



Depiction of Wild Food Foraging Practices in the Media: Impact of the Great Recession

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ABSTRACT

The practice of gathering and harvesting wild foods has seen renewed interest in recent decades. In addition to contributing to food security and food sovereignty, foraging plays a role in promoting socioecological resilience and creating communities of belonging. However, foraging is generally prohibited by regulations governing public lands in the United States and elsewhere. The growth in food forests suggests public policymakers and land managers' may be interested in reconsidering this broad prohibition of foraging but require an information base to do so. While a body of research on foraging exists, news media coverage of foraging represents an additional, readily available source of input. As a consequence, framings of foraging in media coverage likely influence managers' deliberations on this practice. The current paper uses automated content analysis to understand how the practice of gathering and consuming wild foods is framed in print and digital news media, and how these depictions have varied in a 15-year period that includes the Great Recession. Our results show that prevalent framings of foraging represent it variously as a self-provisioning practice or a source of luxury commodities and experiences, with economic uncertainty appearing to affect the frequency of each framing by news media sources. Given managers' ease of access to them, these distinct framings may influence future regulatory landscapes of foraging.

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Introduction

Throughout our evolutionary history, humans have foraged wild foods such as berries, mushrooms, and dandelion greens. Although foraged foods no longer account for the majority of plants and mushrooms consumed in the industrialized world, foraging remains a significant practice for many and wild foods continue to provide sources of nutrition and culturally salient foods (Poe et al. 2013; Reyes-García et al. 2015; Svizzero 2016), while creating bridges between humans and their environments that contribute to physical and emotional well-being (Martin et al. 2006; Wolf and Robbins 2015). The knowledge on which foraging practices depend (for example, where to find mushrooms or which berries are delicious and nutritious) derives from a variety of sources (Schunko, Grasser, and Vogl 2015). Millennia-old practices of oral transmission from peer to peer and from elders to younger family members are still common (Grasser, Schunko, and Vogl 2012). More

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recently, additional sources of foraging information have emerged, such as crowd-sourced mapping of wild foods (see, for example, www.boskoi.org) and embrace of other mobile technologies (Poe et al. 2014; Hurley et al. 2015). Print news media and their associated digital blogs are another powerful source of information, reaching broad audiences across extensive geographic areas, including those in positions to regulate foraging on public lands. In this paper, we used automated topic modeling to examine 15 years of U.S. and Canadian media related to foraging. Our objectives are to: (1) understand how foraging practices are conceptualized and framed in print and digital mass media; (2) assess trends in this coverage over a recent 15-year period, and (3) analyze the impact, if any, of the Great Recession on media framing of foraging.

News media both shape and respond to social movements (Andrews and Caren 2010; King, Schneer, and White 2017), such as the “turn” toward local food systems (Goodman 2003) with its popular but contested claims about positive social and ecological outcomes (Hinrichs 2003). Scholars have noted that media attention to such movements can be precipitated by individuals and events, such that this attention creates a positive feedback loop that leads to further flurries of attention to formerly quiescent topics (Seguin 2016). In this process, newspapers favor professional and formalized entities that intersect with their emphasis on local economies and well-being (Andrews and Caren 2010). At the same time, the advent of digital information and communication technologies, including those utilized by news media, has provided platforms for disbursed individuals to coalesce into physical and virtual communities around shared interests and provided the means to identify emerging issues around which social movements, or distinct communities, may develop (Ludwig, Reuter, and Pipek 2016). The news media is also an important source for how people learn about economic conditions and subsequently respond to them (Goidel and Langley 1995; Doms and Morin 2004). This suggests that newspapers and other media not only reflect economic conditions in a society but can actually influence the degree of optimism or pessimism people feel about their financial futures and perhaps even subsequent behavior. Our content analysis of foraging practices capitalizes on this relationship between macroeconomic trends and newspaper coverage.

Results of surveys conducted in the northeastern United States are suggestive of numbers of people who forage in the opening decades of the 21st century. In 2004, a random sample of residents of four states (Maine, Massachusetts, New Hampshire, and New York) found that 18% had foraged in the previous 12 months and 26% in the previous 5 years (Robbins et al. 2008). Two cycles of a survey assessing participation in outdoor recreation in a 20-state area covering the region indicate that in the period 1999–2001, 27.9 million individuals 16 years of age and older had foraged mushrooms and/or berries (Cordell et al. 2012). In 2005–2009, that number was 35.0 million people, an increase of 25.7%. Of eight common recreational pursuits in forested areas, only viewing or photographing birds was reported more frequently than foraging. The rate of increase in foraging exceeded all other surveyed activities except visiting farm or agricultural settings.

