

Media framing of the Cayman Turtle Farm: implications for conservation conflicts

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18 6 **AUTHORS:** Jessica M. M. Walker^{1*}, Brendan J. Godley¹, Ana Nuno¹
19
20

21 7 ¹ Centre for Ecology and Conservation, College of Life and Environmental Sciences,
22
23 University of Exeter Cornwall Campus, Penryn, Cornwall TR10 9EZ, UK
24
25

26 9 * Corresponding author
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11 **EMAIL:**

12 Jessica Walker: jessicammwalker25@gmail.com

13 Brendan Godley: b.j.godley@exeter.ac.uk

14 Ana Nuno: a.m.g.nuno@exeter.ac.uk

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1 ABSTRACT

2 Conflicts over natural resource use and management often arise where groups have
3 different goals or priorities. The media can play an important role in these conflicts; it
4 can potentially influence political and public opinion, as well the discourse around a
5 debate. Wildlife farming is a particularly contentious conservation tool attracting the
6 attention of worldwide media, and associated conflicts may undermine its
7 applicability. We investigated the media's portrayal of the Cayman Turtle Farm
8 (CTF), a facility in the Cayman Islands which breeds green sea turtles (*Chelonia*
9 *mydas*) for human consumption, to explore the media's potential as a forum for
10 discussion over conservation issues and its applicability to conflict management.
11 Content analysis was used to compare framing, article valence, and stakeholder
12 representation in 634 newspaper articles from the international and local media in
13 the period 1973-2015. These media stories were framed in terms of: tourism,
14 conflict, conservation, culture/community, management, and utilisation. Aside from
15 tourism, international articles often depicted CTF as a source of controversy,
16 particularly with a welfare angle during a campaign to end turtle farming. Local media
17 mainly had a financial focus and trade in turtle products was mostly debated in older
18 articles. Conflict framing was associated with a negative article valence, and conflict
19 framed articles were significantly likely to not contain conservation information.
20 Mentions of environmental interest groups were significantly associated with
21 negative articles, whereas academics were significantly more likely to be mentioned
22 in positive articles. Illustrating the multiple facets of wildlife farming covered in the
23 media, these findings provide insights for improving the role of media in conflict
24 management and identify potential conflict dynamics over time. Whilst the media can

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3 1 be useful to promote dialogue, it must be managed carefully to avoid dramatisation
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5
6 2 and potentially worsen conflict among stakeholders.

7
8 3 **KEYWORDS:** Captive breeding; conservation conflicts; human dimensions; wildlife
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10 4 trade
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16 6 **INTRODUCTION**

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18
19 7 A key challenge in conservation arises from the fact that stakeholders rarely all share
20
21 8 similar goals (Marshall *et al.*, 2007); conservation conflicts thus occur as a result of
22
23 9 clashes between parties with differing objectives (Redpath *et al.*, 2013). This may
24
25 10 undermine interventions, which may be particularly concerning for *ex-situ*
26
27 11 conservation of endangered species where conflicts could ultimately have a negative
28
29 12 impact on wild populations (Kueffer & Kaiser-Bunbury, 2014). Understanding how to
30
31 13 better navigate in these complex contexts is therefore important for implementing
32
33 14 effective conservation interventions.
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39 15 The media collect, frame, and distribute information and can be a significant player in
40
41 16 conservation conflicts, promoting public engagement and providing a forum for
42
43 17 discussion. Moreover, it can potentially influence attitudes (Jacobson *et al.*, 2012)
44
45 18 and may present a challenge to conflict management by highlighting and
46
47 19 sensationalizing aspects of debate (Barua, 2010). Journalists can use framing to
48
49 20 highlight or downplay certain aspects of an issue, impacting how audiences interpret
50
51 21 the media stories (Entman, 1993).
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56 22 Framing an issue in dramatic terms may exacerbate simplification and neglect
57
58 23 important contextual information. For example, Siemer *et al.* (2007) found that media
59
60 24 coverage of black bears (*Ursus americanus*) focussed on specific events and missed

