Twice as nice?

A Longitudinal Field Study of Separate vs. Combined Nudges for Household Laundry Behaviours

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Context

- Laundry represents about 19% - 28% of home energy use (in houses using electric water heating)

- Little research on changing laundry behaviour

- Identifiable via spikes in metered data (in theory)

- "Petri dish" to test nudges

Key Questions

- How to nudge *sustainable* behaviour change?

- Better to use "prosocial" motivation, "pro-self" motivation, or both together?

- Better to request many behaviour changes, or focus on one?

Pilot Surveys

- Perhaps a *decal* on the laundry machine could provide a lasting nudge?
  - Constant reminder
  - Attractive
  - Low-cost
  - What's the right message?
- 6 pilot surveys (Feb 2021 – Apr 2021) pre-tested ideas via hypothetical scenarios with online samples from Prolific.co
  - Financial appeals were not effective (e.g., "Change your laundry habits to reduce your costs by $2,129 over 10 years!")
  - Climate appeals were not effective (e.g., "Change your laundry habits to reduce your CO_2 by 95,287 grams over 10 years!")

Methods

Study Design: Participants

- 1,210 BC Hydro customers recruited from BC Hydro's Team Power Smart program and completed the first survey

- Follow-up surveys every 3 months, for 1 year total

- Must have Washing Machine & Clothes Dryer and pay BC Hydro bill

- 64% women, mean age = 57

Target Laundry Behaviours

- Re-wear

- Combine loads

- Use cold water

- Hang dry clothes

Study Design: Overview

- **Six intervention conditions:**
    1. Control (no decal)
    2. Control (QR logging decal)
    3. Decal: Turtle appeal to change 4 behaviours
    4. Decal: Fleece appeal to change 4 behaviours
    5. Decal: Turtle + fleece appeal to change 4 behaviours
    6. Decal: Turtle + fleece appeal to hang dry
- **Four types of measures:**
    1. **Intentions** to re-wear, combine loads, cold water, hang-dry
    2. Retrospective **self-reports** every 3 months
    3. Ongoing **log** of laundry behaviour for one year
    4. Energy **meter data** (hourly level) for one year, including 1-year prior history

Control (no decal)

Control (logging decal only)

As part of your participation in this study, we will mail you a decal to put on your washer or dryer, which will look like the following:

bit.ly/ubchydro1

Sea Turtle + Bundled

When you machine wash and dry your clothes with hot water and hot air, "microplastics" come out of your clothes. In fact, experts say that between 700,000 and 12 million microfibres can be shed during one single load of laundry. **It is estimated that laundry is responsible for 35% of microplastics in our oceans, seriously harming sea turtles and other marine life.**

You can save our planet by:
- Re-wearing clothes more often
- Combining loads to run fewer, larger loads of laundry
- Washing laundry with cold water, rather than hot water or warm water
- Hanging clothes to dry (inside or outside), rather than machine-drying clothes

As part of your participation in this study, we will mail you a decal to put on your washer or dryer, which will look like the following:

Save our planet!
Fight microplastics!

A REQUEST FROM A SEA TURTLE
"Please re-wear, combine loads, use cold water & hang dry. Thank you!"

bit.ly/ubchydro2

Clothing + Bundled

When you machine wash and dry your clothes with hot water and hot air, "microplastics" come out of your clothes. In fact, experts say that between 700,000 and 12 million microfibres can be shed during one single load of laundry. **This breaks down the fabric in your clothes, damaging it and shortening the amount of time you'll be able to enjoy wearing it.**

You can save your clothes by:
- Re-wearing clothes more often
- Combining loads to, run fewer, larger loads of laundry
- Washing laundry with cold water, rather than hot water or warm water
- Hanging clothes to dry (inside or outside), rather than machine-drying clothes

As part of your participation in this study, we will mail you a decal to put on your washer or dryer, which will look like the following:

Save your clothes!
Fight microplastics!

