



The Kitimat Fjord System

(Annotated Bibliography)

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Abstract

This backgrounder compiles literature regarding the Kitimat Fjord System (KFS). I loosely defined the scope to papers that involved fieldwork within the KFS, but some of the sources listed here do not fit that mold exactly. In the “About” section for each listing I explain how the source is relevant to the KFS.

This compilation is by no means exhaustive. There are currently 43 entries but I know more are out there. This document will be expanded regularly, especially in the winter months. I would have missed many of these papers if it weren’t for James Pilkington and Cassandra Lamontagne.

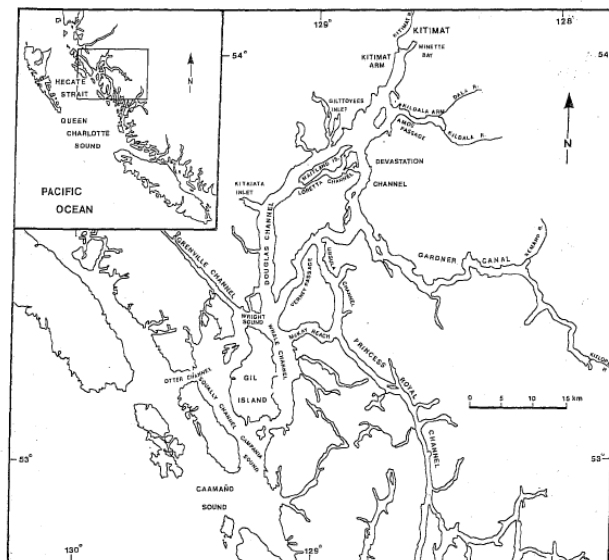


Fig. 1. The Kitimat fjord system.

from MacDonald et al. (1983)

¹ Bangarang Backgrounders are imperfect but rigorous reviews – written in haste, not peer-reviewed – in an effort to organize and memorize the key information for every aspect of the project. They will be updated regularly as new learnin’ is incorporated.

Ashe, E, J Wray, CR Picard, R Williams. 2013. Abundance and survival of Pacific humpback whales in a proposed critical habitat area. PLoS ONE 8(9):e75228.

About: 8-years of survey results from North Coast Cetacean Society and Gitga'at Guardian Watchmen are used in capture-recapture analysis to estimate survivorship, local site fidelity, and annual abundance. The 2011 estimate was 137 humpbacks in the summer.

Keywords: Humpback, North Coast Cetacean Society, Gitga'at, Capture-recapture

Format: Paper / **Dropbox** / Don't have

Ban, NC, C Picard, and ACJ Vincent. 2008. Moving toward spatial solutions in marine conservation with indigenous communities. Ecology and Society 13(1):32.

About: Authors engaged the Gitga'at and Huu-ay-aht First Nations on their perspectives of resource use in their respective territories in a three-phase process: building research partnerships, carrying out semi-structured individual interviews, and holding community discussions. A special focus is given to sustainable fisheries within their territories.

Keywords: Gitga'at, management, fisheries, human ecology

Format: Paper / **Dropbox** / Don't Have

Ban, NC, CR Picard, and AJ Vincent. 2009. Comparing and integrating community-based and science-based approaches to prioritizing marine areas for protection. Conservation Biology 23(4):899-910.

About: Comparing the overlap between protected areas proposed by scientific bodies and those emphasized in two study areas: the Gitga'at First Nation territory and the Huu-ay-aht First Nation. They find that integrating science-based approaches and community-based approaches is the best solution for MPA designation.

Keywords: Gitga'at, management, MPAs, human ecology

Format: Paper / **Dropbox** / Don't Have

Bigg, MA. 1984. Sighting and kill data for the Steller sea lion (*Eumetopias jubatus*) and California Sea Lion (*Zalophus californianus*) in British Columbia, 1892 – 1982, with some records from Washington and southeastern Alaska. Canadian Data Report of Fisheries and Aquatic Sciences No. 460.

