island; and in the Strait of Georgia off Saturna Island and Stanley Park. (Eigenmann and Eigenmann, 1892; Gilbert, 1896c; Jordan and Starks, 1895; Starks, 1911; Kincaid, 1919; Burke, 1930; Clemens and Wilby, 1961; Miller and Borton, 1980; Love et al., 2005)

***Liparis dennyi* Marbled snailfish
Jordan and Starks, 1895**

The marbled snailfish was described by Jordan and Starks from a specimen collected in Admiralty Inlet by members of the Young Naturalists' Society and named for Charles Latimer Denny, "in recognition of his active and intelligent interest in the natural history of Washington." Extending from the eastern Aleutian Islands to the southern end of its range in the Salish Sea, it is found on sandy and silty bottoms throughout our region, recorded from the intertidal to a depth of 225 m. It is most abundant in and around the San Juan Islands, with scattered records in the Strait of Juan de Fuca, off Race Rocks,

Port Angeles, and Smith Island, and in Bellingham Bay. In the southern Strait of Georgia, it is known from off Saturna Island, Active Pass, Burrard Inlet, English Bay, Denman Island, and Nanoose Bay. In Puget Sound, known localities include off Ebey's Landing at the entrance to Admiralty Inlet, Saratoga Passage, off Gedney Island, in and around Port Ludlow, Port Madison, Golden Gardens and Shilshole Bay, Colvos Passage, and Case Inlet. (Gilbert, 1896c; Starks, 1896, 1911; Gilbert and Thompson, 1905; Kincaid, 1919; Burke, 1930; Clemens and Wilby, 1961; Miller and Borton, 1980; Love et al., 2005; Lamb and Edgell, 2010)

***Liparis florae* Tidepool snailfish
(Jordan and Starks, 1895)**

Originally described by Jordan and Starks from a specimen collected at Waadah Island in Neah Bay, the tidepole snailfish is common along exposed coasts in rocky tidepools and the intertidal to a depth of 15 m, ranging from the Gulf of Alaska at Kodiak Island to Southern California at King Harbor. It is extremely abundant in the San Juan Archipelago, especially around San Juan Island and the southern end of Lopez Island, and in the Strait of Juan de Fuca, where it extends in appropriate habitat from Cape Flattery and Tatoosh Island to Sooke, Victoria, and Port Angeles. However, it is very rarely seen in other parts of the Salish Sea. In the Strait of Georgia it has been collected off Saanich, in False Narrows, Discovery Bay, Burrard Inlet, and off Texada Island. In Puget Sound, it has been collected in Deception Pass and off Richmond Beach, Golden Gardens, West Point, and Manchester. (Kincaid, 1919; Burke, 1930; Hubbs and Schultz, 1934; Clemens and Wilby, 1961; Wilimovsky, 1964; Miller and Borton, 1980; Love et al., 2005; Love, 2011)

***Liparis fucensis* Slipskin snailfish
Gilbert, 1896a**

Originally described by Gilbert from "numerous specimens dredged by the *Albatross* in the Straits of Fuca" at depths of 183–276 m, but since recorded on rocky bottoms at depths of 4–388 m, the slipskin snailfish ranges from the southeastern Bering Sea, and the eastern Aleutian Islands at Unimak Pass, to central California at San Simeon. It is relatively common in the Salish Sea, known from widely scattered localities along the Strait of Juan de Fuca, from Tatoosh Island and Makah and Clallam bays to Sooke, Saxe Point, Port Angeles, and Green Point. It is found as well in and around the San Juan Islands and in the southern Strait of Georgia from off the mouth of the Fraser River and in Burrard Inlet and English Bay. In Puget Sound it has been collected in Deception Pass, off Marrowstone and Gedney islands, and off Everett, Port Ludlow and Foulweather Bluff near the

entrance to Hood Canal, Edmonds, Richmond Beach, Golden Gardens, West Point, Manchester, and Blake Island. (Jordan and Starks, 1895; Starks, 1896; Evermann and Goldsborough, 1907; Kincaid, 1919; Powers, 1921; Hubbs and Schultz, 1934; Miller and Borton, 1980; Love et al., 2005; Love, 2011)

Liparis greeni
(Jordan and Starks, 1895)

The holotype of the lobefin snailfish was collected in Victoria Harbour by the president of the Victoria Natural History Society, Ashdown H. Green, for whom the species was named. Ranging from the Pribilof Islands in the southeastern Bering Sea and the Aleutians to the Commander Islands in the west, and to Washington State in the east, it is found in tidepools and the intertidal zone (where it is often associated with kelp) to a depth of 21 m. Relatively rare in the Salish Sea, it has been taken in the Strait of Juan de Fuca off Sooke, Esquimalt, Victoria, and Port Angeles; in Bellingham Bay; off San Juan Island; in Porlier Pass in the southern Strait of Georgia; and off Port Townsend in Puget Sound. This species was previously known as *Polypera greeni*. *Liparis beringianus* (Gilbert and Burke) of earlier published checklists is considered a junior synonym. (Gilbert and Burke, 1912; Kincaid, 1919; Burke, 1930; Schultz and DeLacy, 1936b; Wilimovsky, 1954; Clemens and Wilby, 1961; Miller and Borton, 1980; Chernova et al., 2004; Love et al., 2005; Lamb and Edgell, 2010)

***Liparis mucosus* Ayres, 1855a** **Slimy snailfish**

The slimy snailfish ranges from southeastern Alaska at Samsing Cove to central Baja California at San Carlos Bay and is typically found in the intertidal zone at depths of 15 m or less. Although apparently common off the outer coast of Vancouver Island and Washington, where, among other places, it has been collected at Ucluelet and off Cape Johnson, respectively, it is extremely rare within the restricted waters of the Salish Sea. The only known localities are at Agate Beach, west of Sooke, in the Strait of Juan de Fuca, and at Friday Harbor in the San Juan Islands. (Burke, 1930; Hubbs and Schultz, 1934; Schultz and DeLacy, 1936b; Peden, 1966a; Love et al., 2005)

***Liparis pulchellus* Ayres, 1855a** **Showy snailfish**

Extending from the southeastern Bering Sea through the Aleutian Islands to central California at Monterey Bay, the showy snailfish prefers soft bottoms in the intertidal zone to a depth of 183 m. In contrast to many of its close relatives, it is abundant throughout the Salish Sea, where it is well represented throughout the San Juan Archipelago (especially around Lopez Island and in East and West sounds off Orcas Island); and to the

east in Bellingham Bay, off Anacortes, and Fidalgo Island in Burrows Bay. In the Strait of Juan de Fuca it has been collected off Hein Bank. It has been recorded as well throughout the Strait of Georgia as far north as Comox, and in Puget Sound from Penn Cove on Whidbey Island to Eld Inlet. In Hood Canal, it has been taken off Thorndyke Bay, Brinnon, and at the mouth of The Great Bend. (Whiteaves, 1887; Jordan and Starks, 1895; Starks, 1896, 1911; Burke, 1930; Shelford et al., 1935; Smith, 1936; Kendall, 1966; Miller and Borton, 1980; Love et al., 2005)

***Liparis rutteri* (Gilbert and Snyder, 1898a)** **Ringtail snailfish**

The ringtail snailfish, found primarily in the intertidal zone to a maximum depth of about 73 m, ranges from the Aleutians at Attu Island to the Salish Sea. Rarely encountered in the Salish Sea, it is only known from Tongue Point and Sooke in the Strait of Juan de Fuca, off Deadman Bay and South Beach on San Juan Island, the northwest end of Lummi Island, and Burrard Inlet and English Bay in the southern Strait of Georgia. Records of this species on the outer coast of Washington and farther south are misidentifications of the recently described and morphologically similar *Liparis adiaxolus*, which ranges south to northern California. (Hubbs and Schultz, 1934; Schultz and DeLacy, 1936b; Wilimovsky, 1954; Stein et al., 2003; Love et al., 2005)

***Lipariscus nanus* Gilbert, 1915** **Pygmy snailfish**

A small pelagic species, found at depths of 58 to 910 m, the pygmy snailfish ranges from the Bering Sea and the Aleutians, to the Commander Islands and the southern Sea of Okhotsk, off Hokkaido, in the west, and to Monterey Bay, central California, in the east. Although recorded by Peden from deep water in the southern Strait of Georgia, it is unknown elsewhere in our waters; its small size, "allowing it to slip through coarse mesh nets," and deepwater habitat probably account for its rarity in collections. (Stein, 1978; Peden, 1981b; Love et al., 2005)

Nectoliparis pelagicus **Tadpole snailfish**
Gilbert and Burke, 1912

Like the pygmy snailfish, the tadpole snailfish is a small pelagic species known from the Bering Sea and Aleutian Islands and extends to the Sea of Okhotsk in the west, and to Southern California at San Diego in the east. Uncommon in the Salish Sea, it has been recorded only from the southern Strait of Georgia, off Cowichan, Point Roberts, English Bay, Sechelt Inlet, and Pender Harbour, and in Puget Sound, from Saratoga Passage and Gedeney Island to Golden Gardens and off West Point, with

isolated records near Port Orchard and in Carr Inlet. It has also been recorded from Dabob Bay in Hood Canal. (Burke, 1930; Wilimovsky, 1954; Grinols, 1965; Barraclough and Fulton²⁵; Miller and Borton, 1980; Peden, 1981b; Love et al., 2005)

PERCIFORMES

Moronidae

Morone saxatilis
(Walbaum, 1792)

Native to the western North Atlantic Ocean, where it ranges from the southern Gulf of St. Lawrence and St. Lawrence River to northern Florida at St. Johns River and the northern Gulf of Mexico from Florida to Louisiana, the striped bass was introduced from New Jersey to the northern part of San Francisco Bay in 1879. A second introduction in 1882 and several more in subsequent years led to a thriving fishery by 1889. It is now widely distributed in the eastern North Pacific, extending from Barkley Sound on the outer coast of Vancouver Island to northern Baja California. Relatively uncommon north of the Umpqua River near Coos Bay, Oregon, it has been taken in the Columbia River estuary, Grays Harbor, and the lower Willamette River near Portland. It is extremely rare in the Salish Sea, with only three verifiable records, one in the Strait of Juan de Fuca at Port San Juan and two in Puget Sound—in Holmes Harbor on Whidbey Island and in Colvos Passage between Vashon Island and the Kitsap Peninsula. A pelagic coastal species, usually found in shallow bays and estuaries and migrating into rivers in the spring to spawn in freshwater, it is seldom caught more than a few kilometers from shore. There is no evidence, however, that this species spawns in the Salish Sea. (Scofield, 1934; Roedel, 1953; DeLacy et al., 1972; Forrester et al., 1972; Moyle, 1976, 2002; Miller and Borton, 1980; Robins et al., 1986; Wydoski and Whitney, 2003)

Carangidae

Trachurus symmetricus
(Ayres, 1855b)

The jack mackerel ranges from the Gulf of Alaska and open ocean south of the Aleutian Islands to southern Baja California at Magdalena Bay and across the eastern tropical Pacific. An epipelagic schooling species, it can be found anywhere between the surface and 183 m and, rarely, down to at least 400 m. The young frequently

PERCHES

Temperate basses

Striped bass

school near kelp and under piers. There are numerous records off British Columbia, especially off the west coast of Vancouver Island, but it is extremely rare within the restricted waters of the Salish Sea. There are only two known occurrences: a specimen taken on 28 January 1965 at Finlayson Arm, Saanich Inlet, and another collected on 23 October 1975, with hook and line off Lyle Point, Anderson Island, in southern Puget Sound. (Roedel, 1953; Wilimovsky, 1954; Ahlstrom and Ball, 1957; Neave and Hanavan, 1960; Clemens and Wilby, 1961; Grinols, 1965; Miller and Borton, 1980)

Bramidae

Brama japonica Hilgendorf, 1878

Ranging from the southern Bering Sea and open ocean south of the Aleutians to the Commander Islands and Japan in the west, and to the Gulf of Alaska and as far south as Peru in the east, the Pacific pomfret is an epipelagic schooling species found on the surface down to at least 620 m. It is only rarely taken in nearshore waters. The earliest record in the Salish Sea is based on material collected off Port Townsend in 1882 by James G. Swan who described it as “not uncommon off Vancouver Island, and esteemed for its edible qualities” (as quoted by Tarleton Bean). Since then, the only additional indication of its presence in our waters is a record from off Mukilteo in central Puget Sound. All known records labeled “Strait of Juan de Fuca” or “Cape Flattery” are based on specimens collected far out to sea, well outside of the Salish Sea. (Bean, 1884b; Jordan and Starks, 1895; Kincaid, 1919; Crawford, 1927b; Mead and Haedrich, 1965; Mead, 1972; Miller and Borton, 1980)

Sciaenidae

Atractoscion nobilis (Ayres, 1860b)

Ranging from southeastern Alaska at Juneau to southern Baja California at Magdalena Bay and the Gulf of California, the white seabass is a schooling species found over rocky bottoms and in kelp beds, and occasionally in surf zones, anywhere between the surface and a depth of 122 m. Rare off the coasts of British Columbia, Washington, and Oregon—and only taken during El Niño events, when warm waters bring populations north—it was first recorded in the Salish Sea by David Starr Jordan in 1893, on the basis of a specimen from Sooke Harbour in the Strait of Juan de Fuca “found on top of the water in distress, its pectoral and caudal fins having been bitten by the dog-fish sharks.” Since then, very few additional occurrences in the Salish Sea have been reported: a specimen collected from off Sherringham Point in the Strait of Juan de Fuca, another in Toba Inlet at the extreme northern end of the Strait of Georgia, and a third

²⁵Barraclough, W. E., and J. D. Fulton. 1968. Data record: food of larval and juvenile fish caught with a surface trawl in Saanich Inlet during June and July 1966. Fish. Res. Board Can. Manuscr. Rep. Ser. 1003, 82 p. [Available at <http://www.dfo-mpo.gc.ca/Library/32842.pdf>.]

