May 1st, 8:30 AM - 10:00 AM

The Salish Sea Ecosystem in FishBase and SeaLifeBase

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2014 Salish Sea Ecosystem Conference

April 30 - May 2, 2014
Washington State Convention & Trade Center
Seattle, Washington

Marine Birds and Mammals of the Salish Sea: Identifying Patterns and Causes of Change

The Salish Sea in FishBase and SeaLifeBase

MLD Palomares and N Bailly

1 May 2014

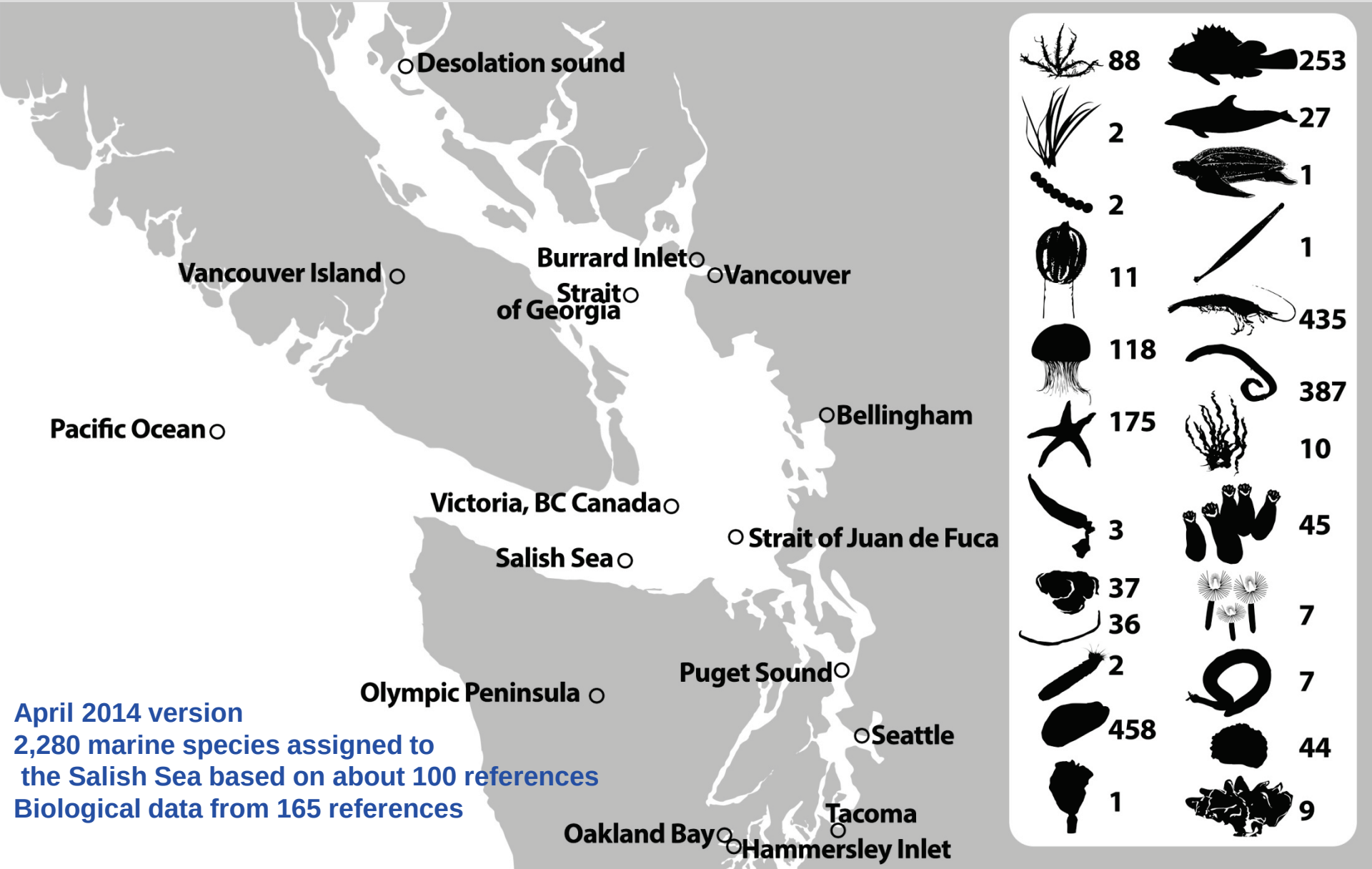
www.sealifebase.ca

www.fishbase.ca

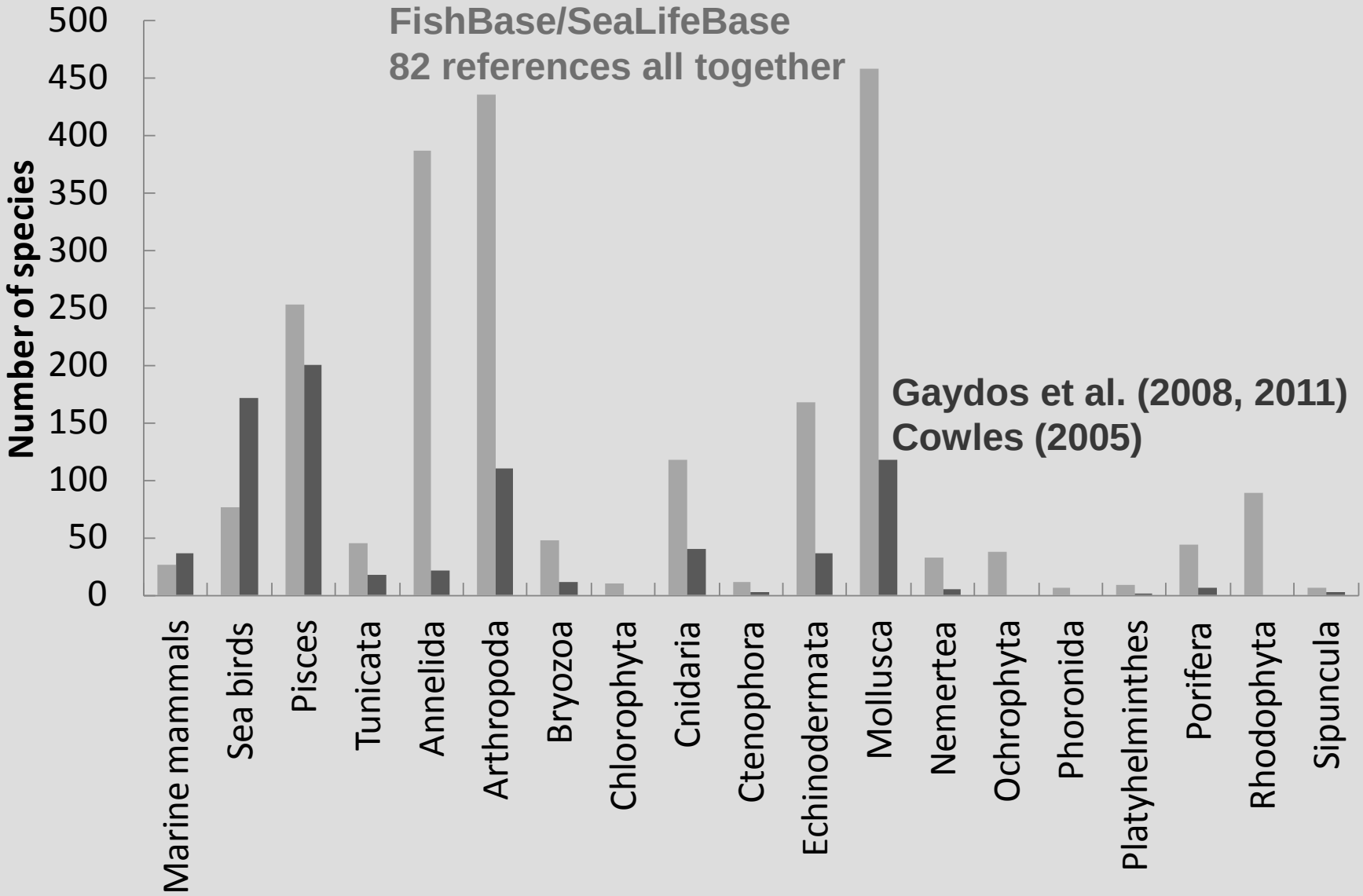
Objectives of the study

- Document the marine biodiversity of the Salish Sea and its sub-ecosystems in FishBase and SeaLifeBase;
- Complete this documentation at least for vertebrates.