A REQUEST FROM YOUR CLOTHES
"Please re-wear, combine loads, use cold water & hang dry. Thank you!"

bit.ly/ubchydro3

Turtle + Clothing + Bundled

When you machine wash and dry your clothes with hot water and hot air, "microplastics" come out of your clothes. In fact, experts say that between 700,000 and 12 million microfibres can be shed during one single load of laundry. **This breaks down the fabric in your clothes, damaging it and shortening the amount of time you'll be able to enjoy wearing it. It is also estimated that laundry is responsible for 35% of microplastics in our oceans, seriously harming sea turtles and other marine life.**

You can save your clothes and save our planet by:
- Re-wearing clothes more often
- Combining loads to, run fewer, larger loads of laundry
- Washing laundry with cold water, rather than hot water or warm water
- Hanging clothes to dry (inside or outside), rather than machine-drying clothes

As part of your participation in this study, we will mail you a decal to put on your washer or dryer, which will look like the following:

Save your clothes!
Save our planet!
Fight microplastics!

A REQUEST FROM YOUR CLOTHES & A SEA TURTLE
"Please re-wear, combine loads, use cold water & hang dry. Thank you!"

bit.ly/ubchydro4

Turtle + Clothing + Hang Dry

When you machine wash and dry your clothes with hot water and hot air, "microplastics" come out of your clothes. In fact, experts say that between 700,000 and 12 million microfibres can be shed during one single load of laundry. **This breaks down the fabric in your clothes, damaging it and shortening the amount of time you'll be able to enjoy wearing it. It is also estimated that laundry is responsible for 35% of microplastics in our oceans, seriously harming sea turtles and other marine life.**

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-   Hanging clothes to dry (inside or outside), rather than machine-drying clothes

As part of your participation in this study, we will mail you a decal to put on your washer or dryer, which will look like the following:

Save your clothes!
Save our planet!
Fight microplastics!

A REQUEST FROM YOUR CLOTHES & A SEA TURTLE
"Please hang dry.
Thank you!"

bit.ly/ubchydro5

Results

Intentions to engage in efficient laundry behaviours

Label	Cold Water
Control (n=217)	3.35
QR Scan Only Control (n=185)	3.25
Sea turtle + bundled msg (n=189)	$3.61_{1\ 2}$
Fleece + bundled msg (n=200)	$3.58_{1\ 2}$
Sea turtle + fleece + bundled msg (n=184)	$3.60_{1\ 2}$
Sea turtle + fleece + hang dry msg (n=189)	$3.56_{1\ 2}$

Note: Participants answered on a 1-5 scale from 1="much less often" to 3="the same" to 5="much more often". Subscripts indicate significant difference from control (1) or QR scan only control (2).
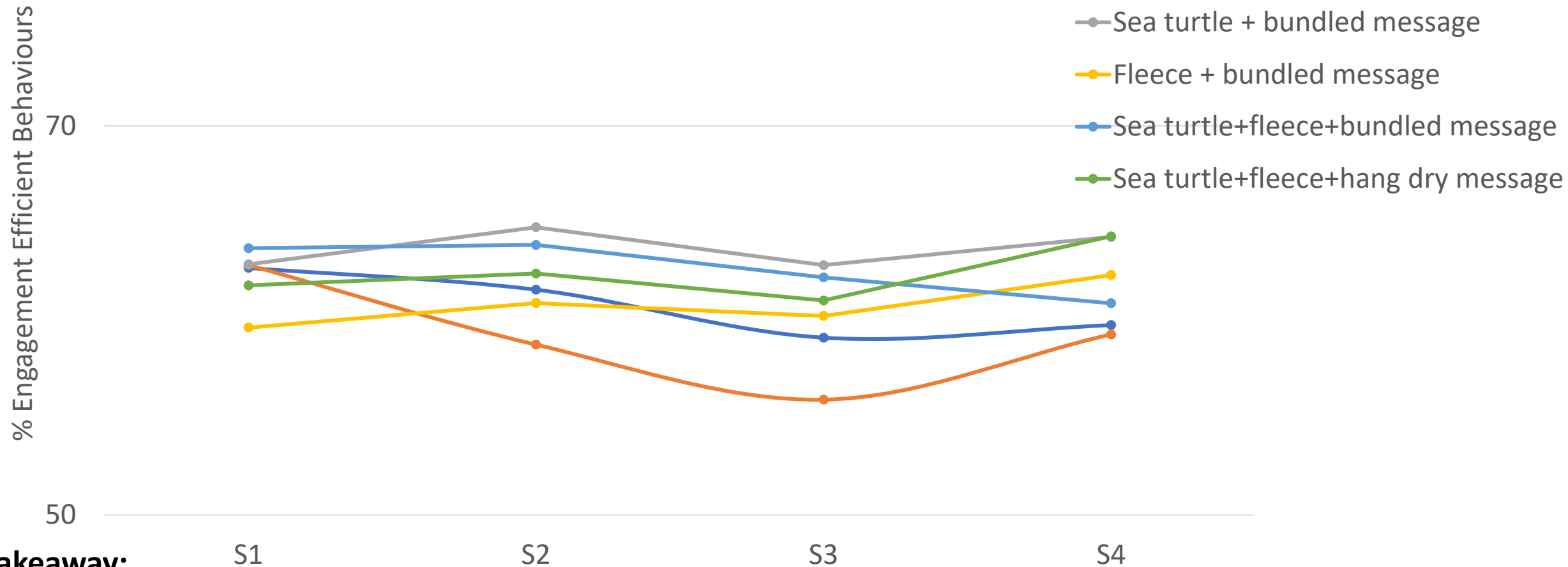
Intentions to engage in efficient laundry behaviours