Pomfrets

Pacific pomfret

Drums and croakers

White seabass

Jacks

Jack mackerel

in Puget Sound taken off the mouth of the Stillaguamish River in Port Susan, between Camano Island and the mainland. (Jordan, 1893; Kincaid, 1919; Fowler, 1923; Jordan et al., 1930; Wilimovsky, 1954; Bonham and Olson, 1956; Radovich, 1961; Miller and Borton, 1980; Eschmeyer and Herald, 1983; Love, 2011)

***Genyonemus lineatus* (Ayres, 1855a) White croaker**

Ranging from Barkley Sound on the outer coast of Vancouver Island to southern Baja California at Magdalena Bay, the white croaker is a schooling species generally found inshore in relatively shallow water, usually at depths less than 30 m, but it has been recorded at a depth of 238 m. It is extremely rare in the Pacific Northwest—the Barkley Sound record, based on a single specimen collected on 8 September 1945, is the earliest evidence of its presence in Canadian waters. Since that time, three collections have been made at widely separated localities in the Salish Sea: one in Swanson Channel, west of Pender Island, in the southern Strait of Georgia, and two in Puget Sound, in Elliott Bay near Seattle and in Case Inlet near Shelton. (Clemens and Wilby, 1946; Rodel, 1948, 1953; Hart, 1973; Miller and Borton, 1980; Schlotterbeck and Connally, 1982; Peden and Hughes, 1986; Love, 2011)

***Seriphus politus* Ayres, 1860b Queenfish**

Another rare croaker in the Pacific Northwest, the queenfish extends from Burrard Inlet in the southern Strait of Georgia to southern Baja California at Tortugas Bay and the southern Gulf of California. An inshore schooling species, it is generally found over sandy bottoms, in bays and tidal sloughs, and around pilings to a depth of about 20 m. The Burrard Inlet record, reported in 1986 by Peden and Hughes, appears to be the earliest and only known Canadian occurrence. Since that time, two additional specimens from the Salish Sea have been collected—in the Strait of Juan de Fuca, between the East and West Twin Rivers, in Clallam County, and in Puget Sound off Port Orchard. (Miller and Lea, 1972; Eschmeyer and Herald, 1983; Schlotterbeck and Connally, 1982; Peden and Hughes, 1986; DeMartini, 1991; Love, 2011)

Embiotocidae Surfperches

***Brachyistius frenatus* Gill, 1862b Kelp perch**

The kelp perch extends from southeastern Alaska near Sitka at Sandy Cove to central Baja California at Turtle Bay, including Guadalupe Island. It is most often found in kelp forests, usually in the upper canopy, to a depth of about 76 m. This species is relatively uncommon in the Salish Sea but recorded from off Sooke and Esquimalt in

the Strait of Juan de Fuca; San Juan and Satellite islands in the San Juan Archipelago; Departure Bay, Newcastle Island, Burrard Inlet, and English Bay in the southern Strait of Georgia; and scattered localities in Puget Sound, including off Port Townsend, Langley in Saratoga Passage, the Wyckoff-Eagle Harbor Superfund site on the east side of Bainbridge Island, Shilshole, Elliott Bay near the ferry terminal in downtown Seattle, the Tacoma Narrows, off Point Defiance, and in Hood Canal. (Jordan and Gilbert, 1881c, 1881d; Eigenmann and Ulrey, 1894; Kincaid, 1919; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Hubbs and Hubbs, 1954; Miller and Borton, 1980; Csepp and Wing, 2000)

***Cymatogaster aggregata* Gibbons, 1854a Shiner perch**

The shiner perch is distributed from southeastern Alaska at Sitka to northern Baja California at Punta Bay. It tolerates a wide range of habitats but is most often found in quiet bays along protected coasts, in shallow eelgrass beds (where it is easily seined), among pilings and along rocky reefs, in tidepools, and in inter- and subtidal zones to a depth of 146 m, and has been reported to a depth of 303 m. One of the most common inshore species throughout its geographic range, it is exceedingly abundant nearly everywhere in appropriate habitat along the outer coasts of Vancouver Island, Washington, and Oregon and throughout the Salish Sea. (Girard, 1855b, 1858b; Günther, 1862; Lord, 1866; Jordan and Gilbert, 1881c, 1881d; Eigenmann and Ulrey, 1894; Gilbert, 1896c; Hubbs, 1918; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Miller and Borton, 1980; Monaco et al., 1992)

***Damalichthys vacca* Girard, 1855b Pile perch**

There is an unconfirmed record of the pile perch from southeastern Alaska near Wrangell, but it is well documented from southern British Columbia, at least as far north as Barkley Sound on the outer coast of Vancouver Island, to central Baja California at San Carlos Bay and Guadalupe Island. It is usually found along rocky and sandy shores, often around pilings and in kelp beds, from the intertidal zone to a depth of 90 m, but it has been reported to 210 m. It is extremely abundant in appropriate habitat almost everywhere in the Strait of Juan de Fuca, in the San Juan Archipelago, in and around Bellingham Bay, and in Puget Sound (including Hood Canal), but in the Strait of Georgia it is apparently restricted to the southern part, south of Jarvis Inlet. (Günther, 1862; Eigenmann and Ulrey, 1894; Gilbert, 1896c; Starks, 1911; Hubbs, 1918; Schultz and DeLacy, 1936b; Smith 1936, 1937; Haw and Buckley, 1971; Miller and Borton, 1980; Love, 2011)

Embiotoca lateralis
Agassiz, 1854 (Fig. 8B)

Striped seaperch

Ranging from southeastern Alaska at Klakas Inlet to northern Baja California at Punta Cabras, the striped seaperch inhabits rocky areas and kelp beds, and is often found around piers and beneath docks, in shallow water to a depth of 50 m and perhaps to 96 m. Almost as common in the Pacific Northwest as its close relative, the shiner perch, this species is abundant everywhere in appropriate habitat along the outer coasts of Vancouver Island, Washington, and Oregon and throughout the Salish Sea. (Girard, 1855b, 1858b; Jordan and Gilbert, 1881c, 1881d; Eigenmann and Ulrey, 1894; Starks, 1911; Hubbs, 1918; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Miller and Borton, 1980; Hueckel and Stayton, 1982; Schmitt and Coyer, 1982; Love 2011)

Hyperprosopon ellipticum
(Gibbons, 1854b)

Silver surfperch

The silver surfperch ranges from southern British Columbia at Brooks Peninsula to northern Baja California at Rio San Vicente. It is found in the intertidal zone down to a depth of at least 110 m, but is more often found in shallow water in depths of less than 4 m. It is uncommon in the northern part of its range, and records inside the restricted waters of the Salish Sea are extremely rare. There are only three verifiable localities: two in the Strait of Juan de Fuca near Port Renfrew and off Port Angeles, and one in Puget Sound off West Point near Seattle. The closely related walleye surfperch, *Hyperprosopon argenteum* Gibbons, 1854a, has been removed from the Salish Sea ichthyofauna (see "Comments," p. 72). (Eigenmann and Ulrey, 1894; Gilbert, 1896c; Kincaid, 1919; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946, 1961; Peden, 1966b; Miller and Lea, 1972; Eschmeyer and Herald, 1983; Peden and Hughes, 1986; Love, 2011)

Phanerodon furcatus
Girard, 1854c

White seaperch

The white seaperch ranges from British Columbia at Goose Island to central Baja California at San Carlos Bay. It prefers quiet offshore waters in bays and sandy areas, or near rocks, piers, and docks, in depths from 1 to 43 m. It is abundant off the California coast, but rare in the northern part of its range. There are a few records from off Oregon (e.g., Coos and Yaquina bays) and Washington (Willapa Bay) but fewer still inside the restricted waters of the Salish Sea, where it has only been recorded in the Strait of Juan de Fuca in Dungeness Bay, off San Juan Island and in East Sound off Orcas Island, in Bellingham Bay, off Nanaimo, and several localities in Puget Sound including Golden Gardens, Fletcher Bay,

and upper Dabob Bay and off Hood Head in Hood Canal. (Eigenmann and Ulrey, 1894; Jordan and Evermann, 1898a; Starks, 1911; Kincaid, 1919; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Roedel, 1953; Turner et al., 1969; Love, 2011)

Bathymasteridae

Ronquils

Ronquilus jordani
(Gilbert, 1889) (Fig. 8C)

Northern ronquil

The northern ronquil ranges from the Bering Sea north to Pribilof Canyon, west along the Aleutians to Amchitka Island, and south to Southern California at La Jolla. It generally inhabits rocky bottoms at depths of 3–275 m, but it is more commonly found at depths less than 150 m. Abundant off the coasts of Vancouver Island, Washington, and Oregon, it is common in the Salish Sea as well. First recorded in 1883 by Jordan and Gilbert (as *Bathymaster signatus*) from Puget Sound, it is now represented by numerous records from throughout the San Juan Islands and the full length of Puget Sound, including Hood Canal. There are additional records from Neah Bay, off Port Angeles, and near Victoria in the Strait of Juan de Fuca, and from Cowichan, English Bay, Burrard Inlet, and Bowen Island in the southern Strait of Georgia. (Jordan and Gilbert, 1883b; Jordan and Starks, 1895; Gilbert, 1896c; Evermann and Goldborough, 1907; Starks, 1911; Shelford et al., 1935; Schultz and DeLacy, 1936b; Smith, 1937; Miller and Borton, 1980; Stevenson and Matarese, 2005)

Zoarcidae

Eelpouts

Lycodapus mandibularis
Gilbert, 1915

Pallid eelpout

Extending from the Gulf of Alaska at Prince William Sound to Southern California at La Jolla Canyon, the pallid eelpout is a mesopelagic, mid-water species typically found at depths of 100–800 m, but it has been recorded to a depth of 1237 m. At least some adults appear to migrate vertically into shallower waters at night. It is surprisingly common in open water between Camano Island and the mainland and in mid-channel in the central Sound, extending from Richmond Beach to Blakely Rocks, but it is represented at only a few scattered localities elsewhere in the Salish Sea, including Possession Sound, off Everett, and off the Kitsap Peninsula, as well as Dabob Bay and Chinom Point in Hood Canal. There are a few localities from the southern Strait of Georgia, including Burrard Inlet and Howe Sound, but no known records from the San Juan Archipelago and Strait of Juan de Fuca. (Chapman, 1940; Hubbs and Schultz, 1941; Bayliff, 1959; Grinols, 1965; Peden and Anderson, 1978, 1981; Peden, 1979, 1981b; Anderson, 1980; Love et al., 2005; Love, 2011)

Lycodapus parviceps **Smallhead eelpout**
Gilbert, 1896a

The smallhead eelpout ranges from the eastern Bering Sea off Unalaska Island to southern Oregon off Coos Bay. It is usually captured by bottom trawls, or non-closing mid-water trawls fishing on or near the bottom, at depths of 80–470 m. Relatively rare throughout its range, it is represented in the Salish Sea by specimens collected off Sheringham Light and Owen and Sombrio points in the Strait of Juan de Fuca and in Howe Sound in the southern Strait of Georgia. There are apparently no records of this species in the San Juan Archipelago and Puget Sound. (Jordan and Evermann, 1896, 1898b; Evermann and Goldsborough, 1907; Gilbert, 1915; Wili-movsky, 1954; Quast and Hall, 1972; Anderson, 1977; Peden and Anderson, 1978, 1981; Love et al., 2005; Maslenikov et al., 2013)