The Salish Sea in FishBase and SeaLifeBase



Compared with previous studies

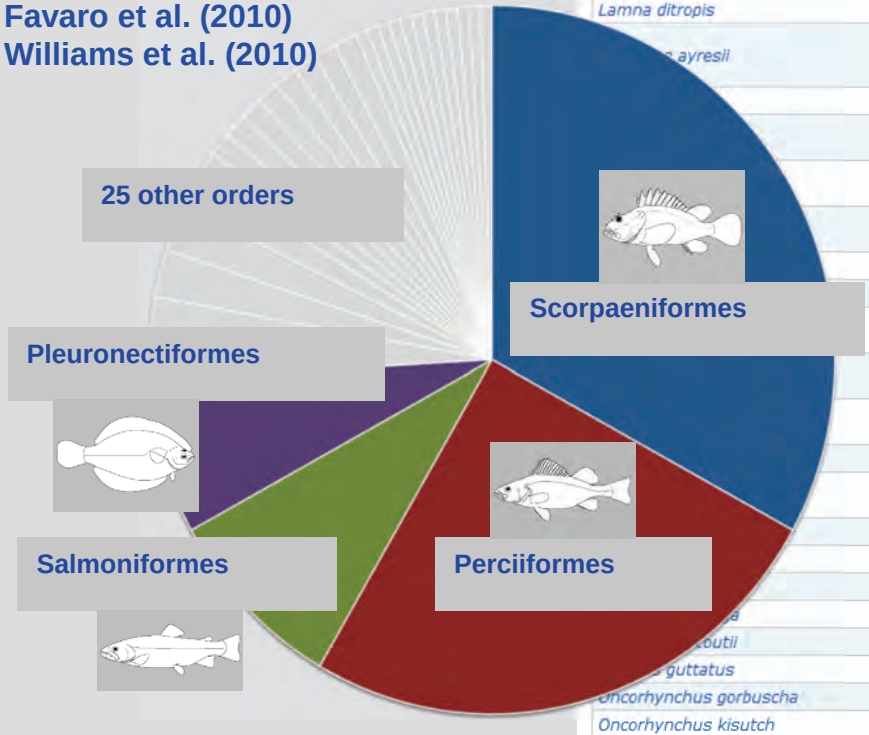


Ray Troll

Salish Sea fishes in FishBase (n=238)

Checked by Andy Lamb and Eric Taylor
Checked against Peden (2002)
Will be checked against Pietch and Orr

85% based on:
Hart (1973),
MacAllister (1990)
Clemens et al. (1961)
Favaro et al. (2010)
Williams et al. (2010)



Species in *Salish Sea*

Comments on faunal list: The list was assembled mainly from Hart (1973: Pacific fishes of Canada; Ref. 6885). Some additions were taken from McAllister (1990: A list of the fishes of Canada; Ref. 11980) and Favaro *et al.* (2010: Ref. 91783), and other primary literature. The coastal fishes were checked against Lamb & Edgell (2010: Coastal fishes of the Pacific Northwest; Ref. 94401).

