



# Worldwide trends in fishing interest indicated by internet search volume

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**Abstract** There is a growing body of literature that shows internet search volume on a topic, such as fishing, is a viable measure of salience. Herein, internet search volume for ‘fishing’ and ‘angling’ is used as a measure of public interest in fishing, in particular, recreational fishing. An online tool, Google Insights for Search, which allows one to study internet search terms and their volume since 2004, is used to examine trends in interest in fishing for 50 countries. Trends in normalised fishing search volume, during 2004 through 2011, varied from a 72.6% decrease (Russian Federation) to a 133.7% increase (Hungary). Normalised fishing search volume declined in 40 (80%) of the countries studied. The decline has been relatively large in English-speaking countries, but also has been large in Central and South American, and European countries. Analyses of search queries provide a low-cost means of gaining insight into angler interests and, possibly, behaviour in countries around the world.

**KEY WORDS:** anglers, angling, Google Insights for Search, recreational fishing, salience.

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## Introduction

Humans have harvested fish for food for at least 42 000 years (O’Connor *et al.* 2011) and in the last half century, there has been a steady increase in the global effort directed toward both commercial (Swartz *et al.* 2010; Anticamara *et al.* 2011) and recreational fisheries (Arlinghaus *et al.* 2002; Cooke & Cowx 2004). The increase in human population over the past century and the increase in importance of fish as both food and recreation have resulted in the global collapse of many fish populations as a result of commercial overharvest (Hilborn *et al.* 2003; Coleman *et al.* 2004), and there is a growing concern for the potential of recreational fishing to contribute to, or cause, the collapse of recreationally important fish stocks (Post *et al.* 2002; Cooke & Cowx 2006; Lewin *et al.* 2006). Thus, there is a need to track local, national and international trends in fishing effort, which is easier for commercial fishing than recreational fishing and is easier in developed countries than developing countries.

Arguably, the three most consistently measured characteristics of both commercial and recreational fishing are participation, effort and harvest. Information on participation can be obtained from licence (permit) and stamp sales. Detailed information on effort and harvest can be obtained by in-person surveys, mail and telephone surveys, log books and numerous other means (Guthrie *et al.* 1991; Pollock *et al.* 1994), although collection of this information is expensive and requires considerable time and manpower. Further, current collections of information on recreational fishing effort and harvest are generally localised, and it is unknown how local efforts and harvests scale up to national and international efforts and harvests, especially for recreational fishing. Current collections of recreational information on national and international scales are logistically constrained by costs that produce low-resolution data collected along with inherent time lags in reporting of data. For example, current monitoring of participation in recreational fishing within the USA logistically has a temporal resolution of 5 years and a

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lag of 2 years for reporting of data. Thus, current detailed information on participation, effort and harvest in recreational fishing usually is unavailable.

In recent years, the internet has become an important source of information and component of people's work, social lives and leisure activities (Amichai-Hamburger & Ben-Artzi 2000; Amichai-Hamburger & Hayat 2011). There is growing evidence of a relationship between volume of internet searches and subsequent human behaviour. For example, spatial and temporal patterns in cases of influenza can be tracked, in real time, using internet search volume, as patients often search for information on symptoms before visiting a doctor for diagnosis and treatment (Ginsberg *et al.* 2009). Volume of search queries is also correlated with patient presentations for kidney stone occurrence (Breyer *et al.* 2011), cancer awareness (Metcalf *et al.* 2011) and a variety of other diseases (e.g. Brownstein *et al.* 2009; Pelat *et al.* 2009). Search volume also is correlated with unemployment rates (Askatas & Zimmermann 2009), perceptions of unemployment (Scheitle 2011) and transactions in stock markets (e.g. Preis *et al.* 2010). Thus, internet search volume is a viable measure of issue salience, or interest, in a variety of disciplines including fisheries (Martin *et al.* 2012). Herein, internet search volumes for 'fishing' and 'angling' are used as a measure of public interest in fishing and, in particular, recreational fishing. An online tool, Google Insights for Search, which allows one to study internet search terms and their volume since 2004, is used to examine trends in interest of fishing for 50 countries.

## Methods

Google Insights for Search (Google 2010) allows one to compare the frequency of words and phrases used in Google search queries within and among geographic regions. Google Insights for Search analyses a portion of Google searches to compute the number of searches that have been conducted for search queries of interest and then scales that number to the total number of Google searches performed over time. Thus, the results indicate the likelihood that a user in a selected geographic area will search for a particular term or phrase and reflect relative, rather than absolute, search volume. Google Insights for Search normalises results so that the greatest value, across regions and time, is arbitrarily set to 100 and all other values in the comparison are scaled against that observation (i.e. each observation is divided by the maximum value in a set of comparisons and is then multiplied by 100).

