STATE OF THE GITGA'AT 2015-2016 OCEAN REPORT

Public Version

The ancient relationship between the Gitga'at First Nation and its surrounding marine and coastal ecosystems is integral to its culture, economy and livelihood.

The *State of the Gitga'at Ocean Report* aims to present Gitga'at members, leaders and research partners with the *outcomes of key monitoring activities* that have been occurring in the territory in recent years.

Aerial View of Gitga'at Territory. (Photo: Francois Depey)

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Gitga'at and the Ocean

The core of Gitga'at traditional foods come from the ocean, as does a large portion of the Gitga'at economy. The harvesting, processing, consumption, use, sharing and trade of marine resources remain cornerstones of Gitga'at daily life. In fact, foods provided by the ocean are consumed by over 90% of Gitga'at people on a daily basis.

The traditional and commercial economies of Gitga'at both heavily rely on healthy marine resources. Until the 1990s most adults were employed by commercial fishing. As the wild salmon fishery collapsed the Gitga'at communities in Hartley Bay and Prince Rupert were pressed to find alternative economic avenues. Many of these alternatives are centered on marine resources and ecosystem services such as ecotourism, shellfish aquaculture, renewable energy, research, and wild and traditional fisheries.

State of the Giga'at Ocean Report (SOGO) 2015-2016

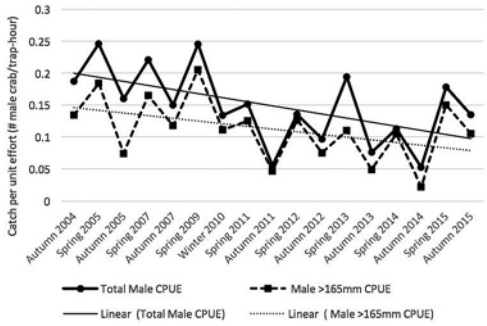
The State of the Gitga'at Ocean Report (SOGO) 2015-2016 aims to present Gitga'at members, leaders and partners with the *outcomes of key monitoring activities* that have been occurring in the territory in recent years. All of these have been carried out in partnership or in full by the Gitga'at Guardian Program. Further, it *paints a picture of the health of the marine and coastal environments in Gitga'at territory* during the decade leading to and including 2016. By compiling data collected by the Guardian Program as well as the results of research carried out in partnership with the Gitga'at First Nation, we hope to provide a *present day baseline upon which future monitoring, research, and local marine resource use can build.*

This first annual SOGO report is not comprehensive. Rather, *it is a local and specific complement to external research occurring in and around Gitga'at Territory*. We hope that the scope of future SOGO reports increase as Gitga'at-partnered scientific and cultural monitoring and research extends into other components of the marine and coastal ecosystem.

Summary

The 2015-2016 SOGO is divided into two sections. The first section is dedicated to summarizing the results of monitoring and studies pertaining to Gitga'at *traditional food security* and resource use. The second section is focused on *abiotic and biotic environmental indicators* that are not considered key traditional food items. An overview of the key findings in both sections is presented here. Detailed chapters can be found in the full report available online at www.gitgaat-resources.ca, or by email or mail upon request.

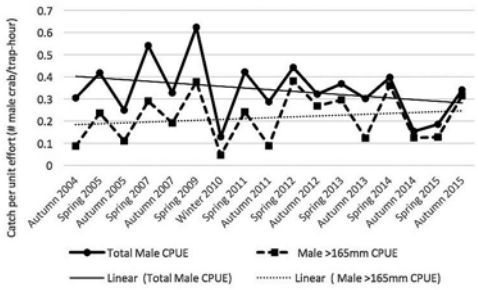
Site 1



Dungeness Crab

Monitoring of the Dungeness Crab populations of important harvest sites has been ongoing since 2004. Since that time a noteworthy decrease of large crab at Site 1 has been observed. This may be due to continued intense recreational and commercial harvest pressure at Site 1. (See Chapter 1.2)

Site 2



Graphs displaying trends of catch per unit effort (CPUE) of all male Dungeness crab (solid line) and male crab measuring >165mm (dashed line) at important harvest sites.

Tatum Reece and Donald Reece conducting crab stock assessments. (Photo: Chris Picard)

Butter clams. (photo: Barb Faggetter)

Butter clams Butter clam stock assessments have been conducted since 2007. These surveys have revealed the biological uniqueness of the clam population at Gitga'at's most frequently harvested beach. The density, abundance and growth rates are consistently higher than other populations. It is also crucial to note that these clams are the only shellfish we've studied that often have high biotoxin levels (See Chapter 1.1 and 1.4).