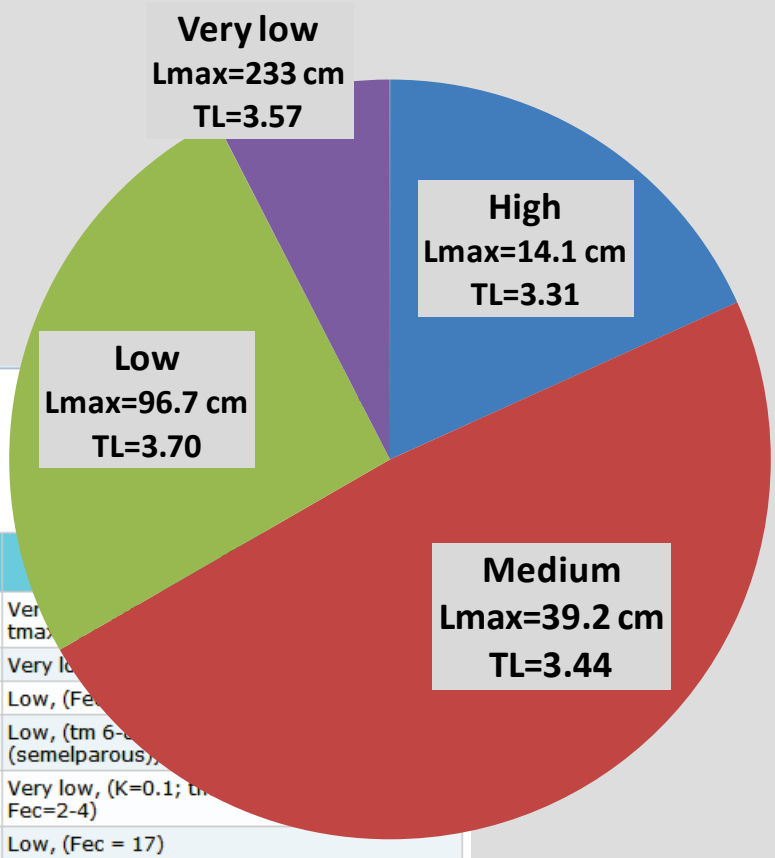
n= 238 (Complete)
See pictures

FishBase

Species	Name	Family	Habitat	Length (cm)	Trophic Level	Status
Notorynchus cepedianus	Broadnose sevengill shark	Hexanchidae	demersal	300.0 TL	4.6	native
Opostomias mitsuii	Pitgum lanternfish	Stomiidae	bathypelagic	43.9 TL	4.6	native
Alopias vulpinus	Thresher	Alopiidae	pelagic-oceanic	760.0 TL	4.5	native
Erilepis zonifer	Skilfish	Anoplopomatidae	bathydemersal	183.0 TL	4.5	native
Lamna ditropis	Salmon shark	Lamnidae	pelagic-oceanic	305.0 TL	4.5	native
ayresii	Western American river lamprey	Petromyzontidae	demersal	31.1 TL	4.5	native
	Striped bass	Moronidae	demersal	200.0 TL	4.5	introduced
	Pacific barracuda	Sphyraenidae	pelagic-neritic	160.9 TL	4.5	native
	California lizardfish	Synodontidae	reef-associated	64.0 TL	4.5	native
	Pacific electric ray	Torpedinidae	demersal	140.0 TL	4.5	native
	Pacific pomfret	Bramidae	pelagic-oceanic	61.0 TL	4.4	native
	Rainbow trout	Salmonidae	benthopelagic	120.0 TL	4.4	native
	Chinook salmon	Salmonidae	benthopelagic	150.0 TL	4.4	native
	Pelagic stingray	Dasyatidae	pelagic-oceanic	160.0 TL	4.4	native
	Atlantic salmon	Salmonidae	benthopelagic	150.0 TL	4.4	not established
	Black rockfish	Sebastidae	reef-associated	63.0 TL	4.4	native
	Yelloweye rockfish	Sebastidae	reef-associated	104.0 TL	4.4	native
	Skipjack tuna	Scombridae	pelagic-oceanic	122.1 TL	4.3	native
	Lingcod	Hexagrammidae	demersal	152.0 TL	4.3	native
	Rough pomfret	Bramidae	pelagic-oceanic	61.0 TL	4.3	native
	Albacore	Scombridae	pelagic-oceanic	155.4 TL	4.3	native
outii						
guttatus						
Oncorhynchus gorbuscha	Pink salmon	Salmonidae	demersal	70.0 TL	4.2	native
Oncorhynchus kisutch	Coho salmon	Salmonidae	demersal	107.9 TL	4.2	native

http://www.fishbase.ca/trophiceco/FishEcoList.php?ve_code=1067

Simple profiles



More info | Plus d'info. | Mais info

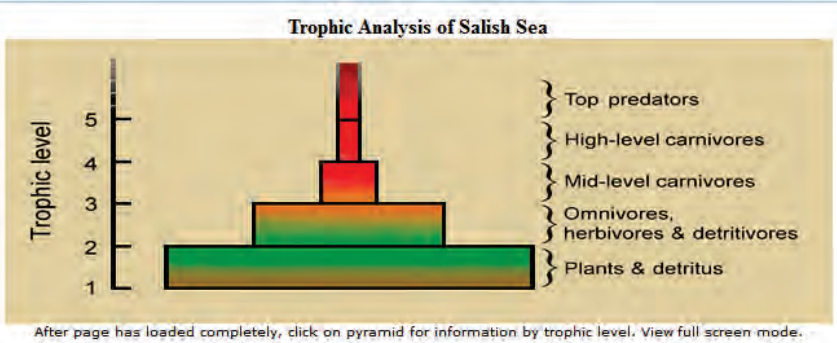
Resilience of Native Fishes in Salish Sea

