MICROPLASTICS IN THE MOUNTAINS?

Represented by:
ERIN COOPER

MICROPLASTICS IN THE MOUNTAINS?
AN OVERVIEW

- What is the Inland Ocean Coalition?
- 2017-2018 Limited Pilot Study
- “Phase 2” development
- Future project phases, goals
- Community Input - from you!
BUT YOU AREN’T NEAR THE OCEAN...

...said lots of folks
OUR MISSION
To create an inland movement that builds land-to-sea stewardship

OUR VISION
For individuals and communities to take an active role in improving the impacts and relationships between inland regions, the coasts, and the ocean
YOU DON’T HAVE TO SEE THE OCEAN TO PROTECT IT.

Vicki Nichols Goldstein, Founder & ED
IT STARTED WITH A QUESTION...

Are there microplastics in Colorado’s headwaters?
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Are there microplastics in Colorado’s headwaters?

According to our limited pilot study, most likely.
THE LIMITED PILOT STUDY

MICROPLASTICS PILOT STUDY

- Ten samples collected by IOC Advisory Board members (citizen scientists) in summer 2017
- Exploration of future study design
- IOC partnered with the Shaw Institute for lab analysis
- Report finalized in spring 2018
ASSESSING MICROPLASTICS IN COLORADO WATERS

Project Aims:

- Design a study
- Explore the presence/absence of microplastics in freshwater rivers in the Front Range (South Platte river watershed)
- If present, at what concentrations?
- Urban/rural differences
- Is there an impact from wastewater treatment plants?
- Should presence raise concerns for residents?
THE LIMITED PILOT STUDY

METHODS

- Samples from South Platte River, Boulder Creek, and tributaries
- Ten 2-liter surface samples collected at 6 locations
  - Glass jars, rinsed & filled according to Shaw Institute protocol
- Jars labeled & shipped to Maine from Colorado
**METHODS (cont.)**

- Jars vigorously shaken to homogenize samples
- Vacuum filtration, 0.45 µm gridded membrane filter
- Hot-needle test
- Twice-filtered distilled water used as processing controls
- Five analyzed samples included in final report
Sites included in lab analysis = ★ ★ ★ ★ ★
<table>
<thead>
<tr>
<th>Site Name</th>
<th>Site Type</th>
<th>Lat.</th>
<th>Long.</th>
<th>Elev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Fork</td>
<td>Rural High</td>
<td>39° 57' 5&quot; N</td>
<td>105° 41' 7&quot; W</td>
<td>11,568'</td>
</tr>
<tr>
<td>Middle</td>
<td>Alpine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boulder Creek</td>
<td>Rural High</td>
<td>39° 58' 27&quot; N</td>
<td>105° 36' 29&quot; W</td>
<td>9,633'</td>
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<tr>
<td></td>
<td>Alpine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mt. Bierstadt</td>
<td>Rural High</td>
<td>39° 35' 43&quot; N</td>
<td>105° 41' 44&quot; W</td>
<td>11,519'</td>
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<tr>
<td>(Bear Creek)</td>
<td>Alpine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boulder WWTP</td>
<td>Urban</td>
<td>40° 3' 0&quot; N</td>
<td>105° 10' 51&quot; W</td>
<td>5,117'</td>
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<tr>
<td>Convergence</td>
<td>Metropolitan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greeley Convergence</td>
<td>Urban</td>
<td>40° 23' 45&quot; N</td>
<td>104° 38' 16&quot; W</td>
<td>4,656'</td>
</tr>
<tr>
<td></td>
<td>Metropolitan</td>
<td></td>
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</table>
DATA WE GATHERED

## Microplastic Counts per Liter Water

<table>
<thead>
<tr>
<th>Location</th>
<th>Count (Particles/Liter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bob Lake</td>
<td>0*</td>
</tr>
<tr>
<td>North Fork Middle Boulder Creek</td>
<td>36</td>
</tr>
<tr>
<td>Mt. Bierstadt</td>
<td>0*</td>
</tr>
<tr>
<td>Downstream Boulder Creek WWT</td>
<td>34</td>
</tr>
<tr>
<td>Greely - River Convergence</td>
<td>17</td>
</tr>
</tbody>
</table>

*Note: Values marked with an asterisk (*) represent zero or very low detection levels.*
FINDINGS & CONCLUSIONS

- Higher counts in rural alpine site
- Atmospheric deposition a possible source?
- Not enough sampling to indicate influence of WWTPs or tap water
- Shaw Institute recommendation: More extensive study needed!
MORE EXTENSIVE STUDY NEEDED:

- Environmental distribution, pathways, & major sources of microplastics in inland freshwater ecosystems
- Contamination of potable & non-potable water
- Uptake rates, tissue concentrations, & potential toxic effects of microplastics in fish and wildlife
ENTERING PHASE 2

- Working group established to lead research & fundraising efforts
- Literature review underway
- Initial seed funding for sampling & lab analysis secured - additional funds for more extensive sampling dataset still needed
- Summer & Fall 2019 set to begin large-scale redesign of pilot study
- GOALS: Proceed with a chosen sampling methodology & develop a robust dataset
PHASE 3 - EDUCATION & OUTREACH

- Citizen science & community engagement
- Public education & outreach on local plastic issues

PHASE 4 - POLICY

- Take concerns to state leaders & industry reps
- Address plastic issues on a larger scale
WANT TO HELP US?

- Seeking insights on freshwater sampling methodologies
- Presence/absence
- Site determination
- Successes & failures

Let us know!
THANK YOU!

Interested in learning more or contributing?

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