

Social media survey of kitesurfers that use the beaches and water in North Somerset during the winter months

Keywords: seawater, water quality, UV treatment, winter, Wessex water

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Summary

Reasons for performing study: Wessex water is considering ceasing UV treatment of sewage water on the North Somerset coast beaches in the winter months. A survey previously conducted suggested minimal benefit of UV treatment in winter due to a low number of water users counted on survey days. The conducted survey is flawed.

Objectives: To use social media site Facebook to estimate the number of kitesurfers that enter the water in the Weston-super-Mare (WSM) and Burnham area during the winter.

Methods: A facebook poll on 4 different groups for kitesurfers in North Somerset evaluated the number of kitesurfers that indicated using the beaches of WSM and Burnham area during the winter. A binary test was performed in Microsoft Excel to calculate total number of people using the waters in the winter. Another evaluation on 3 of the facebook groups using sociagraph then produced a list of dates that kitesurfers have been using the North Somerset waters in the 2015/2016 winter.

Results: With a 95% confidence interval the facebook poll results suggest a total number of between 309 and 326 individual kitesurfers using the waters in the winter. A list of dates was compiled on

21 which kitesurfing on North Somerset beaches was discussed, and this included 57 different days
22 during the winter months.

23 **Conclusions:** The beaches of WSM and Burnham area are used during the winter months by
24 kitesurfers.

25 **Potential relevance:** The UV treatment cannot be switched off due to health and safety risks to a
26 significant number of people.

27 **Introduction**

28 Wessex water sewage is flowing into the estuary along the beaches of North Somerset, UK. This
29 waste water is currently treated by UV radiation to inactivate the majority of potential pathogens
30 before allowed to flow into the estuary. To reduce the yearly costs of this treatment, Wessex water
31 is now considering only using UV treatment in the summer months. A cost versus benefit analysis is
32 needed to help make this decision.

33 Wessex water has conducted a survey on the beaches of the Weston-super-Mare (WSM) area
34 including the beaches of Sand Bay, Royal Sands and Uphill, the Burnham area including the beaches
35 of Brean, Berrow and Burnham-on-Sea, and the Minehead area including the beaches of Minehead,
36 Dunster and Blue Anchor Bay. During this survey the number of beach users and the number of
37 people entering the water were counted (1). This survey was used for the cost versus benefit
38 analysis. It found no kitesurfers on the beaches of the Minehead area, only 1 kite- or windsurfer in
39 the Burnham area during a total of 41 visits, and 14 kite- or windsurfers in the WSM area during a
40 total of 41 visits. This led Wessex water to conclude the benefit to water users during the winter
41 versus the financial cost of UV treatment was minimal.

42 Kitesurfers of the North Somerset coast argue the previous survey conducted by Wessex water is
43 majorly flawed. The dates of beach visits are not available in the report, but the photos in the report
44 suggest the survey visits were conducted on days when there was little of no wind. Well established
45 and basic research principles include taking measures to avoid skewing of results where possible.
46 Where the skewing of results is unavoidable this should be discussed in the research report (2).
47 Avoidance of skewing or the discussion about the lack thereof was not included in the survey
48 conducted by Wessex water. The author therefor proposes the survey conducted by Wessex water
49 between 1st of October 2015 and 15th of May 2016 is invalid.

50 To help compile results a social media survey amongst North Somerset kitesurfers was conducted.
51 This survey consists of 2 parts; an poll of currently active kitesurfers that indicate if they use the
52 beaches of WSM and Burnham area in the winter, and a retrospective survey of Facebook^[1] posts
53 within three different Facebook groups of kitesurfers in the North Somerset area that give an
54 indication of dates the beaches and water have been visited by kitesurfers between 1st of October
55 2015 and 15th of May 2016.

56 **Materials and Methods**

57 For the first part of this survey a poll was published on 4 facebook^[1] groups with kitesurfers on the
58 North Somerset and nearby coasts. The purpose of the poll was explained and users had 4 possible
59 options; 1. Using the WSM and Burnham area waters in winter. 2. Only using the WSM and Burnham
60 area waters in summer, not in winter. 3. Never using the WSM or Burnham area waters. 4. Already
61 voted in the same poll on another Facebook group. Of the responses, votes that were duplicated in
62 other facebook groups were manually removed. Unique votes were added for kitesurfers that do not
63 use facebook and asked others to comment on the poll to include them. The unique votes were
64 divided into kitesurfers that do use the WSM and Burnham area beaches in the winter and those

65 that do not. A power calculation^[2] was performed to assess power of poll results using unique votes
66 in a single proportion, 1-sample 1-sided test. The H_0 hypothesis was that 50% of kitesurfers use the
67 waters in winter and H_1 was that more than 50 percent used the waters in winter. The α value for
68 this power calculation was set at 0.05 and the unique votes produced the total sample size.

