"Catch the King" Tide
Thank You and Review

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Dec. 13, 2017

VIMS | **William & Mary**
VIRGINIA INSTITUTE OF MARINE SCIENCE

Thank You & Review

1. Thank You!

   A. To Our Many, Many Volunteers

   B. To Our Enthusiastic Media Partners

   C. To the App Developers

2. Data Review

   A. App Data and Model Comparison

   B. What We Learned

   C. Your Thoughts and Experiences (Q&A Panel)

Catch the King Tide

Thanks to You:

- We were able to validate and improve predictive models for future forecasting
- 35 separate volunteer training events held all over Hampton Roads resulted in:

  - 510 known participants on Nov. 5th
  - 53,006 time-stamped GPS max. flood extent measurements collected
  - 1,126 geotagged photographs
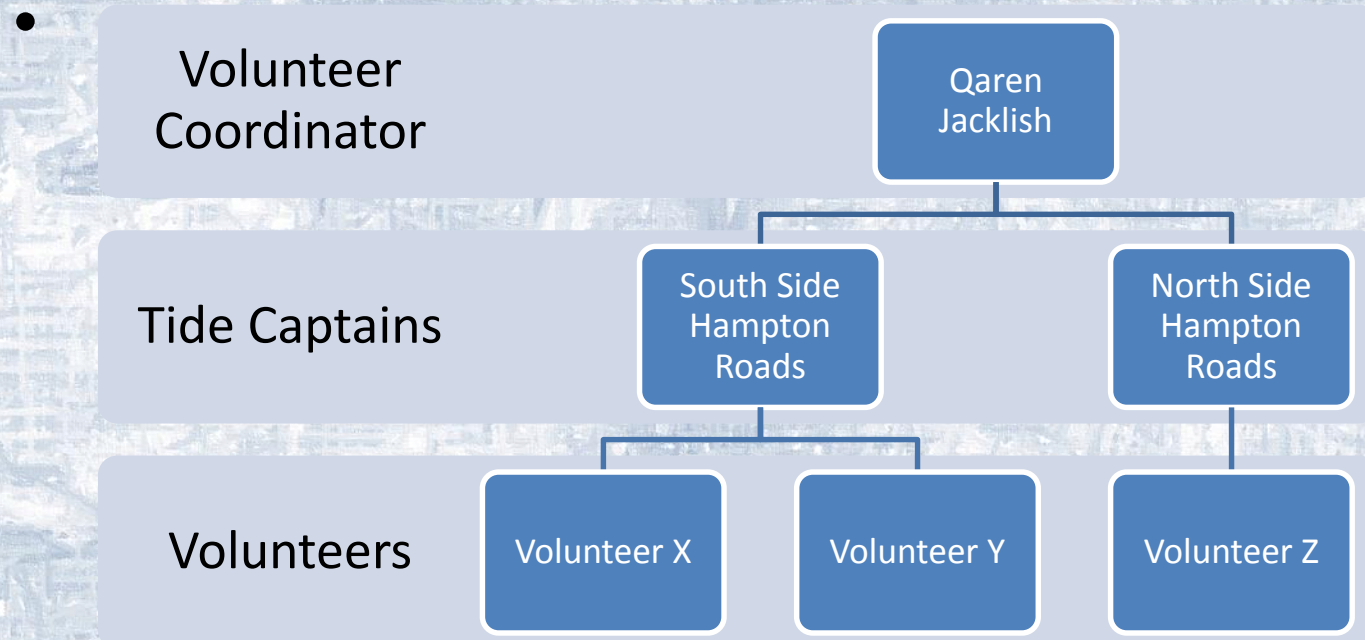
Thanks to Our Volunteers

CATCH THE KING

Thank You & Review

1. Thank You To:
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   C. App Developers

2. Review of:
   A. App Data
   B. What We Learned
   C. Q&A Panel

Thanks to You:

"Catch the King" Geospatial Participation Statistics by Locality
(ranked by # of GPS High Water Marks)

KING TIDE
NOV. 5. 2017 | LET'S TRACK HOW FAR IT REACHES

*Please note, only KT-regions designated in the Sea Level Rise App are represented in these #'s

Rank	Locality	Participants	GPS Data Points	Geotagged Pictures
1	Norfolk	156	20601	389
2	Virginia Beach	166	17040	355
3	Hampton	35	4179	67
4	York Co. / Poquoson	31	3709	84
5	Chesapeake	45	3063	105
6	Portsmouth	29	1632	63
7	Gloucester	14	1124	16
8	Newport News	16	923	29
9	Williamsburg / James City Co	4	334	12
10	Suffolk	9	249	16
11	Outside HR	5	152	2
Total	-	**510**	**53006**	**1126**

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Thanks to Qaren Jacklish

CATCH THE KING

Thanks to You:

- The sheer number of volunteers involved in this effort made organization tough:

-

Volunteer Coordinator		Qaren Jacklish
Tide Captains	South Side Hampton Roads	North Side Hampton Roads
Volunteers	Volunteer X	Volunteer Y	Volunteer Z

Thanks to Our Tide Captains

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Thanks to Qaren & Our Tide Captains!