About: Bigg compiles all published and unpublished sightings and kill records from the past century for the Steller sea lion, a year-round resident of all BC waters, and the California sea lion, a winter migrant to southern British Columbia. Its citation list is exhaustive for BC sea lion publications. Survey results of Ashdown Island from 1960-1977 are given in Table 100. Abundances for Kitimat Arm, Whale channel, Douglas Ch., and other nearby areas are given in Table 102. Kills at Ashdown island are given in Table 221 (5 killed in May 1963, 8 more killed in September same year). Several kills from the KFS are reported in Table 222. Figure 4 (pg. 176) shows locations of rookeries, year-round haulouts, and winter sites in and adjacent to KFS. The Ashdown haul-out is mapped in Figure 8i (pg. 190 of .pdf).

Keywords: Steller sea lion, California sea lion, DFO, Historical

Format: Paper / **Dropbox** / Don't have

Bigg, MA. 1985. Status of the Stellar sea lion (*Eumetopias jubatus*) and California sea lion (*Zalophus californianus*) in British Columbia. Can. Spec. Publ. Fish. Aquat. Sci. 77:20p.

About: A report of aerial censuses 1971-1984 is combined with a literature review to describe distribution, density, and haul out behavior of the two species in BC, including the Steller's presence in the Kitimat Fjord System. Steller sea lions move seasonally between local rookeries and winter sites. Only adult and subadult male California sea lion were seen September-May, primarily off southern Vancouver Island. California sea lion numbers increased over the course of the study.

Keywords: Steller sea lion, California sea lion, DFO, Historical

Format: Paper / **Dropbox** / Don't have

Bornhold, B.D. 1983. Sedimentation in Douglas Channel and Kitimat Arm. Can. Tech. Rep. Hydrogr. and Ocean Sci. 18, 88-114.

About:

Keywords:

Format: Paper / **Dropbox** / **Don't have**

Clarke, CL, GS Jamieson. 2006. Identification of ecologically significant areas in the Pacific North Coast Integrated Management Area: Phase II – Final Report. Can. Tech. Rep. Fish. Aquat. Sci. 2686: v + 25p.

About: This is the second phase of the identification of Ecologically and Biologically Significant Areas (EBSA) within the proposed management area in BC's north coast (PNCIMA). Caamano Sound was identified as an EBSA in Phase I, and again in Phase II. It was recognized as a highly productive system due to tidal mixing and an important area for killer whales.

Keywords: PNCIMA, BC coast, ecosystem

Format: Paper / **Dropbox** / Don't have

Crawford, W., Johannessen, D., Whitney, F., Birch, R., Borg, K., Fissel, D., and Vagle, S. 2007. Appendix C: Physical and chemical oceanography. In Ecosystem overview: Pacific North Coast Integrated Management Area (PNCIMA). Edited by Lucas, B.G., Verrin, S., and Brown, R. Can. Tech. Rep. Fish. Aquat. Sci. 2667: vii + 77 p.

About: A review of the physical, chemical and biological oceanography of the proposed Pacific North Coast Integrated Management Area, which encompasses the Kitimat Fjord System.

Keywords: Ecosystem, Conservation, oceanography, DFO

Format: Paper / **Dropbox** / Don't have

Enbridge. 2010. Volume 8A: Overview and General Information – Marine Transportation; Volume 8B: Environmental and Socio-Economic Assessment (ESA) – Marine Transportation. Enbridge Northern Gateway Project Sec. 52 Application.

About: The application and self-environmental assessment submitted by Enbridge to Canada's National Energy Board for the Northern Gateway pipeline and tanker project.

Keywords: Enbridge, environmental assessment

Format: Paper / **Dropbox** / Don't have

Fisheries and Oceans Canada. 2008. Recovery strategy for the northern and southern resident killer whales (*Orcinus orca*) in Canada. Species at Risk Act Recovery Strategy Series, Fisheries & Oceans Canada, Ottawa ix + 81pp.

About: Resident killer whales are listed as Threatened under SARA. This document outlines the DFO recovery strategy for the species. In this document only Johnstone Strait is listed as a specific critical habitat for northern residents.