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3 1 aspects of bear conservation, representing a missed opportunity to create a dialogue
4
5 2 amongst communities living with bears. Furthermore, the media has the potential to
6
7 3 tell the public what to think about; McCombs and Shaw's seminal paper (1972) on
8
9 4 agenda-setting has received continuing support (e.g. McCombs, 2005; Weaver,
10
11 5 2007). The underlying principle is that increased emphasis on an issue increases its
12
13 6 salience to the reader. Potential consequences may include policy action; for
14
15 7 example, heightened public and media concern surrounding foreign defence issues
16
17 8 has been correlated with increased defence funding (Soroka, 2003). Additionally,
18
19 9 frame valence, i.e. if a media report is positively or negatively expressed, has been
20
21 10 suggested to influence public support for specific policies (Vreese & Boomgaarden,
22
23 11 2003). The media are also able to define important "messengers" in a debate (e.g.
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25 12 scientists, politicians, celebrities) to deliver different perspectives (Muter *et al.*, 2013).
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33 13 Wildlife farming, representing the domestication, cultivation, propagation or breeding
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35 14 of plant or animal species (Phelps *et al.*, 2014), is a particularly contentious
36
37 15 conservation tool. It aims to relieve harvest pressure on wild populations through the
38
39 16 production of a sustainable supply of farmed product and drive down market prices
40
41 17 (Damania & Bulte, 2007; Abbott & van Kooten, 2011). For example, this approach
42
43 18 has had some success for crocodilians (Hutton & Webb, 2002); in Brazil, wild
44
45 19 populations of Black caiman (*Melanosuchus Niger*) have recovered from endangered
46
47 20 levels in the 1970s through harvest programs (Thorbjarnarson, 2010). However,
48
49 21 farming of endangered species is often debated regarding its actual contribution to
50
51 22 conservation as well as economic, animal welfare and ethical implications (e.g.
52
53 23 Gratwicke *et al.*, 2008; Kirkpatrick & Emerton, 2010; Lyons & Natusch, 2011; Sheng
54
55 24 *et al.*, 2012). There is concern that continued supply may increase demand,
56
57 25 stimulate illegal take and allow laundering of illegal products (Damania & Bulte,
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2
3 1 2007); concerns which have been raised for turtles, rhinos, and tigers alike (
4
5 2 Campbell, 2002; Abbott & van Kooten, 2011; Biggs *et al.*, 2013). The media can thus
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7
8 3 be used to obtain insights about the characteristics and drivers of conflicts over
9
10 4 wildlife farming as well as facilitating support for certain interventions.
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14 5 Media analysis has previously been used to understand the discourse surrounding
15
16 6 environmental issues such as climate change (Dotson *et al.*, 2012) and human-
17
18 7 wildlife interactions (Houston, Bruskotter & Fan, 2010) but it has never been applied
19
20 8 to wildlife farming. Using the Cayman Turtle Farm (CTF) as a case study, we
21
22 9 examined media reporting over time, comparing national and international coverage.
23
24 10 We focused on article content in terms of article framing, valence, and stakeholder
25
26 11 representation, providing insights about the media's potential as a useful forum for
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28 12 discussion over conservation issues, and its applicability to improve management of
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30 13 conflicts over natural resource use.
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39 **METHODS**

40 *Case study*

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45 17 The Cayman Islands are a Caribbean UK Overseas Territory. Now a tourism
46
47 18 hotspot, turtle fishing once formed the basis of Cayman's economy (Wood & Wood,
48
49 19 1994), exhausting local turtle populations by the early 1800s (Aiken *et al.*, 2001).
50
51 20 Turtles remain integral to the Islands' cultural identity, as is visible on the flag and
52
53 21 currency (Wood & Wood, 1994) and turtle meat is often considered the Cayman
54
55 22 Island's "national dish". A green turtle breeding farm was established in 1968 with
56
57 23 the aims of supporting the local tradition of consuming sea turtle, through a
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2
3 1 continued supply of farmed turtle reducing the need to take wild turtles, and
4
5 2 replenishing the wild population via releases (Fosdick & Fosdick, 1994; Rieser,
6
7 3 2012). In 1978, legal protection for the remnant wild nesting population was
8
9 4 instituted, with further protections added in 1985 and 2008 (Bell *et al.*, 2006). Small
10
11 5 populations of green turtles have been monitored since 1998, with more than 200
12
13 6 nests recorded in 2015 (Cayman Islands' Department of Environment unpublished
14
15 7 data).
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19
20 8 CTF's operations have, however, been subject to long-standing controversy
21
22 9 regarding its conservation role, animal welfare and economic sustainability
23
24 10 (Ehrenfeld, 1974; Fosdick & Fosdick, 1994; D'Cruze, Alcock & Donnelly, 2015).
25
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27 11 International trade of most turtle products ceased in 1978 as a result of CITES
28
29 12 regulations (Fosdick & Fosdick, 1994). Controversially, the USA listed green turtles
30
31 13 as endangered under the Endangered Species Act in 1978, barring shipment of
32
33 14 turtle products through Miami and resulting in CTF operating only domestically since.
34
35 15 This created financial difficulties for CTF, changing hands frequently to come under
36
37 16 the Cayman Islands Government since 1983 (Rieser, 2012). In 2002, the United
38
39 17 Kingdom attempted to gain CITES permission to reopen trade in farmed turtle shell
40
41 18 but this was met with some disapproval (Donnelly, 2011): 38 votes were in favour, 24
42
43 19 against and 48 abstentions. Besides turtle meat production for domestic trade, a
44
45 20 large proportion of the facility is now tourism focused.
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52 21 In 2012, an international animal welfare group called World Animal Protection (WAP;
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54 22 previously WSPA) launched a campaign to end sea turtle farming. They questioned
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56 23 welfare conditions (Arena *et al.*, 2014), raised concerns that farming may create
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58 24 "artificial" demand by providing meat to tourists (WSPA, 2013) and criticized the
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3 1 release of turtle hatchlings into the wild (WSPA, 2012). The facility also carries
4
5 2 significant operating costs, and it has been argued that money could be more
6
7 3 effectively spent protecting wild populations (D’Cruze *et al.*, 2015); government
8
9 4 subsidies were estimated at 10 million US dollars for the financial year 2013-2014
10
11 5 (six million for debt reduction, four million for operating shortfalls) (Cayman Turtle
12
13 6 Farm, 2014). The campaign attracted international and local attention, with
14
15 7 discussions in the public and political arenas about several potential farm
16
17 8 management strategies, including closure.
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25 10 *Sample selection*

