

Marine Pollution Bulletin

Plastic cigar tips debris: Exploring use and disposal issues for Lake Erie beaches

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Abstract

Great Lakes states are increasingly faced with questions regarding how plastic debris is impacting marine and coastal ecosystems. This is especially evident along the southern beaches of Lake Erie, where high population and industrial development have contributed to the plastics problem. In Ohio, the most common items found are cigarettes and other smoking related materials, including plastic cigar tips. Given the growing awareness of the issue, and the impact of plastics on beaches throughout the Great Lakes, a focus group convened to investigate strategies to help address the problem. The group was comprised of individuals with practical knowledge of plastic cigar tip use and disposal issues, including representatives of government agencies, nongovernmental organizations, community groups, and local academic institutions. This report represents the exploratory results of the focus group, complete with information regarding the *what*, *why*, and *how* of plastic cigar tip debris in the region, guidance on the material and social barriers to sustaining desired behaviors (cessation of use by minors and/or proper disposal), strategies to overcome those barriers, and suggestions for management and policy actions moving forward. Group members suggest that a combination of education and government-supported financial incentives may be the most effective approach, with community-based positive messaging backed by local taxes on smoking items that have plastic tips and rebates or other rewards for properly disposing of debris.

Key Words: Great Lakes, Plastic Marine Debris, Plastic Cigar Tips, Behavior Change

35 **I. Introduction**

36 Great Lakes states are increasingly faced with questions regarding how plastic debris is
37 impacting marine and costal ecosystems. Roughly eighty percent of all trash found on
38 beach cleanups along the Great Lakes is plastic (Driedger et al., 2015). None of the Great
39 Lakes have been under more pressure than Lake Erie, which has recorded the highest
40 concentrations of plastic fragments on public beaches among Lakes Huron, St. Clair, and
41 Erie (Zbyszewski et al., 2014), and the greatest amount of pelagic microplastics between
42 Lakes Superior, Huron, and Erie (Eriksen et al., 2013). Of all the U.S. states that border Lake
43 Erie, Ohio has the most coastline, highest residential land use, and greatest amount of
44 industrial activity within the watershed, all of which contribute to high concentrations of
45 plastic debris on recreational beaches.

46 Cigarettes and other smoking related materials (filters and plastic cigar tips) are the most
47 common litter items found on beach cleanups in Ohio, as reported by the Alliance for the
48 Great Lakes Adopt a Beach program (2017). Such items are thought to come from a
49 combination of recreational beach users, converging surface currents, and urban
50 stormwater runoff (Driedger et al., 2015; Zbszewski et al, 2014; Eriksen et al., 2013).
51 Nowhere are plastic cigar tips more noticeable than on beaches found near Ohio’s largest
52 coastal city, Cleveland, and its surrounding communities. Given the growing awareness of
53 marine-based plastic pollution (Derriak, 2002; Sheavly and Register 2007), and the impact
54 of plastic marine debris around Cleveland and throughout the Great Lakes (Driedger et al.,
55 2015; Eriksen et al., 2013; Hoellein et al., 2015; NOAA, 2014; Zbyszewski et al., 2014), there
56 is mounting support for further research that addresses the issue and offers solutions.

57 The National Oceanic and Atmospheric Administration (NOAA) funded a pilot study in
58 2016 to better understand the barriers and benefits to proper disposal of three plastic
59 marine debris items in northeast Ohio’s Lake Erie basin: plastic shopping bags, water
60 bottles, and cigar tips (Bartolotta and Hardy, 2018). A survey was completed by
61 approximately 1000 individuals in the Cleveland-Elyria-Mentor statistical area, asking
62 questions about consumer habits, policy preferences, and suggestions for supporting
63 positive behaviors regarding the use and proper disposal of the three plastic items. While
64 the results provided important data in support of a municipal social marketing campaign
65 targeting plastic shopping bags and plastic water bottles, only two out of the nearly one
66 thousand survey respondents self-identified as plastic cigar tip smokers. This gap in the
67 data prompted further investigation and forms the basis for this research.