Keywords: NR killer whales, DFO, critical habitat, recovery strategy

Format: Paper / **Dropbox** / Don't have

Fissel, DB, K Borg, DD Lemon, JR Birch. 2010. Marine Physical Environment. Enbridge Northern Gateway Project. ASL Environmental Sciences. Technical Data Report .

About: **ASL Environmental Sciences** conducted the physical oceanography component of Enbridge's environmental assessment. Their work included oceanographic cruises in September 2005 and January 2006, CTD casts at 15 locations in the CCAA, and four Acoustic Doppler Current Profiler stations (one near Kitimat, one at the mouth of Douglas, one at the entrance of Caamano Sound, and one in Principe Channel).

Keywords: Northern Gateway

Format: Paper / **Dropbox** / Don't have

Ford, JKB. 2006. Assessment of critical habitats of resident killer whales in waters of the Pacific coast of Canada. Canadian Science Advisory Secretariat Research Document 2006/072.

About: Ford identified critical habitat for resident killer whales as part of the development of the species' recovery plan. Killer whales are listed as Threatened under Schedule 1 of SARA. Ford identified Caamano Sound and adjacent waterways (incl. Whale, Estevan and Squally channels and Campania and Wright Sound) as critical habitat. All groups of northern residents have been observed here.

Keywords: NR killer whale, DFO, critical habitat

Format: Paper / **Dropbox** / Don't have

Fisheries and Oceans Canada. 2013. Recovery Strategy for the North Pacific Humpback Whale (*Megaptera novaeangliae*) in Canada. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa. x + 67 pp.

About: Humpbacks are listed as Threatened under Schedule 1 of SARA, but the decision to move the species to "Special Concern" is being assessed. Figure 2 shows locations of humpback photo-ID in BC

(1984-2007). Fig. 3 show transect sighting locations for the BC coast. Four critical habitat areas were identified, one of which is Gil and Gribbell Basin in the KFS (Figure 4 and 5).

Keywords: Humpback, DFO, recovery strategy, critical habitat

Format: Paper / **Dropbox** / Don't have

Garibaldi, A, and N Turner. 2004. Cultural keystone species: implications for ecological conservation and restoration. *Ecology and Society* 9(3):1.

About: Using the Gitga'at's use of red laver seaweed and western red-cedar as examples, these authors introduce the idea of cultural keystone species as a tool in incorporating matters of cultural heritage into conservation planning. Semi-quantitative methods for evaluating candidate species as keystone are presented.

Keywords: Gitga'at, Management, Plants, Seaweed, human ecology

Format: Paper / **Dropbox** / Don't Have

Hay, D.E., P.B. McCarter, 2006. Spawning areas of British Columbia herring: a review, geographical analysis and classification. *Can. MS Rep. Fish. Aquat. Sci.* 2019 rev. ed

About: The distribution of herring (*Clupea pallasii*) spawning sites have been monitored since 1928. 18% of BC's 29,500km coastline has been classified as spawning habitat. Approx. 450-600 km of coastline is used by spawners in an average year. The document provides links to maps of where spawning sites occur, including Caamano Sound, Gil Island, Gardner Canal, Kitimat Arm, and Surf Inlet. This document's citation section is an exhaustive review of reports that provide herring data on the BC coast (Fig. 5).

Keywords: Herring, DFO, Historical

Format: Paper / **Dropbox** / Don't have

Jacques Whitford. 2010. Technical Data Report: Marine Birds. Enbridge Northern Gateway Project. Jacques Whitford AXYS.

About: Report on the literature review and fieldwork for the baseline studies on birds in the Confined Channel Assessment Area of the Northern Gateway project.

Keywords: Enbridge, seabirds, environmental assessment, baseline

Format: Paper / **Dropbox** / Don't have

Joint Review Panel. 2013. Volume 1: Connections; **Volume 2:** Considerations. Report of the Joint Review Panel for the Enbridge Northern Gateway Project.