Lycodes beringi **Andriashev, 1935** **Bering eelpout**

Although the western limit of the Bering eelpout is unclear, it appears to range from the Bering Sea and Aleutian Islands to at least the Kamchatka Peninsula at Kronotskiy Bay and perhaps farther south to the Sea of Okhotsk and Kuril Islands. In the east, its southern limit is the Salish Sea. It is most often trawled off muddy bottoms in relatively deep water, at depths ranging from 76 to 760 m, with the vast majority of collections made at depths of 200 m or more. Relatively rare in the Salish Sea, it has been reported from Burrard Inlet, Howe Sound, and Bute Inlet in the Strait of Georgia and from Bellingham Bay. In Puget Sound, localities include off Port Madison, Meadow Point, northwest of Carkeek Park, Golden Gardens, Richmond Beach, and Quilcene Bay in Hood Canal. There is a single known record from off Smith Island in the eastern Strait of Juan de Fuca, but there are no known occurrences in the San Juan Islands. In the past, this species has been confused with *Lycodes diapterus* Gilbert, 1892 (see “Comments,” p. 72). (Chapman and DeLacy, 1933; Bayliff, 1959; Peden and Wilson, 1976; Allen and Smith, 1988; Anderson, 1994; Steverson and Sheiko, 2009)

Lycodes brevipes **Bean, 1890b** **Shortfin eelpout**

The shortfin eelpout extends from the Bering Sea and the Aleutian Islands east of Unalaska to the Sea of Okhotsk in the west, and to Southern California off Lompoc in the east. A benthic species, it is found on sandy or muddy bottoms at depths of 2 m or less to a known maximum of 973 m. In the Salish Sea, it is most abundant in East and West sounds off Orcas Island, and to the east in Bellingham Bay. It has also been taken at widely scattered localities throughout Puget Sound from Skagit Bay and Admiralty Inlet to Elliot Bay, with a number

of collections made between Whiteman Cove and Taylor Bay in Case Inlet, and at other nearby localities in the southern Sound. It is apparently common as well in the southern Strait of Georgia, with localities extending from south of Cherry Point to Burrard Inlet and English Bay. Clemens and Wilby reported a specimen from the stomach of a lingcod caught near Victoria, but no other collections of this species from the Strait of Juan de Fuca have been reported. (Gilbert and Thompson, 1905; Evermann and Goldsborough, 1907; Starks, 1911; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Miller and Borton, 1980; Lamb and Edgell, 1986, 2010; Allen and Smith, 1988)

Lycodes cortezianus **(Gilbert, 1890)** **Bigfin eelpout**

Extending from southeastern Alaska to Queen Charlotte Sound and Southern California off San Diego, the bigfin eelpout is another deep-dwelling eelpout that prefers muddy, sandy, and gravelly bottoms at depths of 60–1190 m, but it is most often taken at depths between 70 and 400 m. Although common off Oregon and California, it is extremely rare in the Salish Sea, where its presence is indicated by only seven records: single specimens collected near Victoria, in Bellingham Bay, off Orcas Island, and at an unspecified locality in Puget Sound, plus three specimens taken by trawl off Port Madison in 2004. This species was previously known as *Aprodon cortezianus*. (Brock, 1943; Carl and Wilby, 1945; Clemens and Wilby, 1946; Palmen, 1954; Bali and Bond, 1959; Grinols, 1965; Allen and Smith, 1988; Love, 2011; Essington et al., 2013; Maslenikov et al., 2013)

Lycodes pacificus **Collett, 1879** **Blackbelly eelpout**

The blackbelly eelpout species ranges from the Aleutian Islands and Gulf of Alaska to Baja California. It is usually found on muddy bottoms at depths of 9–400 m. In stark contrast to most other Pacific Northwest eelpouts, it is extremely abundant in the Salish Sea, with numerous records from the San Juan Archipelago, Bellingham Bay, and throughout the full length of Puget Sound, including Hood Canal. It is common as well in the Strait of Georgia, especially in and around Burrard Inlet and English Bay, as far north as Comox. Records in the Strait of Juan de Fuca, however, are very few and restricted to the eastern end, in Discovery Bay and west of McArthur Bank. This species was previously known as *Lycodopsis pacificus*. (Bayliff, 1959; Grinols, 1965; Levings, 1969; Miller and Borton, 1980; Lamb and Edgell, 1986, 2010; Stein et al., 1992; Love, 2011)

Lycodes palearis **Gilbert, 1896a** **Wattled eelpout**

The wattled eelpout extends from the Chukchi and Bering seas and off the Aleutians to the Sea of Okhotsk in

the west, and to Oregon in the east. It prefers muddy or sandy bottoms at depths of 2–925 m, but it is nearly always captured at depths less than 200 m. The earliest record in the Salish Sea was reported in 1911 by Starks from Friday Harbor on San Juan Island. Since then it has been collected at numerous but widely scattered localities throughout the San Juan Archipelago and in Bellingham Bay; from Satellite Channel, Cowichan, Active Pass, Boundary Bay, and Burrard Inlet in the southern Strait of Georgia; and from Point Jefferson to mid-channel between West and Skiff points in central Puget Sound, with two known captures in Hood Canal, off Bangor and Thorndike Bay. There are also a few known reports of this species taken at both ends of the Strait of Juan de Fuca. (Starks, 1911; Kincaid, 1919; Halstead, 1950; Slipp and DeLacy, 1952; Bayliff, 1959; Allen and Smith, 1988; Love et al., 2005; Love 2011)

Stichaeidae

Pricklebacks

Anoplarchus insignis

Slender cockscomb

Gilbert and Burke, 1912 (Fig. 9A)

From the southeastern Bering Sea and Aleutians at Attu Island to northern California at Arena Cove, the slender cockscomb is found among rocks and algae from the inter- and subtidal zones to a depth of about 30 m. Relatively rare throughout its range, there are only a few records from the Salish Sea—from off Sooke in the Strait of Juan de Fuca; in Harris Strait off Mandarte Island; off San Juan Island; and off Cowichan, in Pender Harbour, off New Westminster, in Burrard Inlet, Howe Sound, and Malaspina Strait off the south side of Pearson Island in the southern Strait of Georgia. This species is scarce as well in Puget Sound, where there are less than a half-dozen known individuals, collected in Deception Pass, off Point Defiance, and off Point Fosdick and Dougall Point in the South Sound (as well as an underwater photograph taken at Lagoon Point on Whidbey Island). (Hubbs, 1927; Peppar, 1965; Peden, 1966c; Peden and Wilson, 1976; Horn and Allen, 1978; Miller and Borton, 1980; Lamb and Edgell, 1986, 2010)

Anoplarchus purpurescens

High cockscomb

Gill, 1861c

Ranging from the Pribilof Islands and the Aleutians at Attu, to Southern California at Santa Rosa Island, the high cockscomb is a stichaeid found among rocks and algae in tidepools, but more often collected in the intertidal zone to a depth of 30 m. It is represented by widely scattered records throughout the Salish Sea, from Neah and Clallam bays to Tongue Point and off the Jordan River, Sooke, and Esquimalt in the Strait of Juan de Fuca; off all the major islands of the San Juan Archipelago; and along the full length of the Strait of Georgia

from Saanich to Bute Inlet. In Puget Sound, it extends from Deception Pass and Admiralty Inlet to Alki, Point Defiance, and Carr Inlet, with several localities at both ends of Hood Canal. (Jordan and Gilbert, 1881c, 1881d; Hubbs, 1927; Schultz and DeLacy, 1936b; Wilimovsky, 1964; Peppar, 1965; Peden, 1966c; Quast and Hall, 1972; Love, 2011)

Chirolophis decoratus

Decorated warbonnet

(Jordan and Snyder, 1902) (Fig. 9B)

The fantastic decorated warbonnet extends from the eastern Bering Sea and Aleutian Islands to northern California at Humboldt Bay. It is usually found associated with seaweed and sponges on rocky bottoms, often with its head projecting from holes, at subtidal depths to 232 m. Relatively uncommon throughout its range, records in the Salish Sea are few and far between; it has been collected off Admiralty Head in the eastern Strait of Juan de Fuca; off San Juan Island, in East Sound off Orcas, and north of Skipjack Island; and in Bellingham Bay. Puget Sound localities include Saratoga Passage and Port Susan, off Gedney Island in Possession Sound, and off Meadow Point, Carkeek Park, Orchard Point, and Fox Island (as well as underwater photographs taken off Tacoma). Clemens and Wilby cite captures in English Bay, in Burrard Inlet, and off Stuart Island in the Strait of Georgia. This species was previously known as *Chirolophis polyactocephalus* (Pallas, 1814). (Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Shelford et al., 1935; Clemens and Wilby, 1946, 1961; Quast and Hall, 1972; Schultz and DeLacy, 1936b; Miller and Borton, 1980; Love, 2011)

Chirolophis nugator

Mosshead warbonnet

(Jordan and Williams,
in Jordan and Starks, 1895)

The mosshead warbonnet ranges from the western Aleutians at Agattu Island to Southern California at San Miguel Island. It is found primarily in rocky inter- and subtidal zones, often seeking protection in holes or empty shells, to a depth of 80 m. Like its close relative, the decorated warbonnet, this species is rarely encountered throughout its range. Localities in the Salish Sea include off Waadah Island, Tongue Point, and Sooke in the Strait of Juan de Fuca; off San Juan, Lopez, Bell, and Blakely islands in the San Juan Archipelago; off Cowichan, in False Bay south of Nanaimo, in Departure Bay, in Howe Sound, and off Texada and Pearson islands in the Strait of Georgia; and off Port Ludlow, Carkeek Park, West Point, Orchard Point, Point Defiance, and Colvos Passage in Puget Sound. (Jordan and Starks, 1895; Starks, 1911; Clemens and Wilby, 1946; Hubbard and Reeder, 1965; Quast, 1968; Peden and Wilson, 1976; Miller and Borton, 1980; Love, 2011)

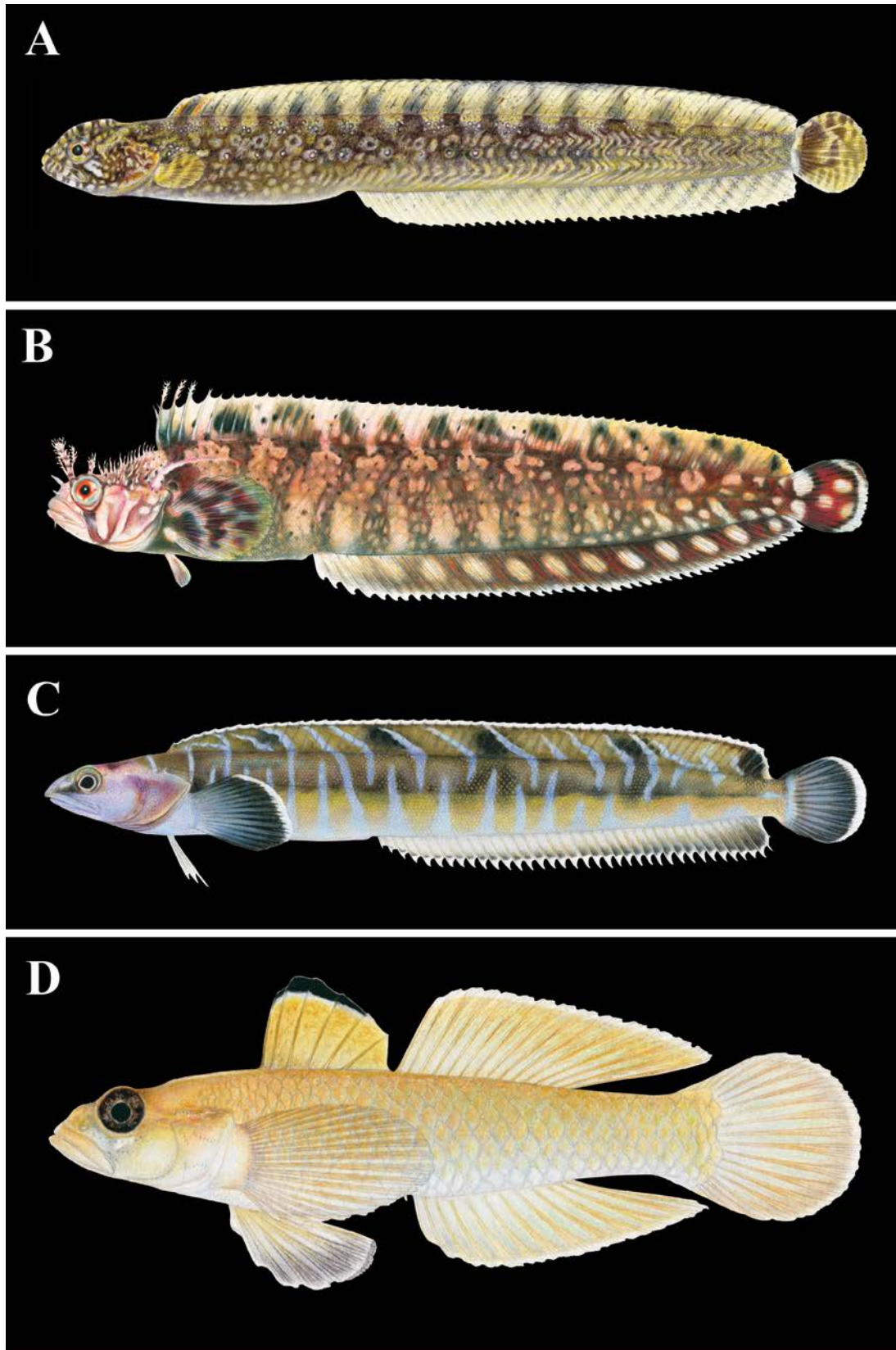


Figure 9

Fishes of the Salish Sea: (A) slender cockscomb (*Anoplarchus insignis*), (B) decorated warbonnet (*Chirolophis decoratus*), (C) bluebarred prickleback (*Plectobranchnus evides*), and (D) blackeye goby (*Rhinogobiops nicholsii*). © Joseph R. Tomelleri.