68 In an effort to address the cigar tip issue beyond the survey, a focus group was convened
69 comprising individuals with practical knowledge of plastic cigar tip use and disposal issues
70 in northeast Ohio. Focus groups have been touted for producing insights that come from
71 group interaction, or what Carey (1994) refers to as the “group effect.” This helps to solicit
72 responses from individual members in relation to topics discussed by the group as a whole,
73 and can generate valuable vernacular speech which better relates to localized topics and
74 participants (Tracey, 2013). Such messaging is key to outreach and education campaigns.

75 This report represents the exploratory results of the focus group, complete with
76 information regarding the what, why, and how of plastic cigar tip debris in the region,
77 guidance on the material and social barriers to sustaining desired behaviors (cessation of
78 use by minors and/or proper disposal), strategies to overcome those barriers, and
79 suggestions for management and policy actions moving forward. In a broader sense, this
80 study introduces an emerging environmental issue within the Great Lakes and bodies of
81 water across the globe. One which is proving to be intractable within current governance
82 arrangements and projected to gain greater saliency in the coming years.

83 **2. Plastic cigar debris**

84 Plastic cigar tips are generally made of low-density polyethylene (LDPE), or #4 plastic
85 (Alibaba, 2018). They contain no filter agent and attach directly to the smoking product
86 with which they are being used. They are most commonly used with cigarillos and small
87 cigars (that do not contain a filter) and will float when deposited in water because they
88 have a density of less than 1 g/ml (British Plastics Federation, 2018). However, when they
89 break down into micro-fragments through the process of photo-degradation the plastic has
90 a higher likelihood of sinking. Another reason some of these plastics sink is because of
91 fouling of the plastic from other particles or organisms in the water. As these particles or
92 organisms bind to the plastic fragments they become denser, causing the fragments to sink
93 and reside in sediment.

94 Smokers use cigar tips for practical and aesthetic reasons. Plastic cigar tips serve as a
95 barrier between the cigar or cigarillo and the user's mouth and teeth, which can help
96 prevent staining or discoloration. Since cigarettes have an internal filter, plastic tips are not
97 used as commonly, and serve primarily as a fashion accessory rather than a functional
98 apparatus. Despite the absence of an external plastic filter, it is important to note that
99 improper disposal of cigarettes is also cause for plastic pollution because filters are made
100 of cellulose acetate, a plastic made from cellulose (Novotny et al., 2009; Harris, 2011).

101 In Ohio, 27% of all debris collected during Adopt-a-Beach cleanups is related to smoking
102 activities, with plastic cigar tips comprising 11% of smoking litter compared to 15% for
103 cigarettes/cigarette filters (Alliance for the Great Lakes, 2017). This accounts for a much
104 greater percentage of smoking litter than in other Great Lakes states, where cigar tips have
105 been found to make up only 3% of the litter profile compared to 18% for
106 cigarettes/cigarette filters. When viewed from a regional perspective, Ohio is responsible
107 for 33% of the total cigar tips in the Great Lakes, but only 8.5% of the cigarettes/cigarette
108 filters. Thus Ohio ranks highest among Great Lakes states in terms of the amount of cigar
109 tips on beaches and 4th for cigarettes/cigarette filters (Alliance for the Great Lakes, 2017).

110 **3. Methods**

111 On November 10, 2016 from 10:00 am-12:00 pm a focus group convened in a private
112 conference room at the Watershed Stewardship Center in the Cleveland Metroparks West
113 Creek Reservation. The focus group (from here on referred to as 'the group') followed

114 established social science protocols, including development of an interview guide,
115 participant recruitment, recording and transcription of the group interview, and
116 moderation of the group discussion by a trained facilitator (Creighton, 2005; Bryman,
117 2012; Yin, 2014).

