Apr 5th, 4:30 PM - 4:45 PM

Microplastics contamination in blue mussels (Mytilus edulis (L.)) and marine sediments along the coast of British Columbia, Canada

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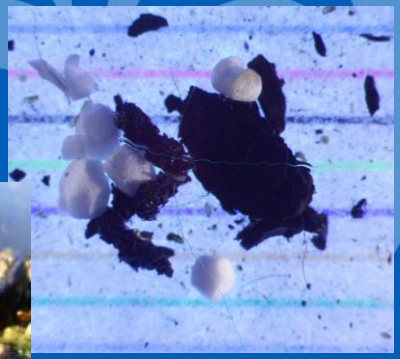
Microplastics contamination in blue mussels (*Mytilus edulis* (L.)) and marine sediments along the coast of British Columbia, Canada
- Preliminary results



Mégane Néauport

Marie Noel, Anahita Etemadifar and Peter Ross

Salish Sea Ecosystem Conference, April 5th 2018

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Microplastics…?

- Plastic particle < 5 mm
- Different polymers
- Different shapes : fibre, fragment, pellet, sheet…

Primary microplastics and Secondary microplastics

Manufactured as such

From the fragmentation of larger plastic items

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Primary microplastics and Secondary microplastics

Manufactured as such

From the fragmentation of larger plastic items

Threats ?

- Found everywhere
- Can serve as a matrix to bind and transport chemicals
- Ingested by organisms
- Accumulate up the food chain

Cole *et al.*, 2013

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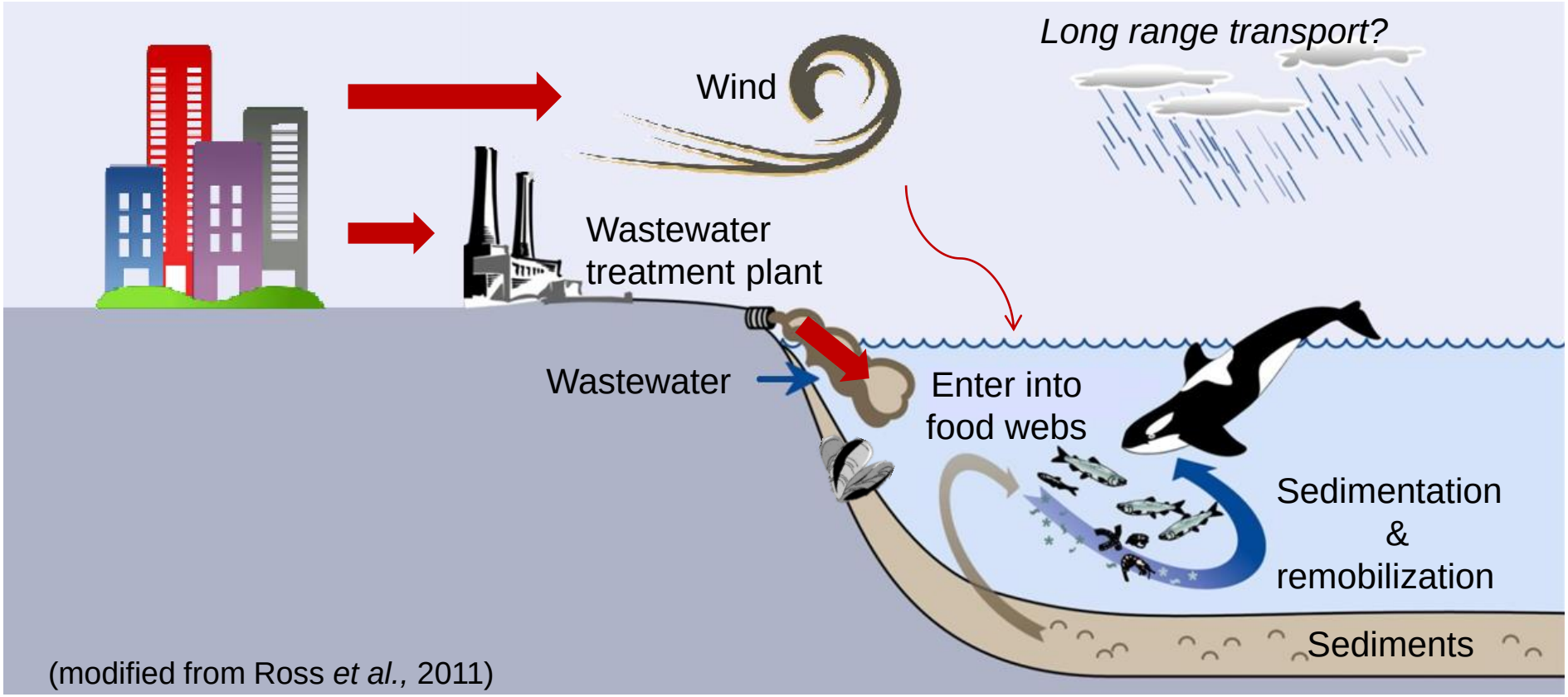
Microplastics are found in all ecosystems