Leptoclinus maculatus
(Fries, 1838)

Daubed shanny

The daubed shanny is widespread in Arctic waters, ranging widely across the North Atlantic and Beaufort and Bering seas, into the Aleutians as far west as Unalaska Island, to the Sea of Okhotsk and Japan in the west, and to the Salish Sea in the east. It prefers soft, low-relief bottoms at depths ranging from 2 to 491 m, but it is found most often at depths less than 170 m. This species is only rarely encountered in the Salish Sea, where collections have been made near Port Renfrew, Sheringham Point, Port Angeles, Sequim, and West Point in the Strait of Juan de Fuca; off San Juan, Lopez, Orcas, Stuart, and Vendovi islands in the San Juan Archipelago; in Bellingham Bay; and off Port Madison, Carkeek Park, and Golden Gardens in Puget Sound. There are no known records in the Strait of Georgia, except for a single specimen trawled in open water about halfway between Sucia Island and Cherry Point, Washington. This species was previously known as *Lumpenus maculatus*. (Chapman and DeLacy, 1933; Schultz and DeLacy, 1936b; Smith, 1936; Wilimovsky, 1964; Peden, 1966b; Quast and Hall, 1972; Miller and Borton, 1980; Allen and Smith, 1988; McAllister, 1990)

Lumpenella longirostris
(Evermann and Goldsborough, 1907)

Longsnout prickleback

The longsnout prickleback is widespread, present in the North Atlantic, from the coastal waters of Cape Cod and Greenland to Norway and Sweden, and in the Bering Sea and Aleutian Islands to the Sea of Okhotsk and northern Japan in the west, and to southern British Columbia at Burrard Inlet in the east. It is usually found on soft bottoms at depths of 25–1195 m, but it is more commonly taken at depths between 100 and 200 m. Well represented at Burrard Inlet, Howe Sound, and off New Westminster in the southern Strait of Georgia, it is unknown everywhere else in the Salish Sea. (Clemens and Wilby, 1946; Wilimovsky, 1954; Lamb and Edgell, 1986, 2010; Allen and Smith, 1988; Love et al., 2005; Love, 2011)

Lumpenopsis hypochroma
(Hubbs and Schultz, 1932)

Y-prickleback

The Y-prickleback is an extremely rare species, known with certainty only from southern British Columbia. It was originally described from a single specimen collected in 1927 off Newcastle Island, in Departure Bay just north of Nanaimo, at a depth of 37 m. Only a few specimens have been discovered since—two from outside the Salish Sea, from Fairfax Inlet in the Queen Charlotte Islands and off Malcolm Island at the mouth of Johnstone Strait, a third from Baker Passage at the extreme northern end

of the Strait of Georgia, and a fourth, perhaps misidentified, larval or juvenile specimen from Saanich Inlet off the southeast end of Vancouver Island. References to its occurrence off Southern California are apparently based on *Lumpenopsis clitella*. The Y-prickleback was previously known as *Allolumpenus hypochromus*. (Schultz and DeLacy, 1936c; Clemens and Wilby, 1946; Barraclough et al.²⁶; McAllister et al., 1985; McAllister, 1990; Hastings and Walker, 2003; Love et al., 2005)

Lumpenus sagitta
Wilimovsky, 1956

Snake prickleback

The snake prickleback ranges from the Bering Sea and Aleutian Islands to northern California at Humboldt Bay and to the seas of Okhotsk and Japan. It prefers muddy, sandy, and pebbly bottoms from shore to a depth of 425 m. The species is common off the coasts of Vancouver Island, Washington, and Oregon, and is abundant throughout the Salish Sea, especially in and around the islands of the San Juan Archipelago, Bellingham Bay, the Strait of Georgia as far north as Comox, and the full length and breadth of Puget Sound, including Hood Canal. (Jordan and Gilbert, 1881c, 1881d; Gilbert, 1896c; Schultz and DeLacy, 1936b; Smith, 1936; Clemens and Wilby, 1961; Wilimovsky, 1964; Miller and Borton, 1980; Allen and Smith, 1988; Love, 2011)

Phytichthys chirus
(Jordan and Gilbert, 1880d)

Ribbon prickleback

The ribbon prickleback ranges from the Aleutian Islands and Gulf of Alaska to Southern California, and is usually found beneath rocks (often associated with algae) in the intertidal zone to a depth of about 12 m. First recorded in the Salish Sea in 1881 by Jordan and Gilbert, it is now well represented by collections made off San Juan Island, with additional scattered localities off nearby Lopez and Orcas islands, but it is much less common elsewhere in our region. Captures have been made off Waadah Island, Port Renfrew, Sooke, Bentinck Island, Victoria, and Smith Island in the Strait of Juan de Fuca; off Cowichan, Departure Bay, Nanaimo, and Texada Island in the Strait of Georgia; and off Port Ludlow, Orchard Point, and Elliot Bay near Seattle in Puget Sound. (Jordan and Gilbert, 1881c, 1881d; Jordan and Starks, 1895; Starks, 1896, 1911; Miles, 1918; Kincaid, 1919; Bean and Weed, 1920; Hubbs, 1927; Schultz and DeLacy, 1936b; Miller and Borton, 1980; Love, 2011)

²⁶Barraclough, W. E., D. G. Robinson, and J. D. Fulton. 1968. Data record: number, size composition, weight, and food of larval and juvenile fish caught with a two-boat surface trawl in Saanich Inlet, April 23–July 21, 1968. Fish. Res. Board Can. Manusc. Rep. Ser. 1004, 305 p. [Available at <http://www.dfo-po.gc.ca/Library/32843.pdf>.]

Plectobranthus evides **Bluebarred prickleback**
Gilbert, 1890 (Fig. 9C)

Ranging from central British Columbia to San Diego, California, the bluebarred prickleback is found on muddy and sandy bottoms at depths of 57–368 m. It was first reported in the Salish Sea by Gilbert and Thompson in 1905, on the basis of a specimen collected in Hood Canal, and later described by Kincaid in 1919 from unspecified localities in Puget Sound as “one of our rare and beautiful fish forms.” Since then it has been collected occasionally in the northeastern part of Puget Sound—especially in Saratoga Passage, Port Susan, and Possession Sound and off Port Madison and Meadow Point to Duwamish Head and Alki Point—but unreported almost everywhere else in the Salish Sea. In the remaining parts of Puget Sound, there are single records in Carr Inlet and the entrance to Eld Inlet, as well as off Holly in Hood Canal, and a cluster of captures at the mouth of The Great Bend. But there are no known occurrences in the Strait of Juan de Fuca or in the San Juan Archipelago, and there is only a single collection in the Strait of Georgia, where three specimens were taken in November 1951 from Ladysmith Harbour south of Nanaimo. (Gilbert and Thompson, 1905; Gilbert, 1915; Kincaid, 1919; Schultz and DeLacy, 1936b; Smith, 1937; Barraclough, 1959; Clemens and Wilby, 1961; Miller and Borton, 1980; Love et al., 2005)

Poroclinus rothrocki **Whitebarred prickleback**
Bean, 1890b

The whitebarred prickleback ranges from the southeastern Bering Sea and Aleutian Islands to Southern California at San Diego. It is found on rocky bottoms at depths of 35–160 m. In the Salish Sea it is most common in the northeastern part of Puget Sound, where numerous collections have been made in Saratoga Passage, Port Susan, and Possession Sound; from Port Madison and Port Orchard bays to Meadow Point, Golden Gardens, and Elliot Bay; and from Duwamish Head to Alki Point. Significant collections have been made as well in the southern Strait of Georgia, from off Cowichan and in Satellite Channel, Porlier Pass, and Departure Bay; and from Point Whitehorn to the mouth of the Fraser River, Burrard Inlet, and off Indian Arm. However, it is rare in other parts of the Salish Sea—in the San Juan Islands, there is a single known capture, in East Sound, off Orcas Island; single records in Bellingham Bay, and in Carr Inlet in southern Puget Sound; and three occurrences off Union and the mouth of the Skokomish River Delta in Hood Canal. There are no known collections from the Strait of Juan de Fuca. (Starks and Morris, 1907; Smith, 1936; Clemens and Wilby, 1961; Quast and Hall, 1972; Miller and Borton, 1980; Love et al., 2005)

Xiphister atropurpureus **Black prickleback**
(Kittlitz, 1858)

Extending from the western Gulf of Alaska at Kodiak Island to northern Baja California at Rio SantoTomas, the black prickleback prefers exposed rocky shorelines where it is usually found beneath rocks and often associated with algae in tidepools and the intertidal zone to a depth of 12 m. It is extremely abundant around the full periphery of San Juan Island and off the southern end of Lopez Island (with a few captures in East Sound off Orcas and one specimen collected to the east off Fidalgo Island), with numerous records as well along the Strait of Juan de Fuca, from Cape Flattery and Neah and Clallam bays to Victoria and Sequim Bay, but rare everywhere else in the Salish Sea. In the southern Strait of Georgia, it has been collected off Saturna Island, in and around Departure Bay, in Burrard Inlet, and Howe Sound. Surprisingly scarce in Puget Sound, it has been recorded only at Port Ludlow by Starks and in the “vicinity of Seattle” by Jordan and Starks. (Jordan and Gilbert, 1881c, 1881d; Bean, 1882a, 1882b; Jordan and Starks, 1895; Starks, 1896; Bean and Weed, 1920; Hubbs, 1927; Batts, 1961; Miller and Borton, 1980; Love et al., 2005)

Xiphister mucosus **Rock prickleback**
(Girard, 1858b)

Extending from the western Gulf of Alaska at Kodiak Island to Southern California at Santa Cruz Island, the rock prickleback is usually found along open coastlines and under rocks and is often associated with algae from the intertidal zone to a depth of 18 m. Like many of its close relatives, it is especially common in the San Juan Archipelago, around the periphery of San Juan Island and at the southern end of Lopez, with single occurrences off Shaw, Bare, and Sucia islands, and off the northern shore of Orcas Island. It is also well represented along the length of the Strait of Juan de Fuca from Cape Flattery and Neah Bay to Esquimalt and Smith Island. Rare elsewhere in the Salish Sea, it has been documented off Gabriola Island and New Westminster in the southern Strait of Georgia and off Port Townsend, Port Ludlow, Mukilteo, and Manchester Rocks in Puget Sound. (Bean, 1882b, 1884a; Starks, 1896, 1911; Miles, 1918; Hubbs, 1927; Clemens and Wilby, 1946; Miller and Borton, 1980; Cross, 1981; Lamb and Edgell, 1986, 2010; Love et al., 2005; Love, 2011)

Cryptacanthodidae **Wrymouths**

Cryptacanthodes aleutensis **Dwarf wrymouth**
(Gilbert, 1896a)

The dwarf wrymouth ranges from the southeastern Bering Sea and Aleutian Islands as far west as Unalaska to

Eureka, California. It prefers soft muddy bottoms at depths ranging from 21 to 750 m, often observed partially buried. Common throughout the San Juan Archipelago, it is rare elsewhere in the Salish Sea—known localities include off Port Renfrew and near Victoria in the Strait of Juan de Fuca; off Cowichan, Pender Island, New Westminster, and English Bay in the southern Strait of Georgia; off Port Townsend, Port Madison, and the entrance to Eld Inlet near Olympia; and in Dabob Bay, Hood Canal. This species was previously called *Lyconectes aleutensis*. (Gilbert and Thompson, 1905; Starks, 1911; Hubbs, 1928; Schultz, 1930; Clemens and Wilby, 1946; Walker, 1953; Wilimovsky, 1964; Grinols, 1965; Quast and Hall, 1972; Miller and Borton, 1980; Love et al., 2005)