Given these rates of participation, it is not surprising that contemporary foraging transcends the urban–rural divide and motivations are as diverse as the people who engage in the practice (Emery et al. 2006). Among its multiple and often simultaneous values, foraging is appreciated as a way to procure healthy foods and connect with nature. Many foragers regard the practice as a measure of self-sufficiency and recent history shows that foraged foods can provide some food security during times of social disruption and

economic scarcity (Redzić 2010; Shumsky et al. 2014). In some instances, sale of foraged materials enhances household incomes (Emery et al. 2003). Regardless of livelihood function, foraging practices can contribute to food sovereignty, helping sustain social and cultural connections (Bharucha and Pretty 2010; Poe et al. 2013; McLain et al. 2014).

In the 1960s and 1970s, this ancient practice enjoyed a spike of mass media interest in the Anglophone world with the publication of books by authors such as Euell Gibbons (1962) and Richard Mabey (1972), who were writing in conjunction with the Back-to-the-Land movement (Jacob 1996). Following some decades of relative quiet, the topic once again has become the subject of frequent media attention. Personalities and institutions acting as spearheads of the local food movement have explicitly tied foraging and wild foods to its goals (Pollan 2006; Nordahl 2009). World-class chefs and restaurants have showcased wild foods, including René Redzepi and his now-closed Copenhagen restaurant Noma, once noted by the New York Times as “arguably the world’s most influential restaurant at the moment” (Nordahl 2009; Gordinier 2015).

This burgeoning attention to foraging as a social, cultural, and environmental practice notwithstanding, foraging is prohibited in many, if not most, of the places it occurs, including public lands of all types (McLain et al. 2014; Hurley et al. 2015). However, growth in food forestry (Clark and Nicholas 2013; Park, Turner, and Higgs 2018) and the City of Seattle’s embrace of foraging as a legitimate use of its urban forest (Floberg et al. 2013) suggest some public policymakers and land managers may be interested in reconsidering this broad prohibition of the practice. To do so, they will require an information base, such as the scholarly literature briefly summarized above.

News media coverage is an additional source of information about foraging that is readily available to policymakers, managers, and their constituents. Research has shown that media coverage, in concert with elite cues and economic factors, has an important influence on public concern about climate change (Lee et al. 2015; Stoddart, Haluza-DeLay, and Tindall 2016; Carmichael and Brulle 2017). This work, within the broader umbrella of framing theory (Reese et al. 2001), speaks to the importance of the media and its influences in shaping public debate. As a case-in-point, a public exchange in one of the United States’ premiere newspapers also is indicative of the significance of media in reporting and setting the context of natural resource use policy. In 2010 and 2011, the New York Times was the setting for a debate between those extolling the joys of foraging for plant materials and mushrooms in that city and those who saw it as a selfish and destructive pursuit, inconsiderate of other residents and the law. The then Commissioner of the New York City Department of Parks and Recreation was among the thousands of commenters who posted on the ‘Times’ website. Thus, it can be expected that framings of foraging in media coverage, and the actors who help shape those framings, may affect deliberations on future policy relative to this practice.

As of yet, media coverage of foraging in the industrialized world is unexplored. Is foraging framed as a pastime of culinary elites or an act of economic desperation? Are newspapers drawn to cautionary tales about deaths caused by mushroom poisoning, or are local foraging practices celebrated and promoted? Has this focus changed through time, particularly in relation to macroeconomic conditions?

We approach these questions and our research objectives by analyzing media depictions of foraging over a 15-year period, which includes the economic contraction in the United States from December 2007 to June 2009. Often referred to as the Great Recession, this

economic crisis, which ultimately became global in scope, was precipitated by a slowdown in the U.S. housing market. Sharply increased unemployment rates and decreased stock values were among the indicators of the resulting economic malaise in the United States and beyond.¹ As recent work is beginning to reveal, the Great Recession had significant social and psychological effects, as reflected in increased rates of suicide, depression, and other signs of psychological distress. Hunger and food insecurity also increased, touching an additional 17.4 million households over the prerecession period (Riches and Silvasti 2014; Chandler 2016). Given the intimate relationships between the role of connections with nature in human well-being (Lee et al. 2011; Park et al. 2011), media framings of foraging may have particularly important implications at times of collective economic stress such as the Great Recession for considerations ranging from public health to public land management.

Methods

To probe trends in media framings of foraging, we used topic modeling to examine articles and blog posts in Canadian and U.S. newspapers from 2001 to 2015. We began by compiling one corpus for each of these media types through the LexisNexis Academic database, which hosts full-text documents from thousands of news, business, legal, and online sources. Search terms included “wild foods,” “foraging,” and “wild mushrooms” (see Appendix A for full list). In addition to articles of interest for the study, initial search results yielded pieces outside the scope of human foraging for and use of wild foods such as profiles of wildlife behavior, dumpster diving, and shopping. When these were removed, we were left with a total of 2,035 newspaper articles and 644 blog posts.

Two differences between the newspaper and blog corpuses are worth noting. First, we were able to assemble 15 years of newspaper articles about foraging. The earliest identified blog post on foraging dates to 2006. This difference in temporal depth is not surprising given that blogging was not a widespread practice until the mid-2000s (Tremayne 2012). Second, while LexisNexis has an extensive database of full-text articles from newspapers across the United States and Canada, its database of blog posts is sparser. LexisNexis preselects blogs from Newstex, a blog syndication service. Newstex provides access to prominent blog sites, such as Gawker, Gothamist and blogs hosted by the New York Times, and other major newspapers. It does not subscribe to many specialized blogs. Our sample of blogs is necessarily skewed by this bias and therefore may not reflect the full range of topics covered by blogs that are exclusively about foraging. Further implications of this caveat are discussed below.