26
27 11 The international sample was mainly sourced from LexisNexis newspaper database;
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29 12 coverage varies by news source but some go back several decades (LexisNexis,
30
31 13 2016). The terms ‘Cayman’ and ‘turtle’ were searched for simultaneously and
32
33 14 returned results dating from 1973, with the last search completed on the 26th May
34
35 15 2015. An article was considered relevant if it provided contextual information about
36
37 16 CTF, rather than simply a geographical location. Repeated stories were included if
38
39 17 they were in a different newspaper, as this reflects increased coverage. Newswires
40
41 18 and letters to the Editor were also included as the editor judged them topical enough
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43 19 to publish.
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49 20 The only local news source covered in the LexisNexis search, Cayman Net News
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51 21 (CNN), is no longer live. Therefore, additional local news providers (Cayman News
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53 22 Service (CNS; only available from January 2015); Cayman Compass; Cayman
54
55 23 Reporter; ieyenews.com) were identified based on local knowledge (Blumenthal, J,
56
57 24 pers. comm., 15 May 2015), and their websites were searched for the term ‘turtle
58
59 25 farm’. In addition, Google News, an aggregator with worldwide coverage, was cross-
60

1 checked for 'Cayman turtle'. Any relevant international or local articles not in the
2 original searches were included in the final database.

3 Overall, this resulted in 317 international articles and 707 local articles. All
4 international articles and a randomly selected sub-sample of 45% of the local articles
5 were considered for detailed content analysis, resulting in a total 634 articles, split
6 equally between local and international articles (n=317 each).

7 8 *Coding protocol*

9 Content analysis was used to examine the articles. A hybrid approach of inductive
10 and deductive coding was used (Hsieh & Shannon, 2005) with coding done by
11 J.M.M.W. Deductive coding was used first to derive categories from the literature,
12 prior to involvement with the data (Cavanagh, 1997). Framing analyses from political
13 science (Semetko & Valkenburg, 2000), climate change (Boykoff, 2008; Nisbet,
14 2009) and environmental management literatures were consulted (Kellert, 1985;
15 Boissonneault *et al.*, 2005), resulting in the following initial codes of themes expected
16 in the media stories: economic, political, conflict, ethical, ecological, human interest
17 (culture and utilitarian) and solutions.

18 To ensure that the typology was comprehensive, an inductive approach was then
19 used to develop codes (Elo & Kyngäs, 2008) through piloting this initial framework on
20 30 international articles with 'Cayman Turtle Farm' in their headline, as headlines
21 have been shown to optimise relevance for the reader (Dor, 2003). More specific
22 frames such as tourism were added, and sub-frames were grouped under broader
23 categories: conservation, culture/community, tourism, utilisation, management and
24 conflict. Conflict also included aspects of disagreement and uncertainty, but these

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2
3 1 are referred to together as 'conflict' for brevity. The final framework is described in
4
5 2 Table 1.
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9 3 Following Nisbet, Brossard and Kroepsch (2003), the article sample was coded for
10
11 4 each frame as absent = 0, present = 1, or the main focus/lead frame = 2. Articles
12
13 5 were also coded for valence as positive, negative, or ambiguous. Similarly to Burke
14
15 6 *et al.* (2015), articles were recorded as positive unless they contained negative
16
17 7 language, or elements of uncertainty. Controversy portrayed in a one-sided way was
18
19 8 deemed negative, whereas articles that outlined various viewpoints equally were
20
21 9 deemed ambiguous. Publication year and country of origin were also recorded.
22
23 10 "Messengers" were identified where a group was described as important, or a
24
25 11 representative was quoted as an information source (Muter *et al.*, 2013).
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33 *Data analysis*

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35 14 Differences in lead frame prominence between the local and international samples
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37 15 were investigated using Chi-square tests. Differences in proportions between
38
39 16 particular frame counts were assessed using z-tests. Logistic regression was used to
40
41 17 test for association between lead frames and secondary frames, between frame and
42
43 18 valence, and between stakeholders and valence. Linear regression was applied to
44
45 19 investigate the change in coverage over time. Statistical analysis was carried out in
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47 20 SPSS 12 and Microsoft Office Excel 2007.
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1 RESULTS

2 *Sample coverage*

3 The number of media stories per year, totalling 1024 articles, significantly increased
4 over time in both the international ($R^2 = 0.62$, $F_{1,40} = 65.2$, $p < 0.001$), and local
5 media ($R^2 = 0.86$, $F_{1,9} = 57.2$, $p < 0.001$). However, given the explosion in Internet
6 use since the late 1990s, and the greater digitalisation of newspapers, it is likely
7 older newspapers are underrepresented in our sample. The international sample
8 included outlets from a range of countries; the majority were from three nations
9 (U.S.A.: 37%; UK: 31%; and Canada: 25%). This included both broadsheet
10 newspapers such as *The New York Times*, and tabloids such as *The Daily Mail*. A
11 number of specialist travel magazines were also found. Names and source locations
12 of international articles found are available in Appendix 1. *The Cayman Compass*
13 was the most prominent of the five local news providers with 74% of the coverage.