118 Recruitment took place via snowball sampling with the goal of a small, socio-
119 demographically stratified group of stakeholders. The number of participants was
120 purposively capped at eight in an effort to highlight personal accounts and allow the
121 conversation to breathe. Group participants made up a diverse demographic profile,
122 including variety among gender, race/ethnicity, age, and representation. Five of the
123 participants were female and three male. Five were white and three were black/African
124 American. Ages ranged from 20s – 60s. Group members represented institutions of higher
125 learning in the region, government and nongovernmental organizations that manage land
126 in coastal locations where cigar tips are commonly found, and neighborhood
127 representatives from the City of Cleveland where stormwater often contributes to
128 combined sewer overflows that can carry cigar tips from city streets to Lake Erie.

129 A professionally trained moderator facilitated the focus group and all responses were
130 recorded on video and audio, as well as written on large flip charts. The entire group
131 interview was transcribed and coded to reveal trends and themes among responses.
132 Interview questions were developed by the research team and a script was followed to
133 steer discussion among group members. Interview questions can be found in *Appendix A*.

134 Constant comparison, transcript-based analysis was used to analyze the data. First, open
135 coding was used to divide all responses into units with similar content. Next, similar codes
136 were arranged into broad categories for further analysis (axial coding). Finally, the
137 categories were combined into a series of themes that help to describe the main outputs of
138 the session (selective coding) (Strauss and Corbin, 1998; Saldana, 2013). Results are
139 organized around the themes and reported in detail in the *Results* section below.

140 **4. Results**

141 ***4.1 What, Why, and How***

142 The first questions for group discussion centered on the WHAT, WHY, and HOW of plastic
143 marine debris. When asked *what* local residents think about the issue, all agreed that
144 people in Cleveland are well aware and concerned about the abundance of cigar tips found
145 along Lake Erie's shore. When asked *why* this matters, group members suggested that it
146 affects the benefits of living in a community, like neighborhood pride and public health, as
147 well as the social, environmental, and financial viability of local neighborhoods.

148 Community benefits were cited as the biggest reason why this issue matters. Group
149 members felt that addressing the problem with cigar tips would enhance the perception of,
150 and appreciation for, community, family, and personal health. This was suggested to relate
151 to an increased feeling of community and rejuvenated sense of pride in Cleveland.

152 Social benefits were also thought to be important. Reduction of plastic cigar tips was seen
153 as a way to attract more people to Cleveland. ‘The more beautiful the community, the more
154 people would want to visit or live.’ The group also felt cleaner communities could equate to
155 safer communities (e.g., street trees and other vegetation have been linked to reduced
156 crime in some studies (Kuo and Sullivan, 2001; Donovan and Prestemon, 2012).

157 Environmental benefits of reducing cigar tips were also mentioned, and include drinking
158 water improvements, wildlife habitat improvements, cleaner natural spaces, more efficient
159 stormwater management, and safer and healthier fish consumption. Lastly, financial
160 benefits were suggested as a potential outcome. For example, if a cigar tip tax or fee was
161 levied on cigar tip purchases the increase in tax dollars could go back into the community.

162 This leads to the *how* of the matter. How can decision makers successfully combat the
163 growing problem of plastic cigar tips? The group sought to identify barriers to sustainable
164 behavior in terms of convenience of disposal options, social norms for use and disposal of
165 cigar tips, and lack of knowledge of the issue. For this report barriers are broken down into
166 two themes: MATERIAL barriers and SOCIAL barriers.