(modified from Ross *et al.*, 2011)

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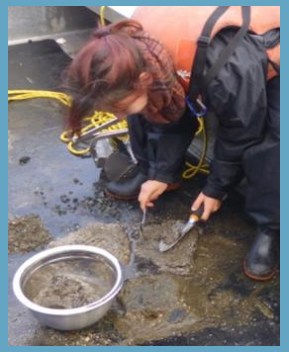
Mussels and sediments were collected for the *PollutionTracker* project

SEDIMENTS

- A sink for contaminant
- Sediment Quality Guidelines
- Links to food web
- Management tool



MUSSELS

- Filter large volumes of water
- Bio indicator for pollution
- Used internationally for coastal monitoring

COLLECTION

Sediments from 5-20 m depth in nearshore waters with a petit ponar

Mussels within 2 km of the sediment sites

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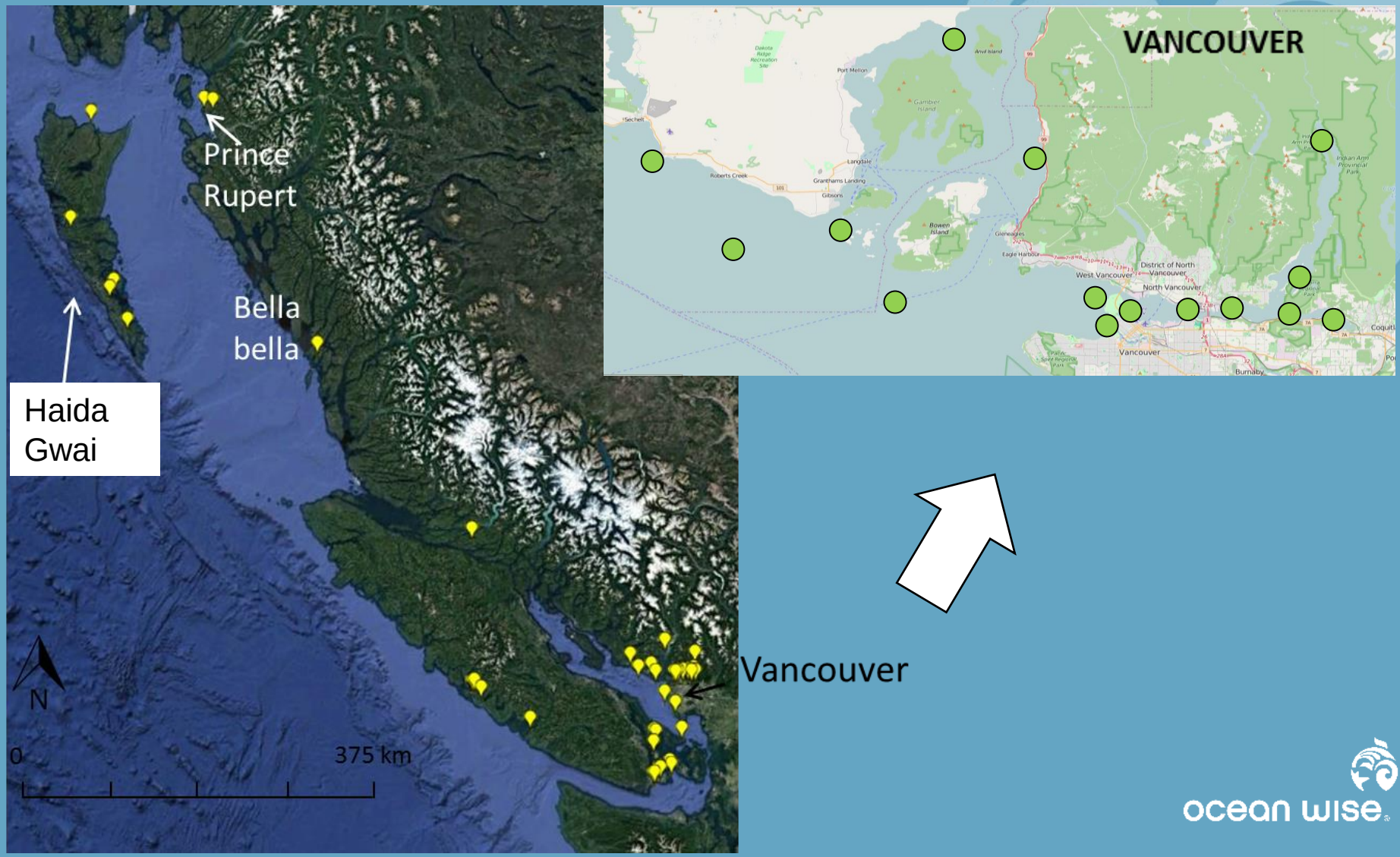
pollutiontracker.org