Registration Time	Name	Region	Neighborhood	TC
8/27/2017 9:34	Doug Simpson	York/Poquoson	Anywhere	Tide Captain
9/29/2017 11:49	Lisa Nickel	Williamsburg/James City	I live in Kingsmill, which ma	Tide Captain
11/4/2017 8:36	Avery Fernandez	Williamsburg/James City	Cypress Point	Tide Captain
8/15/2017 14:05:10	Brian Callahan	Virginia Beach	Cape Story by the Sea	Teacher/Youth Leader
8/22/2017 13:50:52	Rachel Friend	Virginia Beach	Western Shore Dr. /chichks	Tide Captain
8/23/2017 8:49:00	Chris Aebel	Virginia Beach	Sandbridge or Croatan	Tide Captain
8/23/2017 11:22:49	Dell young	Virginia Beach	Baylake beach, between lea	Tide Captain
8/25/2017 15:58	Edgardo "Pete" Abreu	Virginia Beach	Windsor Woods area or "no	Tide Captain
9/17/2017 9:20	Mike Overstreet	Virginia Beach	Thalia	Tide Captain
9/17/2017 15:40	Monica Ward	Virginia Beach	East of Lesner Bridge, First	Tide Captain
9/17/2017 19:07	Jean Kerry	Virginia Beach	Thoroughgood	Tide Captain
9/17/2017 20:52	Steven Stasulis	Virginia Beach	Kings Grant/Royal Grant I li	Tide Captain
9/17/2017 22:23	Patrick Lehman	Virginia Beach	Sandbridge or Backbay.Wil	Tide Captain
9/18/2017 8:13	Jeannie Landis	Virginia Beach	Chesapeake Beach	Teacher/Youth Leader
9/18/2017 9:54	Kim Miller	Virginia Beach	Anywhere in Norfolk	Tide Captain
9/18/2017 18:12	Sara Atherholt	Virginia Beach	Virginia Beach Resort or No	Tide Captain
9/19/2017 8:48	Karen Forget	Virginia Beach	Anywhere in Virginia Beach	Tide Captain
9/19/2017 18:46	June McDaniels	Virginia Beach	Bayfront	Tide Captain
9/27/2017 7:45	Cheryl Turpin	Virginia Beach	Cox HS/Great Neck Area	Teacher/Youth Leader
9/27/2017 11:10	Shawn Krisch	Virginia Beach	Carrolanne Farms / Eastern	Teacher/Youth Leader
10/7/2017 8:05	Andy Friedman	Virginia Beach	Bay Island- Long Creek	Tide Captain
10/7/2017 11:24	Tompkins Family	Virginia Beach	Little Neck area	Tide Captain
10/10/2017 20:07	Martin Mayer	Virginia Beach	No Preference	Tide Captain

Thanks to Media Partners

CATCH THE KING

CTK's Enthusiastic Media Partners!

Sponsored by:
- The Virginian-Pilot
- Daily Press
- WHRO Public Media
- WVEC-TV

- The Commonwealth Center for Recurrent Flooding Resiliency (sponsoring tonight's event)

Thanks to Media Partners

Media Partners:

- Wrote dozens of news stories
- Developed fliers and a webpage: kingtide757.com
- Aired many broadcasts to prompt volunteer support

CATCH THE KING

THE KING TIDE IS COMING | NOV. 5, 2017 | LET'S TRACK HOW FAR IT REACHES

Join us in a Hampton Roads citizen-science project.

Help improve flood forecasting.

Be part of an innovative communitywide crowdsourcing experience.

Sunday morning Nov. 5, 2017

CALL IT THE KING TIDE. The year's highest astronomical tide. The highest tide if everything other than the positions of the earth, sun and moon – and their gravitational effects – were factored out. Sounds impressive.

But travel forward, and this year's king looks more and more like a commoner. With sea levels rising, some scientists say the high tides of today would be more like low tides just half a century from now.