About: The first volume reviews the project and all the issues associated with it. It concludes with the JRP's decision to approve the project conditionally. The second volume outlines the perspectives offered during the hearing process for the Northern Gateway Project, the JRP's conclusions about their importance, and the panel's 209 conditions for approving the project.

Keywords: Enbridge, environmental assessment

Format: Paper / **Dropbox** / Don't have

Lindstrom, SC. 1993. Inter- and intrapopulation genetic variation in species of *Porphyra* (Rhodophyta: Bangiales) from British Columbia and adjacent waters. *J. Applied Phycology* 5:53-62.

About: This paper outlines the genetic structure of *Porphyra* seaweed, a harvest species that is important to the Gitga'at First Nation.

Keywords: Phycology, First Nations, Intertidal

Format: Paper / **Dropbox** / Don't have

Macdonald, RW, ed. 1983. Proceedings of a workshop on the Kitimat Marine Environment. *Canadian Tech. Rep. of Hydrography and Ocean Sci.* No. 18.

About: A classic! Contains the following papers:

Macdonald, Bornhold and Webster. The Kitimat Fjord System: An Introduction.

Webster. The baroclinicity of the semi-diurnal tidal currents in Douglas Channel, BC.

Huggett and Wigen. Surface Currents in the Approaches to Kitimat.

Macdonald, Crestney, Wong, Erickson. Chemical characteristics of water in the KFS.

Bornhold. Sedimentation in Douglas Channel and Kitimat Arm.

Lewis. Bottom water temperature variations as observed, and as recorded in the bottom sediments, Alice Arm and Douglas Channel, British Columbia.

Cretney, Wong, Macdonald, Erickson, Fowler. Polycyclic aromatic hydrocarbons in surface sediments and age-dated cores from Kitimat Arm, Douglas Channel and Adjoining Waterways.

Brown, Thompson, Heath, Erickson, Cretney, Wong. Histopathological evaluation of bivalves from Kitimat Arm – Douglas Channel and Alberni Inlet, British Columbia.

Keywords: Classic, Physical, Sedimentation, Chemical, tides, bivalves, pollution

Format: Paper / **Dropbox** / Don't have

Mazur, S, N Wilkin. 2003. Moore/McKenney/Whitmore Islands Ecological Reserve Purpose Statement. July. Environmental Stewardship Division.

About: This island reserve is located just southwest of Parker Passage between Aristazabal and Rennison Islands in Caamano Sound. It and another reserve, the Byers/Conroy/Harvey/Sinnett Islands ER, encompass enormous nesting colonies of seabirds including rhinoceros (at least 90,000 pairs, 7% of the world population) and Cassin's auklets, storm-petrels and guillemots. These birds feed within the KFS during the summer. The primary role of these ecological reserves is to protect nesting habitat for these seabirds.

Keywords: Seabirds, Conservation, terrestrial

Format: Paper / **Dropbox** / Don't have

Narayanan, Savithri. 1980. Kitimat physical oceanographic study 1977-1978, Part 4: Tidal Circulation Model. Contract Report Series 80-3 (Part 4). Institute for Ocean Sciences.

About: Quantitative model of flow and flow rates throughout the KFS. Neat figures on channel width, cross-sectional topography of channels, etc.

Keywords: Physical, tides, model

Format: Paper / **Dropbox** / Don't have

Nichol, LM and JKB Ford. 2011. Information relevant to the assessment of critical habitats for blue, fin, sei and North Pacific right whales in British Columbia. Can. Sci. Adv. Sec. Research Document 2011/37.

About: These baleen whales are listed as Endangered or Threatened in Schedule 1 of SARA. In order to develop their recovery strategies, critical habitat areas have to be identified for each species. Caamano Sound was highlighted as an area of potential importance for fin whales. Nichol and Ford report that the following research efforts are urgently needed:

1. Expanded acoustic monitoring, both offshore and inshore, with a special emphasis on identifying the behavioral context of fin whale vocalization.
2. Documenting the fine-scale habitat features with which fin whales and their prey are associated "particularly in Hecate Strait and Caamano Sound. Study approaches should include systematic visual surveys, photo-identification, satellite tagging and collection of hydroacoustic data to document potential prey."
3. Systematic survey coverage in key inshore areas such as Caamano Sound. "The occurrence of fin whales in Caamano Sound and adjoining waterways on the northern mainland coast is intriguing as it is one of few inshore areas where fin whales are found in BC and where they were encountered historically as well."
4. Linking whale distribution to oceanographic processes. "Concurrent data on whale distribution and oceanographic processes at appropriate spatial and temporal scales are lacking."