Samples were collected at 55 sites along the BC coast

51 sediment samples and 33 mussel samples



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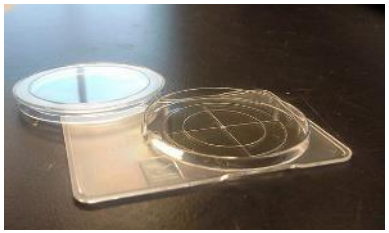
1) Microplastic extraction

Contamination

- Reduction

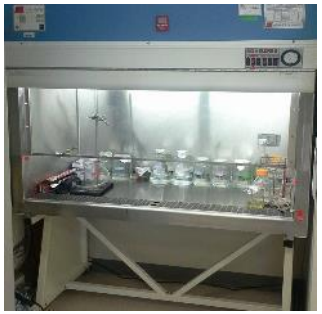
  (flowhood, cotton coveralls, all liquid filtered, glassware rinsed, strict cleaning protocol)



- Assessment

  Procedural blanks + Background blanks

1) Microplastic extraction



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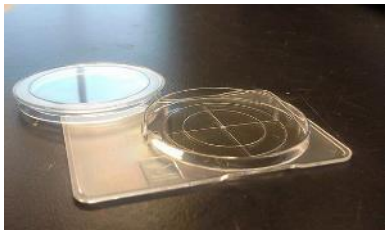

- Assessment

  Procedural blanks + Background blanks

Sediments

- 50 g
- Oil extraction

Crichton *et al.*, 2017

Mussels

- 4 mussels/site
- Enzymatic digestion – Corolase

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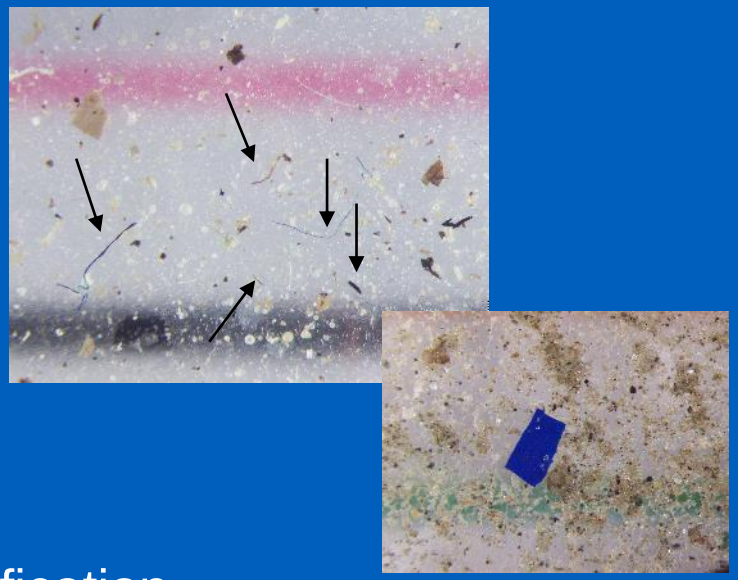
2) Microplastic identification

Visual inspection → **light microscopy**



*****Shape

*Size

*Colour

Confirmation plastic or not ? + particle identification

↳ **FTIR** (Fourier-Transform Infrared Spectrometry)