15 *Framing*

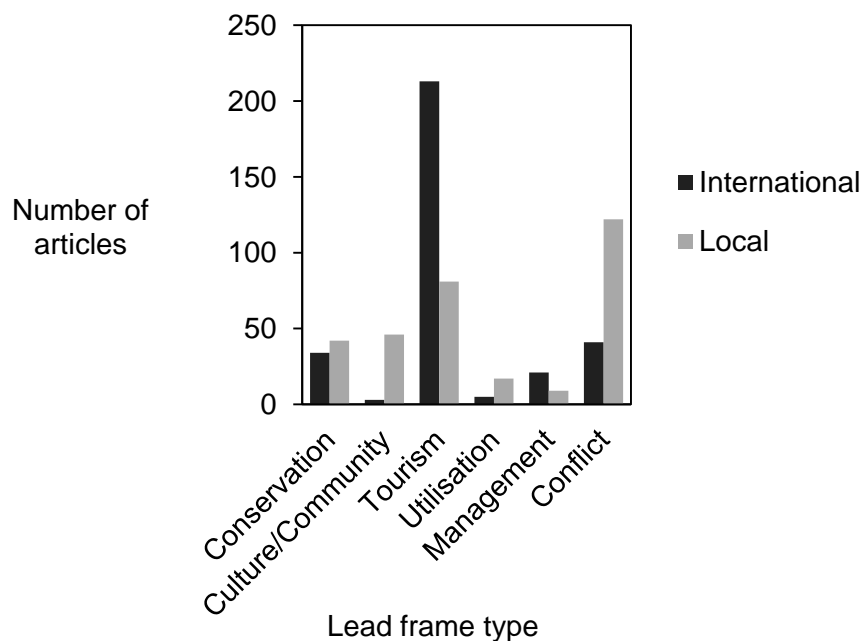
16 Media stories covered a range of topics, which were categorised under six broad
17 frames (Table 1).

18 *Lead frames*

19 The proportion of lead frames varied significantly between the local and international
20 media ($X^2(5) = 149.4$, $p < 0.001$) (Fig. 1). The most common lead frame
21 internationally was tourism (67%), whereas locally it was conflict (38%).

22 Management was significantly more common as the lead frame in international
23 articles ($z = 2.25$, $p = 0.02$); this was largely as a result of those with a policy focus,
24 as no stories in the local sample had policy as a lead frame. There was no significant

1 difference between the samples for the proportion of articles with conservation as a
 2 lead frame ($z = -0.98, p > 0.05$).



3
 4 **Figure 1.** Lead frame prevalence in international and local media. This was the
 5 number of articles containing each lead frame type (the main focus) out of a sample
 6 of 317 articles for both international and local articles.

8 *Secondary frames*

9 The most common secondary frame internationally was conservation ($n=128$), but
 10 locally was conflict ($n=173$), closely followed by management ($n=170$). 74% of the
 11 local articles with management as a secondary frame were a result of the sub-frame
 12 'governance', where the Cayman government was identified as being responsible for
 13 CTF. Articles with conservation as the lead frame were significantly associated with
 14 having conservation also as a secondary frame (Wald's $X^2(1) = 28.6, p < 0.001$).
 15 However, where conflict was the lead frame, articles were significantly likely to not

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2
3 1 have secondary framings of either conservation (Wald's $\chi^2(1) = 42.9, p < 0.001$), or
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6 2 culture/community (Wald's $\chi^2(1) = 34.9, p < 0.001$).
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9 3 *Frame trends over time*

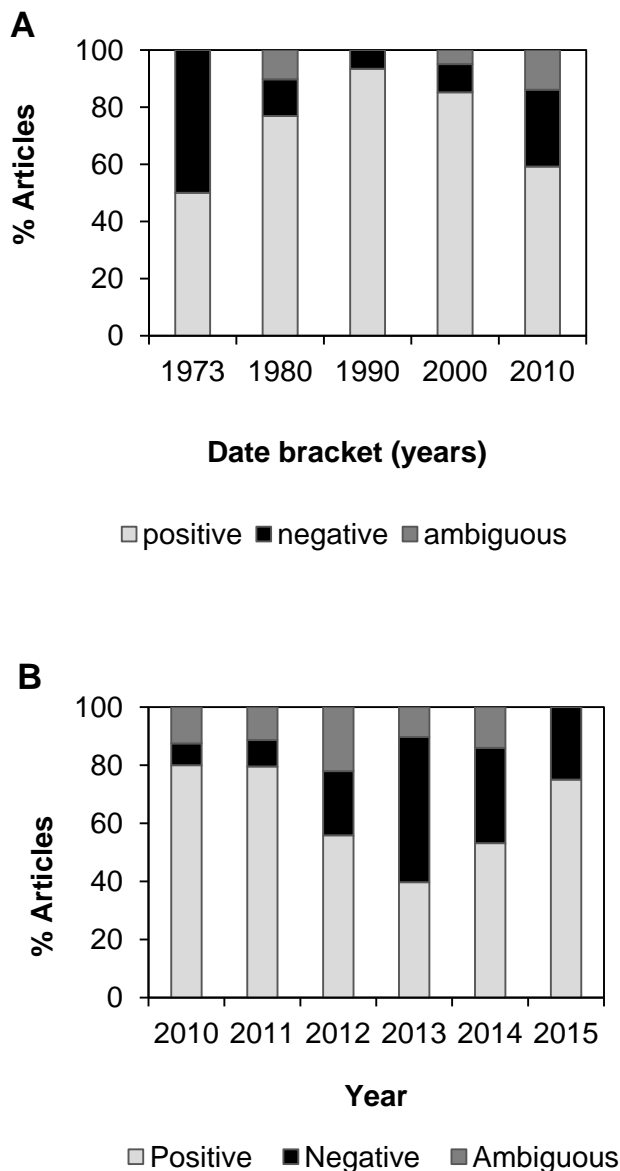
10
11 4 Management was more common as a lead frame in older international articles (Table
12
13 5 2). Tourism remained the most strongly occurring lead frame throughout the course
14
15 6 of the international media. However, conflict became almost equally common for the
16
17 7 period 2010-2015, where over a third of the international stories had conflict as the
18
19 8 lead. In the local media, conflict increased significantly for the period 2010-2015 ($z =$
20
21 9 2.42, $p = 0.02$), to become the most prevalent lead frame. Conservation framing was
22
23 10 stable across time and media, except for the period 1980-1989 internationally where
24
25 11 it was absent.
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31 12 *2010-2015*