We're looking for an army of data-gathering volunteers to catch the king, plotting how far it reaches as it crests across the region. Even if there's no flooding, the information will help scientists, planners and community leaders get a better understanding of our risks from rising tides.

WHAT WE'D LIKE FROM YOU:

Your time. Probably about an hour and a half on the morning of Sunday Nov. 5 to trace a high tide line near where you live, work or play.

Your smartphone. To download an app and practice using it. And then, on the day of the event, to upload to the app some GPS coordinates and photos.

Your team spirit. You'll be part of a team. We even will invite you to become a Tide Captain and lead a team of your own.

Ready to sign up or want to know more? Go to pilotonline.com/kingtide or sign up at bit.ly/catchtheking

Sea Level Rise

The Virginian-Pilot
PilotOnline.com

Daily Press
dailypress.com

whro
PUBLIC MEDIA

abc13 NEWS NOW
.com

Thanks to Media Partners

- Due to their support, Catch the King was the largest Citizen Science flood-data collection event on record:

Our Media Partners continued to inform the public with dozens of stories about flood-related issues and new training opportunities for 8 weeks!

VIMS — VIRGINIA INSTITUTE OF MARINE SCIENCE

DIRECTORY   VISIT   APPLY   EVENTS

ABOUT   RESEARCH & SERVICES   EDUCATION   PUBLIC PROGRAMS   NEWS   BAY INFO   GIVING

New York City, NY Model
Washington, DC Model
Hampton, VA Model
Norfolk, VA Model

Catch the King

High Tide Forecast Nov 4

King Tide Forecast Nov 5

Home > People > Jon Derek Loftis > Catch the King - Hampton Roads

'Catch the King' Tide

Let's map how far it floods...

"Catch the King" is a citizen science GPS data collection effort centered in Hampton Roads, VA, seeking to breadcrumb or map the King Tide's maximum inundation extents to validate and improve predictive models and future forecasting of increasingly pervasive "nuisance" flooding. Volunteers can participate by downloading the "Sea Level Rise" application onto their smartphones, and on the morning of November 5th, 2017, use the app to trace the high tide line

Thanks to Media Partners

CATCH THE KING

Thank You & Review

1. Thank You To:
   A. Our Volunteers
   B. *Media Partners*
   C. App Developers

2. Review of:
   A. App Data
   B. What We Learned
   C. Q&A Panel

- Embedded and linked to volunteer recruitment forms, App download, and interactive story map:

Usage details for the period:

July 30, 2017 - November 10, 2017

Custom Date Range ⬍

Item Views this Period
9,580

Avg Item Views Per Day
93.01

Usage Time Series

CtK Initially featured on NWS weather.gov

Initial teaser story from VA-Pilot

CtK Media Campaign officially begins with 6 articles/broadcasts

4 follow-up stories on CtK and Jose Floods

High Tide in Oct. & 6 test events

8 follow-up stories on CtK

3 more follow-up stories

Weekend of King Tide; 12 follow-up stories

Item Views

544

408

272

136

7/29 8/1 8/4 8/7 8/10 8/13 8/16 8/19 8/22 8/25 8/28 8/31 9/3 9/6 9/9 9/12 9/15 9/18 9/21 9/24 9/27 9/29 10/2 10/5 10/8 10/11 10/14 10/17 10/20 10/23 10/26 10/29 11/1 11/4 11/7

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Protecting and Conserving Wetlands

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- Publications
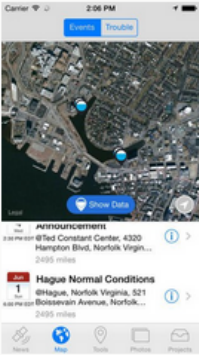- Director's Blog
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- Events

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Sea level Rise Phone App!

We've got a sea level rise phone app out for testing in Norfolk and hope to expand its use statewide.

We saw the crowd sourcing that sprung up after Hurricane Sandy and realized there was an opportunity to involve the public more deeply in the process of adaptation. With a grant from blue moon fund, we developed the phone app and have it in the field now, working the bugs out. We hope to involve more people in r   lems moving forward.

Check out   of our collabora

Goals?

Engage more folks in the issue   to endless community meetings on floodin   reate an expanded network of "floodies,"   t enough folks involved and...

Use that group to collect real-ti   along to modelers. Instead of waiting (fo   and instruments, we become the data network. With enough specific information we can...

