Domoic acid (DA) in the waters of Haida Gwaii, British Columbia:

A summary of occurrences and details on anthropogenic and environmental considerations

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MICROTHALASSIA

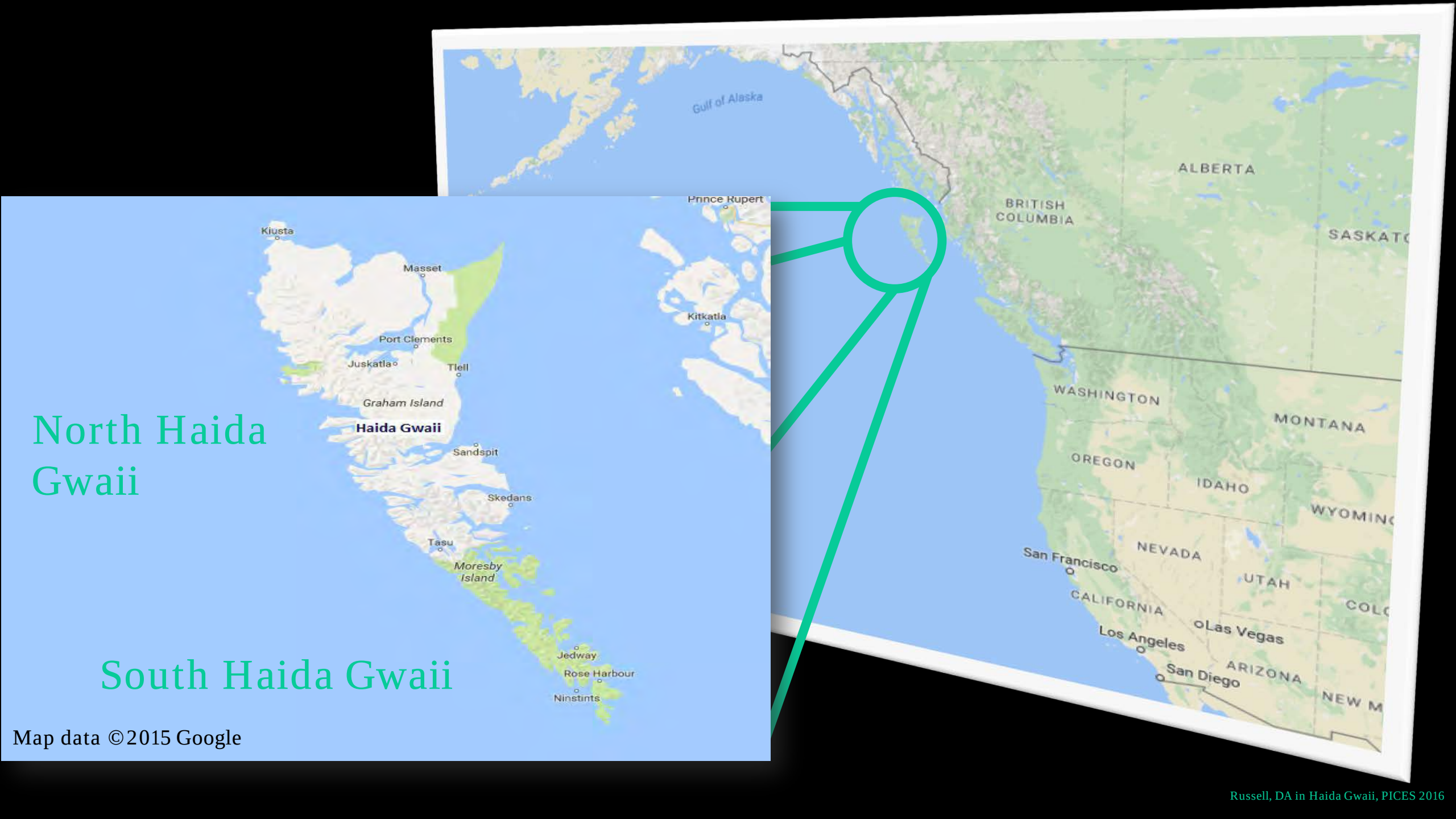
PICES 2016, Harmful Algae Working Group

In this talk

- A bit about Haida Gwaii: the land and the people
- Marine biotoxin monitoring program in BC
- Results: the recent history of domoic acid in Haida Gwaii (2012 & 2015)
- Environmental and anthropogenic influences in 2012 and 2015

A bit about Haida Gwaii


Haida Gwaii
We are here
Gulf of Alaska
ALBERTA
BRITISH COLUMBIA
SASKATC
WASHINGTON
MONTANA
OREGON
IDAHO
WYOMING
NEVADA
UTAH
COLO
San Francisco
CALIFORNIA
Las Vegas
Los Angeles
ARIZONA
San Diego
NEW ME
Map data ©2015 Google


Gulf of Alaska
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Los Angeles
Las Vegas
San Diego
Prince Rupert
Kiusta
Masset
Kitkatla
Port Clements
Juskatla
Tlell
Graham Island
Haida Gwaii
Sandspit
Skedans
Tasu
Moresby Island
Jedway
Rose Harbour
Ninstints
North Haida Gwaii
South Haida Gwaii
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South Haida Gwaii

Rugged coastline
Fjords

North Haida Gwaii

150 km long sandy beach

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The Haida People

- 45% of the population of Haida Gwaii is native Haida people
- Strong dependence on wild caught seafood
- Clam creation story

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Home | Online Shop | Wild Pacific Razor Clams

WILD PACIFIC RAZOR CLAMS

Wild Pacific Razor Clams are considered some of the best eating clams in the Pacific Northwest. They are prized for their size, as well as their sweet and tender meat.

Category: Seasonal

$19.95 / lb

1

ADD TO CART

Home | Online Shop | Wild Dungeness Crab

WILD DUNGENESS CRAB

Well known for its distinctive, mildly sweet flavour and abundance of meat, Dungeness crab are a native west coast species. The tender, briny, succulent meat is low in fat and calories and is a great source of protein. They are also a rich supply of zinc, calcium, magnesium and iron. A delicious addition to salads, pastas, chowders and eggs benedict.