69 Population proportions were calculated in Microsoft excel^[3] using the percentage of winter
70 kitesurfers in the poll results with a confidence interval of 95%. The population proportions from the
71 poll and the size of the largest of the facebook groups were then used to calculate the actual
72 numbers of kitesurfers using the WSM and Burnham area beaches in the winter months.

73 For the second part of this survey the facebook posts of 2 of the kitesurf groups were evaluated
74 using Sociagraph services^[4]. The dates evaluated were between the 1st of October 2015 and 15th of
75 May 2016. The posts were then manually evaluated for relevance and posts that did not concern
76 plans or reports for a kitesurfing session on the WSM or Burnham area beaches within the time
77 period were removed. The dates of kitesurf sessions mentioned in the relevant posts were noted in
78 a list.

79 **Results**

80 The four facebook groups contain 221, 327, 153 and 97 members, amongst which there is marked
81 overlap in users, but at least 327 individuals (the number of members in the largest group) were
82 identified as having an interest in kitesurfing in or near North Somerset.

83 In the four facebook groups a total of 113 responses were received. 16 responses were removed
84 because they were duplicates, and 97 responses were maintained as unique votes. Of the unique
85 votes 96 kitesurfers indicated they use the beach in winter months and 1 kitesurfer indicated he
86 never uses the North Somerset beaches.

87 The power calculation for these votes in a single proportion, 1-sample 1-sided test with H_0
88 hypothesis 0.5, $H_1 > 0.5$, α value set at 0.05 and 97 unique votes produced a power of 1.

89 With a 95% confidence interval and a 98.97% of poll responses indicating use in winter, the total
90 number of kitesurfers using the WSM and Burnham area beaches in the winter months out of a
91 group of 327 people is between 309 and 326 individuals.

92 The dates that Facebook discussed in posts in 2 different groups and showed they have been
93 kitesurfing on WSM or Burnham area beaches between the 1st of October 2015 and 15th of May 2016
94 are shown in Table 1.

95

96 **Discussion**

97 This survey used social media group evaluation to estimate beach and water use by kitesurfers in the
98 WSM and Burnham area in the winter months between 1st of October and 15th of May.

99 The poll responses show the number of people using the beaches of WSM. The power calculation
100 evaluated if there were enough responses to publish the results as statistical significant data. The
101 power calculation parameters were set with H_0 hypothesis 0.5 (50% of kitesurfers use the waters in
102 winter), $H_1 > 0.5$ (more than 50% use the waters in winter), α value set at 0.05 (for a 95% chance that
103 the null hypothesis would not be falsely rejected) and 97 unique votes. The power was calculated at
104 1, indicating a 100% chance the alternative hypothesis was not falsely accepted. Thus we could
105 safely accept that more than 50% of kitesurfers use the WSM and Burnham area beaches during the
106 winter months.

107 With a confidence interval of 95% we can say that between 309 and 326 kitesurfers use the WSM
108 and Burnham area beaches in the winter.

109 Both the above power calculation and total numbers of people using the beaches in winter are
110 flawed.

111 Firstly, using social media to obtain poll results only could underestimate total numbers. The total
112 number of kitesurfers that use the North Somerset beaches and waters at any point during the year
113 is unknown, and because there is overlap in Facebook groups of members only the number of
114 members in the largest group has been used. There are also kitesurfers on Facebook that are not
115 part of this largest group. There are also at least 88 kite sporters in North Somerset that are not on
116 Facebook at all. All this leads to a likely underestimate of total water users in the surveyed areas in
117 the winter.

118 A second flaw is that of the kitesurfers that had not been asked to respond in the poll because they
119 do not use facebook seven of them verbally asked other kites to pass on their name. They were
120 included in the total number of winter water users, although they had not originally been surveyed.
121 Because people that do not use facebook and also did not hear about the poll verbally were not
122 included, there is a bias that leads to overestimation of total number of kitesurfers using the beach
123 in winter.

124 A third possibility for bias is that kites who do use the beaches in the winter months are more likely
125 to be concerned and cast their vote, whereas people that have not voted could either not have seen
126 the poll or might be less interested because they do not use the waters in winter months. This could
127 lead to overestimation of numbers of water users in the winter.

128 For the second part of the survey only a list of dates that kitesurfers have used the waters of WSM
129 and Burnham area beaches between 1st of October 2015 and 15th of May 2016 could be compiled. It
130 is unlikely that this is a complete list, because only Facebook posts were retrospectively reviewed

131 and dates when kitesurfers did not use facebook to talk about their water session could not be
132 included.