167 *4.1.1 Material barriers*

168 The most cited material barrier to sustainable disposal of cigar tips was lack of access to
169 smoking receptacles and overall amount of smoking receptacles located in the City. Another
170 potential problem focuses on the type of receptacles - cigarette and cigar tip receptacles are
171 not coupled together, creating a divide between cigarette disposal options and cigar tip
172 disposal options. There are currently no receptacles specifically designed for cigar tips
173 (with targeted outreach messages). An ideal scenario suggested by the group would be
174 increased numbers of smoking receptacles with trash cans specific to cigar tips. The
175 geographical distribution of smoking receptacles was also seen as a problem. Some
176 locations have more receptacles than others. In the words of a focus group participant:

177 *“You put a recycle can next to a regular can and you put the Black & Mild*
178 *canister right on the same post. Everything has to be together to make it work.”*

179 *4.1.2 Social barriers*

180 Social barriers to sustainable behavior were thought by the group to be more formidable –
181 ‘long-term user habits are more difficult to change than infrastructure.’ Furthermore, it’s
182 difficult to reach the young population (under 21) with social marketing because smoking
183 is illegal for that group. They attempt to hide or be inconspicuous about behavior.

184 Another social barrier raised by the group is that youth and minorities do not always
185 respond to technical language (e.g., “marine debris” does not resonate with everyone),
186 although this represents the target user group. Many cigar tip smokers also identify as “ex-
187 smokers” or “social smokers” and use tipped cigars as justification for quitting cigarettes, or
188 only smoke as a group activity with others. As two members of the group noted:

189 *"You could try different types of receptacles with different types of messaging.*
190 *That's what I find, is some of the messaging, especially water quality and*
191 *watershed words, you've got to really simplify and use really basic words that*
192 *people understand when you're talking watersheds."*

193 *"It's interesting because there's this concept of smoker and how people perceive*
194 *themselves but it's just that people no longer think of themselves as smokers*
195 *because they're smoking cigars. They're not really a smoker because they're not*
196 *smoking cigarettes. So there's a group that's kind of [wrong] because of that*
197 *thinking it's safer even though it's not. Um, but there's also a larger portion of*
198 *smokers who are using both cigars and cigarettes and there's also the potential*
199 *for educating on both products."*

200 **4.2 Strategies for behavior change**

201 One of the goals of the focus group was to inform strategies for overcoming the barriers to
202 sustainable behavior for plastic cigar tips (cessation of use by minors and/or proper
203 disposal). Both MATERIAL and SOCIAL approaches were identified by the group that
204 correlate to the barriers described above.

205 *4.2.1 Material strategies*

206 Strategies recommended to overcome the lack of disposal receptacles in the City were
207 predictable - create more designated smoking areas with visually appealing and clearly
208 marked disposal bins for cigar tips (*attached to trash cans/recycle bins). Group members
209 also suggested education and outreach via billboards and public signage. Location is seen
210 as extremely important for such messaging. Identified locations include bus stops or on
211 busses, stores that sell tipped cigars, fast food restaurants, and parks.

212 Group participants also recommended organizing fundraising opportunities and cleanup
213 events to raise awareness. This could include the creation of visually attractive education
214 pieces (e.g. art installations, storm drain stenciling, and signage for disposal bins).
215 According to one group member:

216 *"I do think there's an interesting opportunity right now to work with the*
217 *retailers and do some retailer education to promote appropriate disposal and*
218 *some of the other work that we're doing. We're working with retailers and*
219 *small servers and advertisers at least about a lot of these things. They are*
220 *pretty receptive to educational opportunity and to sharing information with*
221 *their audience or their customers. So they have an opportunity, particularly in*
222 *combination with the tobacco 21 policy change [in April] and the education*
223 *that's happened through that, they've been fairly receptive so maybe something*
224 *present like that as a more effective way to reach folks."*

225 *4.2.2 Social strategies*

226 Similar to the material strategies, the following social strategies were recommended in
227 response to the social barriers listed above. The most important strategy outlined by the
228 group deals with targeting the correct audience. Group members suggested all messaging
229 focus on 14-25 year old black/African Americans and should be distributed via a variety of
230 media. It was noted that social media in particular should include Instagram and Snapchat,
231 not Facebook or Twitter. This concept is a reflection of the age groups who frequent each
232 platform.