Develop the ability to push specific warning messages to people in advance of storms so we avoid

Adapting our coasts and building resilience

Across the world, coastlines are the frontlines in global climate change. From Louisiana's Gulf Coast to the shores of Virginia to the rice-growing deltas of Myanmar, we're working to reverse wetlands loss and strengthen the resilience of coastal communities in a warming world.

Coastal Virginia faces an estimate of three feet of sea level rise in the coming century. At that rate, Virginia stands to lose 50 to 80% of its tidal wetlands, triggering an ecosystem collapse in the Chesapeake Bay.

Thanks to App Developers

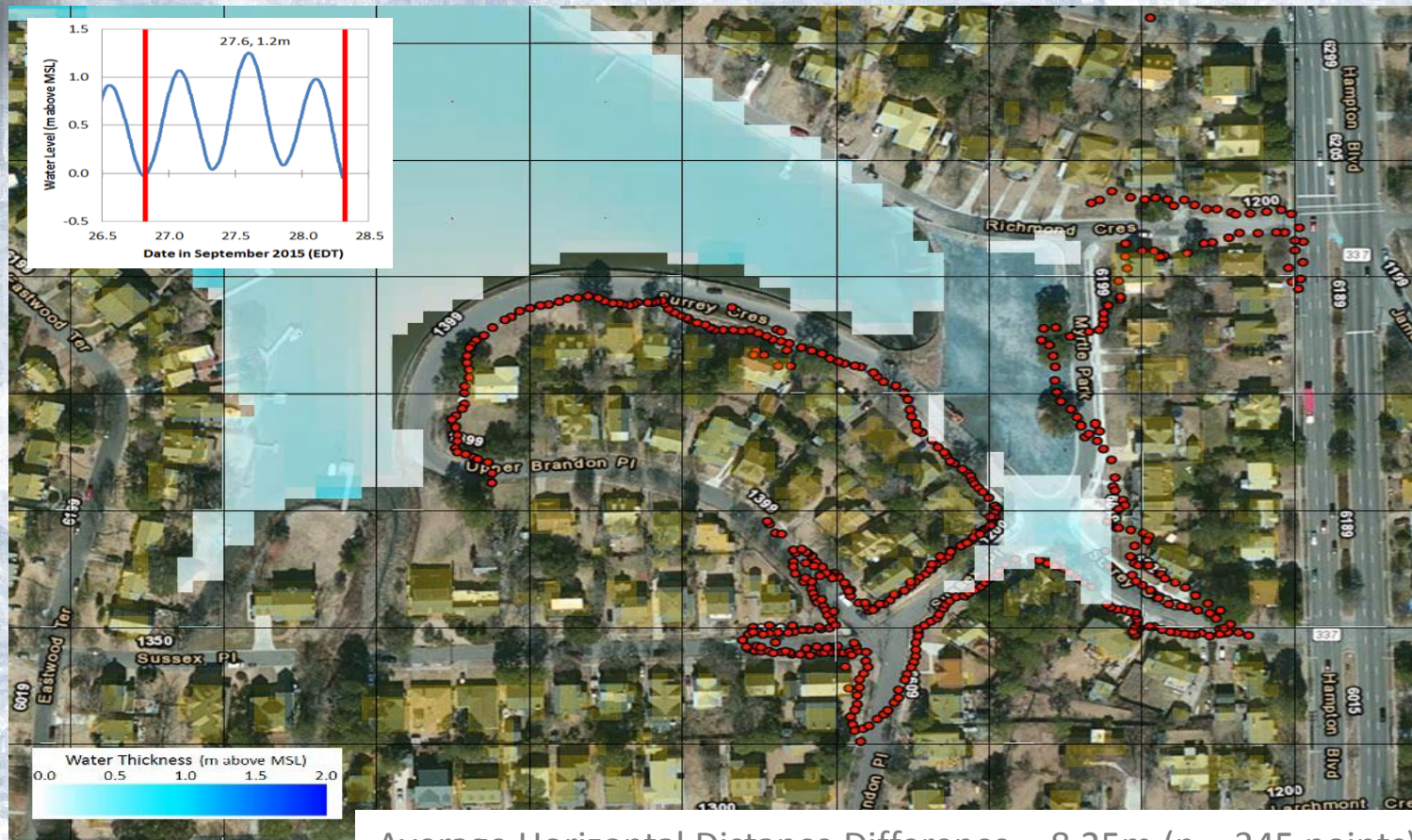CATCH THE KING

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- Witnessed past King Tides and inundation events since 2014

Animation of Forecast Modeled Extents on September 27, 2015 in Surrey Crescent
Plotted with Maximum Inundation Extents from Sea Level Rise App

