11/30/2018

Dear Guinness World Records Authentication Team,

This application package is submitted in support of an annual community-organized volunteer initiative called *Catch the King* in Hampton Roads, VA, USA, and their efforts in submitting the "Most Contributions to an Environmental Survey." It is possible that their effort qualifies for more than just the "Most Contributions" category, but you can be the judge on that. In its inaugural year, *Catch the King* garnered the support of 722 individual volunteers who directly surveyed 59,718 GPS-reported high water marks during a king tide flood event over 6 hours on Nov. 5, 2017, across the U.S. East Coast. *Catch the King's* eligibility aligns with the record definition:

- This record is for the most contributions to an environmental survey.
  -59,718 time-stamped GPS-reported high water mark survey points were collected.

- This record is to be attempted by a single organizing body.
  -Catch the King organized the survey.

- This record is measured in the number of individual, unique contributions to the survey.
  -722 people collected the 59,718 survey samples.

- For the purposes of this record, an "environmental survey" is a "crowdsourced" (citizen science) initiative designed to recruit volunteers living in different parts of a given territory and task them with acquiring environmental "samples" from their local area. These samples are later submitted to the central body to be accumulated and studied for a greater scientific aspiration.
  -I am a Research Scientist from the Virginia Institute of Marine Science at the College of William & Mary, and aided in organizing this survey through Catch the King to help validate the hydrodynamic predictive flood models I develop through my research.

I can testify that this environmental survey aided scientific research in every step of our approach:

1) I forecasted the geospatial flooding extents of the king tide four months before the largest king tide of the year by using a tidal harmonic prediction algorithm and mapping the anticipated flood pattern on an interactive web map using a bathtub model to find public spaces where people could map flooding.

2) Then, we coordinated and trained volunteers over those 4 months how to breadcrumb/trace tidal flooding extents via GPS during flood events at those sites, and what photographic evidence was useful for model validation, and asked them all to show up to places where my model predicted flooding.

3) Finally, I updated the model flood forecast 36 hours before the king tide to account for near-term weather impacts including rainfall, wind, and air pressure fluctuations and asked *Catch the King's* trained volunteers to map the tidal flooding extents in areas where and when the model predicted inundation to confirm the accuracy of its flood predictions. The data points collected by the volunteers was subsequently uploaded to the interactive flood prediction map at: http://bit.ly/2zcS7Ba and shared with the media.

4) The efforts of the volunteers provided useful validation data to move up the public release of a now-public-facing street-level flood forecast model covering all of coastal Virginia, driven with the SCHISM open-source hydro-science model developed at the Center for Coastal Resources Management and shared through the AdaptVA website and the VA Commonwealth Center for Recurrent Flooding Resiliency's flood prediction tools.

Most of the survey data were concentrated among 17 cities and counties in the Hampton Roads region, so named by Captain John Smith during his initial cartographic voyages to the new world.

The maps his team documented of the shorelines of Chesapeake Bay, and the current state of relative sea level rise and acceleration in Hampton Roads over 400 years later has driven the establishment of *Catch the King* to document tidal flooding extents in their cities as it regularly interrupts daily life. *Catch the King* is a year-round initiative to document tidal inundation extents by deputizing a concerned community armed with smart phones and a calibrated GPS mobile application called *Sea Level Rise* (freely available on iOS and Android platforms) developed in the City of Norfolk by Wetlands Watch and Concursive Inc. The app has been used since 2014 in the region to document the depths and extents of tidal flooding and the record being submitted took place over a 6-hour period during a tidal flooding event on the morning of November 5, 2017 from 06:00-12:00 EST (GMT -05:00).