Google Insights for Search was used to assess geographic and temporal patterns in fishing interest, as mea-

sured by internet search volume. 'Fishing' and 'angling' plus translations of both terms in 20 languages (Table 1) were used as search terms. Translations into non-English languages were obtained from Google Translate. In two sets of languages (Danish, Norwegian and Swedish; and Italian, Portuguese and Spanish), the translations were equivalent. In some cases, Google Translate failed to translate 'angling' or translated it as 'fishing'. Collectively, these terms ('fishing' and 'angling' plus translations) combined to 30 terms, the maximum that can be entered into a single search. Analyses were restricted to these languages so that observed trends among countries in normalised search volume would be comparable. Google Insights for Search allows search terms to be examined in up to five geographic regions (i.e. countries) at a time. Included herein are results for 50 countries (Table 2).

Preliminary studies indicated that New Zealand had the greatest mean normalised search volume regardless of the other countries with which it was compared with (i.e. New Zealand results always included the nominal value of 100). Therefore, New Zealand was included in all comparisons (New Zealand + four other countries) as a standard, which allowed direct comparisons of mean normalised search volume among countries.

Google Insights for Search was accessed on 31 December 2011 to download data used in this analysis. On that date, the total available time series (1 January 2004 to 31 December 2011) for each country was obtained. Google Insights for Search allows users to download weekly (or monthly, for smaller countries) search volume for each country searched. Monthly means were calculated from the downloaded weekly

**Table 1.** The English words 'angling' and 'fishing' were translated using Google Translate into 20 languages

Language	Translation
Croatian	Ribolov
Czech	Rybaření
Danish, Swedish, Norwegian	fiske + fiskeri
Dutch	hengelen + vissen
Finnish	kalastus + onkiminen
French	Pêche
German	Angeln + Fischen
Greek	ψάρεμα + αλιεία
Hungarian	horgászás + halászat
Indonesian	memancing + penangkapan ikan
Italian, Portuguese, Spanish	pesca + pesqueras
Japanese	釣り
Polish	rybacki + wędkarstwo
Romanian	Pescuit
Russian	Ужение
Serbian	риболов + пецање

**Table 2.** Means and trend of normalised volumes of Google search queries nationwide for language-appropriate terms of ‘fishing’ and ‘angling’ (Table 1) from 1 January 2004 to 31 December 2011. Countries are listed in descending order of mean normalised search volume, which reflects the within-country relevance of fishing searchers

Country	Mean normalised search volume	Trend	Geographic region
New Zealand	63	17.8	Oceania
South Africa	50	-22.4	Africa
Uruguay	49	-14.5*	South America
Australia	46	-12.6	Australia
Bosnia and Herzegovina	42	0.9 <sup>†</sup>	Europe
Bulgaria	39	-13.7	Europe
United States of America	38	-30.6	North America
Romania	38	-3.3	Europe
Croatia	37	-27.6	Europe
Japan	37	5.7	Asia
Bolivia	37	34.1 <sup>‡</sup>	South America
United Kingdom	32	-28.0	Europe
Ireland	32	-31.5	Europe
Norway	30	-29.0	Europe
Argentina	30	-55.8	South America
Canada	29	-26.5	North America
Serbia	29	-59.9	Europe
Italy	28	-14.7	Europe
Portugal	28	-32.2	Europe
Costa Rica	28	-40.1 <sup>‡</sup>	South America
Sweden	26	-24.6	Europe
Ecuador	26	-41.5	South America
Finland	24	-48.1	Europe
Cuba	24	3.3	Caribbean
Spain	23	-37.3	Europe
Venezuela	23	-64.3	South America
Denmark	22	-27.9	Europe
Trinidad and Tobago	20	8.0	Caribbean
Netherlands	19	-26.9	Europe
Chile	19	-61.5	South America
Slovakia	19	13.8 <sup>‡</sup>	Europe
Jamaica	17	-27.7	Caribbean
Brazil	16	-28.2	South America
Austria	15	-12.1	Europe
Belgium	15	-47.8	Europe
Indonesia	14	-46.3	Asia
Greece	13	-65.2	Europe

(continued)

**Table 2.** (continued)

Country	Mean normalised search volume	Trend	Geographic region
Colombia	13	-53.6	South America
Germany	12	-4.2	Europe
Switzerland	12	-19.0	Europe
Mexico	11	-62.8	Central America
Dominican Republic	11	16.5 <sup>§</sup>	Caribbean
Czech Republic	10	8.3 <sup>‡</sup>	Europe
El Salvador	10	-38.8	Central America
Poland	9	-50.4	Europe
France	8	-50.4	Europe
Hungary	8	133.7	Europe
Puerto Rico	7	-25.7 <sup>‡</sup>	Caribbean
Slovenia	7	-22.7	Europe
Russian Federation	5	-72.6 <sup>‡</sup>	Europe

Because of low search volume or lack of indexing by Google trend analysis is for the period: \*2005–2011; <sup>†</sup>2008–2011; <sup>‡</sup>2006–2011; <sup>§</sup>2007–2011.

values, resulting in a maximum of 96 (12 months × 8 years) observations for a given country. R statistical software was used to conduct an STL (Cleveland *et al.* 1990), a seasonal-trend decomposition procedure, to model trends in search volume. The STL uses Loess, a nonparametric regression, to model the seasonal effects of each time series iteratively and then the long-term trend. The STL models were used to show only the general nature of long-term trends in fishing searches, and no statistical inferences were made.