Automated text analytic approaches, such as topic modeling, are emerging as a way of inferring mental and social processes from unstructured, user-generated data (Dehghani et al. 2014). These new tools allow analysis of open-ended data without relying on resource-intensive manual human coding (Iliev, Dehghani, and Sagi 2015). There are two commonly used approaches to model topics in text: latent Dirichlet allocation (LDA) (Blei, Ng, and Jordan 2003) and the structural topic model (STM) (Roberts et al. 2014). Both are generative approaches, built on the assumptions that documents are comprised of a distribution of topics and that topics are made up of a semantically coherent distribution of words. Topic models in both approaches result in the most probable structure to explain the collection of documents (Chen 2011) and are bottom-up, unsupervised approaches, in the sense that they infer rather than assume the content of topics. Both have

been applied to several fields such as health research (e.g., tagging patient records), education research (e.g., quickly identifying commonalities in student-generated text), and political science (e.g., differences in content by party affiliation) (Blei, Ng, and Jordan 2003; Grimmer 2010; Quinn et al. 2010; Wang and Blei 2011). For the purpose of the current work, we chose to use STM, which is geared toward applied social science and allows researchers to examine the prevalence of a particular topic in a body of text and examine how it varies based on other factors of interest (though approaches such as sLDA also allow researchers to incorporate corpus metadata into topic models). This allowed us to examine how the content of newspaper articles may vary by time (i.e., recessionary period) and corpus type (i.e., newspapers versus blogs). We also note that the particular implementation of topic modeling used in the current work takes a distinctly bottom-up, exploratory approach. That is, while there are other means of building topic-in-set knowledge into LDA and other approaches (Andrzejewski and Zhu 2009), these were not used in the current work.

Before running the topic models, the majority of metadata were removed from each document, including copyright statements, transcript information, date, article length, and byline.² Articles were further processed by changing all words to lowercase, removing punctuation and common stop words (from the “tm” text mining package in R) and by stemming the remaining words (e.g., the words “housed” and “houses” are stemmed to “hous”).

We then used the R (R Core Team, 2014) implementation of STM (Roberts et al. 2014) to derive a topic model of articles related to foraging practices. The total sample consisted of 2,035 news articles and 644 blog articles, from January 12th, 2001 to November 3rd, 2015 (blogs beginning in mid-2006). The corpus type (i.e., news or blogs) and the month–year the article was published were retained as key covariates in deriving the topic model. An analysis of topic semantic coherence, exclusivity, and number of iterations required for model convergence (see Roberts et al. 2014 for further description of these model characteristics) showed the 20 topic models to be the best fit to the corpus compared to alternate versions with 10, 15, 30, or 40 topics (please see Supplementary Materials for a table with key measures).

To detect possible relationships between the Great Recession and media coverage of foraging practices, we used linear and quadratic models to compare the prerecession (January, 2001–November, 2007), recession (December, 2007–December, 2009), and postrecession (January 2010–December, 2015) time periods. Similar analytic frameworks have been used in previous studies examining the impact of the Great Recession on adolescent values (Park, Twenge, and Greenfield 2014, 2017) and child naming practices (Twenge, Dawson, and Campbell 2016), among others.

Results

Topic Prevalence

The structural topic model was built to predict the prevalence of 20 topics with corpus type (i.e., blogs or newspapers) and month/year of article publication as covariates. Of the 20 topics, four were labeled “Junk” because they contained document meta-information (e.g., words such as copyright, blog, date, web) or were comprised of words that did not appear to semantically cohere (refer Supplementary Materials for more details). “Junk” topics are common in LDA- and STM-based approaches (AlSumait et al. 2009; Chuang, Manning, and Heer 2012), often emerging due to statistical co-occurrences of words but

are of little use in describing the corpus. Of the 16 remaining topics, we report here on the six most prevalent topics in the combined corpus (newspapers *and* blogs), followed by an examination of differences between the two corpora (Table 1; refer supplementary materials for information on all topics). There are two important points worth noting here: (1) a given article is composed of all 20 topics to varying degrees. For instance, it may be comprised 30% of Topic 1, 20% of Topic 2, and so on and so forth, summing to 100%. Topic prevalence in the corpus, then, is the average of a given topic across all documents. (2) The topic labels given below are chosen by the researchers as a way of summarizing across the vector of words that each topic describes. As it is quite possible that people can have different interpretations of groups of semantically coherent words, we also provide the most characteristic words for each topic in the text below as well as in Table 1 and the Supplementary Materials.