Cryptacanthodes giganteus **Giant wrymouth**
(Kittlitz, 1858)

The giant wrymouth ranges from the southeastern Bering Sea and Aleutian Islands from Unalaska to northern California at Humboldt Bay. It occupies flat or gently sloping muddy bottoms at depths of 6–331 m, but is usually encountered in depths less than 20 m. The species is rare throughout its range, represented in the Salish Sea by fewer than two dozen collections made off Victoria, Port Angeles, and Discovery Bay in the Strait of Juan de Fuca; at San Juan and Orcas islands in the San Juan Archipelago; in Bellingham Bay; off Nanaimo, in English and Semiahmoo bays, in Pender Harbour, and off Comox in the Strait of Georgia; and off Hoypus Point, Penn Cove, Holmes Harbor, North Beach, and Port Orchard in Puget Sound. This species was previously called *Delolepis gigantea*. (Bean, 1882b, 1884b; Eigenmann and Eigenmann, 1892; Jordan and Starks, 1895; Hubbs, 1928; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Wilimovsky, 1954, 1964; Love et al., 2005)

Pholidae **Gunnels**

***Apodichthys flavidus* Girard, 1854c** **Penpoint gunnel**

The penpoint gunnel extends from the western Gulf of Alaska and Kodiak Island to Southern California off Palos Verdes Peninsula. It is found in the intertidal zone but more often seen in tidepools, usually associated with eelgrass and algae. Especially abundant in and around the San Juan Islands, it is common as well throughout the Salish Sea, represented at numerous scattered localities in the Strait of Juan de Fuca, from Cape Flattery to Victoria, Port Angeles, and Dungeness and Discovery bays; the Strait of Georgia from off Saturna Island to Bute Inlet; and in Puget Sound from Deception Pass and Admiralty Inlet to Point Defiance and off Steilacoom. There are several records as well in Hood Canal, off Bangor and Big Beef Harbor. (Günther, 1861; Jordan

and Gilbert, 1881c, 1881d; Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Bean and Weed, 1920; Schultz and DeLacy, 1936b; Clemens and Wilby, 1961; Kendall, 1966; Miller and Borton, 1980; Love et al., 2005)

Apodichthys fucorum **Rockweed gunnel**
Jordan and Gilbert, 1880d

Ranging from British Columbia at Banks Island to central Baja California at Punta Escarpada, the rockweed gunnel is found in tidepools and the intertidal zone to a depth of 9 m, often associated with algae. Compared to its close relative, the penpoint gunnel, this species is rare in the northern part of its range and especially in the Salish Sea, where it is represented at only a few localities—off Ta-toosh Island, Neah Bay, and Point Renfrew in the Strait of Juan de Fuca; at Deadman Cove on San Juan Island; off Comox in the Strait of Georgia; in Penn Cove on Whidbey Island and off Golden Gardens and Alki Point in Puget Sound. This species has previously been called *Xererpes fucorum*. (Jordan and Gilbert, 1881c, 1881d; Jordan and Starks, 1895; Kincaid, 1919; Bean and Weed, 1920; Schultz and DeLacy, 1936b; Clemens and Wilby, 1961; Miller and Borton, 1980; Love et al., 2005)

***Pholis clemensi* Rosenblatt, 1964** **Longfin gunnel**

Another rare gunnel in the Salish Sea, the longfin gunnel extends from the northern Gulf of Alaska as far west as Prince William Sound to Arena Cove, northern California, and is found on rocky bottoms at depths of 7–64 m. Throughout its range, it appears to be represented in collections by no more than a few dozen specimens, including only about a half-dozen localities in the Salish Sea, most all of which are in the Strait of Georgia—off Bowyer Island in Howe Sound, in Pender Harbour in Malaspina Strait, and at the northern end of Desolation Sound, in Doctor Bay, and in Walsh Cove on the east side of West Redondo Island. There are additional records in the Salish Sea from Protection Island at the mouth of Discovery Bay in the eastern Strait of Juan de Fuca, and off San Juan and Crane islands in the San Juan Archipelago. In Puget Sound it is apparently known only from underwater photographs taken off Port Townsend and in Hood Canal. (Peden and Wilson, 1976; Miller and Borton, 1980; Lamb and Edgell, 1986, 2010; Love et al., 2005; Love, 2011; Maslenikov et al., 2013)

***Pholis laeta* (Cope, 1873)** **Crescent gunnel**

The crescent gunnel ranges from the Aleutians to the Commander Islands and southeastern Kamchatka in the west, and along the Alaska Peninsula and Gulf of Alaska to northern California at Abalone Beach in the east. It prefers intertidal and shallow subtidal areas, often as-

sociated with eelgrass, algae, and rocks, to a depth of about 75 m (but has been reported to 99 m). Rather common in appropriate habitat along the outer coasts of Vancouver Island, Washington, and Oregon, it is abundant as well in the Salish Sea, especially in and around the San Juan Islands and throughout Puget Sound (including Hood Canal), with fewer and widespread localities along the Strait of Juan de Fuca, from Waadah Island and Neah Bay to Victoria, Port Angeles, and Smith Island; Bellingham Bay; and throughout the southern Strait of Georgia from Saanich Inlet and Saturna Island to Discovery Bay, Howe Sound, and Jervis Inlet. (Jordan and Gilbert, 1881c; Schultz and DeLacy, 1936b; Wili-movsky, 1954, 1964; DeLacy et al., 1972; Miller and Borton, 1980; Peden and Hughes, 1984; Lamb and Edgell, 1986, 2010; Love et al., 2005; Love, 2011)

***Pholis ornata* (Girard, 1854c) Saddleback gunnel**

The saddleback gunnel ranges from Vancouver Island to central California at Carmel Beach. A benthic species inhabiting bays, estuaries, and other quiet waters, it is found in tidepools and the intertidal zone, often associated with eelgrass and algae, to a depth of 37 m, but reported to 60 m. Its distribution and abundance within the Salish Sea is nearly identical to that of its close relative the crescent gunnel described previously: abundant in and around the San Juan Islands and throughout Puget Sound, with fewer and more scattered localities in the Strait of Juan de Fuca and the southern Strait of Georgia. (Jordan and Gilbert, 1881c, 1881d; Evermann and Goldsborough, 1907; Miles, 1918; Bean and Weed, 1920; Schultz and DeLacy, 1936b; Miller and Borton, 1980; Peden and Hughes, 1984; Love et al., 2005; Love, 2011)

***Pholis schultzi* Schultz, 1931 Red gunnel**

Extending from southern British Columbia at Rivers Inlet, Queen Charlotte Sound, to Diablo Cove, central California, the red gunnel is a rock and kelp dweller, found in the intertidal zone down to a depth of 26 m. Uncommon throughout its range, it is exceedingly rare in the Salish Sea, represented at only four known localities—off Lime Kiln Lighthouse and Deadman Bay on the west side of San Juan Island, Balkwill Lake on Texada Island in the Strait of Georgia, and at the entrance to Admiralty Inlet in Puget Sound. (Hubbs, 1928; Schultz and DeLacy, 1936b; Schultz and Hubbs, 1961; Peden, 1966a; Miller and Borton, 1980; Love et al., 2005; Lamb and Edgell, 2010; Love, 2011)

Anarhichadidae Wolffishes

***Anarrhichthys ocellatus* Ayres, 1855a Wolf-eel**

The wolf-eel ranges from the southeastern Bering Sea east to Cape Menshikof, west along the Aleutians to

the Krenitzin Islands and Gulf of Alaska, to northern Baja California at Escondido Reef. It is found primarily on rocky reefs and along shorelines, often in caves and crevices, from the intertidal zone to a depth of 226 m. Uncommon in the Salish Sea, there are about two dozen, widely scattered localities throughout the San Juan Islands and Puget Sound—from Skagit Bay and Port Townsend to the Tacoma Narrows and off Steamboat Island at the entrance to Totten Inlet, as well as Hood Canal—with additional records off Cape Flattery, Race Rocks, Saxe Point, and Victoria in the Strait of Juan de Fuca and in Gabriola Pass and Howe Sound in the southern Strait of Georgia. (Jordan and Gilbert, 1881c, 1881d; Jordan and Jouy, 1881; Bean, 1884b; Gill, 1911; Schultz, 1930; Schultz and DeLacy, 1936b; Miller and Borton, 1980; Feeney et al., 2007; Love, 2011)

Ptilichthyidae

***Ptilichthys goodei* Bean, 1881b**

Ranging from the southern Bering Sea and Aleutians to the Commander Islands and seas of Okhotsk and Japan in the west, and to central Oregon in the east, the snake-like quillfish is secretive and very seldom encountered. It is occasionally seen at night, attracted to the surface by lights, but usually remains buried in soft, muddy bottoms during the day to a maximum recorded depth of 360 m. Known from about two dozen specimens collected primarily by night-light and dip-net off the dock at the University of Washington Friday Harbor Laboratories on San Juan Island, it is extremely rare everywhere else in the Salish Sea. Additional localities are limited to Johns Island in the San Juan Archipelago, Trincomali Channel off Porlier Pass in the southern Gulf Islands, North Lagoon Point on the west side of Whidbey Island, off Manchester, Edmonds (on the basis of underwater photographs), and Scenic Beach Park near Seabeck in Hood Canal. (Gilbert, 1896a; Evermann and Goldsborough, 1907; Schultz, 1929, 1930; Chapman and DeLacy, 1933; Walker, 1953; Grinols, 1965; DeLacy et al., 1972; Lamb and Edgell, 1986, 2010; Love, 2011; Maslenikov et al., 2013)

Zaproridae

***Zaprora silenus* Jordan, 1896**

The prowfish extends from the Bering Sea and Aleutian Islands to the Sea of Okhotsk and Hokkaido, Japan, in the west, and to Southern California at San Miguel Island in the east. Adults are generally found near the bottom at depths of 10–801 m, and the young are often taken near the surface. The earliest known record in our waters, one specimen collected off Nanaimo in October 1895, formed the basis for Jordan's original description

Quillfishes

Quillfish

Prowfishes

Prowfish

of the species, but since then it has been very rarely seen in the Salish Sea. Although this species is somewhat common off the mouth of the Strait of Juan de Fuca, with several records from off Umatilla Reef and Swiftsure Bank, Tatoosh Island, and Neah Bay, the only inland record is a specimen collected in 1987 off the mouth of the Puyallup River, near Tacoma, in southern Puget Sound. (Kincaid, 1919; Dymond, 1928; Schultz, 1934; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Wilimovsky, 1964; Grinols, 1965; Allen and Smith, 1988; Smith et al., 2004; Love et al., 2005)

Scytalinidae

Scytalina cerdale

Jordan and Gilbert, 1880i

Ranging from the western Aleutian Islands to Diablo Cove, central California, the graveldiver is found on soft bottoms, in tidepools, and the intertidal zone to a depth of 7 m. It was first recorded in 1880 by Jordan and Gilbert at Waadah Island, off Neah Bay, and since then there have been a number of additional collections made in Neah Bay and off Port Renfrew, Tongue Point, and Sooke in the Strait of Juan de Fuca and from San Juan and Lopez islands in the San Juan Archipelago. It has apparently not been collected in the Strait of Georgia or in Puget Sound. (Jordan and Gilbert, 1881c, 1881d; Kincaid, 1919; Hubbs, 1927; Schultz, 1930; Schultz and DeLacy, 1936b; Miller and Borton, 1980; Love et al., 2005; Hilton, 2009)

Trichodontidae

Trichodon trichodon

(Tilesius, 1813)

The Pacific sandfish extends from the southeastern Bering Sea and Pribilof and Aleutian islands to the Commander Islands, southeastern Kamchatka, Kuril Islands, and Japan in the west, and to northern California at San Francisco in the east. It prefers intertidal areas, where it is often found buried in the sand after a receding tide but has been reported also to a depth of 375 m. In the Salish Sea, it is relatively common in and around the San Juan Islands (especially in East and West sounds off Orcas Island) and in Bellingham Bay. But it appears to be extremely rare or absent everywhere else in the Salish Sea, except for a specimen said to have been collected near Victoria in 1892, another trawled off Birch Bay in the southern Strait of Georgia in 2006, and a specimen each from the Whidbey Basin and central Puget Sound. (Schultz and DeLacy, 1936a; Clemens and Wilby, 1946; Wilimovsky, 1954, 1964; High, 1966; Miller and Borton, 1980; Lamb and Edgell, 1986, 2010; Allen and Smith, 1988; Okiyama, 1990; Love, 2011)