**Results**

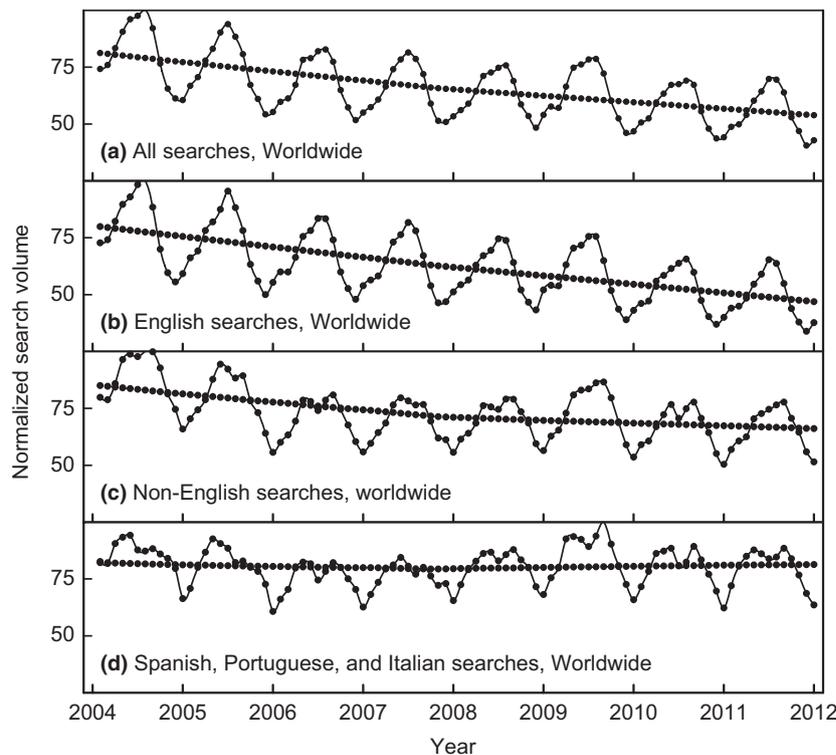
Mean normalised search volume varied from 5 (Russian Federation) to 63 (New Zealand) in the 50 countries studied (Table 2). Differences among countries reflect differences in the relative volume of fishing searches (i.e. interest in fishing) and indicate that fishing searches are 12-times more likely in New Zealand than in the Russian Federation, for example. There were no obvious continental or intercontinental patterns in mean normalised search volume, except that fishing searches generally were more likely in English-speaking countries. Trends in normalised fishing search volume, during 2004 through 2011, varied from a 72.6% decrease (Russian Federation) to a 133.7% increase (Hungary). In general, a trend for increased normalised fishing search

volume was more likely in eastern European and Caribbean countries than elsewhere. There was no correlation between mean normalised search volume and trend in fishing searches ( $P = 0.2995$ ).

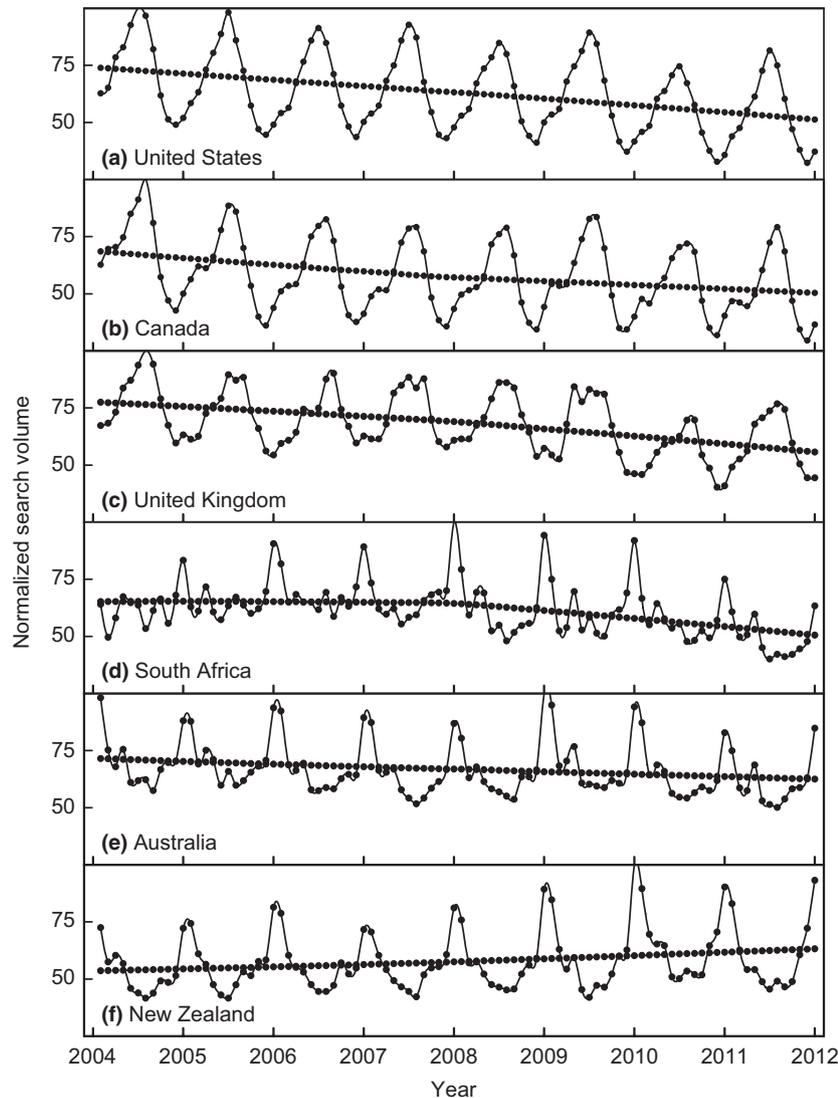
Normalised search volume for fishing, in all languages, decreased 33.6% during 2004 through 2011 (Fig. 1a). There was a pronounced seasonality to fishing searches, with peak volume occurring during the northern hemisphere summer. The absence of a distinct peak during the southern hemisphere summer suggests that the volume of fishing searches originating in the more-developed northern hemisphere is much greater, and swamps, search volume originating in the less-developed southern hemisphere. The worldwide decrease in normalised fishing search volume was largely driven by the decrease in search volume for the English terms 'fishing' and 'angling' (Fig. 1b). Normalised fishing search volume decreased worldwide by 41.2% for these terms. Excluding the English words 'fishing' and 'angling', normalised fishing search volume in all languages assessed (Table 1) showed a 22.2% decrease from 2004 to 2011 (Fig. 1c), a decrease that was not evident in Latin languages (Italian, Portuguese and Spanish), which showed a 1% decrease (Fig. 1d) during 2004 through 2011.