The most prevalent topic of discussion in the corpus was a description of foraging practices, characterized by words such as plant, wild, forag-, garden-, edible, etc. This topic, labeled “Foraging Described,” was present in approximately 7.2% of documents. Articles containing this topic tended to describe the practice of foraging in general terms. For instance, the articles might describe a particular group of foragers and/or discuss the impact of gathering one’s food generally. The second most common topic, after removing the junk categories, was labeled “Finding Wild Foods” and focused on particular, commonly foraged plant species. Comprising 6.7% of the corpus, articles that rated highly on this topic often highlighted local residents successfully foraging for more mushrooms and/or edible plants and provided step-by-step information on how others also might engage in these practices. We expected that articles describing mushroom poisoning or other instances of what has been labeled “mycophobia” (Williams 2014) would be observed within this topic. However, this was generally not the case. Instead, articles which contained the “Finding Wild Foods” topic described generally positive instances of finding local species, though some articles did contain explicit warnings about wild mushroom safety. For instance, in the *Omaha World-Herald* we noted the following warning:

“Do not eat wild mushrooms without positively identifying them. Several in the Midwest can kill or make you ill. Morels are hollow from the tip of the cap to the base of the stem. The cap is fully attached to the stem. The spores are gray to tan in color. The cap is easily identified by the pitted or honeycombed appearance.”

The third and fourth most prevalent topics related to the use of foraged foods in a restaurant setting with one topic talking about foraged foods as a part of a menu (“Food Description”) and the other talking about chefs and restaurants that use wild foods (“Chefs & Restaurants”). These topics were prevalent in 6.6% and 6.4% of documents, respectively. The fifth most common topic consisted of words such as cup, cook, salt, add, and minut-. We labeled this topic “Recipes/Home Use,” as articles which contained this topic appeared to emphasize information on how to use foraged foods at home by providing recipes and food preparation ideas. This topic was found in approximately 5.7% of documents. Finally, a topic we labeled “Food Policy,” was comprised of words such as food, people-, health, communit- and was present in approximately 4.8% of documents.

Differences between the six most common topic emphases are apparent in the text provided in Table 2, which shows selected quotations from the three best exemplars of each topic. The remaining nonjunk topics, along with the 10 most frequent words in each, can be found in the

Table 1. Most frequent topics and their prevalence across newspaper and web-based media outlets.

Topic label	Characteristic words	Topic prevalence			Independent samples T-Test, comparing prevalence rates across news and blog-based media outlets
		Combined (%)	Newspapers (%)	Blogs (%)	
Foraging described	Plant, wild, forage, garden, edible*, can, food, tree, use, flower	7.22	7.16	7.39	$t(2677) = 2.58, p < .05$
Find wild foods	Mushroom, morel, said, ramp, year, hunt, wild, season, find, fam*	6.74	8.11	2.41	$t(2677) = -13.85, p < .001$
Food descriptions	Restaurant, good, sweet, cheeses*, food, like, one, menu, type, sauc*	6.56	7.81	2.61	$t(2677) = -7.08, p < .001$
Chefs & restaurants	Chef, food, restaurant, cook, wine, will, new dinner, com*, local	6.41	6.09	7.41	$t(2677) = 2.12, p < .05$
Recipes/home use	Cup, cook, salt, add, minut*, fiddlehead, water, serv*, oil, heat	5.718	7.05	1.53	$t(2677) = -9.13, p < .001$
Food policy	Food, people, health, will, communiti*, govern, state, help, human, need	4.71	3.27	9.27	$t(2677) = 14.01, p < .001$

*indicates stemmed word.

Table 2. Example text in six most frequent topics.**Foraging described**

Wild foods, once considered too vulgar for industrialized Americans, are making a fashionable comeback, evidenced by their appearance in Martha Stewart's Life and The New Yorker's food issue last year. Wild foods are the freshest phase of the organic-local-seasonal foods movement and considered by many earth-conscious foodies to be the most sustainable way to eat. (*Spirit of Jefferson*, April 10th, 2013)

Armed with pruning shears and a paper bag, Nance Klehm walks along a Chicago sidewalk, pointing out plants and weeds that can make a tasty salad or stir-fry. She snips stalks from a weed with downy leaves and white powder commonly called goosefoot or lamb's quarters ... Klehm is among a small group of urban foragers across the United States who collect weeds and plants from city streets and gardens to use in meals and medicines. (*The Globe and Mail*, July 31st, 2009)

Driving through Europe, even in wintertime, you will often see people poking about in the meadows and woods and stuffing green plants into baskets or plastic bags. They are foraging, a practice as old as the human race itself. I love the idea of finding my food in the wild. I do it occasionally, not out of necessity, as my ancestors did, but because I enjoy interesting flavors served up in their proper season. (*The Washington Post*, July 10th, 2003)

Finding wild foods

First, find someone experienced at identifying morels so you're confident at identifying them yourself. Mike Kempenich of the Mikeology Store has a great tutorial video about morel mushroom foraging, and he administers a Facebook page on mushrooms, the Minnesota Mushroom Forum. The Minnesota Mycological Society has monthly meetings and plenty of helpful members. (*St. Paul Pioneer Press*, May 28th, 2013)