Category: Seasonal

$30.00 / lb

Out of stock

Image: Haida Wild Seafood

The Haida and Shellfish

- Crab (meat & viscera), geoduck, abalone (illegally), sea cucumber, urchin, razor clam, oyster, and scallops.
- Crab and razor clams are the most important (both as a food source and as a source of income)

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Razor clams

- The northern Haida have a stronger dependence on razor clams than southern Haida
- Razor clams are eaten fresh and stored (frozen and canned) for year-long consumption
- Razor clams depurate DA slowly
- Northern Haida may be more at risk of DA exposure

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MAKAH MAIDEN

DA Exposure

- No reported incidents of ASP to date
- There may be unreported cases
- There may be a risk of chronic low dose exposure to DA

The Canadian Shellfish Sanitation Program (CSSP)

- Federal food safety program jointly administered by the Canadian Food Inspection Agency (CFIA), Environment Canada (EC) and Fisheries and Oceans Canada (DFO)
- Mandate for routine testing of shellfish for marine biotoxins
- Publicly available data presented here

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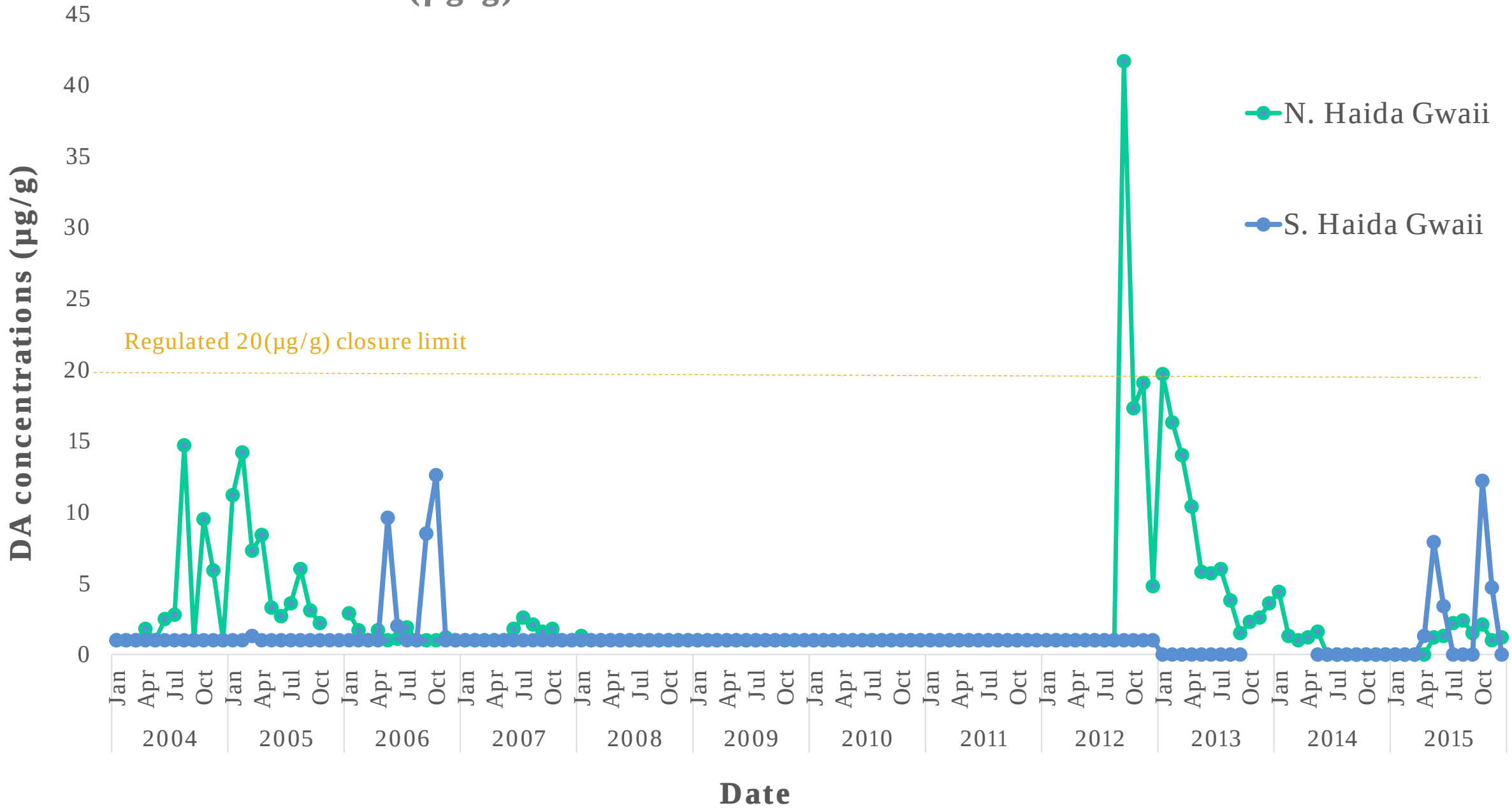
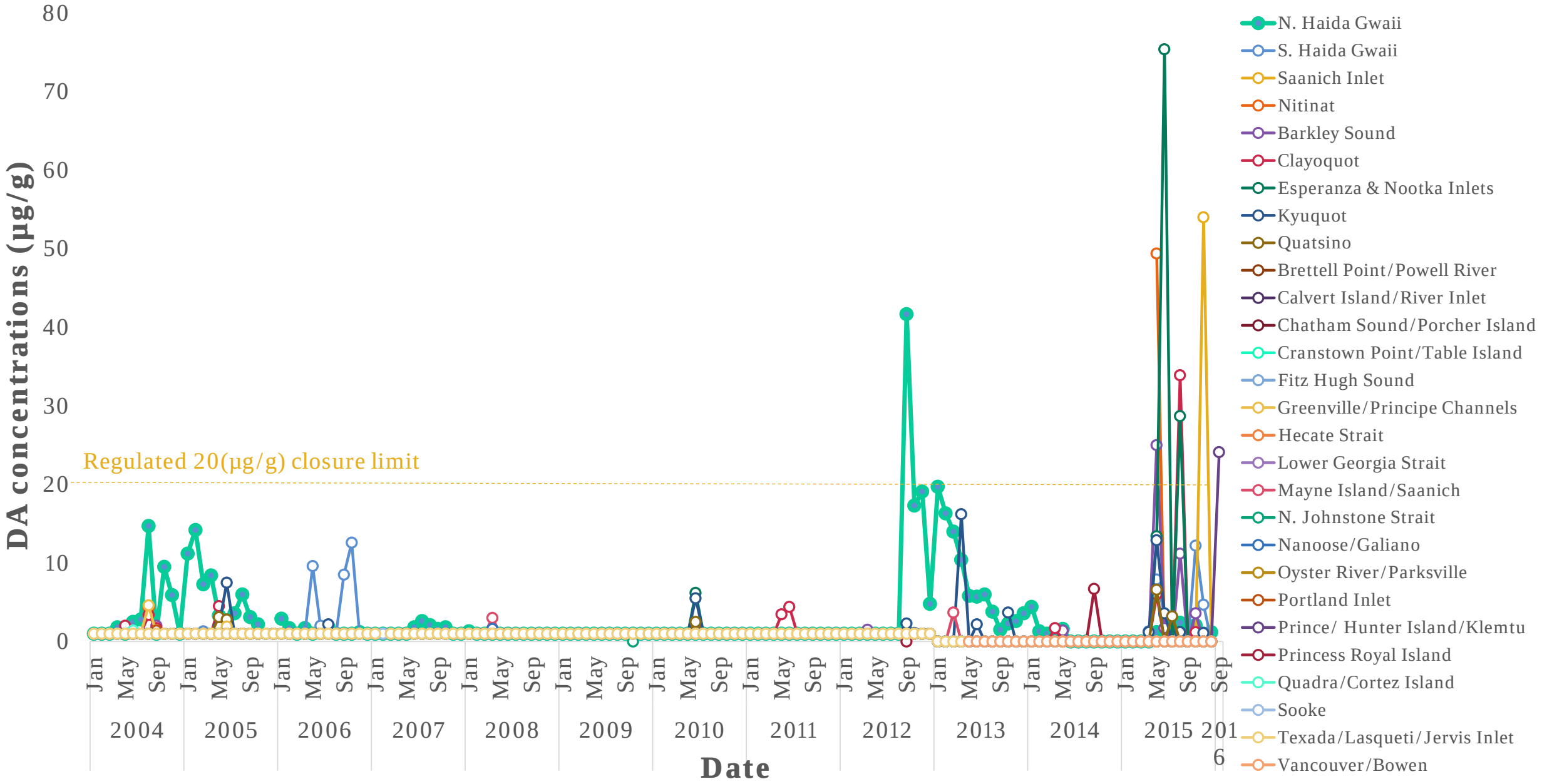
Results