Normalised fishing search volume showed similar seasonal and long-term trends in the USA (Fig. 2a), Canada (Fig. 2b), United Kingdom (Fig. 2c) and Ireland (not figured). Search volume in these countries showed seasonal maxima during the northern hemisphere summer and a linear decrease during 2004 through 2011 that ranged from 26.5% (Canada) to 31.5% (Ireland) (Table 2). In the USA and Canada, in which ice fishing is popular during winter, a small increase in fishing search volume is present in December through January (because ice fishing is conducted at higher latitudes, this increase is much more prominent in Canada). Normalised fishing search volume in South Africa (Fig. 2d), Australia (Fig. 2e) and New Zealand (Fig. 2f) showed seasonal maxima during the southern hemisphere summer. There was a slight quadratic, but downward trend in normalised fishing search volume in South Africa, which decreased 22.4% during 2004 through 2011. In Australia, normalised fishing search volume decreased 12.6%, and in New Zealand normalised fishing search volume increased by 17.8%, which was the only increase observed among English-speaking countries.

In Nordic countries, seasonal and long-term trends in normalised fishing search volume were similar among Norway (Fig. 3a), Sweden (Fig. 3b), Denmark (Fig. 3c)



**Figure 1.** Normalised volume of Google search queries worldwide for the terms 'fishing', 'angling' and associated translations in 20 languages from 1 January 2004 through 31 December 2011 for all search terms (Table 1; panel a), for 'fishing' and 'angling' search terms only (panel b); for all searches except 'fishing' and 'angling' (panel c), and for search terms 'pesca' and 'pesqueras'.



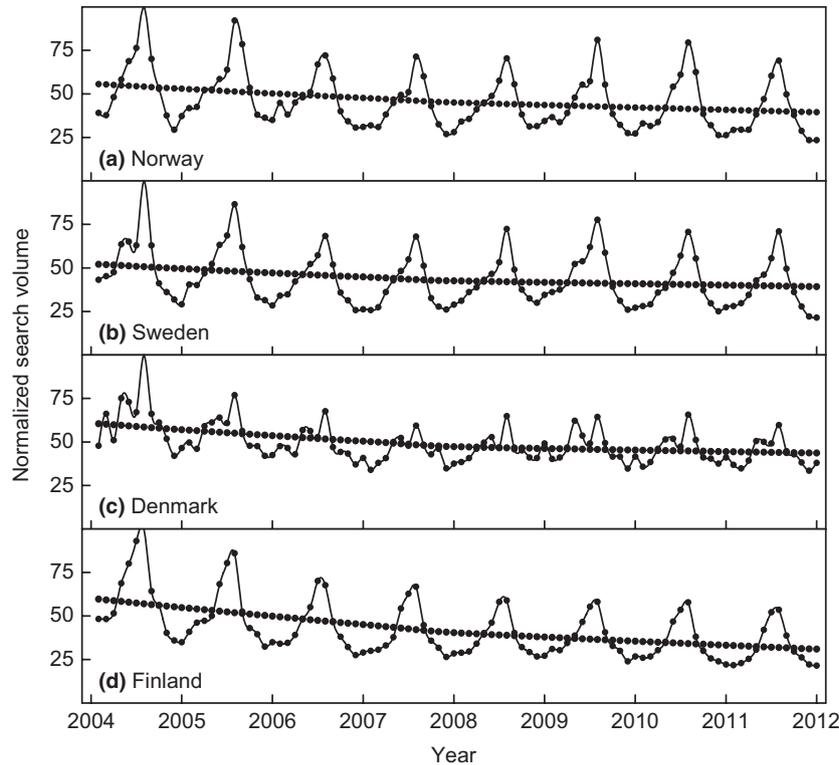
**Figure 2.** Normalised volume of Google search queries nationwide for language-appropriate terms of ‘fishing’ and ‘angling’ (Table 1) from 1 January 2004 through 31 December 2011 for the USA (panel a), Canada (panel b), United Kingdom (panel c), South Africa (panel d), Australia (panel e) and New Zealand (panel f).

