Plastic ingestion by Pacific Sand Lance (*Ammodytes personatus*) in the Salish Sea.
D. Bertram, C. Robinson, M. Hennekes, M. Galbraith, N. Dangerfield, S. Gauthier, K. Woo

Salish Sea Ecosystem Conference
Vancouver, BC, Canada
Douglas Bertram
ECCC S&T Wildlife Research
13 April 2016
Dawe and Morrison 1982

“Sister” Migratory Bird Sanctuaries

Shoal Harbour
Victoria
Esquimalt Lagoon

Figure 1. Federal migratory bird sanctuaries on Vancouver Island
Chain Islets IBA and Ecological Reserve
Sidney Channel IBA, Site: BC047
Potential marine benthic habitats

Potential marine benthic habitats
Sheet 2: Southern Gulf Islands

Potential Pacific Sand Lance (PSL) benthic habitat
Pacific Sand Lance prey and their habitats influence marine bird distributions

Photo from Gary Kaiser’s book “Lords of the British Columbia’s Fjords”
Mark Cunnington
Marbled Murrelet juvenile with PSL
Breeding Rhinoceros Auklets with PSL
Common Murre dad feeds his young a sand lance
Other locally breeding colonial seabirds which depend upon PSL
Heerman’s Gulls: International visitors in the late summer and fall seek PSL
CHS/CCG/EC/OSD/NRC Collaboration

Title: Validation of Pacific Sand Lance presence in sub tidal sand wave habitats.
Vessel: Otter Bay; Dates: 9-11 April 2013
Location: Cordova Channel and Sidney Channel, British Columbia, Canada
Marine bird survey and benthic grab sampling routes 2015-2016
Marine bird survey and benthic grab sampling ‘control’ and ‘experimental’ routes 2015-2016.
Positive locations for PSL: All in Sidney Channel IBA
PSL near James Island 4 Nov 2015
PSL near James Island 4 Nov 2015
PSL diet: copepods, Cirreped cyprids...

size range 0.3mm – 3.8mm
Diet of the Pacific Sand Lance (*Ammodytes hexapterus*) in the Salish Sea, British Columbia, in the 1960s

J. Mark Hipfner$^{1,3}$ and Moira Galbraith$^2$

Similar current and historical PSL diets
Microplastics in PSL stomachs
Example: 4 Nov 2015 near James Island, BC
Measurements of plastic filaments
Microplastic filaments in PSL

• PSL 65mm - 117mm

• 85 % (17/20) of PSL contained colored plastic filaments

• Mean filament length 2.14 mm (0.59 mm to >10mm, subsample n = 38 pieces).

• 1 - 63 pieces per fish (grand total of 211 filaments)
High microplastics in the Salish Sea

- large concentrations of plastic filaments (2877/m³)
- 0.1mm - 0.5mm (42%) 0.5mm - 1mm (27%) >1mm (31%)
BAZAN BAY Wastewater outfall is in the IBA

http://crdcommunitygreenmap.ca/location/saanich-peninsula-wastewater-treatment-plant

Saanich Peninsula Wastewater Treatment Plant

The Saanich Peninsula Treatment Plant serves North Saanich, Central Saanich and the Town of Sidney as well as the Victoria International Airport, the Institute of Ocean Sciences and the Tseycum and Pauquachin First Nations communities. The plant discharges secondary treated wastewater through a multi-port outfall into Bazan Bay about 25 metres below sea level and almost 1.6 kilometres offshore. Monitoring includes testing for priority substances every three months and for nutrients every month, checking surface water quality monthly, studying the seafloor and the health of organisms living near the outfall every four years, and regular analysis of wastewater to ensure compliance with performance parameters. The quality of the biosolids produced at this treatment plant is monitored on a monthly basis. For more information please see the Saanich Peninsula Treatment Plant 2011 Annual Report.

Region:
- Central Saanich

Location type:
- Waste Water Treatment Plant

Address:
Canada
Conclusion

• High densities of plastic in the guts of a key forage fish in an Important Bird Area indicates the large potential for transfer of microplastics into the food web to upper trophic levels.
Acknowledgements

• CCG ‘Otter Bay’ Captain Al Keene
• CHS Craig Lessels, Dave Jackson
• EC Greg Jones
• NRCan Greg Middleton
• ‘Misty Lady’ Captain Bruce Evans
• EC CWS & WRD $