Summary:

- All decals increased intentions to improve behaviours

- Roughly equally effective on intentions

Retrospective Self-reports

% Engagement Efficient Behaviours

Legend:
- Control
- QR Scan Only Control
- Sea turtle + bundled message
- Fleece + bundled message
- Sea turtle+fleece+bundled message
- Sea turtle+fleece+hang dry message

Y-axis: 70, 50

X-axis: S1, S2, S3, S4

Takeaway:
From S1 to S4, participants were marginally less likely to report engaging in laundry efficient behaviours for the control conditions ($ps <.1$). "Sea turtle+fleece+hang dry" message and "Sea turtle+bundled" message were marginally more effective than control conditions at S4 ($ps <.1$)
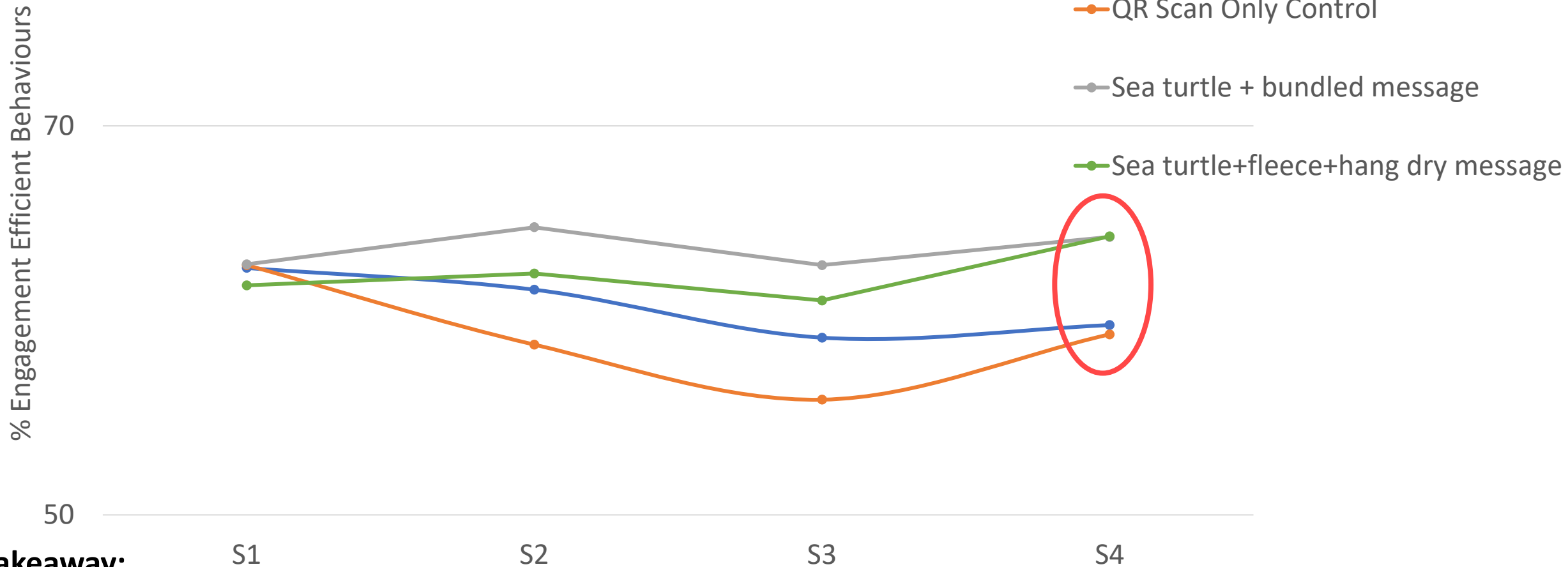
BIG Difference BC 2022