Canadian Food Inspection Agency's reported domoic acid (DA) concentrations (µg/g) in north and south Haida Gwaii from 2004-2015



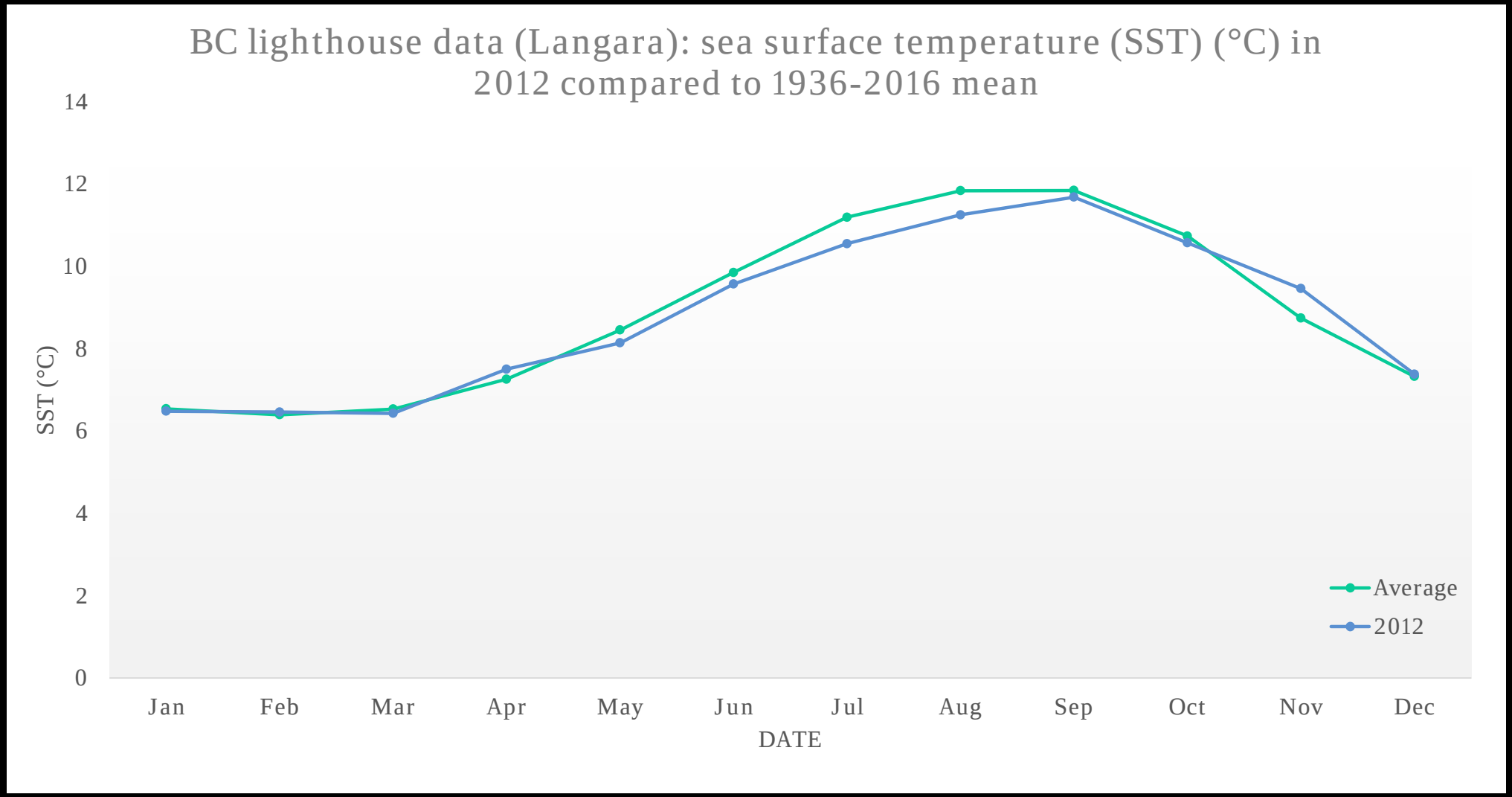
Canadian Food Inspection Agency's reported domoic acid (DA) concentrations (µg/g) in all BC monitored sites 2004-2015