Abalone Dive and intertidal surveys conducted in 2014 to 2016 indicate that abalone populations have shown signs of recovery in the last decade. Results should be interpreted with caution since abalone is still very vulnerable to overexploitation and continued Gitga'at monitoring is essential. (See Chapter 1.3)

(photo: Chris Picard)

Red tide. (photo: Chris Picard)

Fossil-fuel contaminants in shellfish

Overall, baseline levels of fossil-fuel related toxicity in mussels, cockles and clams are below levels that would cause any health risks to Gitga'at consumers. However, levels in mussels may be approaching risk levels, highlighting the importance of continued monitoring. Fossil-fuel combustion, as opposed to spilled petroleum products has become the dominant source of contamination in recent years. (See Chapter 1.5)

Salmon streams

Interviews with knowledge holders and Gitga'at fishermen, and analysis of annual stream walk data, provides a preliminary look at the past and present health of salmon streams within the territory. Many escapements appear stable over the past 30 years. However the number of runs with decreasing or uncertain escapement warrants an enhanced monitoring effort. (See Chapter 1.6)

George Fisher and Archie Dundas counting salmon at Laedkin creek. (photo: Stan Hutchings)

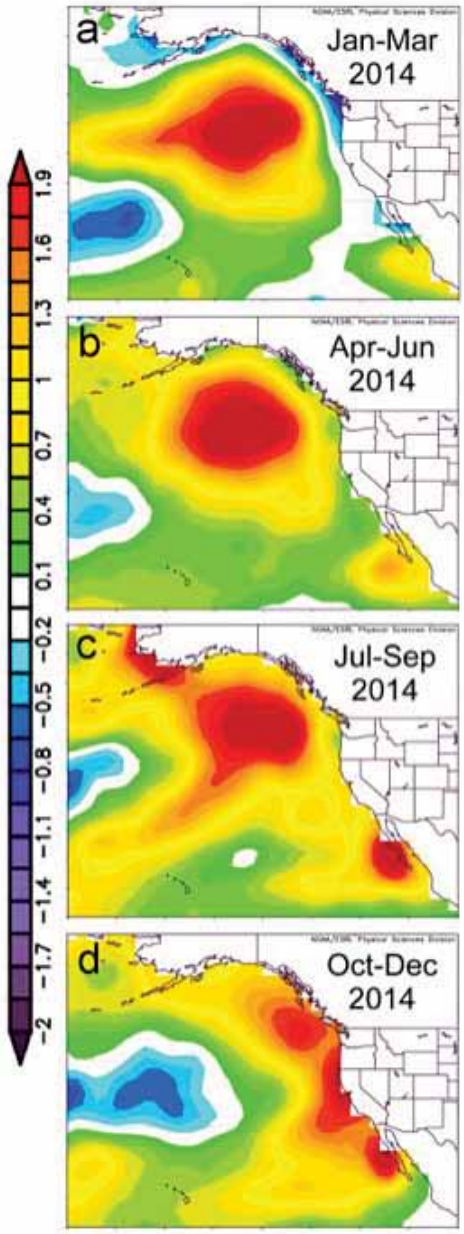


Illustration of the temperature anomalies along the Northeast Pacific Coast in 2014. Scale of difference from normal temperatures (°C) is on the left. Source: www.esrl.noaa.gov/psd/cgi-bin/data/composites/printpage.pl

"Warm Blob"

The "Warm Blob" is a large oceanic water mass whose temperature is over 2.5°C warmer than average. The Blob developed in offshore waters in 2013 and was pushed onto the coast, including Gitga'at territory in 2015. With it came several warm water species rarely seen in Gitga'at territory, as well as other unknown ecological changes. (See Chapter 2.1)

Fukushima Radiation

Despite the arrival to the Fukushima plume, results of water sample analysis by the Integrated Fukushima Ocean Radionuclide Monitoring (InFORM) network indicate that north coast waters, including Hartley bay, remain low but may be increasing. (See Chapter 2.5)

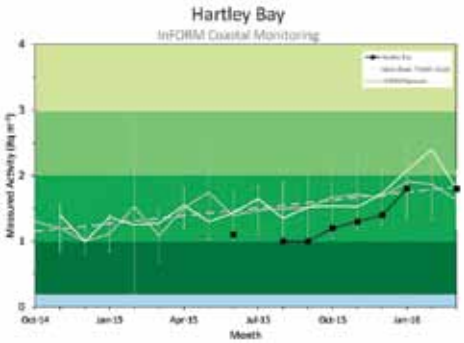
Seastar wasting disease

Symptoms of seastar wasting disease, including lethargy, limb curling, and disintegration were observed in Gitga'at territory in the summer of 2015. The disease is likely caused by a pathogen called a densovirus, and has caused up to 75% mortality of adult ochre stars in some parts of the coast. Warm waters associated with the 2013-2015 "Warm Blob" likely contributed to increase mortality rates. The return of healthy seastars has been observed in some areas in 2016. (See Chapter 2.2)

Baseline ecoacoustic conditions

"Citizen Science" involving 8 field recorders set up along a proposed shipping route established that the composition of ambient sounds in Gitga'at territory varies in time and space. Anthropogenic noise is currently very low except near the busiest shipping lanes in Gitga'at territory. (See Chapter 2.3)

Warm water species seen in Gitga'at Territory: Pacific pompano (photo: Arnold Clifton), Vellella vellella jelly (photo: Teri Robinson), and Mola mola (photo: RV Bangarang crew)