Retrospective Self-reports

Takeaway:
From S1 to S4, participants were marginally less likely to report engaging in laundry efficient behaviours for the control conditions ($ps < .1$). "Sea turtle+fleece+hang dry" message and "Sea turtle+bundled" message were marginally more effective than control conditions at S4 ($ps < .1$)

Retrospective Self-reports

Summary:

- Two decal messages marginally improved self-reported behaviours:
  Microplastics turtle + bundled msg
  Microplastics turtle + fleece+hang-dry msg

Behaviour Logging

Condition	n	Total Washed	Total Dried	Ratio (Dried / Washed)
Control (Decal)	137	72.6	56.4	0.77
Turtle + Bundle	125	50.2***	34.9***	0.68*
Clothes + Bundle	113	67.5	51.8	0.75
Turtle + Clothes + Bundle	109	63.4	46.1†	0.73
Turtle + Clothes + Hang Dry	127	64.2	39.4**	0.63***

Symbols indicate significant differences from control. † $p < .1$, ** $p < .01$, *** $p < .001$

Behaviour Logging

- **Summary:**

Two decal messages improved logged behaviours over time:
Microplastics turtle + bundled msg decreased washing and drying
Microplastics turtle + fleece+hang-dry msg decreased drying

Energy Meter Results: kWh per Day across all participants

Condition	Pre	Post	Change
Control (No survey)	22.74	23.36	0.62
Control (No decal)	21.21	21.54	0.32
Control (QR decal)	22.93	23.14	0.21
Turtle + Bundle Msg	23.02	23.79	0.77
Fleece + Bundle Msg	22.04	22.77	0.72
Turtle + Fleece + Bundle Msg	21.26	22.16	0.9
Turtle + Fleece + Hang Dry Msg	22.06	22.54	0.48

NOTE: No significant differences across conditions

Energy Meter Results: kWh for logging participants

Condition	n	Total Energy	Wash Energy	Dry Energy	Dry Ratio
Control (Decal only)	94	15,168	139	121	0.81
Turtle + Bundle Msg	91	14,704	105[†]	79[*]	0.68[**]
Fleece + Bundle Msg	98	15,778	141	121	0.8
Turtle + Fleece + Bundle Msg	72[*]	14,240	102[†]	82[*]	0.79
Turtle + Fleece + Hang Dry Msg	92	14,410	122	86[*]	0.69[**]

Symbols indicate significant differences from control. † $p < .1$, * $p < .05$, ** $p < .01$

Metered efficient laundry behaviours

- No significant change in total energy usage, but when isolating laundry times, three condition were effective:

  Turtle + bundled msg

  Turtle + fleece + bundled msg

  Turtle + fleece + hang dry

Summary & Conclusions

Summary: Decal Effectiveness vs Control

Condition	Intentions	Self-report	Logged Washing	Logged Drying	Metered Washing	Metered Drying
Turtle + Bundle	✓	✓	✓	✓	†	✓
Fleece + Bundle	✓					
Turtle + Fleece + Bundle	✓				†	✓
Turtle + Fleece + Hang Dry	✓	✓		✓		✓

Conclusions

In the context of a motivated sample of BC laundry doers, over a period of one year:

- Decals can be an effective nudging tool for sustaining energy efficient behaviour over time; serves as a constant reminder & motivation; attractive image is important; could be extended to other behaviours

- Intentions are not a reliable guide to real environmental behaviour

- Changes in laundry behaviours were not detectable in total household energy usage

Save our planet! Fight microplastics!

A REQUEST FROM A SEA TURTLE
"Please re-wear, combine loads, use cold water & hang dry. Thank you!"

bit.ly/ubchydro2

Conclusions

- Most effective: combining a single, novel motivator (microplastics turtle) with **multiple behaviour change requests**

- Not so effective in this context: financial information, climate information

- Sometimes energy motivations are not the best way to change energy behaviours!

- Not all environmental motivators are the same

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Fight microplastics!

A REQUEST FROM A SEA TURTLE
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bit.ly/ubchydro2

Thank you!

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