and Finland (Fig. 3d), except that seasonal variation in normalised fishing search volume was less pronounced in Denmark. There was a linear decrease in normalised fishing search volume in each of these countries, ranging from 24.1% in Sweden to 48.1% in Finland (Table 2).

Normalised fishing search volume declined in a linear fashion in western European countries (Fig. 4, Table 2). The smallest decline, 4.2%, occurred in Germany (Fig. 4d) and the greatest declines, 47.8, 50.4 and 65.2%, occurred in France (Fig. 4c), Belgium (Table 2) and Greece (Table 2), respectively. Temporal variation in normalised fishing search volume was more variable in Eastern Europe (Table 2), with normalised fishing

search volume increasing from 1% in Bosnia and Herzegovina to 133.7% in Hungary, but declining from 3.3% in Romania to 72.6% in the Russian Federation. Among the 50 countries studied herein, eastern European countries included the greatest number with increases in normalised fishing search volume during 2004 through 2011.

Normalised fishing search volume declined in a linear to slightly quadratic manner in Central and South American countries (Fig. 5), with the overall decline ranging from 14.5% in Uruguay to 64.3% in Venezuela. Among the 50 countries studied herein, the most consistent and greatest decrease in normalised fishing search volume occurred in Central and South America (Table 2). With



**Figure 3.** Normalised volume of Google search queries nationwide for language-appropriate terms of 'fishing' and 'angling' (Table 1) from 1 January 2004 through 31 December 2011 for Norway (panel a), Sweden (panel b), Denmark (panel c) and Finland (panel d).

the exception of Mexico (Fig. 5a), these countries showed a less pronounced seasonal variation in normalised fishing search volume than most northern hemisphere countries, possible due to the tropical climates of many of these countries.

Normalised fishing search volume increased by 5.7% in Japan (Fig. 6a) and showed a strong seasonal pattern. Normalised fishing search volume decreased by 46.3% in Indonesia (Fig. 6b), which showed no strong seasonality in fishing searches. Among Caribbean nations, normalised fishing search volume either was extremely low or not indexed by Google until 2006. Trends in Caribbean nations were variable and generally quadratic. Normalised fishing search volume decreased in Jamaica (27.7%) and increased in Cuba (3.3%) and Trinidad and Tobago (8.0).

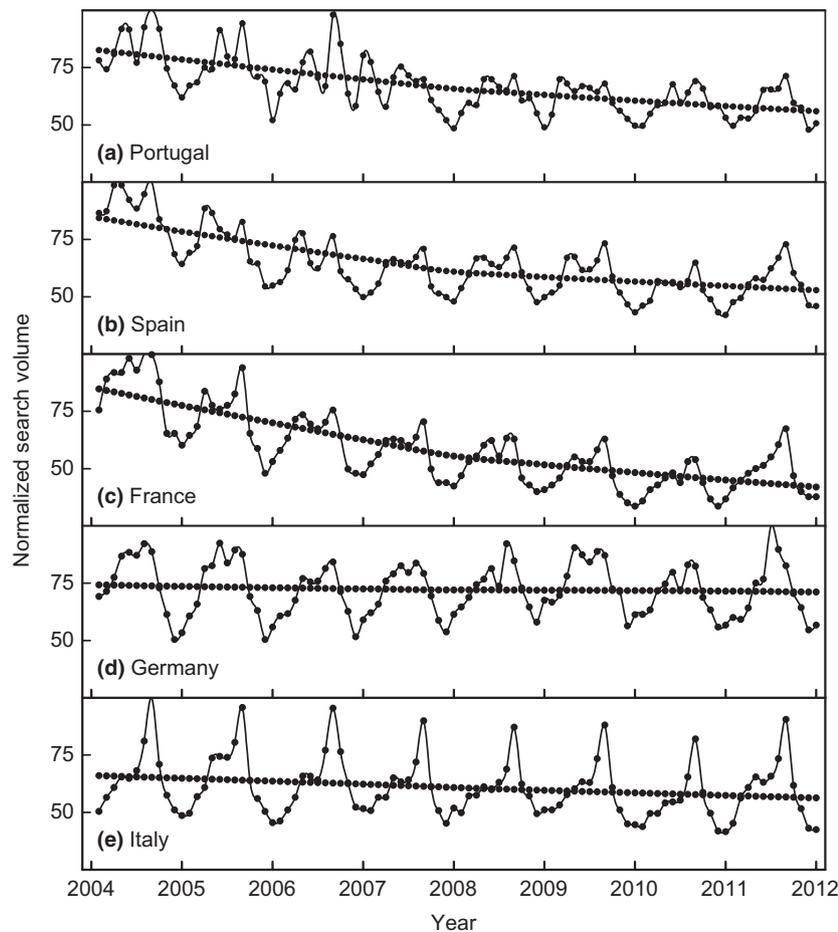
## Discussion

Manfredo (1986) predicted that fishing interest would decrease with increased urbanisation because of competition among activities and changing cultural traditions. Consistent with Manfredo's predictions, results presented here show that normalised fishing search volume declined during 2004 through 2011 in 40 (80%) of the