Environment and Anthropogenic Influences in 2012 & 2015

2012

2012: Sea surface temperature Haida Gwaii



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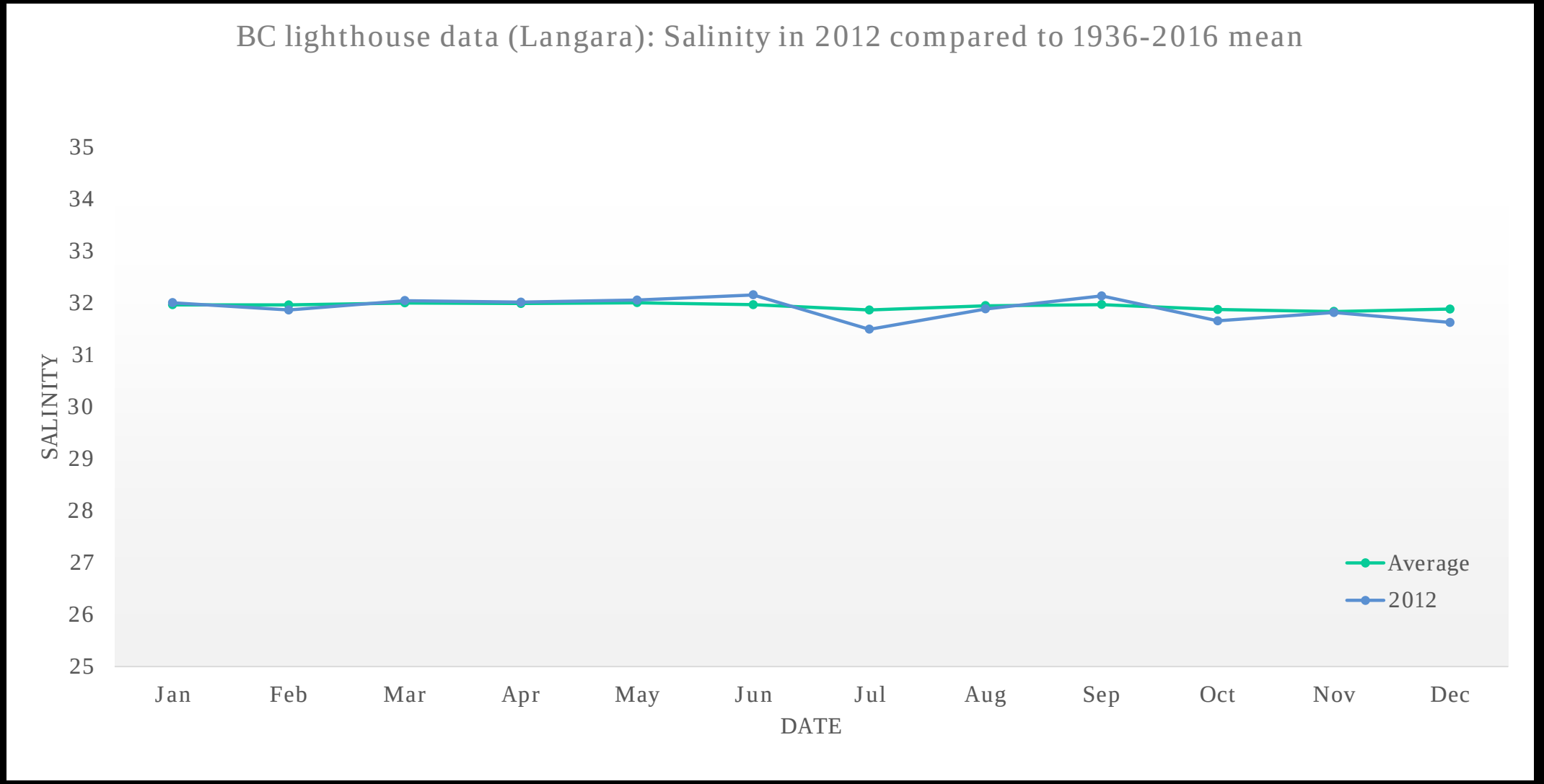
2012: Salinity Haida Gwaii



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2012: Ocean fertilization in Haida Gwaii

- July, 2012: 120 tons of iron sulphate were dumped off west Haida Gwaii over a period of 30 days.
- Hypothesis: increase salmon stocks and capture carbon

2012: Ocean fertilization in Haida Gwaii

- Following the fertilization experiment, there was a 35,000 km^2 plankton bloom that lasted for several months