233 Continuous education on how to dispose of cigar tips was also seen as essential (e.g.,
234 training manuals for offices, stores, and restaurants that purchase or request disposal
235 units). Group members suggested that outreach should focus on solutions (how/where to
236 properly dispose), rather than the hazards. For all messaging, there needs to be a
237 community-based approach to communicating impacts (positive and negative). One group
238 member summed it up this way:

239 *"I think whatever messaging comes around this has to be really targeted for*
240 *young people in a way that they're going to hear it because that's*
241 *predominantly who in the city of Cleveland and Cuyahoga County is smoking*
242 *these products."*

243 4.2.3 The message

244 Focus group members spoke about the importance of the message. More than anything
245 else, they encouraged decision makers to enhance the connection between swimming and
246 drinking water (i.e. not just a beach issue; this impacts everyone's health). The group also
247 suggested coupling public health and environmental health issues. One idea posits tying
248 outreach to city beautification or Cleveland pride, rather than more traditional tobacco
249 messaging such as slogans that say, "Stop smoking!" Another says that a pop-culture
250 "synergy" would be helpful to recruit celebrity support. In one group member's words:

251 *"I can definitely see, I mean in terms of outreach again, in order to also deal*
252 *with the environment right, we're talking about, you know, yes the people who*
253 *continue to buy them, you know, we want to stop that and we talked about*
254 *public health as well and the environment and propagating that the more that*
255 *if you buy them, the more debris is going into Lake Erie and the more it affects*
256 *public health. I mean, that's just one example of a message to deliver that would*
257 *help the environment and public health."*

258 4.3 Cross-cutting strategies

259 At the end of the session, members of the group offered a few cross-cutting strategies for
260 dealing with the issue of plastic cigar tips. One concrete suggestion was to offer positive
261 incentives, like a reward program for returning used cigar tips, or mail-in monetary
262 rewards. Another idea was to implement a tax increase or a deposit program. Some group
263 members felt it would be helpful to involve the United States Food and Drug Administration
264 (FDA) in the environmental/public health aspect of plastic cigar tips in our waterways.

265 Finally, a few group members agreed that it is important to restrict sales of plastic-tipped
266 cigars to tobacco retailers instead of all stores. One group member explained it this way:

267 *“We have a ratio on tobacco in our tax structure but cigarettes are actually*
268 *taxed much higher than the non-cigarette tobacco products. I think that would*
269 *be a good rationalization for increasing the tax at least on the tipped products*
270 *and gear more from that tax for the work to reduce the trash...”*

271 **5. Discussion**

272 The problem of plastic cigar tip debris accumulating on recreational beaches is not new to
273 the scientific community. Researchers from across the globe have begun to consider the
274 issue, often as part of larger projects dealing with plastic marine debris in general. Recent
275 examples can be seen from studies on the types of marine debris found in coastal wetlands
276 in Northwest Africa (Alshawafi et al., 2017), to the abundance and composition of marine
277 litter on beaches along the Mediterranean Sea (Valavanidis and Vlachogianni, 2011), to
278 sources of plastic debris on beaches in coastal regions of the Far East (Jang et al., 2014).

279 In the Great Lakes, researchers have analyzed plastic marine debris through a broad lens
280 (Driedger et al., 2015). Specific projects have sought to better understand microplastic
281 pollution in surface waters (Eriksen et al., 2013), abundance and environmental drivers of
282 anthropogenic litter (Hoellein et al., 2015); and distribution patterns and composition of
283 plastic debris (Zbyszewski et al., 2014), but no studies to date have specifically explored
284 barriers to sustainable behaviors for plastic cigar tip use and disposal in the region.