countries studied. The decline has been relatively large in English-speaking countries, but also has been large in Central and South American, and in western European countries. These declines are consistent with the observations of Pergams and Zaradic (2006, 2008) who reported a general decline in nature-based recreation in several countries. Pergams & Zaradic argued this was part of a general, worldwide decline in interest in outdoor recreation that was correlated with increase in video games, television watching, theatre attendance and internet use. This general decrease in outdoor recreation is likely to continue because exploring nature, as a children's activity, is less prevalent than both watching TV and playing electronic games in 13 of 16 countries studied by Singer *et al.* (2009).

By contrast, increased normalised fishing volume in those few countries where it is observed, such as Japan, Cuba and Trinidad and Tobago, is generally associated with recent increase in internet usage (Miniwatts Marketing Group 2011). Such countries are few among those studied herein, which precludes any meaningful interpretation.

Search volume can decrease for at least three reasons. First, the number of persons searching for fishing and angling may be declining in absolute numbers as the

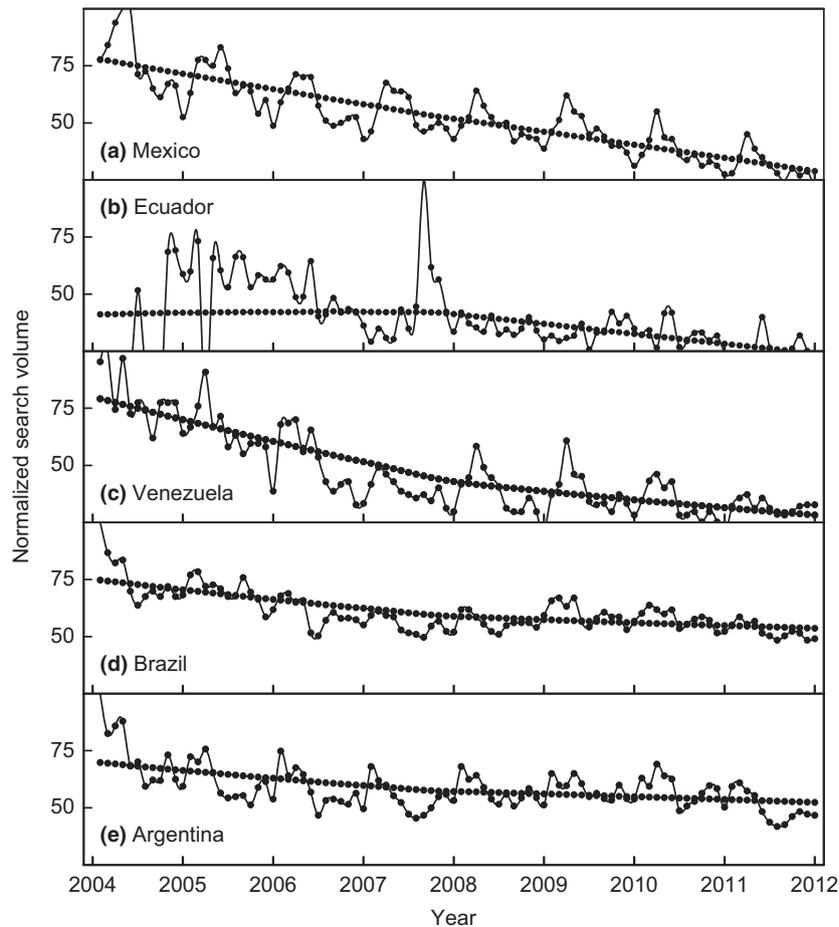


**Figure 4.** Normalised volume of Google search queries nationwide for language-appropriate terms of ‘fishing’ and ‘angling’ (Table 1) from 1 January 2004 through 31 December 2011 for Portugal (panel a), Spain (panel b), France (panel c), Germany (panel d) and Italy (panel e).