It's Iowa's version of a treasure hunt, and those lucky enough to find nature's gold are cashing in. There are no maps, and the bounty isn't buried. Hunters religiously search timber for tasty riches, and once a cache is found, they squirrel away the location in top-secret memory banks. Searching for morel mushrooms is a passion for many people. Some are turning it into a business, as well. "If I told you where I found them, I would have to kill you," Bill Sager said, as he set out bags of morels for sale last week. "Nobody tells where they find them." (*Waterloo Courier*, May 13th, 2010)

The Wright way to discover morel mushrooms produces pounds and pounds of the spongy delicacy. During the last two weeks, Phil Wright of Decatur emerged from the timbers down south with nearly 54 pounds ... "I grew up – I'll be 47 in June – spotting mushrooms. I'm from a family of 13. My late father, J.T. Wright, hunted mushrooms for 66 years, and he took me with him almost as soon as I could walk. "I can see a mushroom 100 feet away. If I can't see the mushroom, I smell it." (*Herald Review*, April 16th, 2009)

Food descriptions

The bitterness of barely wilted dandelion greens is balanced by the sweetness of orange juice and pine nuts in a dangerous butter sauce on al dente ricotta ravioli. (*The Globe and Mail*, May 24th, 2008)

Fresh sheets of pasta are rolled into sublimely rotund cannelloni around a filling of white asparagus tips, wild leeks and morels. There are so many whole morels, in fact, that the dimpled mushroom caps stand both atop the pasta tubes and around them, looking like some miniature hobbit shire from Middle-earth. (*The Philadelphia Inquirer*, May 25th, 2005)

The sauteed Maine cod, a tall hunk of snowy white goodness that separated into ivory shards at the touch of a fork, could not have been better. Its caviar-leek-shiitake cream sauce was a fit partner. Another don't-miss fish was the porcini-dusted halibut with a wild mushroom-three potato hash. (*The New York Times*, January 18th, 2004)

Chefs & restaurants

All of the furniture and the pottery dishes were made by the incredibly creative Stadtlander, who is living a lifestyle that reflects his "five-mile" philosophy. The stunning pizza that Jorg made for our lunch was topped with summer tomato sauce (made with tomatoes from the farm garden), wild leeks and smoked ham from his on-site pigs - and baked in a wood-fired oven outside the restaurant he constructed. (*The Record*, March 3rd, 2012)

Nemacolin Woodlands Resort in Fayette County is working with Table Magazine to hold a series of four "Taste of Nemacolin" weekends featuring tastings, cooking classes, dinners and other food fun:

April 30-May 2: Out of the Woods – celebration of local foods and Pennsylvania wines includes a fly-fishing demonstration and a foraging excursion, after which guests chow down on a freshly foraged spring pairing dinner. (*Pittsburgh Post Gazette*, March 4th, 2010)

Denevan's day job is as executive chef of the Gabriella Café in the beach town of Santa Cruz, the self-proclaimed birthplace of surfing in California. But each spring since 1999 he has fired up a red and silver 1953 FLXible bus and set off across the United States, championing organic, locally produced food and great wines at a series of weekly, open-air dinners across the United States. It brings a whole new meaning to "wild food". The 2006 tour made 17 stops, and the al fresco adventures included pre-dinner foraging in a redwood forest south of San Francisco (*The Compact Traveler*, August 10th, 2005)

Recipes/home use

My first encounter with wild asparagus? I remember finding wild asparagus in my teens – I was an avid reader of Euell Gibbons, the authority on wild foods, so I knew what wild asparagus was. I cooked it for lunch and though it was tender and delicious, my mother sneered at my "always trying to be so different." So my first experience was tinted with the colour of disdain; a colour that was very similar to that of canned asparagus. (*Edmonton Journal*, May 18th, 2005)

(Continued)

Table 2. Continued.

Fiddleheads are a green vegetable that is the early, tender growth of the *Matteuccia Struthiopteris* or more commonly referred to as the ostrich fern. Fiddleheads have received acknowledgment and a lot of respect in the last several years for their high nutritional content and their versatility (meaning they are easily substituted in most vegetable recipes). Fiddleheads can last up to 3 weeks with proper care and storage. For best results keep fresh fiddleheads refrigerated at 36 degrees Fahrenheit, better yet, store them in a bowl of water in the fridge. Fiddleheads keep very well in water, as water is part of their natural habitat. (*Ancaster News*, May 25th, 2011)

Growing herbs, as well as gardening and foraging, has always been a way of life for Reynolds, thanks to her Oklahoma roots. "My mom and dad were from the Depression area, and they were country folks," she said. "They would go and harvest things in nature, wild foods, and they would dig up the garlic and the onions and the poke. They foraged. That was just a part of life then." "And when I was growing up, we would play in the garden, and I remember in the spring the man would come with the mules and the plow and we would walk through the dirt with our bare feet and break up the clumps. Then we would plant all of these wonderful things." Check out some of these recipes that feature herbs prominently. (*Tulsa World*, April 23rd, 2014)