285 A focus group comprised of experts in plastic cigar tip disposal and management convened
286 for more than two hours, discussed the causes and complexities of the issue, and came up
287 with a set of recommendations for helping to reduce plastic cigar tip litter in northeast
288 Ohio. Some suggestions were obvious, like ‘creating more designated smoking areas with
289 proper disposal receptacles’ and ‘developing education and outreach on public signage.’
290 Others were more nuanced, like ‘reward programs and mail in rebates, tax increases,
291 deposit programs, and strict age enforcement by vendors.’ Overall, the group’s findings and
292 recommendations were consistent with other research on the topic.

293 For example, when asked why addressing plastic cigar tip debris matters, group members
294 suggested that it affects the benefits of living in a community, like neighborhood pride and
295 public health, as well as the social, environmental, and financial viability of local
296 neighborhoods. This echoes findings from the NOAA Marine Debris Program regarding
297 welfare losses imposed by litter on citizens who use beaches for recreation. That study
298 found that marine debris has a considerable economic impact on residents, and that
299 littered beaches costs local residents millions of dollars each year (Leggett et al., 2014).
300 Others have suggested that plastic debris on beaches will detract tourists from visiting (Jeftic
301 et al., 2009; Kumar et al., 2016), which directly impacts local communities and economies.

302 Strategies suggested by the focus group for mitigating cigar tip litter have also been
303 proposed by others. One prominent study indicates that successfully addressing the marine

304 debris issue will necessitate a combination of education and government intervention
305 (Sheavly and Register, 2007). For cigar tips debris in northeast Ohio, group members said
306 education is key and should take the form of advertisements on billboards at strategic
307 locations such as bus stops, community events like neighborhood beatification fundraisers,
308 and social media prompts. Governments could contribute by installing more disposal
309 receptacles and offering a series of financial incentives to support desired behaviors.

310 Group members further indicated that proper messaging may be the most important
311 consideration to overcoming barriers to sustainable behaviors regarding plastic cigar tip
312 debris. Part of the problem starts with the term “marine debris,” which Driedger and others
313 (2015) say is ambiguous and may cause confusion when referring to lentic environments.
314 Another problem is that the target audience identified by the group (14-25 year old
315 black/African Americans) may not respond to traditional anti-tobacco messaging, such as
316 “Stop smoking” campaigns, or highly technical language often used by the scientific
317 community.

318 The group’s focus on minority youth is corroborated by the Prevention Research Center for
319 Healthy Neighborhoods at Case Western Reserve University, which found that as many 22%
320 of black/African Americans age 18 – 29 in Cleveland smoke little cigars, compared to 5.7%
321 age 30+, or only 2.9% of white residents in the same age group. In addition, the study
322 suggests that education level may contribute to a language barrier among smokers: “little
323 cigar use in adults is significantly more common among those lacking a high school diploma
324 or GED (Bruckman et al., 2013).” Group members sought to address the barrier by
325 educating people about the connection between swimming and drinking water, along with
326 other public health issues, instead of using potentially confusing jargon when talking about
327 “marine debris” or “watershed management.” This turns the problem from a technical one
328 to a social one, and emphasizes the role of community in mitigation strategies.

329 **6. Conclusion**

330 This project introduces an emerging environmental issue in the Great Lakes region,
331 complete with expert opinions regarding its causes and effects on local communities, and
332 suggestions for mitigation strategies for practitioners and policymakers. A combination of
333 education and government-supported financial incentives may be the most effective
334 approach, with community-based positive messaging backed by local taxes on smoking
335 items that have plastic tips and rebates or other rewards for properly disposing of debris.

336 Given the exploratory nature of the study, there are several limitations that are important to
337 note. The most obvious is the small sample size. Data for this report comes from one focus
338 group held with eight individuals. The results would be more impactful if taken from
339 multiple focus groups in different locations, or triangulated with other forms of data
340 collection. Furthermore, only two focus group members self-identified as smokers. It would
341 be interesting to hear directly from cigar-tip smokers, ideally those who do not properly
342 dispose of their used plastic tips. Unfortunately, legal and logistical questions make
343 engaging with this population challenging.