133 Finally this survey was only conducted within a group of kitesurfers that use Facebook in North
134 Somerset. Other water users like windsurfers, bodyboarders, sailors etc have not been surveyed.

135 Because many of the water sports conducted at WSM and Burnham area are dependent on wind,
136 the author proposes that beach surveys should be conducted in all different weather conditions, or
137 that a more extensive remote (social media or email) survey be conducted to reduce possible bias.

138 An additional observation is that stormy weather conditions are also likely to negatively influence
139 the quality of water samples taken in the estuary during surveys due to turbulence in the water. A
140 future survey should take this into account. Water users found on the beach on these days could be
141 asked to obtain the water samples from areas of the sea they use.

142 The above limitations are inherent to conduction of a social media poll. This could not be
143 circumvented because unlike the first survey that was conducted by Wessex water the author of the
144 current survey did not have the finances and time available to conduct a full survey.

145 **Manufacturers' details**

- 146 1. Facebook, Menlo Park, California, United States, <https://www.facebook.com/>
- 147 2. HyLown Consulting LLC, Georgia, United States, <http://powerandsamplesize.com/>
- 148 3. Microsoft Excel, Redmond, Washington, United States
- 149 4. SocioGraph Solutions, Coimbatore, Tamil Nadu, India, <http://sociograph.io/>

150 **Tables**

151 Table 1.

Date spoken about
07/10/2015
21/10/2015
22/10/2015
07/11/2015
14/11/2015
15/11/2015
17/11/2015
20/11/2015
21/11/2015
29/11/2015
01/12/2015
03/12/2015
05/12/2015
19/12/2015
20/12/2015
21/12/2015
22/12/2015
24/12/2015
25/12/2015
31/12/2015
07/01/2016
09/01/2016
22/01/2016
29/01/2016
31/01/2016
02/02/2016
03/02/2016
05/02/2016
06/02/2016
07/02/2016
09/02/2016
20/02/2016
21/02/2016
02/03/2016
04/03/2016
21/03/2016
25/03/2016

27/03/2016
28/03/2016
05/04/2016
06/04/2016
07/04/2016
08/04/2016
10/04/2016
16/04/2016
17/04/2016
18/04/2016
20/04/2016
25/04/2016
26/04/2016
28/04/2016
29/04/2016
30/04/2016
01/05/2016
02/05/2016
03/05/2016
15/05/2016

152

153 Table 1. Dates that kitesurfers on 2 different facebook groups have been using the beaches on WSM
 154 or Burnham area between the 1st of October 2015 and 15th of May 2016.

155 **References**

156 1. Wessex water Survey [https://wessexwater-](https://wessexwater-my.sharepoint.com/personal/philippa_bond_wessexwater_co_uk/_layouts/15/guestaccess.aspx?guestaccesstoken=f%2bTthfF9SkJXD7JlIJXWzq6qL%2fEuNqu3TkEDuLvygHw%3d&docid=0e0edac77f0e04992aa06989f732ca019&rev=1)
 157 [my.sharepoint.com/personal/philippa_bond_wessexwater_co_uk/_layouts/15/guestaccess.](https://wessexwater-my.sharepoint.com/personal/philippa_bond_wessexwater_co_uk/_layouts/15/guestaccess.aspx?guestaccesstoken=f%2bTthfF9SkJXD7JlIJXWzq6qL%2fEuNqu3TkEDuLvygHw%3d&docid=0e0edac77f0e04992aa06989f732ca019&rev=1)
 158 [aspx?guestaccesstoken=f%2bTthfF9SkJXD7JlIJXWzq6qL%2fEuNqu3TkEDuLvygHw%3d&docid](https://wessexwater-my.sharepoint.com/personal/philippa_bond_wessexwater_co_uk/_layouts/15/guestaccess.aspx?guestaccesstoken=f%2bTthfF9SkJXD7JlIJXWzq6qL%2fEuNqu3TkEDuLvygHw%3d&docid=0e0edac77f0e04992aa06989f732ca019&rev=1)
 159 [=0e0edac77f0e04992aa06989f732ca019&rev=1](https://wessexwater-my.sharepoint.com/personal/philippa_bond_wessexwater_co_uk/_layouts/15/guestaccess.aspx?guestaccesstoken=f%2bTthfF9SkJXD7JlIJXWzq6qL%2fEuNqu3TkEDuLvygHw%3d&docid=0e0edac77f0e04992aa06989f732ca019&rev=1)

160 2. Gastel, B., and Day, R. A. (2006) How to write and publish a scientific paper, 6th ed.
 161 Cambridge University Press, UK.