Food policy

North Carolina's city of Asheville is the most recent town in our nation to create a Food Action Plan. These sensible strategies address difficult issues, such as food deserts[1], community health, food insecurity, nutrition knowledge deficits[2], barriers to local food production and distribution, as well as food sovereignty. The plan was approved 6-0 on January 21, 2013 by the city council; this legislation will play an active role in improving healthy food access, and will also help to build a more sustainable local food infrastructure. (*EcoLocalizer*, January 27th, 2013)

With the cost of fuel rising, failures in the global industrial and commercial markets, and the production of food becoming less and less diversified food security and crop diversification is a growing concern. While proponents of the global industrial and commercial markets argue for better nutrition and cheaper food, the foods they produce have become increasingly homogenized and processed for the poor. Incorporating food growing practices in urban areas provides better nutrition through diverse growing and eating habits of indigenous plants. (*Indigenous Peoples Issues*, April 22nd, 2011)

Supplementary Materials. In general, the remaining topics included categories that announced local events, such as music or art festivals, discussed geographically specific information (e.g., state of New York or Canada) or topics which discussed the outdoors and wildlife.

We examined how prevalent each topic was by corpus type. That is, were there some topics that occurred more frequently in either newspaper articles or blog posts? This was done by analyzing differences in topic prevalence rates between the two corpuses. Excluding junk categories, three topics were more prevalent in blogs than in newspapers—the general topic describing foraging practices ("Foraging Described"), those discussing the high-end culinary use of local foods ("Chefs & Restaurants"), and a topic that described food and public policy ("Food Policy"). Both topics were statistically more likely to occur in blog posts than in newspaper articles. Topics more prevalent in newspaper articles included "Recipes/Home Use," "Finding Wild Food," and "Food Descriptions." These results are summarized in Table 2.

Impact of Great Recession on Foraging Topics

We hypothesized that there would be an increase in media coverage of foraging and wild food topics at the time of the Great Recession, relative to the pre and postrecession levels. To test this hypothesis, we constructed multivariate generalized least square model (GLS) assessing both the linear and quadratic impact of Economic Period (prerecession, recession, and postrecession) on the five topics most common in the combined corpus: Foraging Described; Finding Wild Foods; Food Descriptions; Chefs & Restaurants; and Recipes/Home Use. Assessing the nonlinear (quadratic) effect of Economic Period on discussion of foraging topics allowed us to examine whether the rate of growth or decline of a particular topic varied across the three economic periods. Furthermore, the use of GLS allowed us to apply a first-order autoregressive structure to the model to account for

Table 3. Generalized least squares results with first-order autoregressive structure, predicting topic prevalence across six focal topics by linear and quadratic trends of recessionary time period.

Topics	Time period (Pre, during and postrecession)			Time period^2		
	β	t	p	β	t	p
Recipes/home use	2.84	4.51	0.00	−0.67	−4.05	0.00
Food policy	−0.89	−1.56	0.12	0.21	1.42	0.16
Finding wild food	1.84	3.26	0.00	−0.38	−2.57	0.01
Chefs & restaurants	−1.16	−2.27	0.02	0.24	1.81	0.07
Food descriptions	4.52	7.30	0.00	−1.04	−6.36	0.00
Foraging described	−1.51	−3.14	0.00	0.34	2.70	0.01

temporal autocorrelation across the three time periods. A logit transformation was used to map topic prevalence-dependent variables to the real number line, which originally had values bounded by 0 and 1 (Kieschnick and McCullough 2003; Baum 2008). All analyses were done using the R Statistical Computing Software (R Core Team, 2014) and the GLS equations were fit using the nlme package (Pinheiro et al. 2017). Final models assumed the following structure (see Table 3 for summary of findings):

$$\begin{aligned} \text{logit}(\text{TopicPrevalence}) = \log\left(\frac{\text{TopicPrevalence}}{1 - \text{TopicPrevalence}}\right) = & \beta_0 + \beta_1 * \text{EconomicPeriod} \\ & + \beta_2 * \text{EconomicPeriod}^2 + \varepsilon \end{aligned} \tag{1}$$