Show all fishes of this ecosystem type [n=237] Complete = No

Family	Species	Author	Length (cm)	Trophic level	
Hexanchidae	*Notorynchus cepedianus*	(Péron, 1807)	300.00 TL	4.60	Ver… tmax…
Lamnidae	*Lamna ditropis*	Hubbs & Follett, 1947	305.00 TL	4.50	Very lo…
Petromyzontidae	*Lampetra ayresii*	(Günther, 1870)	31.10 TL	4.50	Low, (Fe…
Petromyzontidae	*Entosphenus tridentatus*	(Richardson, 1836)	76.00 TL	4.50	Low, (tm 6-… (semelparous)…
Alopiidae	*Alopias vulpinus*	(Bonnaterre, 1788)	760.00 TL	4.50	Very low, (K=0.1; t… Fec=2-4)
Torpedinidae	*Torpedo californica*	Ayres, 1855	140.00 TL	4.50	Low, (Fec = 17)
Sphyraenidae	*Sphyraena argentea*	Girard, 1854	145.00 FL	4.50	Medium, (K=0.14; tm=2-3; tmax=12; Fec=42,000)
Icosteidae	*Icosteus aenigmaticus*	Lockington, 1880	213.00 TL	4.50	Low, (K=0.13; Fec=293,000)
Sebastidae	*Sebastes ruberrimus*	(Cramer, 1895)	104.00 TL	4.43	Very low, (tm=12-15; tmax=118)
Salmonidae	*Oncorhynchus mykiss*	(Walbaum, 1792)	120.00 TL	4.42	Medium, (K=0.38-0.46; tm=2-5; tmax=11; Fec=200)
Salmonidae	*Oncorhynchus tshawytscha*	(Walbaum, 1792)	150.00 TL	4.40	Medium, (tm=4; tmax=9; Fec=4,000)
Sebastidae	*Sebastes melanops*	Girard, 1856	63.00 TL	4.38	Low, (tm=7.5; K=0.14; tmax=50)
Dasyatidae	*Pteroplatytrygon violacea*	(Bonaparte, 1832)	160.00 TL	4.36	Very low, (K=0.18 (captivity); Fec=1-9 (could probably have 2 litters per year))
Merlucciidae	*Merluccius productus*	(Ayres, 1855)	91.00 TL	4.35	Low, (tmax=17; tm=4; also Musick et al. 2000 (Ref. 36717))
Hexagrammidae	*Ophiodon elongatus*	Girard, 1854	152.00 TL	4.32	Low, (tm=4; tmax=25;)
Hexanchidae	*Hexanchus griseus*	(Bonnaterre, 1788)	482.00 TL	4.28	Low, (Fec= 22-108)
Somniosidae	*Somniosus pacificus*	Bigelow & Schroeder, 1944	440.00 TL	4.25	Low, (Fec=300; assuming tm<=10)
Trichiuridae	*Benthodesmus pacificus*	Parin & Becker, 1970	112.00 SL	4.25	Medium, (Preliminary K or Fecundity.)
Salmonidae	*Salvelinus malma*	(Walbaum, 1792)	127.00 TL	4.23	Low, (tm=3-5)
Salmonidae	*Oncorhynchus kisutch*	(Walbaum, 1792)	107.95 TL	4.22	Medium, (K=0.98(?); tm=2-4; Fec=1,400)

Trophic pyramid

- Trophic level estimates from diet composition and food items.
- Top predators: large species



After page has loaded completely, click on pyramid for information by trophic level. View full screen mode.

Trophic Level >= 5	
Number of fish species:	0
Trophic Level 4.50 - 4.99	
Number of fish species:	9
Length range:	31 - 760 cm TL
Geom. mean length (95% CI):	175.5 (91.1-338.1)
Mean Trophic Level (95% CI):	4.51 (4.49-4.53)
Trophic Level 4.00 - 4.49	
Number of fish species:	41
Length range:	14 - 482 cm TL
Geom. mean length (95% CI):	100.3 (78.5-128.1)
Mean Trophic Level (95% CI):	4.19 (4.15-4.24)
Trophic Level 3.50 - 3.99	