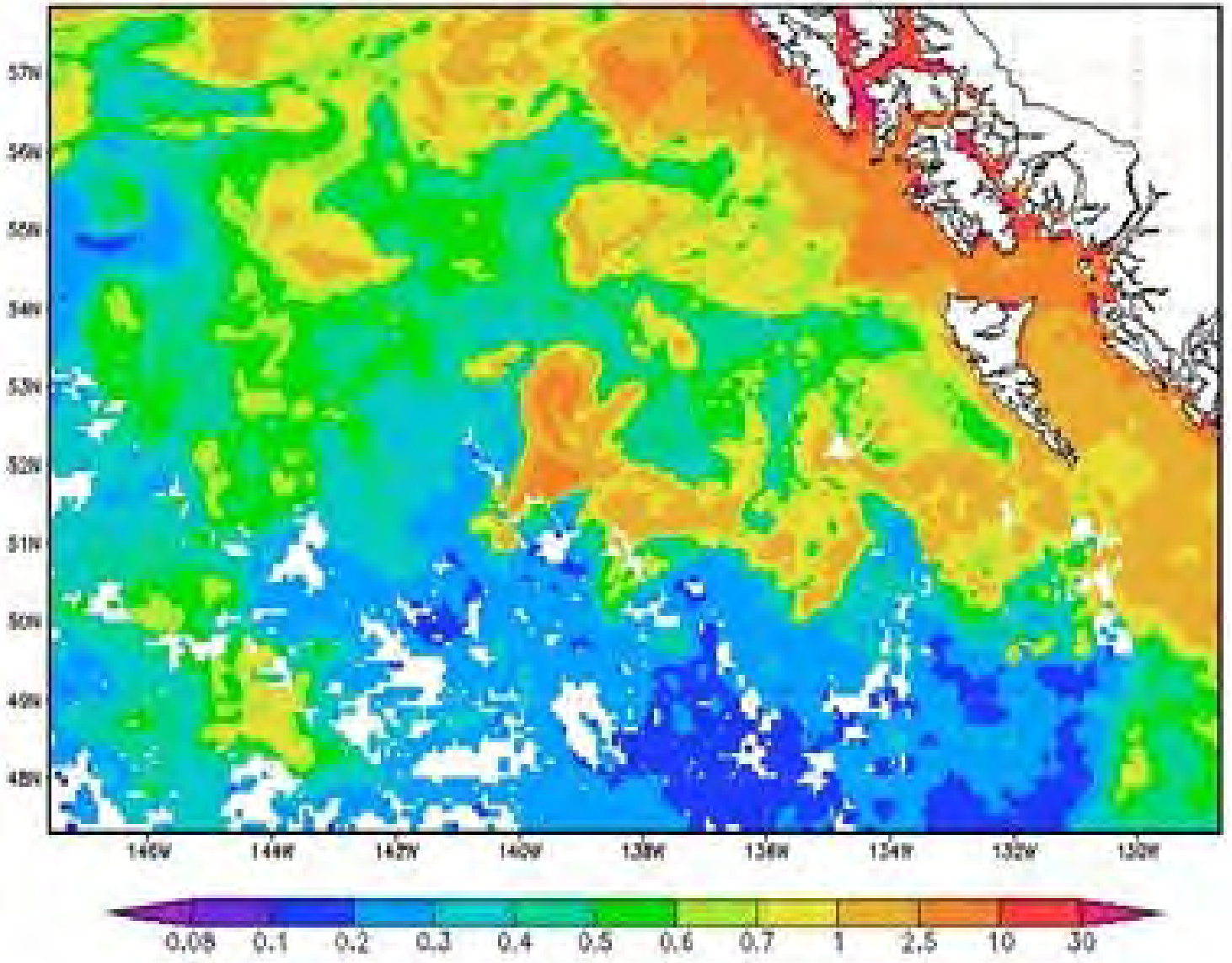

Image: Yellow and brown colours show relatively high concentrations of chlorophyll in August 2012, after iron sulphate was dumped into the Pacific Ocean as part of a controversial geoengineering scheme. Photograph: Giovanni/Goddard Earth Sciences Data and Information Services Center/NASA

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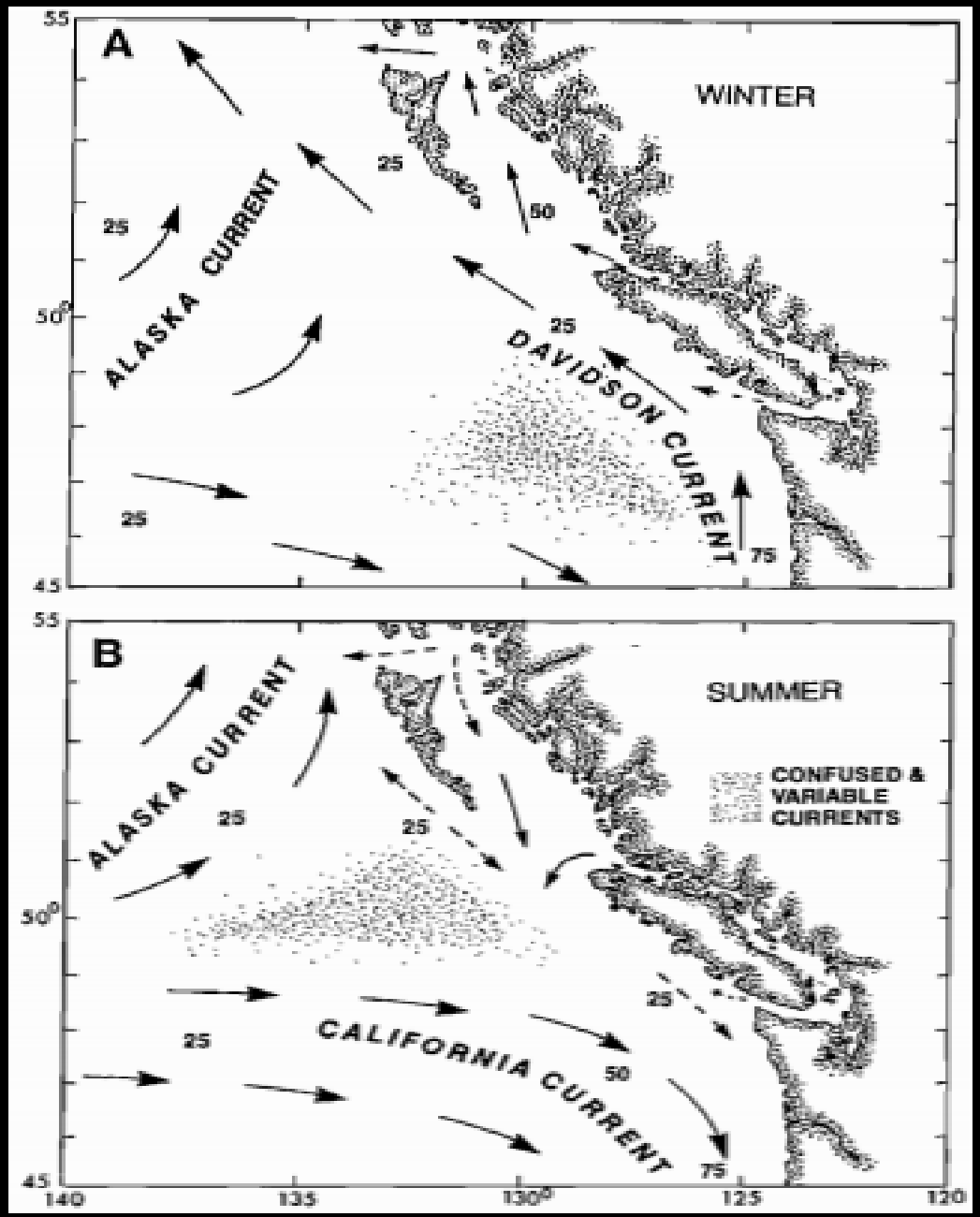