Keywords: Fin whale, blue whale, North Pacific right whale, sei whale, DFO, critical habitat

Format: Paper / **Dropbox** / Don't have

Okey, TA, HM Alldina, V Lo, A Montenegro, S Jessen. 2012. Climate change impacts and vulnerabilities in Canada's Pacific Marine Ecosystems. CPAWS BC and WWF-Canada, Vancouver, BC.

About: The processes of climate, oceanography and climate change are outlined for the entire BC coast. The ecosystem for each region of the coast is characterized, including a Northern Shelf region in which the KFS can be found. The vulnerability to climate change of the Northern Shelf specifically is assessed on pages 59, 69-71 of the document. The north coast fjords are discussed on page 74.

Keywords: BC coast, climate change, meteorology, oceanography

Format: Paper / **Dropbox** / Don't have

People of the Gitga'at First Nation. 2006. 'Nwana'a lax Yuup: Plants of the Gitga'at People. Eds. Nancy J Turner and Judith Thompson. Cortex Consulting.

About: This incredible guide reviews the botany of the Gitga'at First Nations and the uses of each species in Gitga'at culture.

Keywords: Terrestrial, intertidal, phycology, botany, First Nations

Format: Paper / Dropbox / Don't have

Pickard, GL. 1961. Oceanographic features of inlets in the British Columbia mainland coast. J. Fish. Res. Db. Canada 18(6): 96pp.

About: A classic and original treatise on the physical oceanography of British Columbia's inlets as unique fjord environments. Pickard classified Douglas Channel and Gardner Canal of the Kitimat Fjord System as "A-1" inlets, the A-1 subgroup having the lowest salinity of high freshwater discharge inlets. Dimensions of Douglas Channel, Gardner Canal and Surf Inlet are given in this paper.

Keywords: Fjords, Oceanography.

Format: Paper / **Dropbox** / Don't have

Pilkington, J, H Meuter, J Wray. 2011. Occurrence of fin whales (*Balaenoptera physalus*) in the Confined Channel Assessment Area between Wright Sound and Caamano sound from North Coast Cetacean Society observations for the period 2004 to 2011. Written evidence, JRP for Northern Gateway Pipeline Application.

About: Results of NCCS fieldwork both from land and boat demonstrate the occurrence of fin whales in Gil Basin and Caamano Sound from 2006 to 2011. The authors discuss how the proposed Enbridge Northern Gateway Pipeline may affect these inland fin whales and how the corporation's assessment efforts were inadequate for this species.

Keywords: Enbridge, fin whale, NCCS, environmental assessment.

Format: Paper / **Dropbox** / Don't have

Pilkington, J, H Meuter and J Wray. 2011. Occurrence of Northern Resident killer whales (*Orcinus orca*) in the Confined Channel Assessment Area between Wright Sound and Caamano Sound from North Coast Cetacean Society Observations for the Period of 2006 to 2011. Written evidence submission to the Joint Review Panel assessing the Northern Gateway Pipeline Application.

About: Results of NCCS fieldwork both from land and boat demonstrate habitat use and occurrence of northern resident killer whales in Gil Basin and Caamano Sound. The authors discuss how the proposed Enbridge Northern Gateway Pipeline may affect these populations and how the corporation's assessment efforts were inadequate.

Keywords: Northern Gateway, NR killer whale, NCCS, environmental assessment

Format: Paper / **Dropbox** / Don't have

Reimchen, TE, SD Douglas. 1987. Brief notes on a field trip to Dewdney Island (ER#25), June 1987.