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33 13 The increase in conflict framing in both the international and local media during
34
35 14 2010-2015 (Table 2) is likely connected to the campaign initiated by the WAP.
36
37 15 Although conflict was present in both the international and local samples during this
38
39 16 period, it was expressed differently between the two samples in terms of sub-frames
40
41 17 ($\chi^2(8) = 79.6, p < 0.001$). The overwhelming source of conflict in the local sample
42
43 18 was financial (65%), although this notably decreased during 2012 and was
44
45 19 counterbalanced by sub-frames such as interpersonal conflict, which had not been
46
47 20 present before 2012. Internationally, the most prevalent conflict sub-frame for the
48
49 21 years 2013-2014 was animal welfare. A significantly greater proportion of the
50
51 22 international sample had welfare as the leading form of conflict than the local sample
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53 23 ($z = 6.00, p < 0.001$).
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1 Valence trends over time

2 The majority of articles over time had a positive valence (Fig. 2a), possibly because
3 all frames, apart from conflict, were significantly associated with positive valence
4 (Wald's $\chi^2(5) = 218, p < 0.001$). Articles with conflict as the lead were 1.5 times
5 significantly more likely to be negative stories (Wald's $\chi^2(1) = 6.59, p = 0.01$). The
6 proportion of negative articles increased in 2012 (Fig. 2b), and peaked during 2013.



9 **Figure 2.** Change in the valence (positive, negative, ambiguous) of media articles
10 over time. This is for the time period 1973-2015 (A), and 2010-2015 (B). In (A), the

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3 1 number of articles, out of the total number of articles per date bracket, was
4
5 2 calculated for each valence (i.e. 1973-1979, 1980-1989 etc). This is represented as
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7 3 a separate percentage for each date bracket, with the start date for each category
8
9 4 shown. In (B) the percentage is per year, rather than larger date bracket.
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11
12

13 5 14 6 *Stakeholder groups*

17 7 10 groups of “messengers” were identified in the media stories (Table 3), among
18
19 8 which environmental/animal welfare groups and the Cayman Islands government
20
21 9 were the most common in international and local media, respectively. For example,
22
23 10 the government of the USA was often quoted in connection with CITES and
24
25 11 controversy over trade in turtle products. Environmental interest groups, such as
26
27 12 Greenpeace, were 11 times more likely to be associated if the article was negative
28
29 13 (Wald’s $X^2(1) = 21.5, p < 0.001$). Conversely, academics were significantly
30
31 14 associated with positive articles (Wald’s $X^2(1) = 6.59, p = 0.01$). Valence was not a
32
33 15 significant predictor of the celebrity presence (Wald’s $X^2(2) = 0.584, p > 0.05$).
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41 17 **DISCUSSION**