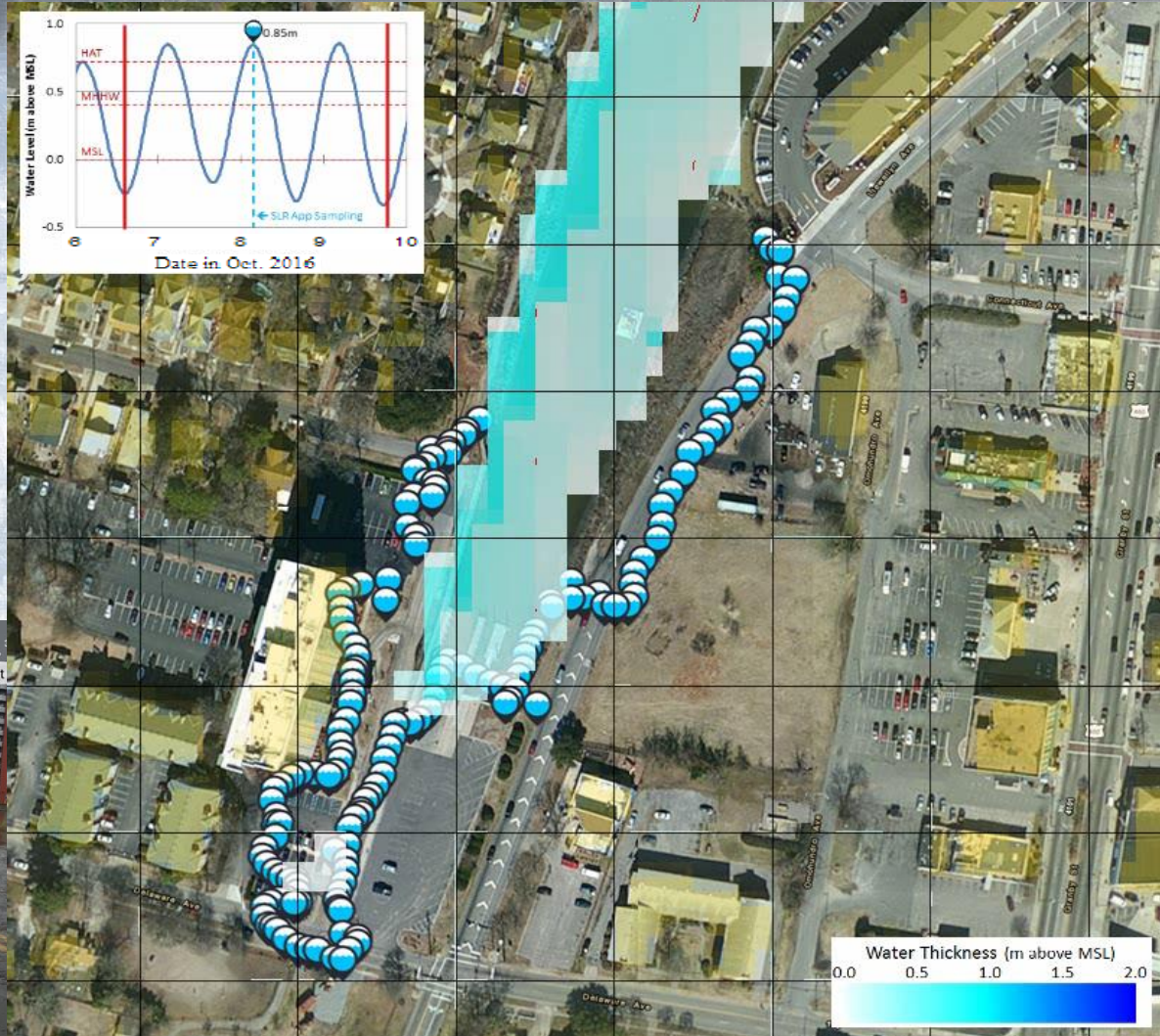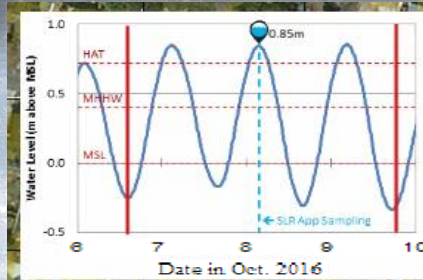Average Horizontal Distance Difference = 8.25m (n = 345 points)

Thanks to App Developers

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Forecast Modeled Extents at 2:30pm on Oct. 9, 2016 @ Llewellyn Ave Compared with SLR App