About: The Dewdney and Glide Islands Ecological Reserve, on the northwest corner of Caamano Sound, has only been surveyed once by naturalists, in 1987. This document shares notes from that field trip, including an encounter with coastal wolves, adventures in sphagnum bogs, minnow traps, and no evidence of human presence. "The density of blackflies was beyond description and quantification."

Keywords: Conservation, terrestrial,

Format: Paper / Dropbox / Don't have

Shardlow, TF. 2013. Isotopic evidence of salmon, *Oncorhynchus* spp., in the diet of the Wolverine, *Gulo gulo*, on Princess Royal Island, British Columbia. Canadian Field-Naturalist 127(4):338-342.

About: Isotopic signatures from wolverine hair samples collected in Chapple Inlet on Princess Royal Island indicate that salmon is part of wolverine diet. This is the first published record of wolverines (the world's largest terrestrial mustelid) on that island.

Keywords: Terrestrial, salmon

Format: Paper / **Dropbox** / Don't have

Simpson, CD. 1997. Some aspects of the distribution and fate of polycyclic aromatic hydrocarbon contamination in the Kitimat Fjord System. PhD Thesis, UBC.

About: Chemical oceanography of hydrocarbons in the air and in the water in Kitimat Art.

Keywords: Chemical, pollution, bivalves

Format: Paper / **Dropbox** / Don't have

Slotnick, B. 2004. Glaciation and glacial history of British Columbia during Fraser Glaciation. UC: Davis.

About: This paper introduces the Wisconsin Fraser glaciations and their impact on the topography of northern British Columbia, including the Skeena and Kitimat River areas.

Keywords: glaciation, geology

Format: Paper / **Dropbox** / Don't have

Thomson, R, I Fine, M Krassovski, J Cherniawsky, K Conway, P Wills. 2012. Numerical simulation of tsunamis generated by submarine slope failures in Douglas Channel, British Columbia. Canadian Science Advisory Secretariat. Research Document 2012/115.

About: Sedimentary evidence of Holocene landslides and subsequent tsunamis in Douglas Channel are reported, and models of the wave propagation discusses wave heights in the near and far field.

Keywords: Physical, waves, sedimentation, tsunami

Format: Paper / **Dropbox** / Don't have

Turner, NJ. 2003. The ethnobotany of edible seaweed (*Porphyra abbottae* and related species; Rhodophyta:Bangiales) and its use by First Nations on the Pacific Coast of Canada.

About: The natural history and cultural importance of red laver seaweed (*Porphyra*) to the Gitga'at and other Coastal First Nations. Information is provided on nutrition, how to harvest and prepare, and where it can be found in Gitga'at Territory (with extensive quotes from Helen Clifton).

Keywords: Gitga'at, Seaweed, First Nations

Format: Paper / **Dropbox** / Don't have

Turner, NJ & H Clifton. 2009. "It's so different today": Climate change and indigenous lifeways in British Columbia, Canada. *Global Environmental Change* 19:180-190.

About: Turner, an ethnobotanist, and Clifton, the matriarch of Hartley Bay, discuss how First Peoples have responded to changing environments for hundreds of years but how recent changes are much different in pace and scale.

Keywords: Climate change, First Nations

Format: Paper / **Dropbox** / Don't have

Watson, T., J. Whitford AXYS Ltd., M. Vaughan. 2010. Technical Data Report: Marine Fisheries: Enbridge Northern Gateway Project.

About: A review of literature and recent catch data (mainly 2000-2008) regarding the fisheries activities within the Confined Channel Assessment Area of the Northern Gateway Project. Commercial, recreational, aboriginal, and aquaculture fisheries are discussed.

Keywords: Fisheries, Enbridge, environmental assessment

Format: Paper / **Dropbox** / Don't have

Webster, I.T. 1980. Kitimat Physical Oceanographic Study 1977-1978, Data Collection and Analyses. Contract Report Series 80-3 (part 1), Institute of Ocean Sciences, Patricia Bay, B.C., unpublished manuscript, 51 pp.