Image: Thompson: Oceanography of the British Columbia Coast, 1981

Haida Gwaii Currents

- Generally the Alaskan current pushes water towards Haida Gwaii

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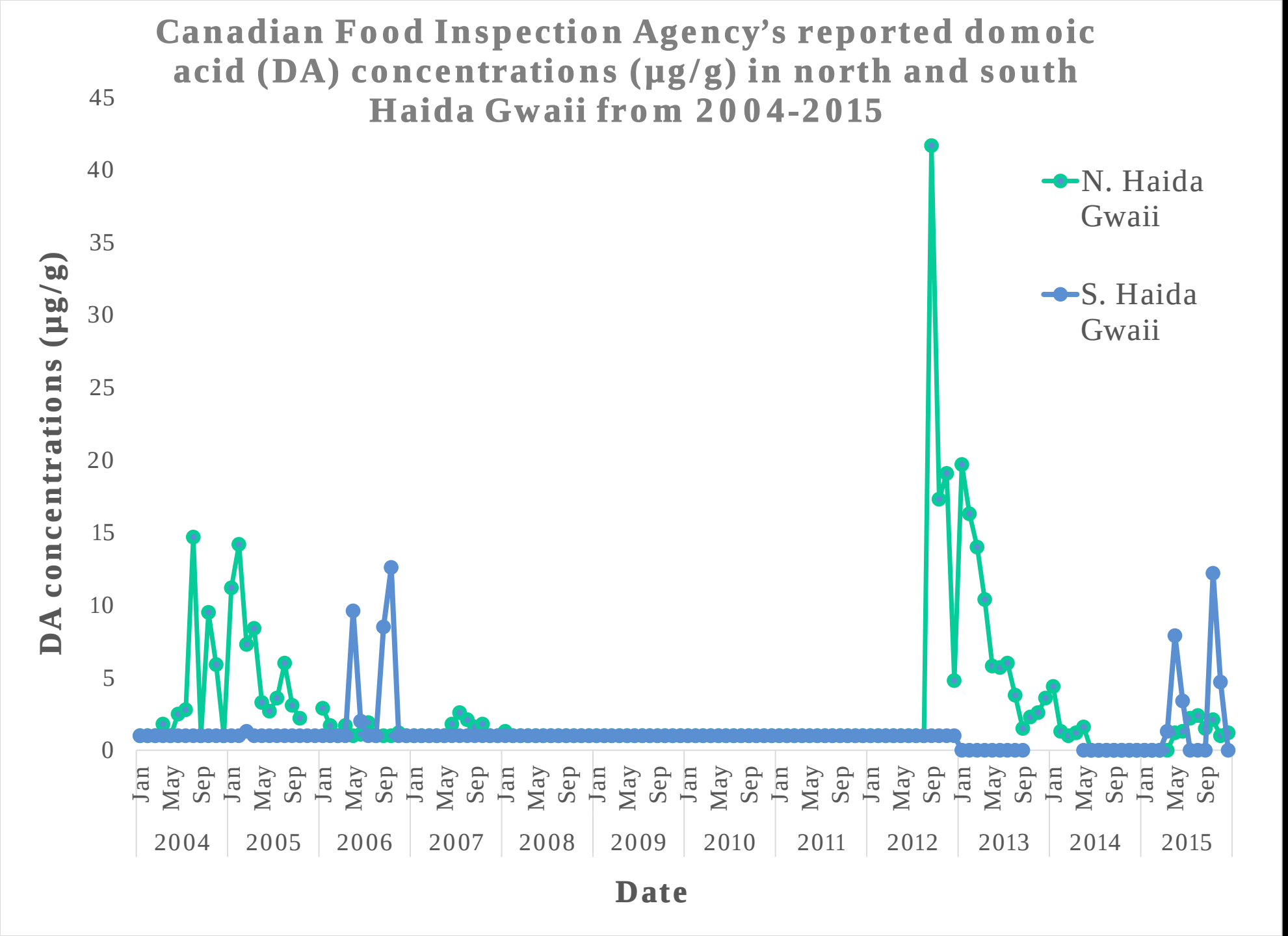