Average Horizontal Distance Difference = 6.89m (n = 162 points)

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Mean Horizontal Distance
Deviation = 7.16m (n = 120 pts)

Review of App GPS Data

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Nov. 5th, 2017 King Tide Data Collection Statistics

"Catch the King" Tide Data Entry Over Time

9:10-9:50 AM: An average of 572 measurements/min
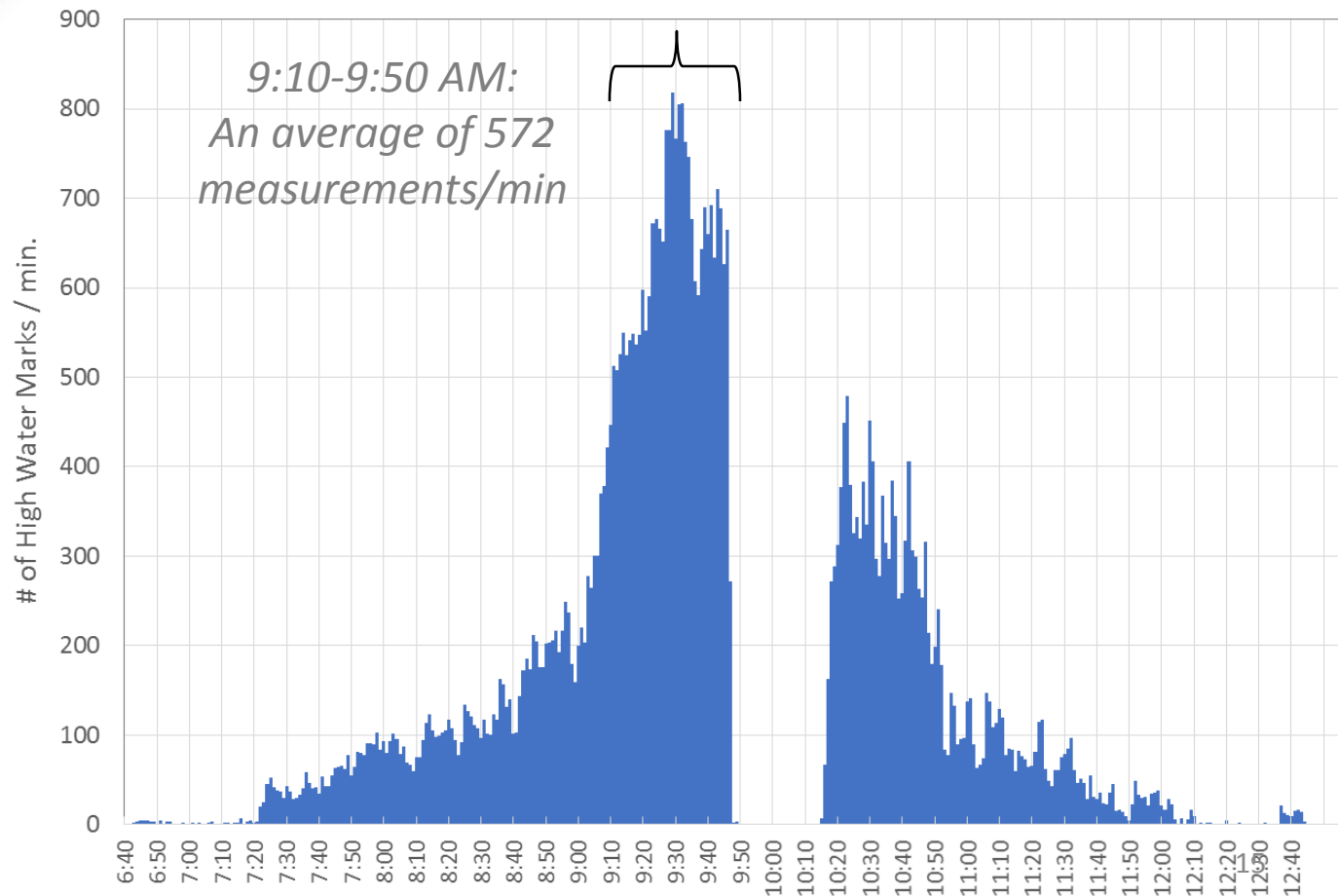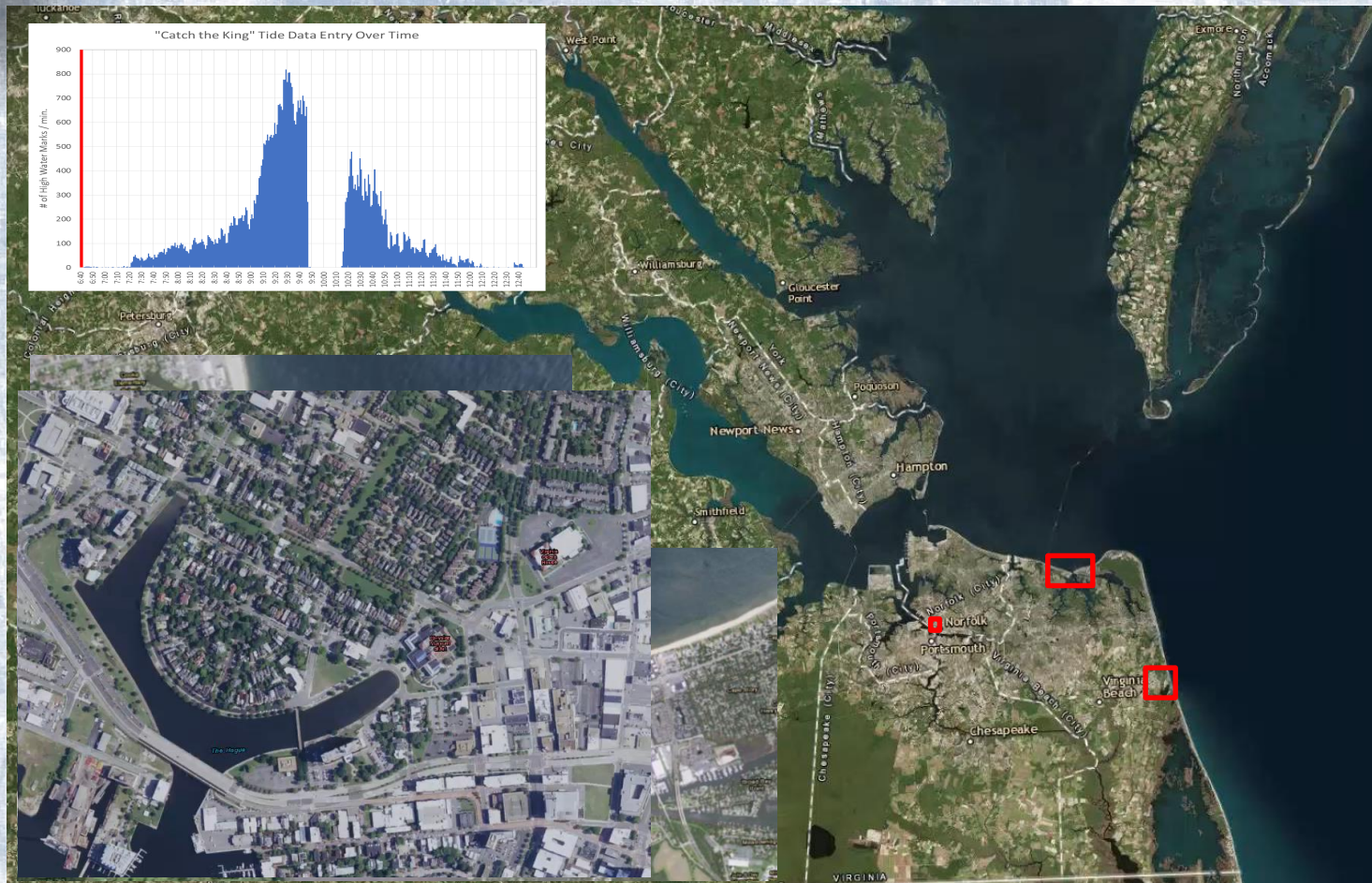
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Dynamic Time Lapse of GPS Data Entry on Nov. 5th