Graveldivers

Graveldiver

Sandfishes

Pacific sandfish

Ammodytidae

Ammodytes personatus

Girard, 1856

An epipelagic schooling species often also found buried in soft substrate, from the intertidal zone near the surface to a depth of 100 m (but reported to 172 m), the Pacific sand lance ranges from the Bering Sea and Aleutian Islands to the Sea of Japan in the west, and to Southern California at Balboa Island in the east. First described from specimens collected off Cape Flattery by Lieutenant William Trowbridge during the Pacific Railroad Surveys of 1853–1855, it occurs in large schools along sandy shores everywhere off the coasts of Vancouver Island, Washington, and Oregon, as well as throughout the Strait of Juan de Fuca, from Neah Bay, Port Renfrew, and Pillar Point to Sooke, Victoria, Port Angeles, and Dungeness Bay; in and around the San Juan Archipelago and in Bellingham Bay; and in Puget Sound from Similk Bay and Admiralty Inlet to southern Hood Canal in the west and to Alki Point in the east, with a few scattered localities as far south as Henderson Bay, Carr Inlet, and the entrance to Eld Inlet. In the southern Strait of Georgia it extends at least as far north as Porlier Pass in the west and Sand Heads Light off the mouth of the Fraser River in the east. This species was recently distinguished from *Ammodytes hexapterus* Pallas, 1814, which appears to be restricted to northern Alaska and the Arctic and western Pacific oceans, and is, therefore, more appropriately referred to as the Arctic sand lance. The common name Pacific sand lance is hereby reassigned to *A. personatus* to more accurately reflect its distribution. (Jordan and Gilbert, 1881c, 1881d; Bean, 1883; Starks, 1896, 1911; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; Barraclough^{27, 28, 29}; Love et al., 2005; Love, 2011; Mecklenburg et al., 2011; Orr et al., 2015)

Sand lances

Pacific sand lance

Icosteidae

Icosteus aenigmaticus

Lockington, 1880d

Originally described by Lockington as lacking “firmness”—“it can be doubled up as readily as a piece

Ragfishes

Ragfish

²⁷Barraclough, W. E. 1967. Data record: number, size and food of larval and juvenile fish caught with a two boat surface trawl in the Strait of Georgia, April 25–29, 1966. Fish. Res. Board Can. Manusc. Rep. Ser. 922, 54 p. [Available at <http://www.dfo-mpo.gc.ca/Library/12655.pdf>.]

²⁸Barraclough, W. E. 1967. Data record: number, size, and food of larval and juvenile fish caught with an Isaacs-Kidd trawl in the surface waters of the Strait of Georgia, April 25–29, 1966. Fish. Res. Board Can. Manusc. Rep., Ser. 926, 79 p. [Available at <http://www.dfo-mpo.gc.ca/Library/30481.pdf>.]

²⁹Barraclough, W. E. 1967. Data record: number, size and food of larval and juvenile fish caught with a two-boat surface trawl in the Strait of Georgia, June 6–8, 1966. Fish. Res. Board Can. Manusc. Rep. Ser. 928, 58 p. [Available at <http://www.dfo-mpo.gc.ca/Library/31897.pdf>.]

of soft, thick rag”—the ragfish ranges from the Bering Sea to the Pacific coast of southern Honshu, Japan, in the west, and to the Gulf of Alaska and Southern California at Point Loma in the east. It occupies the surf zone to a depth of 1420 m. The young are often found in shallow water or offshore near the surface, and the adults are more often seen near the bottom in deeper water. Rare in the Salish Sea, it is known from only a few widely scattered records—near Victoria in the Strait of Juan de Fuca; off San Juan and Lopez islands; and off Port Townsend, Mutiny Bay, Colvos Passage (west side of Vashon Island), Gig Harbor, Point Defiance, Commencement Bay, and Budd Inlet near Olympia. (Bean, 1888; Goode and Bean, 1896; Bean, 1899; Kincaid, 1919; Crawford, 1927b; Pritchard, 1929; Schultz, 1930; Schultz et al., 1932; Schultz and DeLacy, 1936a; Cowan, 1938; Miller and Borton, 1980; Allen, 2001)

Gobiesocidae

Gobiesox maeandricus (Girard, 1858b)

The northern clingfish ranges from southeastern Alaska at Noyes Island to central Baja California, where it prefers tidepools and the intertidal zone to a depth of 140 m. It is common in and around the San Juan Archipelago (especially off San Juan Island and the southernmost tip of Lopez Island) and in central Puget Sound, from Port Ludlow to Alki Point and Lincoln Park Beach, but rarely encountered elsewhere in the Salish Sea. In the Strait of Juan de Fuca it has been collected in Neah and Clallam bays, off Port Renfrew, Tongue Point, Sooke, Esquimalt, and Victoria, east of Port Angeles near the mouth of Morse Creek, and in Sequim and Discovery bays; and in the Strait of Georgia it has been found off Nanaimo, in Departure Bay, south of Cherry Point, and off New Westminster, Burrard Inlet, Popham Island, and Comox. (Jordan and Starks, 1895; Starks, 1896, 1905, 1911; Bean and Weed, 1920; Shelford et al., 1935; Clemens and Wilby, 1946; Batts, 1961; Miller and Borton, 1980; Cross, 1981; Love, 2011)

Gobiidae

Clevelandia ios (Jordan and Gilbert, 1882b)

Extending from Rivers Inlet, British Columbia, to southern Baja California at San Bartolome Bay and the Gulf of California, the arrow goby is found in estuaries, lagoons, and tidal sloughs, usually at depths less than 10 m, but recorded to a depth of 45 m. It was first collected in June 1880 from Saanich Arm by Jordan and Gilbert, who retrieved a single specimen from

Clingfishes

Northern clingfish

the stomach of a whitespotted greenling. Since then it has been recorded from numerous but widely scattered localities throughout most of the Salish Sea—off Port Renfrew, Maple Grove, and Victoria in the Strait of Juan de Fuca; off San Juan, Shaw, and Blakely islands in the San Juan Archipelago and in Chuckanut Bay near Bellingham; in the Strait of Georgia, from Saanich Arm, Pender Harbour, Departure and Boundary bays, New Westminster, Whytecliff Park, Taylor Bay on Gabriola Island, and Comox Harbour; in Puget Sound, off Fidalgo Island in Skagit Bay, Holmes Harbor on Whidbey Island, off Everett, Port Madison, Elliott Bay, Eld Inlet, and Oyster Bay at the extreme southern end of Totten Inlet; and in Anderson Cove and Bywater and Quilcene bays in Hood Canal. (Jordan and Starks, 1895; Gilbert, 1904; Kincaid, 1919; Shelford et al., 1935; Schultz and DeLacy, 1936b; Carter, 1965; Miller and Borton, 1980; Love, 2011)

Lepidogobius lepidus (Girard, 1858b)

Bay goby

The bay goby ranges from southeastern Alaska at Kegan Cove to central Baja California at Cedros Island and Sebastian Vizcaino Bay. It inhabits the intertidal zone to a depth of 305 m. The species is abundant throughout most of the San Juan Archipelago (especially in East and West sounds off Orcas Island), in Bellingham and Padilla bays, and throughout Puget Sound from Skagit Bay and off Port Townsend to Eld Inlet, including Hood Canal, from Dabob Bay to the mouth of The Great Bend. It is common as well in the Strait of Georgia, extending at least as far north as Comox, but less well known in the Strait of Juan de Fuca where known localities are limited to Esquimalt and Victoria. (Jordan and Gilbert, 1881c, 1881d; Jordan and Starks, 1895; Kincaid, 1919; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946; DeLacy et al., 1972; Miller and Borton, 1980; Love, 2011)

Rhinogobiops nicholsii

(Bean, 1882b) (Fig. 9D)

Blackeye goby

Ranging from southeastern Alaska near Sitka to central Baja California at least as far south as Punta Rompiente (as well as Guadalupe and Cedros islands), the blackeye goby is found in the intertidal zone to a depth of more than 640 m. It was originally described in 1882 from a single specimen collected in Departure Bay. Since then it has been recorded from off Port Renfrew, Port Angeles, Sooke, Saxe Point, and Victoria in the Strait of Juan de Fuca; from San Juan, Orcas, and Brown islands in the San Juan Archipelago; and from scattered localities in Puget Sound, including off Edmonds, Golden Gardens to Meadow Point, off Port Madison and Port Orchard, off the mouth of the Duwamish River, and in Case Inlet. In Hood Canal it has been collected in Dabob Bay, off Seal Rock, Holly, and at the mouth of The Great Bend. This

goby is apparently more common in the southern Strait of Georgia, and numerous specimens have been taken in Departure, English, and Horseshoe bays, in Pender Harbour, in Burrard Inlet and Howe Sound, off Popham Island, and farther north to Jervis Inlet. This species was earlier known as *Coryphopterus nicholsi*. (Kincaid, 1919; Wismer and Swanson, 1935; Clemens and Wilby, 1946; Barraclough²⁸; Miller and Borton, 1980; Cole, 1984; Csepp and Wing, 2000; Love et al., 2005; Love, 2011)

Sphyraenidae

Sphyraena argentea

Girard, 1854c

Ranging from Kodiak Island and the Gulf of Alaska to Cape San Lucas, southern Baja California, the southwestern Gulf of California, and the Revillagigedo Islands, the Pacific barracuda is a nearshore, epipelagic, schooling species, found near the surface to a depth of 38 m. Although considered rare north of Point Conception, California, individuals are occasionally taken off the Washington coast and some venture into the Salish Sea. The earliest known occurrence in our waters was reported in 1878 by Franz Steindachner on the basis of a specimen collected in Gig Harbor in central Puget Sound. A second individual was captured in 1904 in a fish trap at Otter Point near Sooke in the Strait of Juan de Fuca, and additional material has since been taken in San Juan Channel, off West Beach at the northwestern tip of Whidbey Island, and off Port Madison. (Steindachner, 1878; Starks, 1896; Kincaid, 1919; Cowan, 1938; Van Cleve and Thompson, 1938; Miller and Borton, 1980; Love et al., 2005; Love, 2011)

Trichiuridae

Benthodesmus pacificus

Parin and Becker, 1970

The North Pacific frostfish has been collected from the Kyushu-Palau Ridge and Ryukyu Islands, Japan, and from the Strait of Juan de Fuca to central California at Monterey Bay. It is a benthopelagic species that extends to a depth of at least 380 m but sometimes migrates to the surface; juveniles are mesopelagic. Extremely rare in the Salish Sea, the only two known records are a specimen captured in May 1916 off Bentinck Island near Victoria (reported by Gilbert as *Benthodesmus atlanticus*) and another in March 1949 from Skunk Bay near Point No Point in central Puget Sound (reported by Peden and Hughes as *Benthodesmus tenuis* and confused by others with *Benthodesmus simonyi*). (Gilbert, 1917; Clemens and Nowell, 1963; Anderson and Cailliet, 1975; Peden, 1980; Peden and Hughes, 1986; Nakamura and Parin, 1993; Miller and Borton, 1980; McAllister, 1990; Love et al., 2005)

Barracudas

Pacific barracuda

Cutlassfishes

North Pacific frostfish

Scombridae

***Sarda chiliensis* (Cuvier, 1832)**

The Pacific bonito has an antitropical distribution, with a northern population ranging from the northeastern Gulf of Alaska to southern Baja California off Cape San Lucas and the Revillagigedo Islands and a southern population extending from Máncora, Peru, to Talcahuano, Chile. A nearshore schooling species, it is found at the surface to depths as great as 110 m. Although considered rare north of California, it is relatively common off the west coast of Vancouver Island and Washington State but seldom seen in the restricted waters of the Salish Sea. A number of occurrences in central Puget Sound, off Richmond Beach, in Rolling Bay (Bainbridge Island), and near Seattle, were reported in the *Fisherman's News* in 1963, with titles "Unusual catch" and "Sound gillnets take bonito." Additional localities in the Salish Sea include Sooke and Victoria in the Strait of Juan de Fuca, off Yellow Point in the southern Strait of Georgia, and Kingston and Elliott Bay in Puget Sound. (Kincaid, 1919; Quast, 1964; Manzer, 1965; Patten et al., 1965; Miller and Borton, 1980; Collette and Nauen, 1983; Love et al., 2005; Love 2011)

Scomber japonicus

Houttuyn, 1782

The Pacific chub mackerel is widely distributed throughout temperate and tropical seas around the world. In the eastern Pacific it ranges from the Gulf of Alaska to the Gulf of California and from Panama to Chile, including the Galapagos Islands. It is apparently absent in the intervening waters between southern Mexico and northern Panama. A coastal pelagic species, it forms large schools, primarily over the continental slope, and in surf zones as well, from the surface to a depth of about 300 m, reaching greatest depths during the day. It is common off the outer coasts of Vancouver Island and Washington State but extremely rare in the Salish Sea. Known localities include Point No Point in the Strait of Juan de Fuca, Nanaimo Harbour in the southern Strait of Georgia, and off Everett, Edmonds, and Maury Island in Puget Sound. (Kincaid, 1919; Fowler, 1923; Hubbs and Schultz, 1929; Miller and Borton, 1980; Collette and Nauen, 1983; Eschmeyer and Herald, 1983; Love et al., 2005; Love, 2011)

Stromateidae

Peprilus simillimus

(Ayes, 1860b)

Ranging from Queen Charlotte Sound, British Columbia, to southern Baja California at Magdalena Bay and the Gulf of California, the Pacific pompano is a pelagic, schooling species found in surf zones and common over

Mackerels

Pacific bonito

Pacific chub mackerel

Butterfishes

Pacific pompano

sandy bottoms along exposed coasts, to a depth of about 90 m (but reported to 311 m). Rather common off the coast of Vancouver Island, but rare in the Salish Sea, it is known from off Sooke and Victoria in the Strait of Juan de Fuca; in East Sound off Orcas Island in the San Juan Archipelago; in Bellingham Bay; in the southern Strait of Georgia off the mouth of the Fraser River, in Pender Harbour, and off Denman Island; and in Puget Sound in the Whidbey Basin, off La Conner, at Lagoon Point, in Port Ludlow, Port Madison, Golden Gardens, off Myrtle Edwards Park, Port Orchard, Fletcher Bay, Tacoma, and in Dabob Bay. (Jordan and Gilbert, 1881c, 1881d; Starks, 1896; Kermode, 1909; Kincaid, 1919; Roedel, 1953; Batts, 1960; Clemens and Wilby, 1961; High, 1966; Miller and Borton, 1980; Love, 2011; Essington et al., 2013).