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44 18 Our results show that the media is an important consideration for the portrayal of
45
46 19 conflicts over wildlife farming, with potential conservation implications. Different
47
48 20 prevalence of thematic frames in local and international media demonstrates the
49
50 21 varying temporal and spatial scale of discussions related to wildlife farming, with
51
52 22 international pressure via the media playing a role in conflict dynamics. Overall, the
53
54 23 international media most commonly portrayed CTF as a popular tourist facility. Aside
55
56 24 from tourism, conflict was a common framing, particularly during WAP’s campaign in
57
58 25 2012-2013. The local media largely reported CTF’s financial problems and the
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1
2
3 1 Cayman Islands government were often identified as responsible for this issue. A
4
5 2 conflict of interests was apparent over spending to ensure the supply of turtle meat
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7
8 3 and other public services:
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10 4 *'Each dollar squandered on entrepreneurial fictions such as the Cayman Turtle*
11
12 5 *Farm...is one less dollar that the government could have devoted to education,*
13
14 6 *infrastructure or indigent care.'* (Cayman Compass, 2014).
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18 7 CTF is represented in a number of ways in the local and international media, with
19
20 8 frames illustrating potential trade-offs between multiple facets. For example, the local
21
22 9 sample in particular reflected the socioeconomic importance of the facility: CTF
23
24 10 engages with the community and is embedded in local culture. The tradition of
25
26 11 utilising turtles suggests that the ethical and welfare framings found in the
27
28 12 international sample will not have great local resonance, whereas the financial frame
29
30 13 plays in to the cultural climate. It is evident that CTF has become a local political
31
32 14 issue and the media is a contributor to the political process in the country, with local
33
34 15 journalists trying to capture both the public and governments' attention:
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40 16 *'The Turtle Farm is still losing money and the people....have a right to ask*
41
42 17 *whether that should be allowed to go on. They deserve honest answers from those*
43
44 18 *who are running for office....'* (Cayman Compass, 2013).
45
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48 19 Although concentrated media attention may be successful in achieving short-term
49
50 20 policy changes, Hall (2002) suggests that longer-term solutions are only found when
51
52 21 media attention wanes. The intense media attention in 2012-2013 is characteristic of
53
54 22 a controversial issue fading after an initial peak (Birkland & Lawrence, 2009). Older
55
56 23 conflict framed articles often focussed on the debate in trade over turtle products,
57
58 24 and welfare was not present as a lead frame prior to the WAP campaign. This
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3 1 reflects how the agenda has changed over time, and that the media both reflects and
4
5 2 shapes what issues are high on the public agenda (Schoenbach & Becker, 1995).
6
7 3 Although waning slightly, disagreement over trade in sea turtles has sustained media
8
9 4 attention. Debates surrounding trade in animal products have continued for other
10
11 5 endangered species; for instance, Biggs *et al.* (2013) sparked intense discussion
12
13 6 when they described crocodilian farming as applicable to rhino conservation.
14
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17
18 7 The media is thought to outline how an issue should be interpreted by the reader
19
20 8 (Entman, 1993). CTF was often depicted as a source of controversy, and conflict
21
22 9 was associated with a negative valence. The increase in negative articles during
23
24 10 WAP's campaign may reflect dramatisation, which could result in conflicts becoming
25
26 11 increasingly intractable (Shmueli, Elliott & Kaufman, 2006) as distrust is a major
27
28 12 obstacle for communication (Ansell & Gash, 2008). Furthermore, articles where
29
30 13 conflict was the lead of story were significantly likely to not express conservation or
31
32 14 Caymanian culture as secondary attributes. This echoes the concern of previous
33
34 15 media analyses which found that articles often simplify complex issues, potentially to
35
36 16 the detriment of conservation outcomes (Siemer *et al.*, 2007). The controversy
37
38 17 surrounding wildlife farming may derive from the need for a situation specific
39
40 18 strategy, depending on the local conditions (Challender & MacMillan, 2014), and
41
42 19 therefore simplification could be problematic. However, articles with conservation as
43
44 20 the lead were rich in conservation information, which is promising as Soroka (2002)
45
46 21 postulates that the media is a significant driver of public and legislative concern for
47
48 22 environmental matters usually inconspicuous to the public eye. For media to be most
49
50 23 useful, it is necessary to integrate scientific foundations into the debates surrounding
51
52 24 controversial conservation issues.
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3 1 Our results also demonstrate that media analysis can be used to identify potential
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5 2 stakeholders and explore how they are portrayed: environmental groups were
6
7 3 associated with negative articles, due to their involvement, and sometimes
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9 4 instigation of debate. We agree with Muter et al.'s (2013) suggestion that
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11 5 conservationists could benefit from media engagement training, who somewhat
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13 6 similarly found articles citing conservationists were not correlated with shark
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15 7 conservation information. Frames can have greater public resonance through the
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17 8 use of influential personalities (Gamson & Modigliani, 1989) but the efficacy of such
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19 9 tactics to sustain continued attention is questionable (Thrall *et al.*, 2008). For
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21 10 example, the use of celebrities by WAP is an attempt to attract attention, although
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23 11 they were not mentioned that often in comparison to other groups, and celebrities
24
25 12 were not associated with any particular valence.

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33 13 We found that there was often an ethical undertone in international media stories:

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35 14 *'Friends were not impressed when I revealed my turtle plan before heading to*
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37 15 *the Cayman Islands. You're going to eat what? Disgust was the general reaction'*
38
39 16 (The Globe and Mail, 1999).

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41
42 17 WAP are mainly engaged in a conflict of beliefs with CTF, which Young (2010)
43
44 18 described this as *'where differences exist over normative perceptions'* and Redpath
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46 19 *et al.* (2015) noted can be particularly difficult to resolve. It has often been argued
47
48 20 that CITES trade ban restrictions are insufficient for preventing wildlife poaching, and
49
50 21 wildlife farming should not be forgotten as at least as a short-term alternative
51
52 22 (Challender & MacMillan, 2014), and so it is important not to transform conservation
53
54 23 conflicts into a purely ethical debate. For example, the widespread appeal of sea
55
56 24 turtles has curtailed the practice in comparison to the less charismatic crocodilians
57
58 25 (Dickson & Hutton, 2000). Ethical framing is likely applicable to other species of

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3 1 conservation concern, and Challender and MacMillan (2014) note that ethical
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5 2 opposition should not necessarily prevent the development of wildlife farming. Better
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8 3 understanding of the drivers and dynamics of conservation conflicts and how
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10 4 perceptions towards wildlife farming might affect its feasibility and conservation
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12 5 outcomes is thus essential for implementing robust interventions.
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19 *Conclusion*

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21 8 Conservation conflicts are likely to become an increasing problem and the media is
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23 9 an important consideration for conflict management. The media clearly has potential
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26 10 to act as a useful forum for discussion, but it can also prevent the development of a
27
28 11 constructive dialogue where issues are framed in dramatic terms. To avoid this,
29
30 12 essential contextual features of a debate should not be omitted. The international
31
32 13 media's portrayal of the CTF provides an example of where this was the case.
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34 14 Furthermore, the local sample results support the suggestion that the media is an
35
36 15 important consideration for governance. In order to manage conflict effectively,
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38 16 conservationists must be aware of the impact the media might have, and work with
39
40 17 media outlets to ensure that headlines do not hinder desired outcomes.
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3 **Table 1.** Descriptions of each main frame type found in articles about the Cayman
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6 Turtle Farm (CTF). The rationale provides details of how each frame is made up of
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8 smaller sub-frames, and contains quotes taken from the media stories to illustrate
9
10
11 examples

Frame name	Rationale and examples
Conservation	Portrays CTF as having a potential role in conservation. For example, reducing the number of turtles poached from the wild, releasing farmed turtles, and scientific research. This frame was also assigned if CTF was mentioned as a conservation centre; providing education, practical terrestrial conservation or beach cleans, homing and providing veterinary care for both turtles and other animals, and relocating turtles to other establishments for the purposes of conservation.
Culture/ Community	Depicts CTF as part of Cayman's cultural identity, including both historic and symbolic importance (e.g. <i>'take turtle out of the Cayman way of life would be similar to taking the whale away from the Eskimos.'</i>). CTF's role in community engagement and creating local jobs also applies here (e.g. <i>'sponsored a local volleyball club team'</i>).
Tourism	Describes CTF as a visitor attraction (e.g. <i>'Baby green turtles are handed out to the crowds'</i>).
Utilisation	Encompasses CTF's commercial aspects, and was assigned where turtle meat consumption or price was mentioned. This also includes

other potential or historically produced commodities, even if CTF does not currently retail them (e.g. *'leather, tortoise shell and cosmetics'*).