"Catch the King" Tide Data Entry Over Time

Review of App GPS Data

CATCH THE KING

Nov. 5th, 2017 King Tide Data Collection Statistics

"Catch the King" Tide Data Entry Over Time

Estimation of Data Collection without System Downtime from 9:48-10:14 AM

Linear Declination function with Randomization factor

-Estimated 18,000 to 20,000 more GPS data would have been captured

Review of App GPS Data

CATCH THE KING

Nov. 5th, 2017 King Tide Data Collection Statistics

"Catch the King" Tide Data Entry Over Time

Data Collection Realistically Lost with System Downtime from 9:48-10:14 AM

Exponential Declination Function with Randomization Factor

-Estimated 8,500 to 11,000 GPS data points were lost

# of High Water Marks / min.

y-axis: 0, 100, 200, 300, 400, 500, 600, 700, 800, 900

x-axis: 6:40, 6:50, 7:00, 7:10, 7:20, 7:30, 7:40, 7:50, 8:00, 8:10, 8:20, 8:30, 8:40, 8:50, 9:00, 9:10, 9:20, 9:30, 9:40, 9:50, 10:00, 10:10, 10:20, 10:30, 10:40, 10:50, 11:00, 11:10, 11:20, 11:30, 11:40, 11:50, 12:00, 12:10, 12:20, 12:30, 12:40