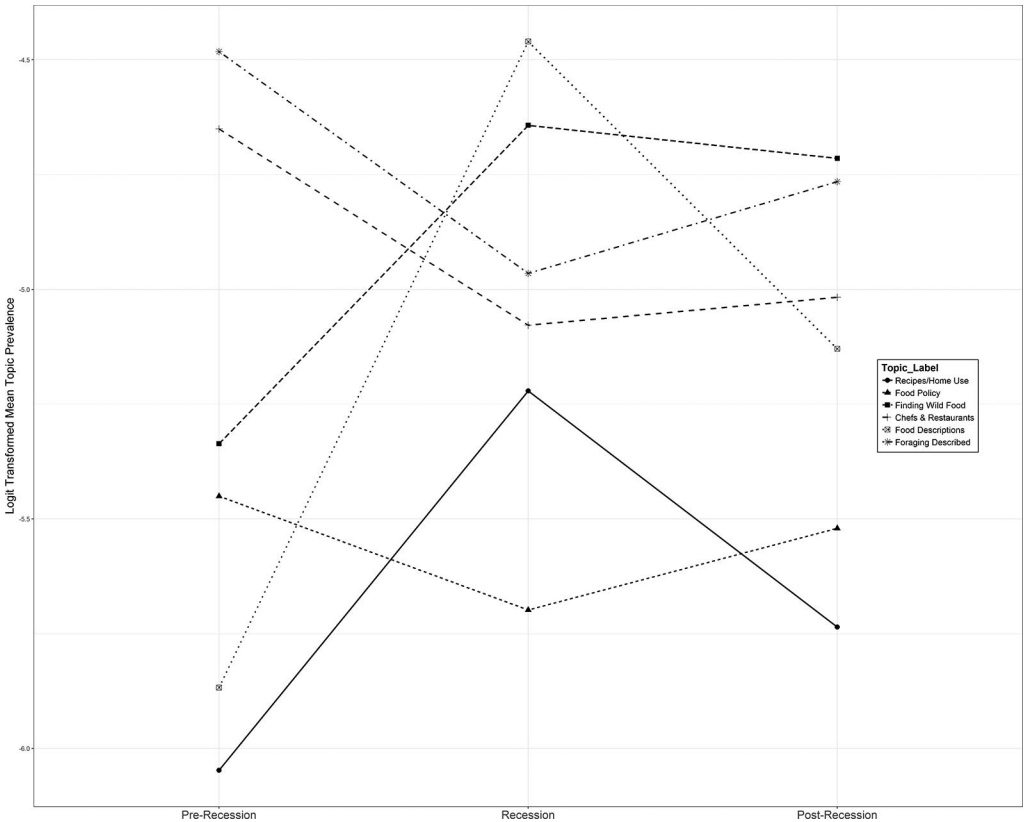


Figure 1. Variation in topic prevalence by recession period.

Figure 1 summarizes the linear and quadratic effects of Economic Period on topic prevalence. Our hypothesis proved to be true for some topics but false in the aggregate. For instance, articles containing recipes that showed home cooks the best ways to use foraged foods (topic label Recipes/Home Use) increased during the recession and then declined sharply in the postrecession period. Articles discussing expert foragers and forageable species (topic label Finding Wild Foods) also increased during the recession years but remained at relatively high levels in the postrecession years. In contrast to both these topics, those which described general foraging practices (topic label Foraging Described) and the use of forage foods in high-end restaurant cuisine (topic label Chefs & Restaurants) declined during the recessionary period and did not return to earlier levels of frequency in the postrecession period.

Discussion

Results described here demonstrate that print and digital mass media articles describe multiple aspects of foraging and wild foods. The five most frequently mentioned topics (Table 2) may be characterized within two broad categories; self-provisioning and luxury commodity. The three self-provisioning topics (Foraging Described, Finding Wild Foods, Recipes/Home Use) often were presented in the common journalistic style of a human interest story and variously: (1) acquainted the reader with the notion of foraging and wild foods in contemporary First World context, (2) provided some information on how foraging is done, and (3) provided tips on preparing foraged wild foods at home. Luxury commodity topics (Food Descriptions, Chefs & Restaurants) effectively were food and travel journalism, in which wild foods served as an element of distinction for dishes, restaurants, and chefs.

The Great Recession of 2007–2009 showed as a distinct signal in the frequency of coverage of each of these topics. However, at first blush the directionality of the signals appears to be contradictory, rising sharply in three cases (Find Wild Foods, Recipes/Home Use, and Food Descriptions) and dropping in two (Foraging Described and Chefs & Restaurants). This bidirectionality is all the more striking given there are opposite trends within the two larger categories (self-provisioning and luxury commodity stories). Though we did not specifically predict this pattern of results, some possible explanations suggest themselves. During a time of reduced incomes and increased food insecurity, it is not surprising that journalists might consider practical information about self-provisioning strategies such as finding and preparing foods available at no cost to be of heightened interest to their readers. As other work has shown, framing theory is a significant tool in understanding the narratives presented by media outlets, and how these frames may shape public perceptions and beliefs (Scheufele 1999; Chong and Druckman 2007a). In this perspective, we might expect that framing an article about foraging in terms of how one might forage in a local community and how those foods can be used in cooking preparations at home might help readers be more economical during tough financial times. Conversely, more general descriptions of the practice itself do less to meet that need.

The opposing directionalities of the two luxury commodity topics may be due in part to contractions in the restaurant industry during the recession, resulting in fewer new venues and chefs to review (i.e., a decrease in the Chefs & Restaurants topic), even while vicarious experiences such as reading about sumptuous foods that are out of financial reach may

provide an escape in stressful times (i.e., the Food Descriptions topic). The “lipstick effect” theory (Koehn 2001; Nelson 2001; Hill et al. 2012) offers an explanation for increased attention to luxury uses of wild foods; consumers desire to splurge on small treats when their spending is otherwise restricted. By focusing their readers’ attention toward the world of high-end cuisine, newspapers might provide the types of vicarious experiences their readers demand during tough times.