37 % of the anthropogenic particles were actually plastics

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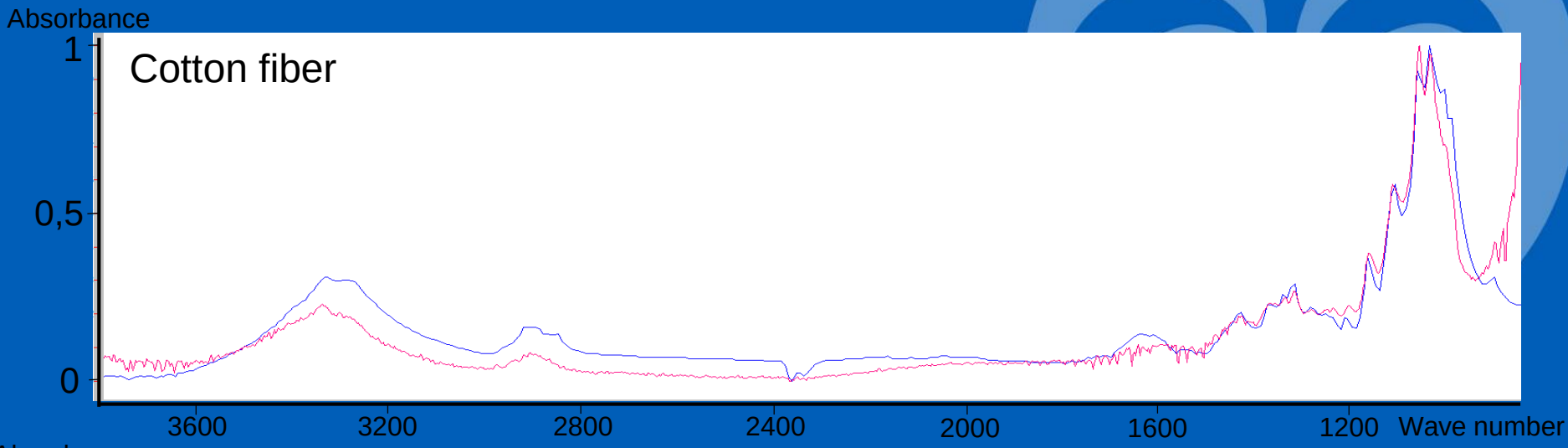
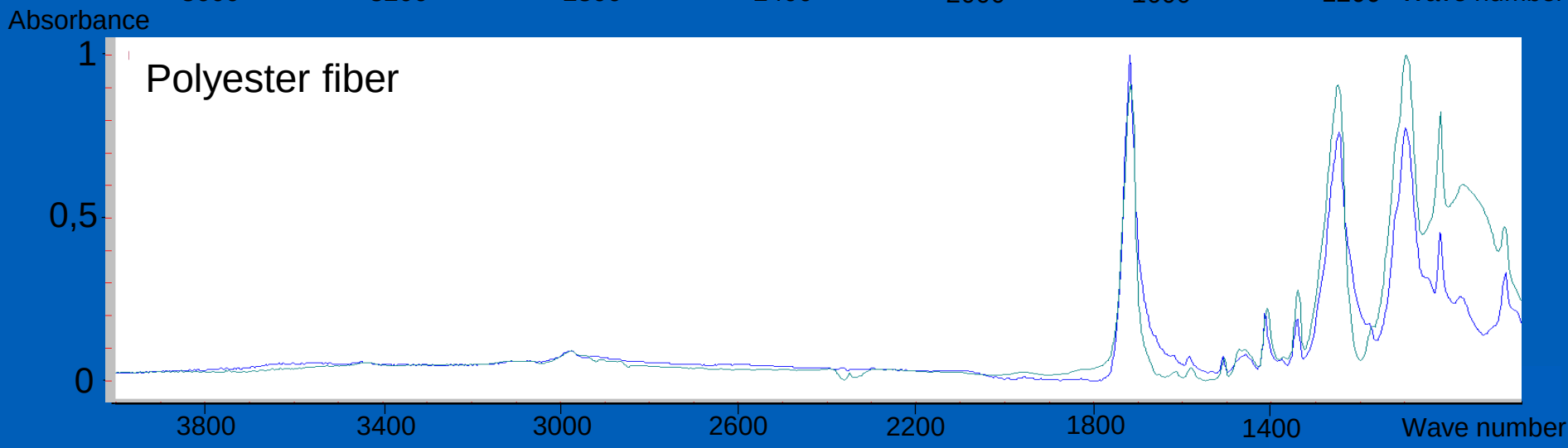
2) Microplastic identification : FTIR