About:

Keywords:

Format: Paper / **Dropbox** / **Don't have**

Webster, I. 1982. The baroclinicity of the semi-diurnal tidal currents. in Douglas Channel, B.C. *Can. Tech. Rep. Hydrog. Ocean Sci.* 18, 14-32.

About:

Keywords:

Format: Paper / **Dropbox** / **Don't have**

Wheeler, B, A Rambeau, K Zottenberg. 2010. Technical Data Report: Marine Mammals. Enbridge Northern Gateway Project. Stantec.

About: Report on the literature review and fieldwork for the baseline studies on marine mammals in the Confined Channel Assessment Area of the Northern Gateway project.

Keywords: Enbridge, marine mammals, humpback, NR killer whale, Steller sea lion, environmental assessment, baseline

Format: Paper / **Dropbox** / Don't have

Williams, R, and L Thomas. 2007. Distribution and abundance of marine mammals in the coastal waters of British Columbia, Canada. *J. Cetacean Res. Management* 9(1):15-28.

About: An application of distance sampling methods from medium-sized vessels throughout the BC coast (field work 2004-5), presenting an example of applying such methodology to complex coastal habitats.. KFS was selected as a Primary Sampling Unit for the coastal portion of this study. No fins whales were found in the coastal corridors. Estimated BC-wide abundance was 496 (201-1220) fin whales (quite high variance).

Keywords: Marmams, distance sampling, abundance

Format: Paper / **Dropbox** / Don't have

Williams, R, P O'Hara. 2010. Modelling ship strike risk to fin, humpback and killer whales in British Columbia, Canada. *J. Cetacean Res. Manage.*

About: Using results from Williams and Thomas (2007, field work in 2004-5), ship strike risk for whales was modeled for BC waters. Because the referenced study did not see any fin whales in the KFS, ship strike risk for that area was published as negligible.

Keywords: Fin whale, humpback whale, environmental assessment, ship strike.

Format: Paper / **Dropbox** / Don't have

Williams, R, E Ashe, PD O'Hara. 2011. Marine mammals and debris in coastal waters of British Columbia, Canada.

About: The authors report on the density and distribution of debris observed on early-2000s marine mammal distance sampling surveys on the BC coast, then use models to quantify the risk of cetacean species to marine anthropogenic debris. The authors recognize the northern mainland fjords as potentially an important area for fin whales (although they did not see any in inland waters on their surveys).

Keywords: Distance sampling, fin whale, humpback, NR killer whale, anthropogenic, debris

Format: Paper / **Dropbox** / Don't have

Wray, J, H Meuter, J Pilkington, C Ballert. 2011. Occurrence of humpback whales (*Megaptera novaeangliae*) in the Confined Channel Assessment Area between Wright Sound and Caamano Sound from North Coast Cetacea Society observations for the period 2004 to 2011. Written evidence, JRP for Northern Gateway Pipeline.

About: Humpback presence and distribution in the KFS.

Keywords: Marmams, Northern Gateway

Format: Paper / **Dropbox** / Don't have

Williams, R, CW Clark, D Ponirakis, E Ashe. 2013. Acoustic quality of critical habitats for three threatened whale populations. *Animal Conservation*. DOI: 10.1111/acv.12076.

About: The authors used MARUs to measure ocean noise levels at 12 sites, chosen for current and predicted intensities of anthropogenic activities and importance to killer, fin and humpback whales. Three of these sites were within the KFS: Caamano Sound, Kitimat Arm and Kitkiata Inlet. Noise levels are generally low in areas used heavily by the baleen whales but the waters are not yet protected. Mainland inlets, including Kitimat Arm and Caamano Sound, had some of the quietest low-frequency levels observed on the BC coast.

Keywords: Acoustics, fin whale, humpback whale, NR killer whale, anthropogenic noise

Format: Paper / **Dropbox** / Don't have

www.gitgaat.net

About: The sections of the Gitga'at First Nation website provide excellent information on the nation's history, culture and land use.

Keywords: First Nations

Format: Website.