344 Ultimately, this project is a pilot study and would be enhanced by additional research on
345 plastic cigar tip use and disposal in the region. Future studies should seek responses from a
346 larger number of stakeholders, in different locations, and via different methods. It would be
347 ideal if some of those respondents represented the target audience for which this project is
348 focused – plastic cigar tip smokers.

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355 **8. References**

- 356 Alibaba Group. 2018. <www.alibaba.com> Accessed 10/3/2018.
- 357 Alliance for the Great Lakes. 2017. *Adopt a Beach Program Litter Report: Raw Data from*
358 *Great Lakes Beach Cleanups*. Cigar tip percentage calculated by Jill Bartolotta, Ohio Sea
359 Grant College Program and The Ohio State University Extension, October 1, 2018.
- 360 Alshawafi, A., Analla, M., Alwashali, E., and Aksissou, M. 2017. “Assessment of marine debris
361 on the coastal wetland of Martil in the North-East of Morocco.” *Marine Pollution Bulletin*,
362 117 (1-2) 302-310.
- 363 Bartolotta, J., and Hardy, S. 2018. “Barriers and Benefits to Desired Behaviors for Single Use
364 Plastic Items in Northeast Ohio’s Lake Erie Basin.” *Marine Pollution Bulletin*, 127: 576-585.
- 365 British Plastics Federation. 2018. Polyethylene (Low Density) LDPE, LLDPE. Retrieved from
366 <http://www.bpf.co.uk/plastipedia/polymers/LDPE.aspx>. Accessed August 20, 2018.
- 367 Bruckman, D., Trapl, E.S., Jewett-Tennant, J., and Borawski, E. 2013. “Data Brief: Little Cigar
368 Use in Cleveland Neighborhoods, (2005-2009).” Cleveland, OH: Prevention Research
369 Center for Healthy Neighborhoods at Case Western Reserve University.
- 370 Bryman, A. 2012. *Social Science Methods*, 4th Edition. Oxford, UK: Oxford University Press.
- 371 Creighton, J.L. 2005. *The Public Participation Handbook: Making Better Decisions Through*
372 *Citizen Involvement*. San Francisco, CA: John Wiley and Sons, Inc.
- 373 Derraik, J.G., 2002. The pollution of the marine environment by plastic debris: a review.
374 *Mar. Pollut. Bull.* 44 (9), 842–852.
- 375 Donovan, G., and Prestemon, J. 2012. “The effect of trees on crime in Portland, Oregon.”
376 *Environment and Behavior*, 44(1): 3-30.
- 377 Driedger, A.G.J., Durr, H.H., Mitchell, K., and Cappellen, P.V. 2015. “Plastic Debris in the
378 Laurentian Great Lakes: A Review.” *Journal of Great Lakes Research*. 41 (1): 9-19.

379 Eriksen, M, Mason, S., Wilson, S., Box, C., Zellers, A., Edwards, W., Farley, H., and Amato, S.
380 2013. "Microplastic pollution in the surface waters of the Laurentian Great Lakes." *Marine*
381 *Pollution Bulletin*, 77: 177-182.

382 Harris B. 2011. "The intractable cigarette 'filter problem'." *Tobacco Control*. 20(Suppl
383 1):10i-i16.

384 Hoellein, T.J., Westhoven, M., Lyandres, Ol, and Cross, J. 2015. "Abundance and
385 environmental drivers of anthropogenic litter on 5 Lake Michigan beaches: A study
386 facilitated by citizen science data collection." *Journal of Great Lakes Research*, 41(1) 78-86.

387 Jang, Y.C., Lee, J., Hong, S., Su Lee, J., Joon Shim, W., and Song, Y. 2014. "Sources of Plastic
388 marine Debris on Beaches of Korea: More from the Ocean than the Land." *Ocean Science*
389 *Journal*, 49(2): 141-162.