PLEURONECTIFORMES

Paralichthyidae

Citharichthys sordidus (Girard, 1854b)

The Pacific sanddab is common in shallow waters along the west coast of North America, extending from the western Gulf of Alaska to southern Baja California at Cape San Lucas. Typically collected off muddy and sandy bottoms at depths of 10–150 m and occasionally as deep as 549 m, it is exceedingly abundant everywhere throughout the Salish Sea. (Jordan and Gilbert, 1881c, 1881d; Jordan, 1884; Tanner, 1894; Gilbert, 1896c; Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Kincaid, 1919; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Citharichthys stigmaeus Jordan and Gilbert, 1882a

Nearly sympatric with its close relative, the Pacific sanddab (described previously), the speckled sanddab ranges from the northern Gulf of Alaska in Prince William Sound to southern Baja California at Magdalena Bay and in Concepcion Bay in the Gulf of California (and perhaps also to Ecuador and Peru). It is usually found on soft bottoms at depths less than 60 m, and rarely recorded as deep as 366 m. In the Salish Sea, it is very abundant everywhere in appropriate habitat. (Evermann and Goldsborough, 1907; Starks and Morris, 1907; Starks, 1911; Kincaid, 1919; Bean and Weed, 1920; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Pleuronectidae

Atheresthes stomias (Jordan and Gilbert, 1880l)

The arrowtooth flounder is abundant and commercially fished in the Bering Sea, off the Aleutian Islands, off Ka-

FLATFISHES

Sand flounders

Pacific sanddab

Speckled sanddab

Righteye flounders

Arrowtooth flounder

mchatka, and in the Gulf of Alaska. Although not as common farther south, it ranges to Southern California off Santa Barbara where it inhabits soft bottoms at depths of 9–1145 m and more often between 100 and 500 m. It is found throughout the Salish Sea. (Tanner, 1890, 1894; Rathbun, 1894; Gilbert, 1896c; Schmitt et al., 1915; Fowler, 1923; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Eopsetta jordani (Lockington, 1879a)

Known from scattered records in the eastern Aleutian Islands and western Gulf of Alaska, the petrale sole is more commonly found in the eastern Gulf of Alaska at Yakutat Bay, through Southeast Alaska, to the Coronado Islands of northern Baja California. It occurs from the surface to a depth of 550 m. In the Salish Sea, it has been recorded throughout the area, in both straits to southern Puget Sound (including Hood Canal), although it is uncommon in the San Juan Archipelago. (Jordan and Gilbert, 1881c, 1881d; Jordan, 1884; Rathbun, 1894; Evermann and Goldsborough, 1907; Schmitt et al., 1915; Johnston, 1917; Kincaid, 1919; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Glyptocephalus zachirus Lockington, 1879c

The rex sole is widespread across the North Pacific, extending from the northern Bering Sea and Aleutians to the northern Kuril Islands in the west, and to central Baja California in the east. It occurs at the surface to a maximum known depth of 1145 m, but is more often found between 100 and 500 m. It is exceedingly abundant throughout the Salish Sea. (Tanner, 1890, 1894; Rathbun, 1894; Gilbert, 1896c; Starks, 1911; Schmitt et al., 1915; Kincaid, 1919; Schmidt, 1929; Clemens and Wilby, 1961; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Hippoglossoides elassodon Jordan and Gilbert, 1880k

Occurring throughout the Bering Sea and Aleutians to the northern Kuril Islands in the west, and to Monterey, California, in the east, the flathead sole is found near the surface to a maximum known depth of about 800 m, although it is considerably more common in moderately shallow waters. Like nearly all our local flatfishes, it is widespread and exceedingly abundant in the Salish Sea. (Jordan and Gilbert, 1881c, 1881d; Jordan, 1884, 1887; Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Starks, 1911; Kincaid, 1919; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Petrable sole

Rex sole

Flathead sole

Hippoglossus stenolepis
Schmidt, 1904

Pacific halibut

The Pacific halibut is the most important commercially harvested flatfish in the North Pacific Ocean and, arguably, in the world. It ranges from the northern Bering Sea, Aleutian Islands, and across the North Pacific to the seas of Okhotsk and Japan in the west, and to northern Baja California in the east, occupying depths of 5 to 2000 m. Abundant off the outer coasts of British Columbia, Washington, and Oregon, it is common as well throughout the Salish Sea, although most often taken in the Strait of Juan de Fuca and in northern and central Puget Sound. (Jordan and Gilbert, 1881c, 1881d; Hammond, 1887; Jordan, 1887; Collins, 1892; Kincaid, 1919; Fowler, 1923; Thompson and Freeman, 1930; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

***Parophrys vetulus* (Girard, 1854a) ×** **Forkline sole**
***Platichthys stellatus* (Pallas, 1787)**

Confirmed as an intergeneric hybrid between the English sole and the starry flounder, the forkline sole remains poorly understood geographically. Jordan and others proposed a range northward to Alaska, and Clemens and Wilby reported it from the west coast of Vancouver Island, but voucher specimens for these records no longer exist. Reports by Herald and Reed of specimens taken off Oregon and northern California have been validated, but over the past century the Salish Sea is the only region where the forkline sole has been consistently collected. Known localities in the Salish Sea include Drayton Harbor near Blaine, Point Roberts, Padilla Bay near Anacortes, Oak Harbor, Saratoga Passage near Coupeville, Possession Bay, Port Orchard, and Carr Inlet. (Jordan and Gilbert, 1880k, 1881c, 1881d; Jordan, 1884; Kincaid, 1919; Villadolid, 1927; Jordan et al., 1930; Schultz and Smith, 1936; Herald, 1941; Clemens and Wilby, 1961; Reed, 1964; Garrett et al., 2007)

Isopsetta isolepis **Butter sole**
(Lockington, 1880a)

Ranging from the southeastern Bering Sea and the central Aleutians at Amchitka Island to Southern California at Ventura, the butter sole is found on soft, muddy, or silty bottoms at depths of 2–425 m, but it is more commonly seen at depths between 18 and 100 m. In the Salish Sea, it is common everywhere in appropriate habitat, except in the Strait of Juan de Fuca where it is known from only a few scattered records in Neah and Discovery bays. (Jordan and Gilbert, 1881c, 1881d; Jordan, 1884; Tanner, 1890; Rathbun, 1894; Evermann and Goldsborough, 1907; Starks, 1911; Clemens and Wilby, 1961; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Lepidopsetta bilineata
(Ayres, 1855a) (Fig. 10A)

Rock sole

The rock sole has been recorded from the Pribilof Islands in the Bering Sea, the western Aleutian Islands near Buldir Island, the Gulf of Alaska, and British Columbia to southern California at Tanner Bank. It is usually found on sandy bottoms at depths of 13–339 m. The species is widespread and exceedingly abundant in appropriate habitat throughout the Salish Sea. (Jordan and Gilbert, 1881c, 1881d; Jordan, 1884, 1887; Rathbun, 1894; Jordan and Starks, 1895; Starks, 1896, 1911; Evermann and Goldsborough, 1907; Kincaid, 1919; Miller and Borton, 1980; Kramer et al., 1995; Orr and Matarese, 2000; Love et al., 2005; Love, 2011; Maslenikov et al., 2013)

Lepidopsetta polyxystra **Northern rockfish**
Orr and Matarese, 2000

Recently described and distinguished from its congener, the rock sole (described previously), the northern rockfish is abundant throughout the eastern North Pacific from the Bering Sea (where it is the target of significant commercial fisheries) to the Sea of Okhotsk, the Kuril Islands, and northern Hokkaido, and from the Aleutian Islands and Gulf of Alaska to its southernmost extent in Puget Sound. This flatfish is present in Hecate Strait off the coast of British Columbia but so far has not been taken along the outer coast of Vancouver Island. On sandy bottoms at depths of 3–517 m, it is abundant everywhere throughout the Salish Sea. (Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Limanda aspera **Yellowfin sole**
(Pallas, 1814)

The yellowfin sole ranges from the Beaufort Sea off Point Barrow, and possibly farther east, to the Okhotsk Sea and Sea of Japan off Korea in the west, and to Atka Island in the Aleutians, from the Gulf of Alaska to British Columbia at Barkley Sound, and the Salish Sea in the east. It is said to be found on soft bottoms at depths of 5–600 m, but this lower limit, now well-fixed in the scientific literature, is probably in error as the yellowfin sole is generally a shallow-water flatfish, especially during the summer months, and is very rarely (if ever) taken below a depth of 250 m. In the Salish Sea it is represented by only two known specimens collected on 20 June 1963 in East Sound, Orcas Island, in the San Juan Archipelago and trawled at a depth of 20–37 m. Henry Fowler recorded this species from “the fish markets and about the wharves of Seattle,” but Schultz and DeLacy thought these specimens were “probably taken by commercial fisherman in Alaska.” (Hubbs, 1915; Fowler, 1923; Schultz and DeLacy, 1936a; Clemens and Wilby, 1961; Wilimovsky, 1964;

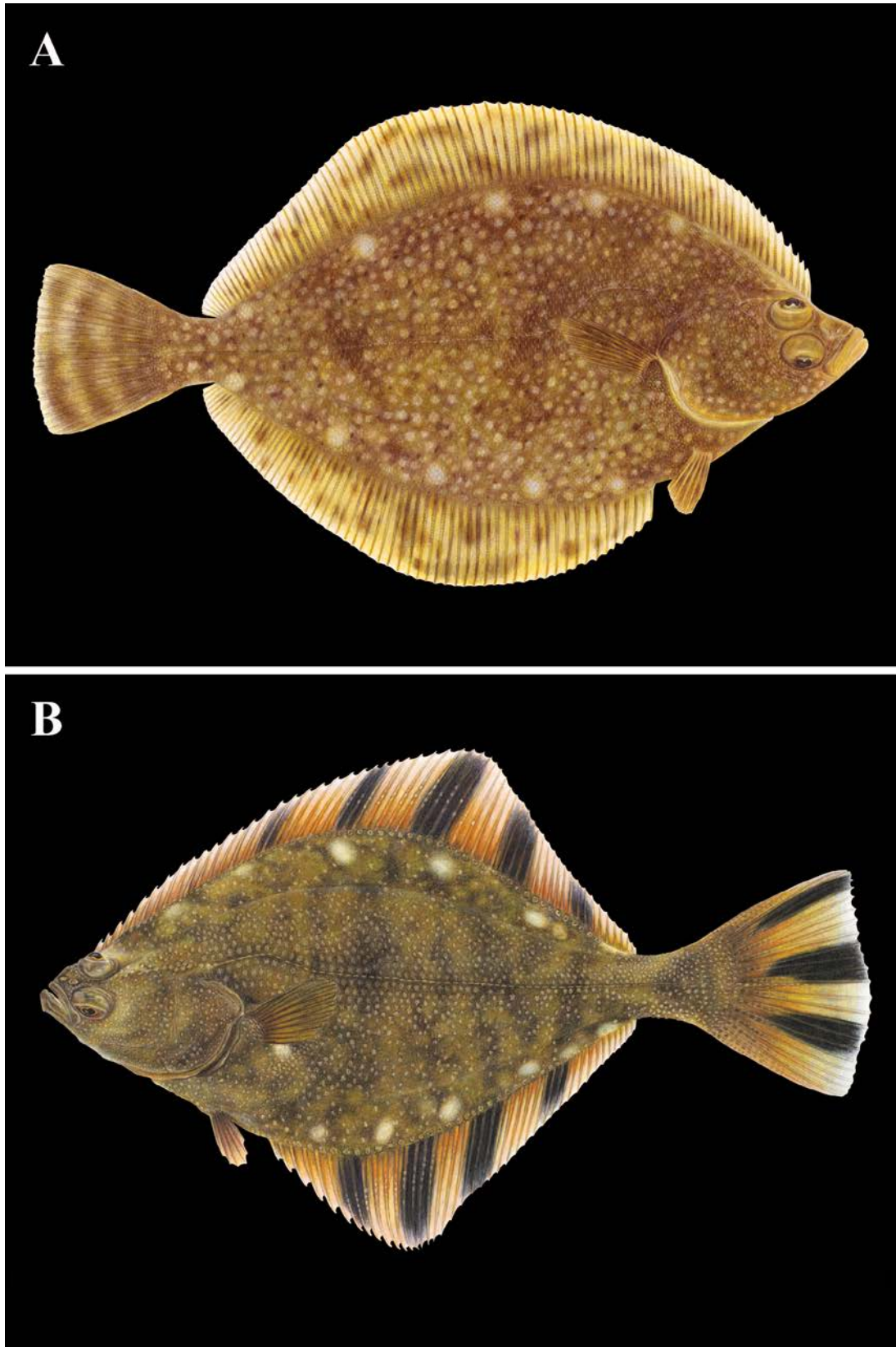


Figure 10

Fishes of the Salish Sea: (A) rock sole (*Lepidopsetta bilineata*) and (B) starry flounder (*Platichthys stellatus*). © Joseph R. Tomelleri.