2015

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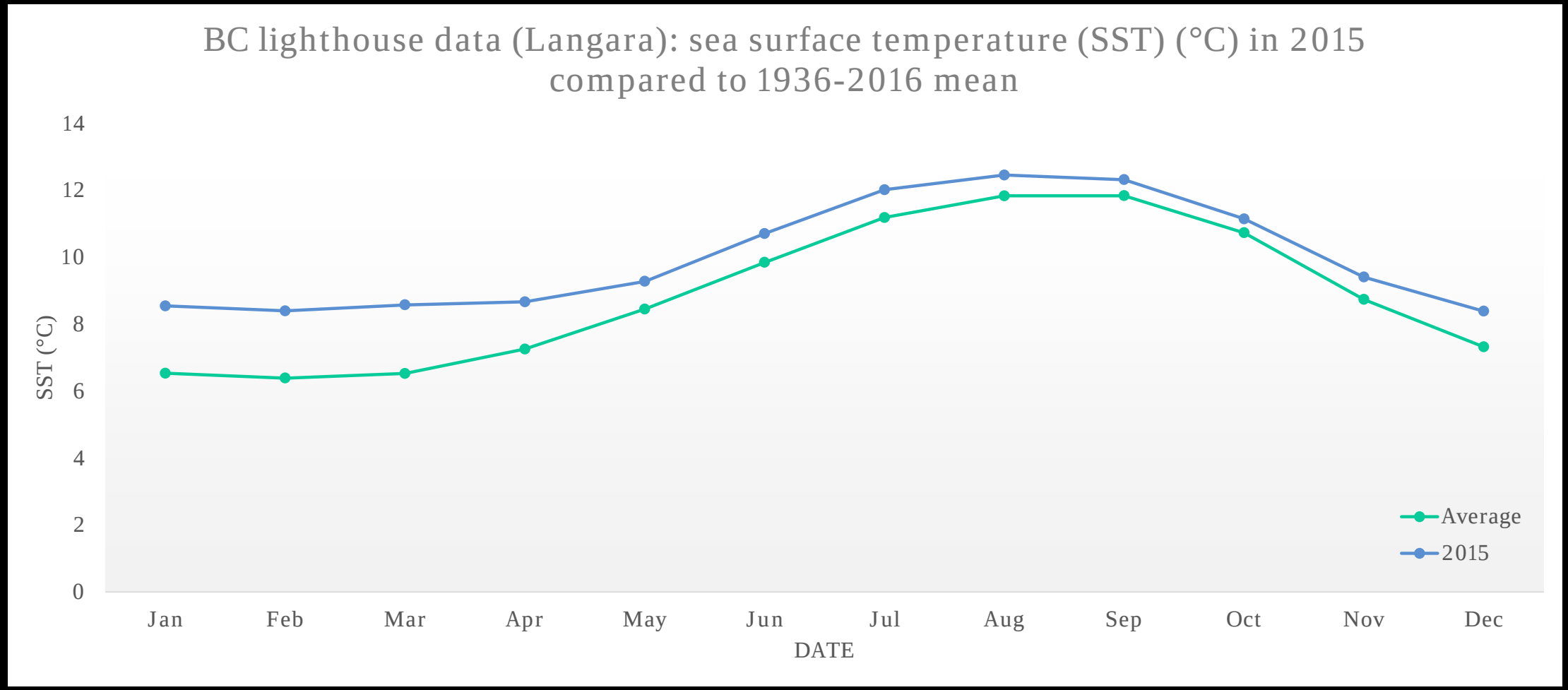
2015: Sea surface temperature Haida Gwaii



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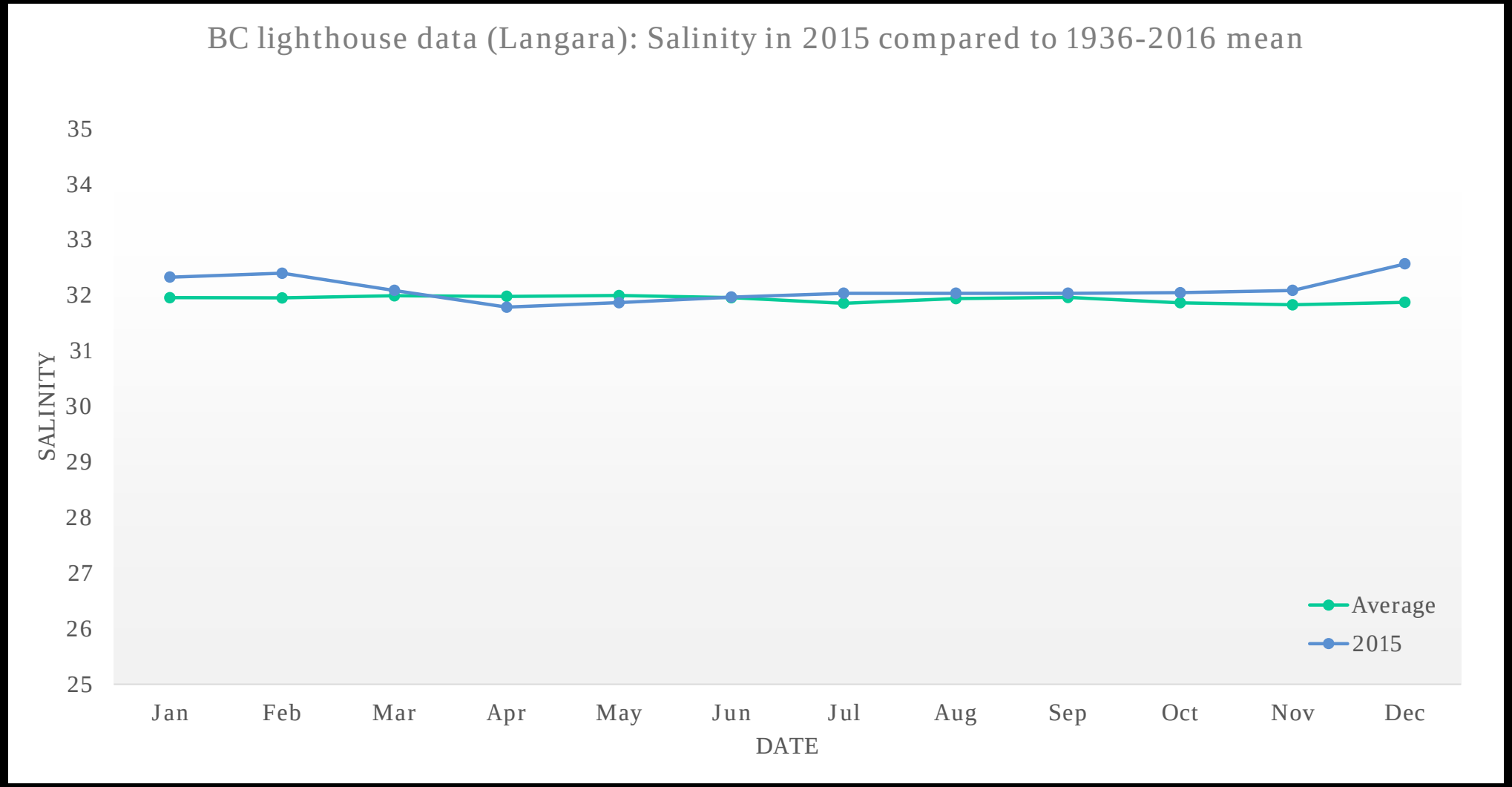
2015: Salinity Haida Gwaii