Our results do not directly speak to whether the distinct frames used by media outlets to describe the process of gathering wild foods actually affect and shape foragers’ motivations. However, a significant body of work on media communication and the effects of narrative frames have found that public attitudes on issues such as climate change or nuclear energy are affected by how these topics are discussed in newspapers and other mass media (Entman and Rojecki 1993; Chong and Druckman 2007b; Carmichael and Brulle 2017). As the anecdote from the public policy debate about foraging in the New York Times above suggests, these articles in major newspapers are a reliable source of information for park managers and policymakers. When and whether foraging practices are described as the taste of a few privileged elites or as a self-provisioning service could impact managers’ acceptance of these practices.

Our analysis also demonstrates that newspapers and blogs tended to frame foraging differently in the years examined here. For example, Food Policy, which conditions the possibility to forage and/or offer wild foods in restaurants, was the most commonly occurring topic in blogs and the least commonly occurring in newspapers. Frequency in these two types of outlets was the reverse for the Finding Wild Foods topic. The Food Descriptions topic also occurred significantly more frequently in newspapers than blogs, perhaps reflecting the fact that food critics have long been a feature of arts and lifestyle sections in print media.

However, these differences between the corpus types also point to a key limitation of our study results. The newspaper and blog corpuses had data from different time depths and reflected only the data we were able to compile given the indexing service used. Our temporal analysis necessarily elides differences, if any, in the directionality of topic coverage and responses to economic context on the two platforms through time. These limitations have two clear, related implications. One, relying on LexisNexis’ indexing service to assemble our corpus of blogs means that we have missed out on many influential wild foods blogs, such as the site, “Eat The Weeds.” It is possible that blogs dedicated to foraging cover a greater range of topics about wild foods. Our current analysis lays the groundwork for further analyses of media coverage of foraging, with future work comparing and contrasting the content of specialized foraging websites. The second implication of our limited blog sample is that the relatively greater weight given to topics covered by newspapers, particularly for the time period before the Great Recession, could mean that most of the 2009 trends that we observe are due to a greater proliferation of blogs, in general. However, if this was the complete explanation, we would not expect to observe a quadratic trend as we do in our results, indicating, in some cases, a return to baseline, prerecessionary values.

Topic modeling and other means of computerized text analysis are rapidly emerging as ways of making sense of large amounts of publicly available data. Although this type of analysis remains primarily exploratory, especially in the unsupervised implementations of topic modeling used in the current work, it can still yield insights which align with important sociocultural issues, particularly those that play out in the media. Such an

approach makes it possible to parse key elements of a subject as presented in the media and identify trends through time in relationship to contextual factors in a way that would be resource-intensive with more manual analytical techniques. Future approaches could be strengthened by bringing in ethnographic methods as well as other sources of Big Data (e.g., social media) to understanding geographic variation in foraging practices. For instance, do urban and rural centers differ in the prevalence and motivations of foragers and are these geographic and demographic differences reflected in media coverage? Combining topic modeling with theory and other social-scientific methods to probe the reasons for observed trends can provide more rapid and thorough understanding of emerging issues and changing coverage.

Conclusion

Foraging and eating wild foods might be imagined to have disappeared in the 21st century industrialized world. Our analysis demonstrates that, on the contrary, these practices continue to be discussed in specialized and mainstream media outlets in the United States and Canada. Further, these practices appear to be intimately linked to other socio-cultural phenomena and are components of our modern food systems. During times of strong economic growth, contemporary foraging and consumption of wild foods may serve as sources of luxury commodities and can be thought of as cherished and productive recreational activities. In times of economic hardship, however, our results suggest that these practices are reconceptualized as satisfying basic needs, with more articles in the corpus discussing home use of foraged foods during the Great Recession. Across both of these contexts, these practices forge intimate connections to landscapes and provide the material for performing hybrid survival and culinary skills.

Where access to the spaces and resources on which foraging depends is available, the relative weight and significance of these aspects of the practice are adaptable and support human resilience to changes in micro- and macroeconomic circumstances. As with other social trends, media sources both reflect and lead developments in foraging, even while filtering its choice and manner of covering the subject through the traditions and contemporary imperatives of journalism (Franklin 2014). Thus, the picture of foraging and wild foods drawn by this analysis tells us much about what foraging and wild foods look like in two of the most industrialized nations in the world, even while leaving us to further explore the constants and variability in these practices.

Notes

1. Similar economic trends occurred in Canada virtually concurrently though perhaps to a lesser extent (Tencer 2013).
2. Metadata removal was more difficult for blog pieces as those tended to be published in a non-standard format, therefore this information was left intact for several blog articles. As the Results section will demonstrate, this meta-information emerged as a separate topic in the model.

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