More info | Plus d'info | Mais info | <<Back

FishBase

Fish Species in Trophic Level 4.50 - 4.99

Mean Trophic Level (95% CI): 4.51
n=9

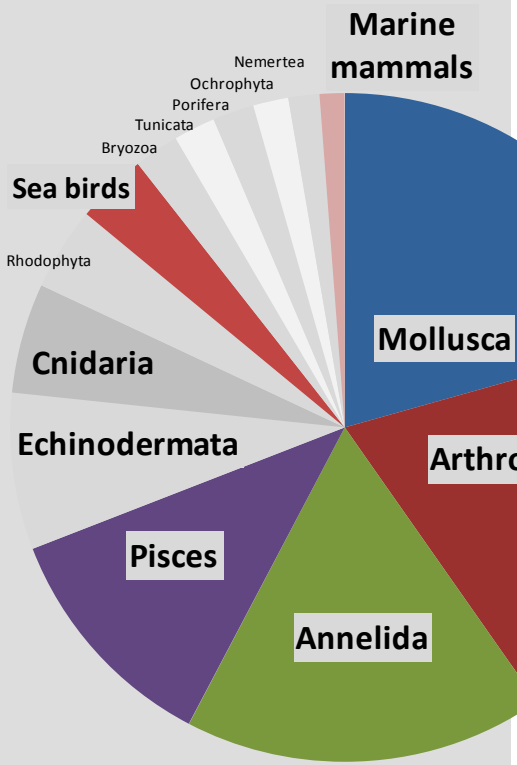
Species	Family	Habitat	Length (cm)	Trophic level
Alopias vulpinus	Alopiidae	pelagic-oceanic	760.0 TL	4.5
Lamna ditropis	Lamnidae	pelagic-oceanic	305.0 TL	4.5
Sphyraena argentea	Sphyraenidae	pelagic-neritic	160.9 TL	4.5
Notorynchus cepedianus	Hexanchidae	demersal	300.0 TL	4.6
Morone saxatilis	Moronidae	demersal	200.0 TL	4.5
Torpedo californica	Torpedinidae	demersal	140.0 TL	4.5
Entosphenus tridentatus	Petromyzontidae	demersal	76.0 TL	4.5
Lampetra ayresii	Petromyzontidae	demersal	31.1 TL	4.5
Icosteus aenigmaticus	Icosteidae	bathypelagic	213.0 TL	4.5

FishBase

Salish Sea marine species in SeaLifeBase

>90% based on :
Macdonald et al. (2010);Lamb et al. (2011); Pacific Northwest Shell Club (2014); Schoch and Diether (2001); Marliave et al. (2011); Lambert and Austrin (2007); Gaydos and Pearson (2011); Backe et al. (2011); Elahi (2012); and Lambert (2000).

Mike A. Yap, SeaLifeBase



SeaLifeBase More info Language: English

Species in *Salish Sea*

Note: The list below is incomplete. You can assess the extent of its coverage by examining the references we used to assign species to this ecosystem. Note, however, that there are too many species of invertebrates for SeaLifeBase to provide you with complete species lists. You may be able to help us more on this list by sending us Internet sources or published references that we have not yet used for this ecosystem. We will encode this material, and credit you for providing it