A turtle poaching episode, or stealing from CTF, was also assigned to this category under the assumption that it was motivated by financial gain, or the desire to consume turtle (e.g. *'making a quick dollar by stealing the turtles, butchering and selling the meat'*).

Conflict/ Presents CTF as a source of controversy, including uncertainty that
Disagreement results in debate and potential disagreement. This includes conflicts
/ Uncertainty over beliefs or fundamental values i.e.

Ethics: Opposing views on whether sea turtle farming, and consumption, is inherently wrong. (e.g. *'scandal of breeding sea turtles for food', 'no humane way', 'differentiate between farming of fish and turtles? Neither is domesticated'*).

Welfare: Opposing views on whether CTF's turtles are adequately cared for (e.g. *'foul conditions', 'horrific sight', 'cannibalism', 'overcrowding'*)

Trade: Conflict over trade in farmed turtle products (e.g. *'to permit imports of farmed products might open the door for unscrupulous sellers to supplement their wares with creatures taken from the wild'*).

Personal disagreement also applies here i.e.

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4 Interpersonal Conflict: Conflict between main actors, in terms of
5 personal disagreement and issues of trust (e.g. *'sensational*
6 *allegations'*, *'ignoring our concerns'*, *'unwillingness to meet us*
7 *halfway is posing a great challenge'*).
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15 Financial: Disagreement over how to manage CTF considering
16 its financial difficulties. May be portrayed as a burden on
17 Cayman's economy (e.g. *'\$2 million of that is going into the*
18 *financially failing Turtle Farm; more than is going to our national*
19 *carrier Cayman Airways'*).
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29 This category also includes debate which is largely the result of
30 uncertainty. This may not necessarily be negative, but it does frame
31 CTF as an issue that needs to be discussed i.e.
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37 Demand: where the demand for turtle meat is presented as
38 uncertain this may question necessity for turtle farming (e.g.
39 *'Caymanian Department of Environment has committed to a*
40 *three-year study to ascertain the true demand'*, *'Who the heck*
41 *eats turtles anyway?'*).
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50 Releases: Controversy concerning the impact of releasing
51 farmed turtles into the wild (e.g. *'lack of evidence'*, *'endangers*
52 *wild populations'*).
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58 Health (human): Debate concerning if CTF presents a risk to
59
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human health (e.g. *'at risk of contracting E. coli and salmonella', 'can be fatal'*).

Environmental impact: Concern about CTF's uncertain impact on Cayman's natural environment (e.g. *'discharging unregulated amounts of waste into the ocean', 'anecdotal evidence that coral reefs...have been damaged'*).

Management Presents turtle farming as a management option for conservation, which may be subject to alternative options (e.g. WAP approached CTF about changing some of its operations to come more in line with a sea turtle research facility). This frame also includes the various factors affecting management decisions such as:

Policy: Both local and international laws affecting trade in turtle products (e.g. *'U.S. decision to ban the import of farmed turtle products - which considerably affected the farms productivity'*).

Governance: Local governance where CTF is considered the responsibility of the Cayman Islands government (e.g. *'state-run', 'government-funded', 'subsidy'*).

Cooperation: Where the respective stakeholders are demonstrating efforts to be productive/work together (e.g. *'agreed to be independently evaluated', 'positive talks'*).

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Table 2. Frequency and percentage of lead frames for each sample (Int. represents international, Lo. represents local) and date bracket. No local articles were available prior 2004¹.

Lead Frame	1973-1979		1980-1989		1990-1999		2000-2009		2010-2015	
	Int.	Lo.	Int.	Lo.	Int.	Lo.	Int.	Lo.	Int.	Lo.
	n=2	n=0	n=39	n=0	n=61	n=0	n=125	n=98	n=90	n=219
	(%)		(%)	0	(%)		(%)	(%)	(%)	(%)
Conservation	1	N/A	0	N/A	11	N/A	11	14	11	28
	(50)				(18)		(8.8)	(14.3)	(12.2)	(12.8)
Culture/ Community	0	N/A	0	N/A	1	N/A	1	18	1	28
					(1.6)		(0.8)	(18.4)	(1.1)	(12.8)
Tourism	0	N/A	22	N/A	42	N/A	103	34	46	47
			(56.4)		(68.9)		(82.4)	(34.7)	(51.1)	(21.5)
Utilisation	0	N/A	2	N/A	2	N/A	1	4	0	13
			(5.1)		(3.3)		(0.8)	(4.1)		(5.9)
Management	1	N/A	12	N/A	3	N/A	4	0	1	9
	(50)		(30.8)		(4.9)		(3.2)		(1.1)	(4.1)
Conflict	0	N/A	3	N/A	2	N/A	5 (4)	28	31	94
			(7.7)		(3.3)		(28.6)	(34.4)	(42.9)	

¹. The number of articles found per year increased in both samples. Therefore, to assess if the main article focus has altered over time, lead frames were calculated as a proportion of a specified date bracket (Table 2). As the international sample started in 1973, decadal date-brackets were chosen.