remaining population is static or increasing. This is the case in the USA, where for several years the estimated number of anglers was relatively constant, but has now begun to decrease (U.S. Department of Interior and U.S. Department of Commerce 2008), presumably because of the retirement of the ‘Baby Boom’ generation, born during 1946–1964, which is followed by a much smaller generation (Murdock *et al.* 1996). A similar, general decline in participation has been predicted for a number of other industrialised countries (Snepenger & Ditton 1985; Murdock *et al.* 1992). Second, the number of persons searching for fishing and angling may be relatively constant in number, but their proportion in the population is declining. The numbers of anglers in Germany (Arlinghaus *in* Ditton 2008), the Netherlands (Aarts *in* Ditton 2008) and United Kingdom (Aprahamian *et al.* 2010), for example, are steady to possibly slightly increasing. However, as the non-angling portions of these populations continue to grow, the relative number of anglers will decline, which would be expected to

cause a decrease in normalised fishing search volume. Third, the average number of searches made by an individual may decline through time, either because the location of desired information is known, or because of competing interests. Although bookmarking of known sources of information, such as fishing regulations, conceivably may reduce search query volume, it appears that this may be offset by increased search volume for alternative information sources. Martin *et al.* (2012) reported significant increase in normalised search volume for such terms as ‘fishing forum’, ‘fishing Facebook’ and ‘fishing YouTube’. They also observed, as herein, a decrease in searches for fishing despite many of the former terms including ‘fishing’ and thus would contribute to the volume of searches for fishing information.

The observed declines in normalised fishing search volume agree qualitatively with results from several developed countries including the USA (U.S. Department of the Interior, Fish & Wildlife Service & U.S. Department of Commerce, U.S. Census Bureau 2008).



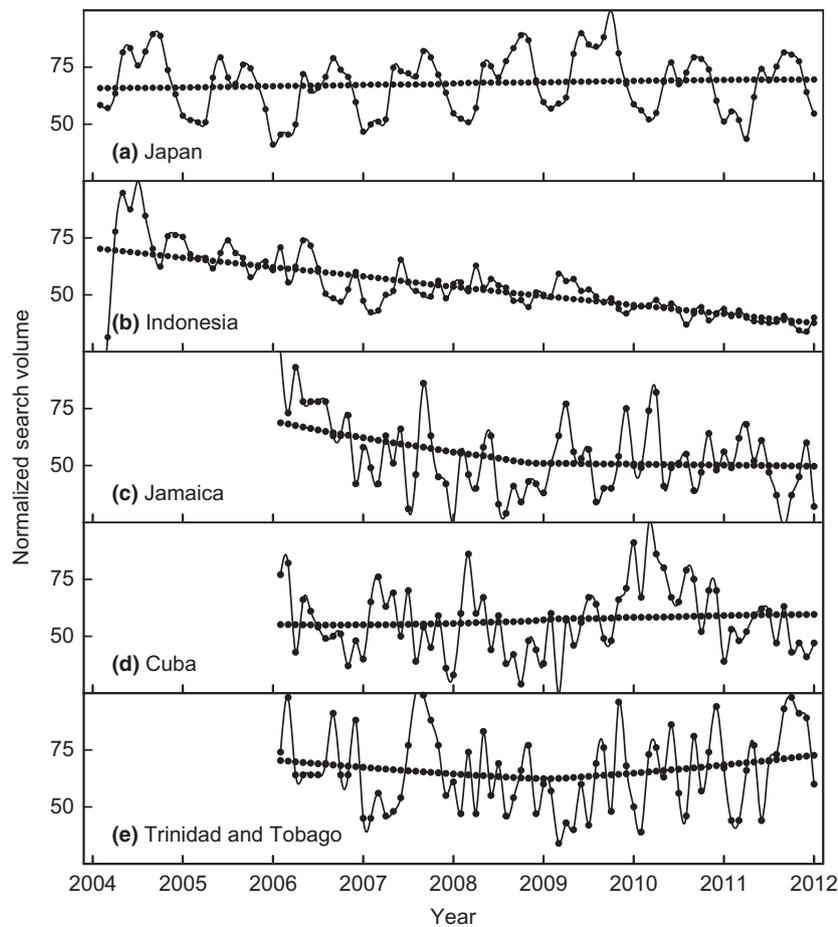
**Figure 5.** Normalised volume of Google search queries nationwide for language-appropriate terms of 'fishing' and 'angling' (Table 1) from 1 January 2004 through 31 December 2011 for Mexico (panel a), Ecuador (panel b), Venezuela (panel c), Brazil (panel d) and Argentina (panel e).

Acquisition of fishing licenses and permits is static or in decline in the Netherlands, France, Germany and United Kingdom (Aarts *in* Ditton 2008; Arlinghaus *in* Ditton 2008; Reid *in* Ditton 2008; Aprahamian *et al.* 2010) and elsewhere in Europe (Cowx 1998), with numerous consequences. Static or declining licence sales threaten proposed and ongoing attempts to increase fishing tourism in both developed (e.g. Domarkas & Radaiytė *in* Ditton 2008; Toivonon *in* Ditton 2008) and developing countries (Zakariah *in* Ditton 2008). The general decline in numbers of anglers has led several countries, such as Canada, England, Norway and USA, among others, to develop programmes to recruit new persons to angling (Harrison & Schratwieser 2008; Wightman *et al.* 2008; Aprahamian *et al.* 2010). The success of these programmes has been difficult to assess, but given the decline in normalised fishing search volume in these countries, it appears that any successes are, as yet, modest. Queries for children's fishing programmes and fishing clinics in the USA have increased in normalised

search volume over time (Martin *et al.* 2012), reflecting growing interest in these programmes, but the absolute volume of these searches presently is small.