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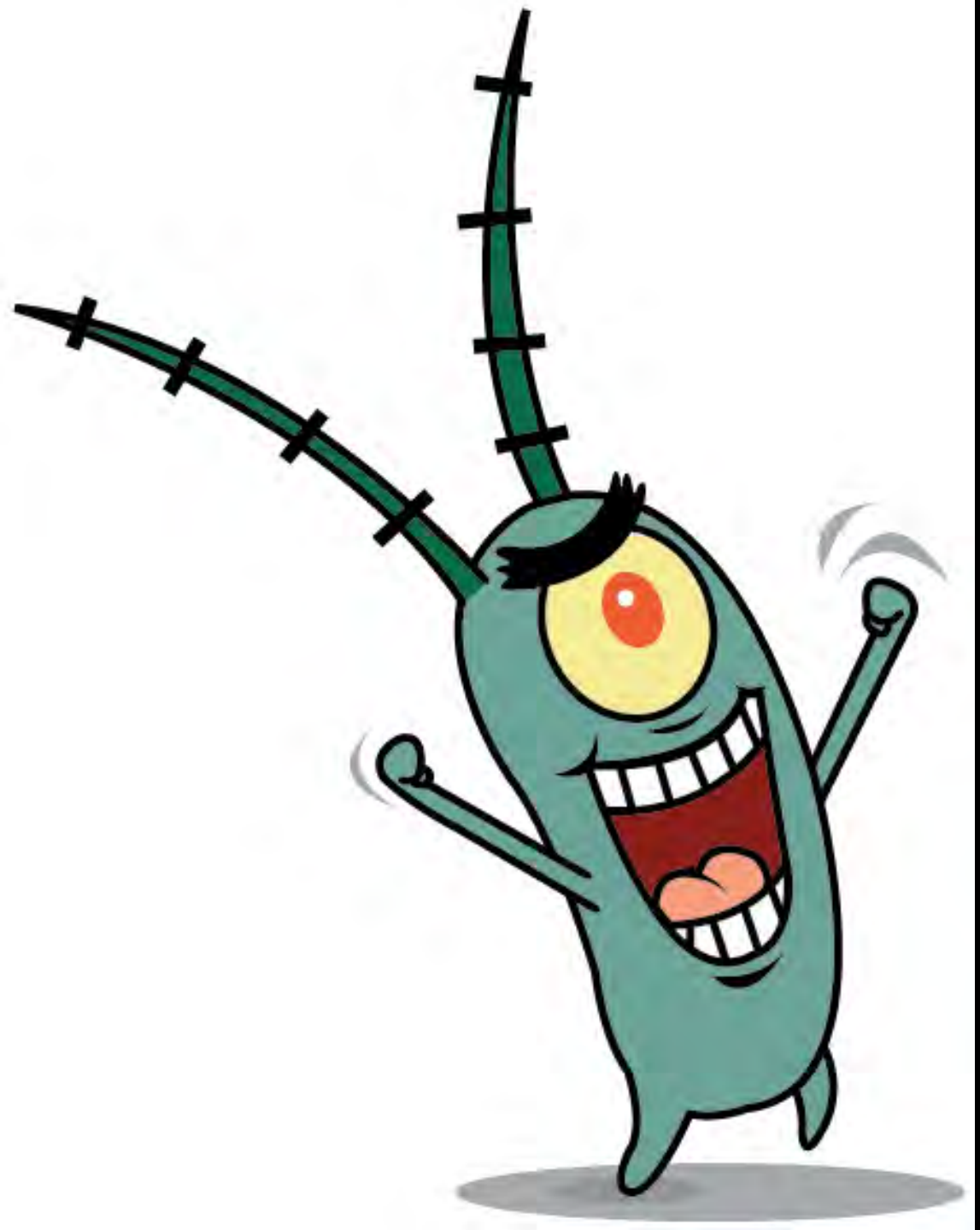
2015: DA and Pn

- Haida Gwaii experienced similar elevated DA levels to other areas.
- No known phytoplankton samples, so no species ID.



Summary:

- 2012: dramatic increase in DA levels in N. Haida Gwaii (Sept)
- July 2012 ocean fertilization
- 2015: Similar elevated DA as other regions and increased SST
- Haida people may be especially at risk from DA exposure due to geography and a heavy reliance on wild caught seafood (inc. razor clams).

Acknowledgements:

- Canadian Food Inspection Agency
- BC Centre for Disease Control
- Department of Fisheries and Oceans
- Environment Canada
- PICES 2016
- Nicky Haigh and Devan Johnson at HAMP (The HAMPsters!)

Thanks for listening!

Any questions?

The HAMPsters