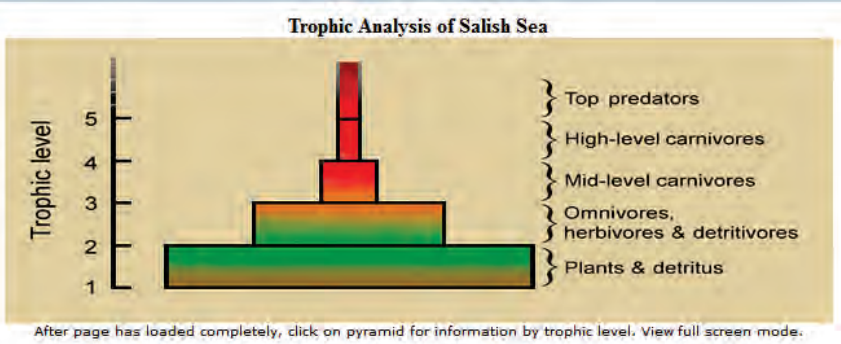
[n= 2027]
See pictures

Species	Name	Family	Habitat	Length (cm)	Trophic Level	Status
Haliaeetus leucocephalus	Bald eagle	Accipitridae	others	100 TL	4.8	native
Calidris mauri	Western sandpiper	Scolopacidae	others	18 TL	4.6	native
Orcinus orca	Killer whale	Delphinidae	pelagic	980 TL	4.6	native
rarius maccormicki	South polar skua	Stercorariidae	others	53 TL	4.6	native
ardius bairdii	Baird's beaked whale	Ziphiidae	pelagic	1,280 TL	4.5	native
inus ursinus	Northern fur seal	Otariidae	bathydemersal	210 TL	4.5	native
nus delphis	Common dolphin	Delphinidae	pelagic	260 TL	4.5	native
macrorhynchus	Short-finned pilot whale	Delphinidae	pelagic	610 TL	4.5	native
glaucescens	Glaucous-winged gull	Laridae	others	70 TL	4.5	native
schistisagus	Slaty-backed gull	Laridae	others	68 TL	4.5	native
arus thayeri	Thayer's gull	Laridae	others	52 TL	4.5	native
ergus serrator	Red-breasted merganser	Anatidae	others	51 TL	4.5	native
ecanus erythrorhynchos	American white pelican	Pelecanidae	others	178 TL	4.5	native
Phalacrocorax penicillatus	Brandt's cormorant	Phalacrocoracidae	others	89 TL	4.5	native
Phoca vitulina	Harbour seal	Phocidae	bathydemersal	190 TL	4.5	native
Phocoena phocoena	Harbour porpoise	Phocoenidae	pelagic	200 TL	4.5	native

Trophic pyramid

Trophic level estimates from diet composition and food items.

Top predators: seabirds and cetaceans



Trophic Level >= 5	
Number of marine species:	0
Trophic Level 4.50 - 4.99	
Number of marine species:	17
Length range:	18 - 1,280 cm TL
Geom. mean length (95% CI):	196.1 (111.1-345.9)
Mean Trophic Level (95% CI):	4.53 (4.50-4.56)
Trophic Level 4.00 - 4.49	
Number of marine species:	51
Length range:	1 - 1,890 cm TL
Geom. mean length (95% CI):	41.4 (28.4-60.4)
Mean Trophic Level (95% CI):	4.20 (4.16-4.25)
Trophic Level 3.50 - 3.99	
Number of marine species:	33
[illegible]ge:	0 - 2,700 cm TL
[illegible]an length (95% CI):	25.8 (14.2-47.0)
[illegible]hic Level (95% CI):	3.72 (3.66-3.77)

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Marine Species in Trophic Level 4.50 - 4.99

Mean Trophic Level (95% CI): 4.53
n=17

Species	Class	Order	Family	Habitat	Length (cm)	Trophic level
Zalophus californianus	Mammalia	Carnivora	Otariidae	bathydemersal	240.0 TL	4.5
Callorhinus ursinus	Mammalia	Carnivora	Otariidae	bathydemersal	210.0 TL	4.5
Phoca vitulina	Mammalia	Carnivora	Phocidae	bathydemersal	190.0 TL	4.5
Haliaeetus leucocephalus	Aves	Ciconiiformes	Accipitridae	others	100.0 TL	4.8
Stercorarius maccormicki	Aves	Charadriiformes	Stercorariidae	others	53.0 TL	4.6
Calidris mauri	Aves	Ciconiiformes	Scolopacidae	others	18.0 TL	4.6
Pelecanus erythrorhynchos	Aves	Ciconiiformes	Pelecanidae	others	178.0 TL	4.5
Mergus serrator	Aves	Anseriformes	Anatidae	others	51.2 TL	4.5
Larus thayeri	Aves	Ciconiiformes	Laridae	others	51.6 TL	4.5
Orcinus orca	Mammalia	Cetacea	Delphinidae	pelagic	980.0 TL	4.6
Berardius bairdii	Mammalia	Cetacea	Ziphiidae	pelagic	1,280.0 TL	4.5
Globicephala macrorhynchus	Mammalia	Cetacea	Delphinidae	pelagic	610.0 TL	4.5
Pseudorca crassidens	Mammalia	Cetacea	Delphinidae	pelagic	600.0 TL	4.5
Tursiops truncatus	Mammalia	Cetacea	Delphinidae	pelagic	380.0 TL	4.5
Delphinus delphis	Mammalia	Cetacea	Delphinidae	pelagic	260.0 TL	4.5
Phocoenoides dalli	Mammalia	Cetacea	Phocoenidae	pelagic	240.0 TL	4.5
Phocoena phocoena	Mammalia	Cetacea	Phocoenidae	pelagic	200.0 TL	4.5