There is strong seasonality in normalised fishing search volume, except in tropical countries and those with large coastal areas (e.g. Denmark and Portugal). Although the long-term trend in normalised search volume varies among countries, there is a remarkably consistent seasonal pattern in queries, wherein the annual maxima and minima occur in summer and winter, respectively. This seasonality is much more consistent with known patterns of recreational, as opposed to commercial, fishing and provides strong circumstantial evidence that normalised search volume for fishing and angling provides an index of interest in recreational fishing. Finally, it is worth noting that seasonal waxing and waning of search volume (=angler interest) generally exceeds the magnitude of the long-term trend.

The regularity of seasonal trends in normalised fishing search volume in many countries suggests search volume



**Figure 6.** Relative volume of Google search queries nationwide for language-appropriate terms of ‘fishing’ and ‘angling’ (Table 1) from 1 January 2004 through 31 December 2011 for Japan (panel a), Indonesia (panel b), Jamaica (panel c), Cuba (panel d), and Trinidad and Tobago (panel e).

may provide a means of monitoring and predicting fishing interest and, possibly, effort on small time scales (e.g. monthly, perhaps weekly). Google Insights for Search allows users to download daily search results for the past 90 days. These results could be used to identify short-term changes in search behaviour (angler interests) that can be used to modify management and enforcement activities in nearly real time.

There are several limitations to the comparisons presented here that warrant mention. First, peculiar to the use of Google Insights for Search, alternatives to ‘fishing’ and ‘angling’ and misspellings of these words are not included in the search results. The absence of alternative, colloquial terms or misspelled words could affect search volume, but this is unlikely to affect the observed seasonal and long-term trends. Second, ‘fishing’ and ‘angling’ were used to evaluate fishing search volume (in searches for English-speaking countries) and these terms then were translated into 20 different languages using Google Translate. It is possible that some transla-

tions may be problematic and may have affected the results in some countries. Both the first and second limitations might affect the relative volume of searches and, hence, comparisons among countries (e.g. Table 1), but they are unlikely to affect the observed seasonal and long-term trends. There is no evidence at hand that either seriously affects the results presented herein and attempts to find alternative terms in several languages revealed no important colloquial terms and top search terms in several non-English languages, identified by Google Insights for Search, were translated to English using Google Translate and these search terms usually were obviously related to fishing and, in particular, recreational fishing. Third, although there is substantial evidence from a variety of disciplines that search volume reflects public interest (Askitas & Zimmermann 2009; Breyer *et al.* 2011; Chay & Sasaki 2011; Metcalfe *et al.* 2011) and behaviour (Ginsberg *et al.* 2009; Preis *et al.* 2010), this evidence is from disciplines in which data are accumulated and reported on weekly, monthly and

quarterly bases. By contrast, most recreational fishery data, particularly licence sales on a national scale, are reported on an annual basis. Therefore, the exact nature of the relationship between search volume (=angler interest) and licence sales (=angler behaviour) is unknown and represents an area that would benefit from empirical research. At present, the limited time series available (8 years) for Google Insights for Search and the annual, and often delayed, reporting of licence and participation data preclude any detailed analysis of the relationship between these variables and normalised search volume.

Despite the limitations of the use of search queries, these data potentially hold considerable promise for fishery management. Issue salience is typically measured by means of special questions in surveys (Dearing & Rogers 1996), which are able to focus on only a portion of the multi-faceted concept termed salience (Gadziala & Becker 1983). Thus, these surveys provide only vague and indirect measures of latent states and actions because survey responses only identify the most important problem(s) perceived by the respondent on the day the questionnaire is completed. Information seeking, as observed through internet search queries, is an excellent indicator of issue salience. Compared with survey questions, there is no interviewer bias or social desirability involved with internet search queries, the summations of search volumes are completely unobtrusive, and observations occur in the field rather than in an artificial setting. Google search queries represent an active pursuit of information by the searcher (Scharnow & Vogelgesang 2011) and arguably predict future action more closely than do survey responses (e.g. Preis *et al.* 2010). This suggests Google Insights for Search may be particularly useful in tracking angler and public interest in emerging issues. For example, in the USA, normalised search volume for 'Asian carp' increases sharply, and very quickly, following news media reports, attempts to document or arrest the expanding distribution of these fish in the Great Lakes (G. R. Wilde, unpublished data).

Cooke and Cowx (2004) suggested the United Nations Food and Agricultural Organisation should include participation and harvest statistics for recreational fisheries in their fishery assessments. However, they noted that data collection would be a challenge in many countries. For example, Griffiths and Lamberth (2002) described information used to assess the recreational fishery in South Africa, which included club logbooks, results from competitive fishing events, voluntarily contributed catch cards and occasional observations by enforcement officers. Griffiths & Lamberth commented on the biases and general unreliability of these data, but it is exactly these kinds of data that are used to assess fishing in many countries that

have not yet developed formal data collection programmes. Until better data collection schemes are put into place, analyses of search queries provide a low-cost means of gaining insight into angler dynamics and interests in countries around the world.

### Acknowledgments

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