The peak of the king tide took place at 09:30 EST in Norfolk, VA, USA, although the winding estuaries in the region caused coastal areas to experience the event sooner inland areas to have to map the event later. This is depicted in the histogram of data entry/minute shown in this video, and was publicized through social media via the 'Help *Catch the King* Tide' Facebook group, established by the organizing body *Catch the King*, and 4 media outlets in the region-- whose press coverage are included for reference, to inform volunteers of their target time window by locality. The Facebook group aids volunteers into helping find mapping groups to collaborate with and where they can attend (or lead) flood mapping training events, which are required for quality assurance and data quality control through the *Sea Level Rise* App's user permission settings. We adhered to all of the rules set forth for the "Most contributions to an environmental survey":

1) This record is to be attempted by professional scientific research bodies, details of which must submitted with the claim. This can include but may not be limited to: private research institutions, corporations with a research division, and universities.
   -*Catch the King* is a volunteer science group aided and sponsored by local media stations including our local Public Broadcasting Station's education team and universities who work to build models from the data. Many of the organizers and volunteers belong to several of these groups.

2) The "samples" collected may be submitted in any format, and can take the form of physical specimens or collected data.
   -The time-stamped GPS data survey points, pictures, and associated notes are available via the GIS data files and database spreadsheet we publicly share with the public, city planners, and scientists.

3) The contributions must be part of the same science initiative, and identical in format. The goal and format of the project and the submitted samples must be pre-approved by Guinness World Records.
   -The contributions are of the same data format and collected for the same initiative on the same day.

4) In cases where the collection of samples requires specialist knowledge and/or training, this training must be provided to participants. Details how this is accomplished must be submitted with the claim.
   -No specialist knowledge was needed, just training in how to map flooding. Volunteers were trained in one of 35 training sessions how to calibrate their phone's GPS in the Sea Level Rise mobile app, and how to walk along the flood extent line and press a button to trace their path as a series of points.

5) Only one contribution per individual participant may be counted towards the final total.
   -Many volunteers mapped dozens of sites far and wide in their county over the course of the event.

6) The contributions must contain either:
   • A physical collected specimen AND/OR
   • Environmental data collected by the participant ← *Catch the King* collected this.

7) All contributions must also include:
   - The day and date ⬅ Metadata includes this.
   - The first name and city/territory/country of residence of the submitting participant ⬅ And this.

8) A full log book must list the name of every participant along with the time and date of their contribution. ⬅ Submitted as evidence; also available in the GPS data files.

9) Two specialist independent witnesses, with experience in conducting environmental surveys, must confirm in their submitted statements that the rules above have been adhered to and must explicitly state the exact and final figure of the total contributions. The statements must describe the counting process and overall attempt in detail.
   -We had two outside documentarians who produced videos on *Catch the King* in 2017 (Video 1 & Video 2 @ 1:12:00) focusing on scientific research studies submit witness statements-- among several others using the Guinness World Record witness forms.

10) The final count must take place in a public space or in a venue open to the public.
    -It was presented publicly a month later on Dec. 13, 2017 in Norfolk in a public auditorium at Old Dominion University that *Catch the King* reserved through the VA Commonwealth Center for Recurrent Flooding Resiliency, and the volunteer thank you and data review event was also live-streamed to the *Catch the King* public Facebook Group. The video archive of the event is here.

11) The survey results must be formally published in a scientific journal.
    -They were published last year in:
    a) Loftis, J.D., Mayfield, D., Forrest, D., Stiles, W. 2018. A Geospatial Analysis of +50,000 Citizen-Science collected GPS Flood Extents and Street-Level Hydrodynamic Model Forecasts during the 2017 King Tide in Hampton Roads, VA. MTS/IEEExplore.
    b) Loftis, J.D. and S. Katragadda. 2018. Crowdsourcing Hydrocorrection: How Tidewater Virginia Caught the King Tide. Esri Press p. 293. PDF

12) The maximum amount of time allotted for an attempt is one year. For example, if the attempt starts January 1, the final contribution sitting must conclude by the end of the day December 31. Any contribution made outside of the attempts allotted time will not be counted towards the final total.
    -The attempt began and ended on November 5, 2017, during a king tide's impact period in SE Virginia over a period of 6 hours (time lapse video with survey entry histogram).

We appreciate your consideration,
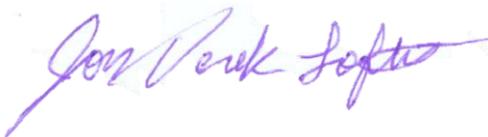
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