SeaLifeBase Back to top

Also available for Puget Sound and Strait of Georgia

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- Ecopath 30 abstract submission OPEN
- Seeking applications for the spatial temporal data framework

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Balancing the Strait of Georgia model

sherman on Mon, 04/12/2010 - 18:48

Title	Balancing the Strait of Georgia model
Publication Type	Report
Year of Publication	1996
Authors	Venier, J
Series Editor	Pauly, D, Christensen V, Haggan N
Type	Report

Interactions between marine mammals and chinook salmon in a Strait of Georgia ecosystem model

Dave Preikshot, and I. Perry
Fisheries and Oceans Canada
Pacific Biological Station, Nanaimo BC

ean trophic level of predators changes in the Strait of Georgia simulation

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Northwest Fisheries Science Center

Research Highlights
from the Puget Sound Ecosystem

2009

The Puget Sound ecosystem ranges from snow-fed watersheds draining the Cascade and Olympic mountain ranges to the depths of Puget Sound marine waters through the Strait of Juan de Fuca to the Pacific Ocean. Home to the majority of the state of Washington's population, its health and beauty are integral to human health and well-being. The NWFSC, working with a variety of collaborators, provides key scientific information about the Puget Sound ecosystem and its health to support the Puget Sound Partnership and other management efforts.

Synthesizing 'what we know' about the Puget Sound ecosystem

NWFSC scientists collaborated with scientists from federal, state, tribal, local government, academic and non-profit entities to develop a comprehensive description of the Puget Sound climatic and physical processes, marine habitats, marine food webs and impacts of future ecosystem change. This collaboration identified indicators of degradation in Puget Sound such listed species, a disrupted food web, diminishing habitats, and persistent and toxic contaminants, and identified preventative strategies as one of the most ecologically sound and cost effective solutions for the future. While change is an inherent feature of any ecosystem, the projected changes in climate, population growth, and the complexity of the Puget Sound ecosystem all point to the need for an ecosystemwide view, integrating the human and natural systems of Puget Sound to improve our ability to choose cost-effective actions and predict long term results. Finally, connections between scientists and decision makers are considered to be crucial in achieving a broader perspective and sustainable strategy for the future of Puget Sound.

Conducting an Integrated Ecosystem Assessment (IEA)

An IEA is a quantitative analytical framework that provides support for ecosystem-scale management. It includes the following steps: identify indicators of ecosystem function, assess risk to those indicators individually and collectively, evaluate management strategies to address risks, assess performance through a monitoring and evaluation plan, and identify adaptation strategies as needed. A team of scientists is working towards the goal of completing the first iteration of an IEA for Puget Sound in 3 years. In the first year (2008), we developed several pieces of the IEA analytical framework:

- A marine food web trophic model (EcoPath with EcoSim) for Central Puget Sound that will be part of the core biophysical ecosystem model for the marine system,
- Preliminary analyses of which indicators best capture attributes of marine system condition (attributes such as resilience, trophic structure, food web stability, etc.),
- Two modules quantifying the effects of strategies on system indicators: (1) hydrology/land use scenario modeling exploring the effects of land use practices on fresh water yields and PCB loadings to the marine environment, and (2) models quantifying the effects of protection or restoration of nearshore eelgrass habitats on a suite of ecosystem services (see back page).

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service

NOAA Technical Memorandum NMFS-NWFSC-106

A Mass-balance Model for Evaluating Food Web Structure and Community-scale Indicators in the Central Basin of Puget Sound

May 2010

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

How about the Salish Sea?

Missing data in FishBase and SeaLifeBase

- 68% of fish species have biological data in FishBase;
- Only about 14% of non-fish metazoans, including some species with CR status in IUCN, have data in SeaLifeBase;
- groups not well covered are: Cnidaria, Annelida, Kamptozoa, Kinorhyncha, Nemertea, Platyhelminthes, Porifera and Sipuncula;
- Data gaps include diet composition studies in marine vertebrates (including fish), and maximum sizes and reproduction in invertebrates.

THANK YOU!

Pearsall Ecological Consulting for funding this work

Sea Around Us for funding my participation in this conference

Ted Pietsch for letting us use Ray Troll's mural

Mike Pan for the map and vertebrate artwork

SeaLifeBase and FishBase team members for encoding the data

FishBase Information and Research Group, Inc. IT Team for updating the *.ca web mirrors

Salamat!

Merci!