Table 3. Magnitude of stakeholder mentions in the international and local media. For each one of the 317 international and 317 local stories, each of the 10 stakeholder groups was recorded as being mentioned or not. Number of mentions (n) represents the sum of all mentions actually found in each sample.

Stakeholder group	Mentions in international media n=166 (%)	Mentions in local media n=330 (%)
Farm staff/management	20 (12.1)	82 (24.9)
Cayman Islands government	24 (14.5)	125 (37.9)
UK government	20 (12.1)	14 (4.2)
USA government	15 (9.0)	0
Environmental/ animal welfare group	40 (24.1)	56 (17.0)
Academics	14 (8.4)	15 (4.6)
Celebrities	6 (3.6)	10 (3.0)
Corporate companies	10 (6.0)	12 (3.6)
Cayman locals	2 (1.2)	13 (3.9)
British Royal family	15 (9.0)	3 (0.9)

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3 **1 FIGURE LEGENDS**
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6 **2 Figure 1.** Lead frame prevalence in international and local media. This was the
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3 number of articles containing each lead frame type (the main focus) out of a sample
4 of 317 articles for both international and local articles.

5 Figure 2. Change in the valence (positive, negative, ambiguous) of media articles
6 over time. This is for the time period 1973-2015 (A), and 2010-2015 (B). In (A), the
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6 number of articles, out of the total number of articles per date bracket, was
7 calculated for each valence (i.e. 1973-1979, 1980-1989 etc). This is represented as
8 a separate percentage for each date bracket, with the start date for each category
9 shown. In (B) the percentage is per year, rather than larger date bracket.
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1 **Appendix 1. Table of geographical sources and names of newspapers,**
 2 **newswires and magazines found in the international sample.**

Location	Newspaper/newswire/magazine name	
n=317 (%)		
United States	Associated Press	Newswire US
	International	Patriot Ledger
116 (36.6)	Bloomberg Business	PR Newswire
	BPI Entertainment News	San Diego Reader
	Wire	San Jose Mercury News
	Buffalo News	SF Gate
	Cape Code Times	St. Louis Post-Dispatch
	Chicago Daily Herald	St. Paul Pioneer Press
	Chico Enterprise-Record	St. Petersburg Times
	Contra Costa Times	(Florida)
	Daily News (New York)	Stillwater Gazette
	Dallas Morning News	Targeted News Service
	Denver Post	The Atlanta Journal and
	Eturbo News	Constitution

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	Federal News Service	The Oklahoman
	Houston Chronicle	The Philadelphia Inquirer
	Idaho Falls Post Register	The State Journal-Register
	Investor's Business Daily	Toronto Star
	Journal of Commerce	Travel & Leisure Close-Up
	Miami Herald	United Press International
	New Jersey Newsroom	US Federal News
	New York Post	US Newswire
	New York Times	Washington Post
	News-Journal Florida	
	Newsweek	
Canada	Calgary Herald	Postmedia Breaking News
	Canwest News Service	Prince George
78 (24.6)	Edmonton Journal	Citizen
	Globe and Mail	Red Deer Express
	(Canada)	The Calgary Herald
	Guardian	The Financial Post
	(Charlottetown)	(Canada)

	Guelph Mercury	The Gazette
		(Montreal)
	Kamloops Daily	
	News	The Leader-Post
	Marketwire	The Vancouver
	National Post	Province
	(Canada)	The Vancouver Sun
	Newswire Canada	Times Colonist
	Ottawa Citizen	Toronto Star
United Kingdom	Birmingham Evening Mail	News of the World
and Ireland	Bristol Post	The Observer
	The Bolton News	The Record
97 (30.6)	The Ecologist	The Scotsman
	The Express	Sunday Sun
	Sunday Express	Sunday Tribune
	Aberdeen Evening	Tamworth Herald
	Express	Daily Telegraph
	Scottish Express	Sunday Telegraph
	Eastern Daily Press	Belfast Telegraph
	ENP Newswire	

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	Evening Chronicle	The Times
	Evening News (Edinburgh)	Evening Times (Glasgow)
	Evening News (Norwich)	The Sunday Times
	Evening Standard	The Irish Times
	Guardian	The Times & Transcript
	The Herald	The Western Mail
	Independent	Travel Agent
	Independent on Sunday	Travel Trade Gazette UK & Ireland
	Daily Mail	Travel Weekly
	Mail on Sunday	UK Newsquest Regional Press
	Mail Online	Wales on Sunday
	Sunday Mail	WENN Entertainment
	Daily Mirror	News Wire
	Daily Post	Western Daily Press
	Morning Star	Wiltshire Times
EU	EU News	Newswire Europe
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Australia	Hamilton Spectator	The Advertiser
	MX Brisbane	The Courier Mail
13 (4.1)	North West Star	The Sun Herald
	Sunday Telegraph (Sydney)	The Weekend Courier
New Zealand	New Zealand Herald	
1 (0.3)		
Costa Rica	Costa Rica Star	
1 (0.3)		
Caribbean	Caribbean News Now	
1 (0.3)		
India	The Hindu	
1 (0.3)		
Pakistan	Daily Times Pakistan	
1 (0.3)		
Gulf	Gulf Weekly	
1 (0.3)		
Hong Kong	South China Morning	

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Review Copy