Monthly averaged data from all InFORM communities (dark grey w/ error bars: 1 std dev), the Haida Gwaii / North Coast region (average of Sandspit, Masset, Lax Kw'alaams, Prince Rupert, and Hartley Bay) (light grey), and Hartley Bay (black w/ squares). (Figure: Jonathan Kellog)

Ochre stars at various stages of wasting in 2015. (Photos: Chris Picard)

Song meter recording ambient sounds in Gitga'at territory. (Photo: Max Ritts)

Lu Lax Kyook Ecological Monitoring Program

Hartley Bay students began monitoring various aspects of Lu Lax Kyook (Mossy Bay) ecology in early 2015. The program included water temperature and salinity data collection, beach seining for intertidal diversity and sea flow monitoring. A year's worth of water temperature and salinity monitoring demonstrated seasonal patterns and spatial gradients that maintain the biodiversity of Lu Lax Kyook. (See Chapter 2.6).

Cetacean diversity abundance and distribution

Monitoring efforts by the Gitga'at Guardians, the North Coast Cetacean Society, and the R.V. Bangarang research team provide insight into the health of cetacean populations within Gitga'at territory. Humpback whale numbers continue to grow with a record number of new juvenile arrivals in 2015, and some of their habitat use patterns are revealed by a decade's worth of spatial data. As fin whales become more present their behaviour and distribution in the territory is also becoming better understood. The three research platforms also collaborated to rescue a stranded juvenile Transient orca whale in July 2015. (See Chapters 2.7, 2.8, 2.9, and 2.10)

Seabird diversity, abundance and distribution

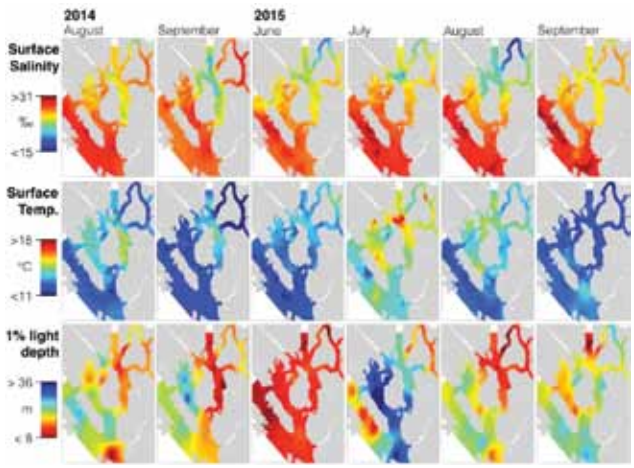
45 bird species have been found during surveys using Gitga'at marine waters. Some species occurred strictly to the southwest of Gil Island ("outer" community), some occurred only to the northeast of Gil ("inner" community), and others occurred in both. Common murres and some gull species appear to be increasing, while Cassin's auklet, rhinoceros auklet and storm-petrels appear to be in decline. The endangered marbled murrelett is found in high abundance in certain months, particularly near Ulric Point and north Squally. Gitga'at waters and islands are important habitat to dozens of seabird species; seabirds use this area for nesting, migrating and foraging. (See Chapter 2.11)

Photos top to bottom:

Students beach seining at Lu Lax Kyook (Mossy Bay). (Photo: Jeremy Janz)

Humpback whale mother and calf. (Photo: North Coast Cetacean Society)

Still photo of a black bear taken by remote hidden field cameras near non-invasive hair snags. (Photo: Christina Service)



Sea surface properties in each monthly survey. 1% light depth is a way of describing the clarity of water; it is the depth at which only 1% of surface light levels remain (deeper = clearer). (Figure: Eric Keen)

Oceanography The first oceanographic survey of its kind in Gitga'at territory reveals that strong inshore-offshore gradients in salinity are established by freshwater river runoff in the summer, that the oceanography changes dramatically in the fall due to strong storms, and that internal waves caused by tidal movements are important features within the fjord system of Gitga'at territory. (See Chapter 2.4)

Bear Pilot Study In 2015, Gitga'at First Nation joined a bear monitoring network supported by academic partners from the University of Victoria, the Raincoast Conservation Foundation and the Hakai Institute to provide insight into bear population trends, habitat use, movements and diet. The pilot project consisted of 23 non-invasive hair snags paired with remote cameras installed in various parts of Gitga'at territory. 298 hair samples, belonging to 28 individual bears. Of these, 2 were Spirit bears and 6 were black bears who carry the white (Kermode) gene. (See Chapter 2.12)

RESEARCH CONDUCTED BY

The Gitga'at Guardian program in collaboration with Lynn Lee, Spencer Greening, Max Ritts, Steven Dundas, Ethan Dundas, Stuart Gage, Eric Keen, Jay Barlow, Jonathan Kellog, Jeremy Janz, Janie Wray, Hermann Meuter, James Pilkington, Christina Service, Stan Hutchings, Laurie Chan, Kim-Ly Thompson and Chris Picard.