Allen and Smith, 1988; Kramer et al., 1995; Barber et al., 1997; Love et al., 2005; Love, 2011)

Lyopsetta exilis
(Jordan and Gilbert, 1880g)

Slender sole

Ranging from the eastern Bering Sea, the western Gulf of Alaska, and Unalaska Island to southern Baja California, the slender sole is widespread and extremely abundant almost everywhere in the Salish Sea at depths of 9–1145 m, but it is most commonly found at depths between 40 and 110 m. (Jordan and Gilbert, 1881c, 1881d; Jordan, 1884; Rathbun, 1894; Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Starks, 1911; Gilbert, 1915; Kincaid, 1919; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011; Maslenikov et al., 2013)

Microstomus pacificus
(Lockington, 1879b)

Dover sole

An abundant, deep-dwelling, commercially important species common on the outer continental shelf and upper slope waters of the northern Bering Sea and Aleutian Islands that extends south to southern Baja California at Punta San Juanico, the Dover sole has been captured on muddy bottoms at depths of 2–1400 m. It is widespread and abundant throughout the Salish Sea. (Jordan and Gilbert, 1881c, 1881d; Jordan, 1884; Rathbun, 1894; Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Starks, 1911; Kincaid, 1919; Schultz, 1930; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Parophrys vetulus
Girard, 1854a

English sole

One of the most common flatfishes in the Salish Sea and found in great abundance almost everywhere in appropriate habitat, the English sole ranges from the northern Bering Sea and western Aleutian Islands to central Baja California at San Cristobal Bay. It is usually found in the intertidal and shallow subtidal zones, but it has been reported to a maximum known depth of 550 m. (Jordan and Gilbert, 1881c, 1881d; Jordan, 1887; Tanner, 1890, 1894; Rathbun, 1894; Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Starks, 1911; Kincaid, 1919; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Platichthys stellatus
(Pallas, 1787) (Fig. 10B)

Starry flounder

The starry flounder is common and widespread throughout the North Pacific, ranging from the Chukchi and Beaufort seas in the Canadian Arctic, south through the Bering Sea and Aleutian Islands, to the seas of Okhotsk and Japan in the west, and to Southern Cali-

fornia off Los Angeles in the east. Although usually found in the intertidal zone, and often venturing into brackish- and freshwaters, it has been collected as deep as 600 m. It is common in shallow waters and estuaries throughout the Salish Sea, and often taken as juveniles in freshwater. (Suckley, 1860; Hallock, 1877; Jordan and Gilbert, 1881c, 1881d; Jordan, 1887; Tanner, 1890; Rathbun, 1894; Jordan and Starks, 1895; Starks, 1896, 1911; Evermann and Goldsborough, 1907; Kincaid, 1919; Fowler, 1923; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011; Orr, in press)

Pleuronichthys coenosus
Girard, 1854a

C-O sole

Ranging from southeastern Alaska at Sitka to southern Baja California at Punta Abreojos, on soft bottoms near the surface to a depth of 350 m (but usually in less than 20 m), the C-O sole is common in the San Juan Islands, the Strait of Georgia, and throughout Puget Sound (especially in the central and southern parts of the Sound), but apparently it is much less abundant in the Strait of Juan de Fuca where known localities include Port Angeles and Sequim and Discovery bays. (Jordan and Gilbert, 1881c, 1881d; Jordan, 1884, 1887; Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Starks, 1911; Starks and Thompson, 1911; Kincaid, 1919; Fowler, 1923; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Pleuronichthys decurrens
Jordan and Gilbert, 1881c

Curlfin sole

Ranging from the Aleutians off the northwest coast of Unimak Island, through the Gulf of Alaska, to southern Baja California at Punta San Juanico, the curlfin sole—in rather stark contrast to other flatfishes of our region, which are all widespread and extremely abundant in the Salish Sea—is rarely seen in our waters. Records are limited to Port Angeles in the eastern Strait of Juan de Fuca and off Edmonds, Meadow Point, Point Defiance, and Case Inlet in Puget Sound. It is usually found in estuaries and other protected waters along the open coast, on soft bottoms and along rock-sand interfaces, from the intertidal zone to a maximum recorded depth of 349 m. (Starks and Thompson, 1911; Walford, 1931; Schultz and DeLacy, 1936b; Clemens and Wilby, 1961; Miller and Lea, 1972; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Psettichthys melanostictus
Girard, 1854a

Sand sole

The sand sole ranges from the southeastern Bering Sea and eastern Aleutian Islands to Southern California at

La Jolla. Widespread and extremely abundant throughout the Salish Sea, it is found on sandy bottoms in the intertidal zone to a depth of 325 m. (Jordan and Gilbert, 1881c, 1881d; Rathbun, 1894; Jordan and Starks, 1895; Evermann and Goldsborough, 1907; Starks, 1911; Kincaid, 1919; Fowler, 1923; Miller and Borton, 1980; Kramer et al., 1995; Love et al., 2005; Love, 2011)

Cynoglossidae

Tonguefishes

Symphurus atricaudus

California tonguefish

(Jordan and Gilbert, 1880a)

Although common off Southern California and extending south to Panama, the California tonguefish is rare north of Point Conception, with scattered records in shallow coastal waters. The northern extent of its range is the Salish Sea, where it is known from a single specimen collected in Samish Bay, south of Bellingham. It is found on sand and mud bottoms at depths of 2–55 m. (Dinnel and Rogers, 1986; Kramer et al., 1995; Love et al., 2005; Love, 2011)

TETRAODONTIFORMES

PLECTOGNATHS

Molidae

Molas

Mola mola (Linnaeus, 1758)

Ocean sunfish

The ocean sunfish has a circumglobal distribution in temperate and tropical waters. In the Pacific it ranges from the Gulf of Alaska to the southern Kuril Islands and Japan in the west, and to Las Cruces, central Chile, in the east, including the Gulf of California and the Galapagos Islands. A pelagic species, it is found on the surface to a depth of 644 m; the deepest known occurrence off eastern North Pacific coasts is 392 m. It is often observed along the coasts of British Columbia, Washington, and Oregon, but it very rarely ventures into the restricted waters of the Salish Sea. The few known records in the Salish Sea include at Cape Flattery and in Neah Bay at the mouth of the Strait of Juan de Fuca, in San Juan Harbor and at Quathiaski Cove at the northern end of the Strait of Georgia, and in Puget Sound off Duwamish Head and at Blakely Rock on the east side of Bainbridge Island. (Kincaid, 1919; Hubbs and Schultz, 1929; Schultz and DeLacy, 1936c; Clemens and Wilby, 1961; Grove and Lavenberg, 1997; Cartamil and Lowe, 2004; Love et al., 2005; Yoshita et al., 2009; Love, 2011)

Comments

While 37 species (plus the forkline sole) appear on the checklist of Salish Sea fishes for the first time (see Table 1), the following five species have been removed:

***Raja stellulata* Jordan and Gilbert, 1880c (starry skate):** This species ranges from off Eugene, Oregon, to central Baja California at Cedros Island and Sebastian Vizcaino Bay and is found on soft bottoms at depths of 2–732 m. There is no credible evidence that this species occurs in the Salish Sea. Material reported by Gilbert in 1896 from collections made by the *Albatross* off Cape Flattery and in the Strait of Juan de Fuca was reidentified by Evermann and Goldsborough as *Raja binoculata*. A specimen identified as *Raja stellulata*, collected in 1906 from Upright Channel in the San Juan Islands, was originally archived in the University of Washington Burke Museum Fish Collection, but it has long since disappeared. Most vouchered records from Alaska are misidentified specimens of the Alaska skate, *Bathyraja parmifera* (Bean, 1881b), and no vouchers are available to support records from the Queen Charlotte Islands, which are most likely misidentifications as well. Illustrations published by Hart, and probably those by Clemens and Wilby, are based on Alaskan examples of *Bathyraja parmifera*. (Gilbert, 1896c; Starks, 1911; Kincaid, 1919; Schultz and DeLacy, 1935; Clemens and Wilby, 1946, 1961; Hart, 1973; Ebert, 2003; Love et al., 2005; Orr et al., 2011)

***Artedius corallinus* (Hubbs, 1926a) (coralline sculpin):** All the recent literature indicates that this species ranges from Washington State to central Baja California at San Martin Island, but the sole Washington record, from off Orcas Island in the San Juan Archipelago (collected by dredge in summer 1963), is based on a misidentified specimen of *A. harringtoni*. In addition to the lack of valid Washington records, the coralline sculpin is unknown off coastal Oregon. The northernmost limit of this species is probably Arena Cove on the Mendocino Coast, north of San Francisco. (Miller and Lea, 1972; Eschmeyer and Herald, 1983; Ragland and Fischer, 1987; Gilbert and Williams, 2002; Love, 2011)

***Lycodes diapterus* Gilbert, 1892 (black eelpout):** This species ranges from off the outer coast of Vancouver Island to Southern California as far south as San Diego at depths of 146–844 m. There is no evidence that it occurs in our waters. Former inclusion in the Salish Sea ichthyofauna was based solely on Gilbert's type series of six specimens, one of which was collected in Puget Sound, but subsequently reidentified by Stevenson and Sheiko as *Lycodes beringi* Andriashev, 1935. (Jordan and Evermann, 1896, 1898b; Bayliff, 1959; Miller and Lea, 1972; Stevenson and Sheiko, 2009)

***Liparis beringianus* (Gilbert and Burke, 1912) (Bering snailfish):** This species was originally described as *Cyclogaster beringianus* and referenced in earlier Puget Sound checklists as *Polypera beringianus*, based in part on a specimen collected at Port Townsend. Since that time, several authors, beginning with Charles Burke in 1930, have suggested that it represents the juveniles of

Liparis greeni. Agreeing with this opinion, we hereby remove the name *Liparis beringianus* from the Salish Sea ichthyofauna. (Burke, 1930; DeLacy et al., 1972; Miller and Borton, 1980; Mecklenburg et al., 2002; Chernova et al., 2004; Love et al., 2005)

***Hyperprosopon argenteum* Gibbons, 1854a (walleye surfperch):** All the recent literature indicates that this species ranges from Vancouver Island to central Baja California at Punta San Rosarito, but the Vancouver Island record (four specimens collected in Esquimalt Harbour, well inside the Strait of Juan de Fuca)—which, if valid, would constitute the only known occurrence of this species north of Willapa Bay, Washington—is erroneous. Schultz and DeLacy (followed by Clemens and Wilby) cited Günther as the source for the Esquimalt record, but Günther (1862:248) referred these four specimens (“i-l. Adult: skins. Esquimalt Harbour, Vancouver Islands”) not to *Hyperprosopon argenteum* but to *Ditrema aggregatum*, a synonym of *Cymatogaster aggregata*. On this evidence, *Hyperprosopon argenteum* is hereby removed from the Salish Sea ichthyofauna. (Günther, 1862; Schultz and DeLacy, 1936b; Clemens and Wilby, 1946, 1961; Peden, 1966b; Miller and Lea, 1972; Eschmeyer and Herald, 1983; Peden and Hughes, 1986; Love, 2011)

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