Modified from Vianello, 2017

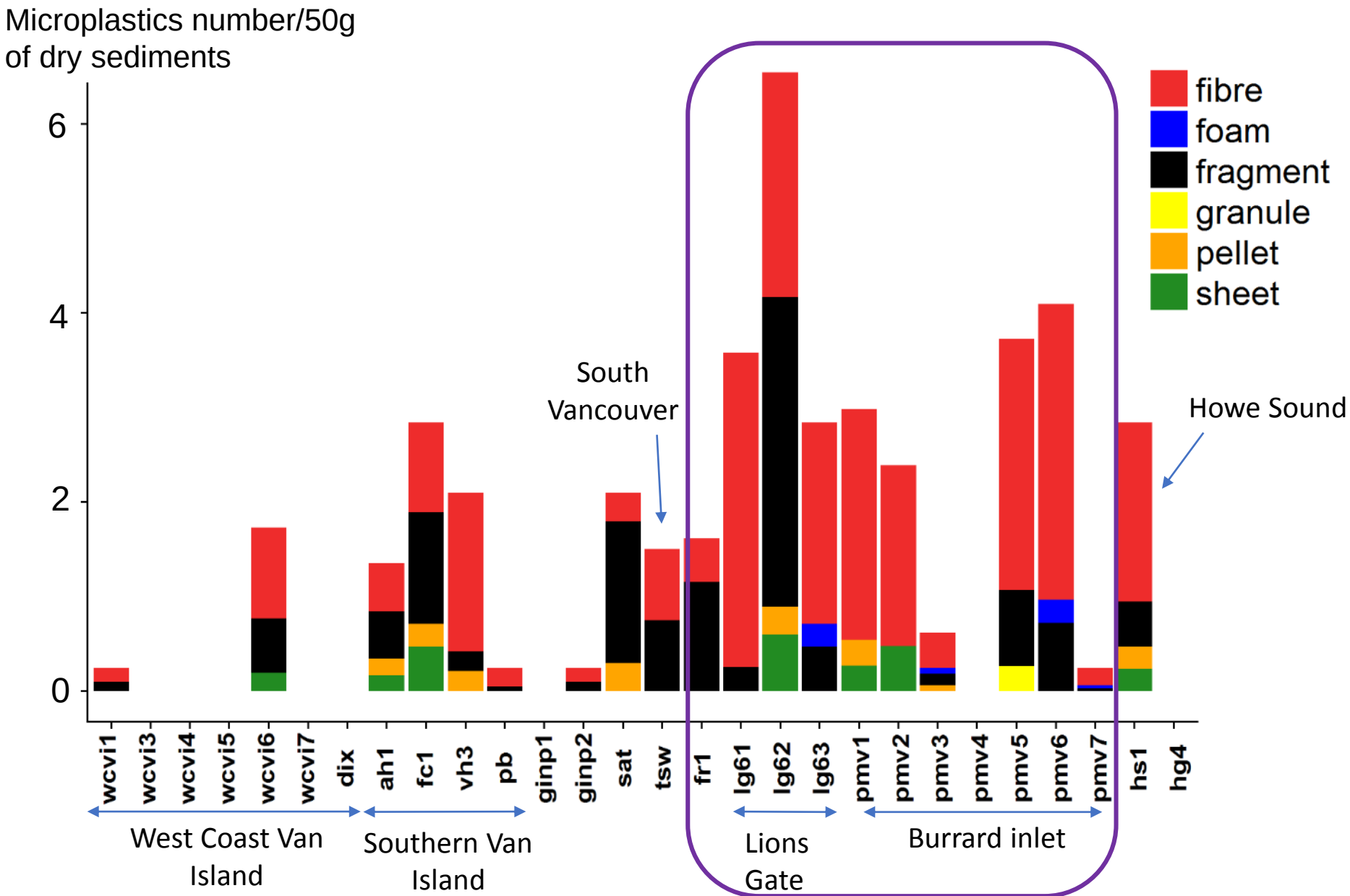
2) Microplastic identification : FTIR



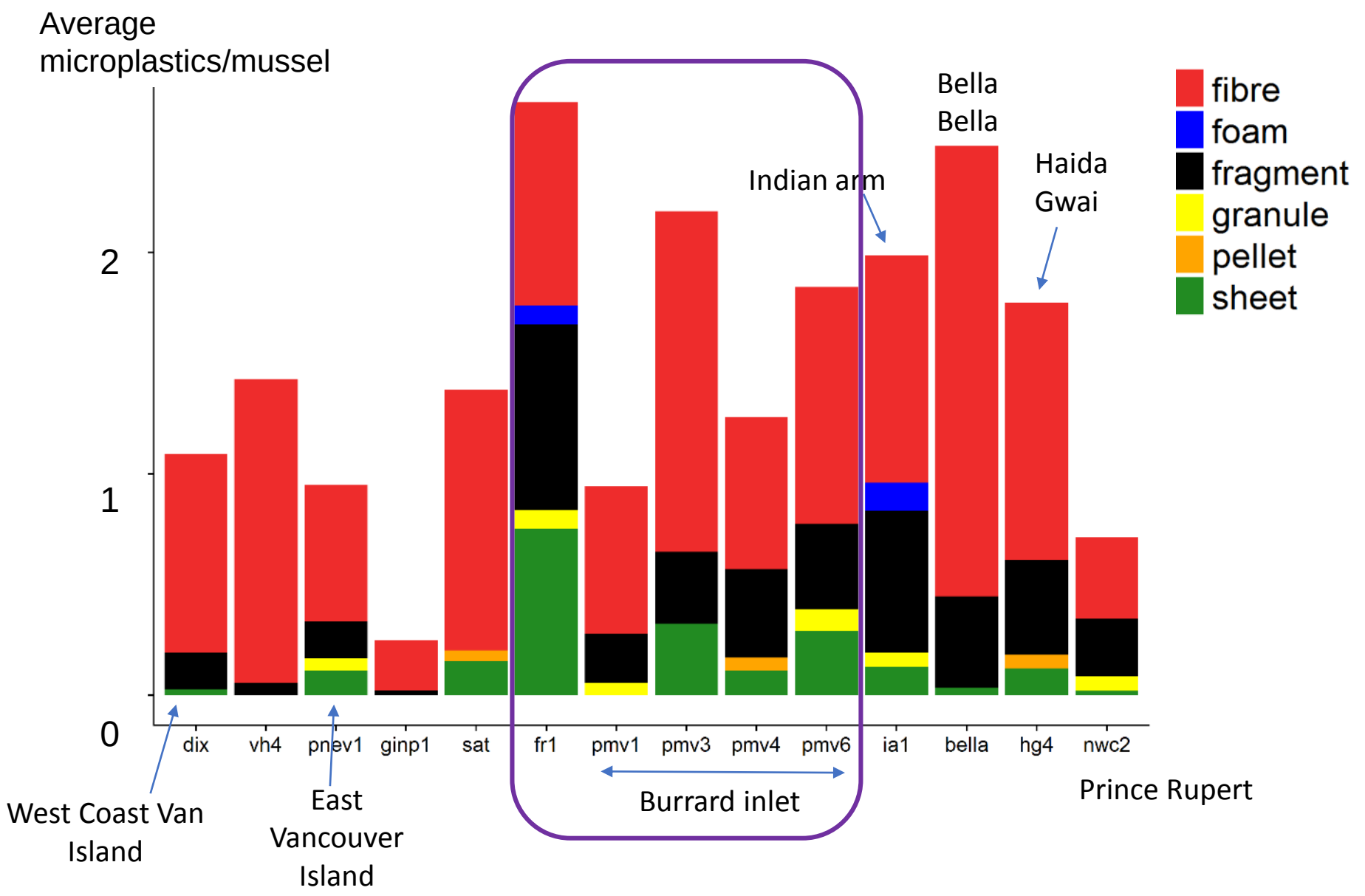


Modified from Vianello, 2017

Microplastics in sediments were dominated by fibres and fragments



On average mussels have < 3 microplastics per individual



Conclusion

- Higher concentration in urban sediment compared to remote areas
  - → Low concentration compared to global trends
- Low number in mussel similar to global trends (Catarino *et al.* 2018)
- Fibres and fragments are the most common microplastics found in sediments and mussels
- **Further steps:**
  - More mussels to be analyzed per site
  - Further polymer identification

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Thank you for your attention

Thank you to *PollutionTracker* partners, funders and everyone from the OPRP laboratory

References

- Catarino Ana I., Macchia Valeria, Sanderson William G., Richard C. Thompson and Henry Theodore B., 2018. Low levels of microplastics (MP) in wild mussels indicate that MP ingestion by humans is minimal compared to exposure via household fibres fallout during a meal. Environmental Pollution 237 (2018) 675e684.
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- Desforges J.P., Galbraith M., Dangerfield N. & Ross P., 2014. Widespread distribution of microplastics in subsurface seawater in the NE Pacific Ocean. Marine Pollution Bulletin 79: 94-99. doi:10.1016/j.marpolbul.2013.12.035