390 Jeftic, L., Sheavly, S., and Alder, E. 2009. "Marine Litter: A Global Challenge." *United Nations*
391 *Environment Program*, pp. 232. Nairobi, Kenya.

392 Kumar, A., Sivakumar, R., Reddy, Y., Raja, M, Nishanth, T., and Revanth, V. 2016.
393 "Preliminary study on marine debris pollution along Marina beach, Chennai, India."
394 *Regional Studies in Marine Science*, 5: 35-40.

395 Kuo, F., and Sullivan, W. 2001. "Environment and crime in the inner city: Does vegetation
396 reduce crime?" *Environment and Behavior*, 33(3) 343-367.

397 Leggett, C., Scherer, N., Curry, M., and Bailey, R. 2014. "Assessing the Economic Benefits of
398 Reductions in Marine Debris: A Pilot Study of Beach Recreation in Orange County, CA."
399 *NOAA Marine Debris Program & Industrial Economics Inc.*

400 National Oceanic and Atmospheric Administration. 2014. "Great Lakes Action Plan." *NOAA*
401 *Marine Debris Program*. Accessed 5.16.2018.

402 Novotny T.E., Lum K., Smith E., Wang V., and Barnes R. 2009. "Cigarette butts and the case
403 for an environmental policy on hazardous cigarette waste." *International Journal of*
404 *Environmental Research and Public Health*. 6(5):1691-705.

405 Saldana, J. 2013. *The Coding Manual for Qualitative Researchers*. Second Edition. London,
406 England. SAGE Publications, Inc.

407 Sheavly, S.B., and Register, K.M. 2007. "Marine Bebris & Plastics: Environmental Concerns,
408 Sources, Impacts and Solutions." *J. Polym Environ* 15:301-305.

409 Strauss, A., and Corbin, J. 1998. *Basics of qualitative research: Techniques and procedures for*
410 *developing grounded theory*. Thousand Oaks, CA: Sage Publishing.

411 Tracey, S. 2013. *Qualitative Research Methods: Collecting Evidence, Crafting Analysis,*
412 *Communicating Impact*. West Sussex, UK: Wiley Blackwell.

413 Valavanidis, A., and Vlachogianni, T. 2011. "Marine litter: Man-made solid waste pollution
414 in the Mediterranean Sea and Coastline. Abundance, Composition and Sources
415 Identification. <<http://chem-tox-ecotox.org/wp/?p=749>.> Accessed 5/29/2018.

416 Yin, R.K. 2014. Case Study Research Design and Methods. Fifth Edition. Los Angeles, CA.
417 SAGE Publications, Inc.

418 Zbyszewski, M., Corcoran, P.L., Hockin, A., 2014. Comparison of the distribution and
419 degradation of plastic debris along shorelines of the Great Lakes, North America. *J. Great*
420 *Lakes Res.* 40, 288–299.

421 **Appendix A: Focus group questionnaire**

422 1. Did you know that litter in the City of Cleveland is comprised of a large amount of
423 tobacco-related products?

424 2. Would you be surprised to learn that beach cleanups find a large amount of tobacco-
425 related products along the shore?

426 3. What are some ideas you might have about how to encourage smokers to dispose of their
427 products in the trash?

428 4. Do you find existing trash disposal options in the City of Cleveland convenient? If not,
429 what would make it more convenient?

430 5. Do you anticipate that some people would be harder to convince to properly dispose of
431 cigar tips than others? If so, which ones? Why?

432 6. How would improved efforts to reduce plastic cigar tip debris personally benefit you?

433 7. What do you feel is the most effective way for the City of Cleveland to encourage people
434 to properly dispose of their plastic cigar tips? In general, how do you get your information
435 (TV, radio, social media)?

436 8. What, if anything, would make it easier to properly dispose of cigar tips?

437 9. Do you have any additional comments that you would like to share?