Review of App GPS Data

Thank You & Review

1. Thank You To:
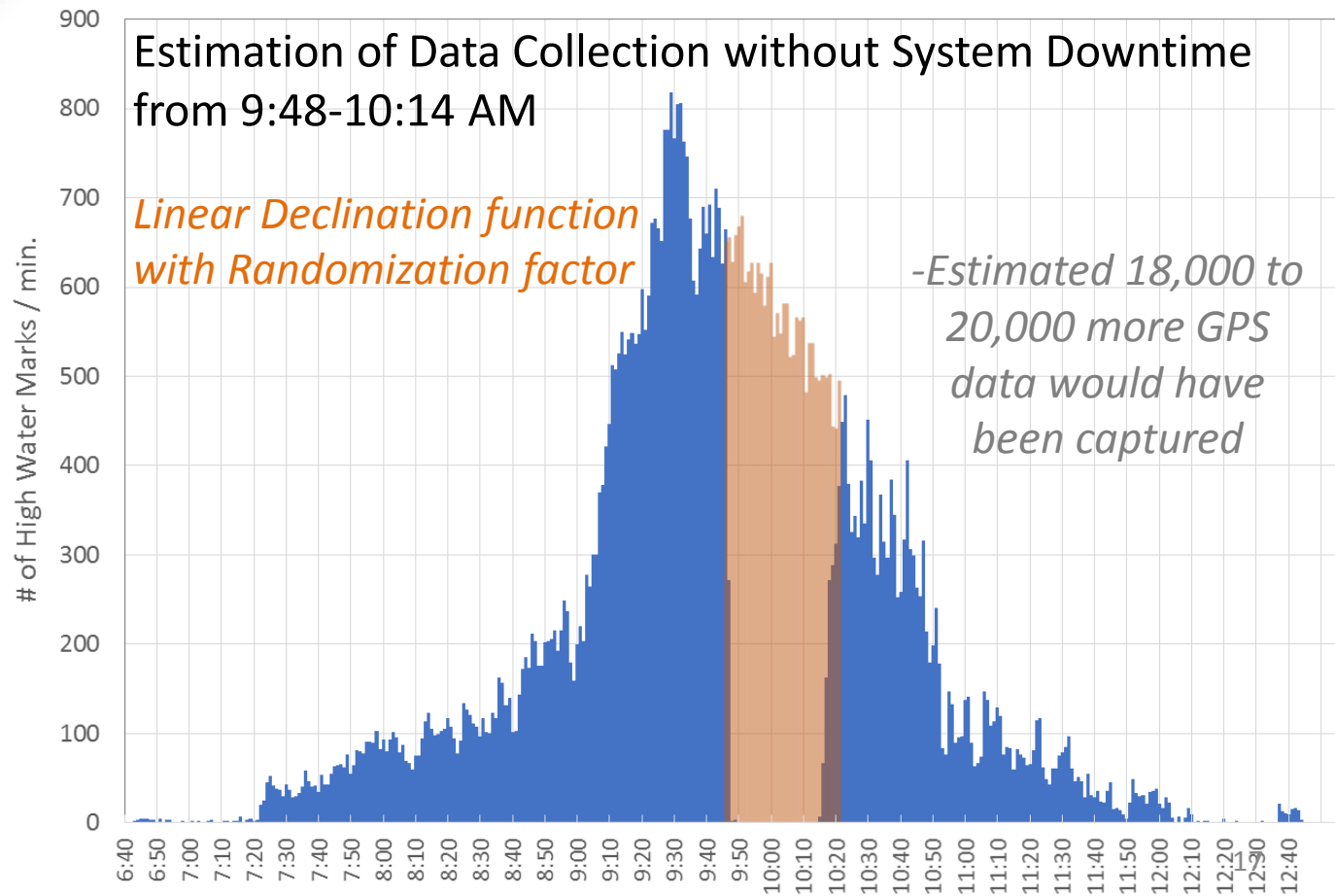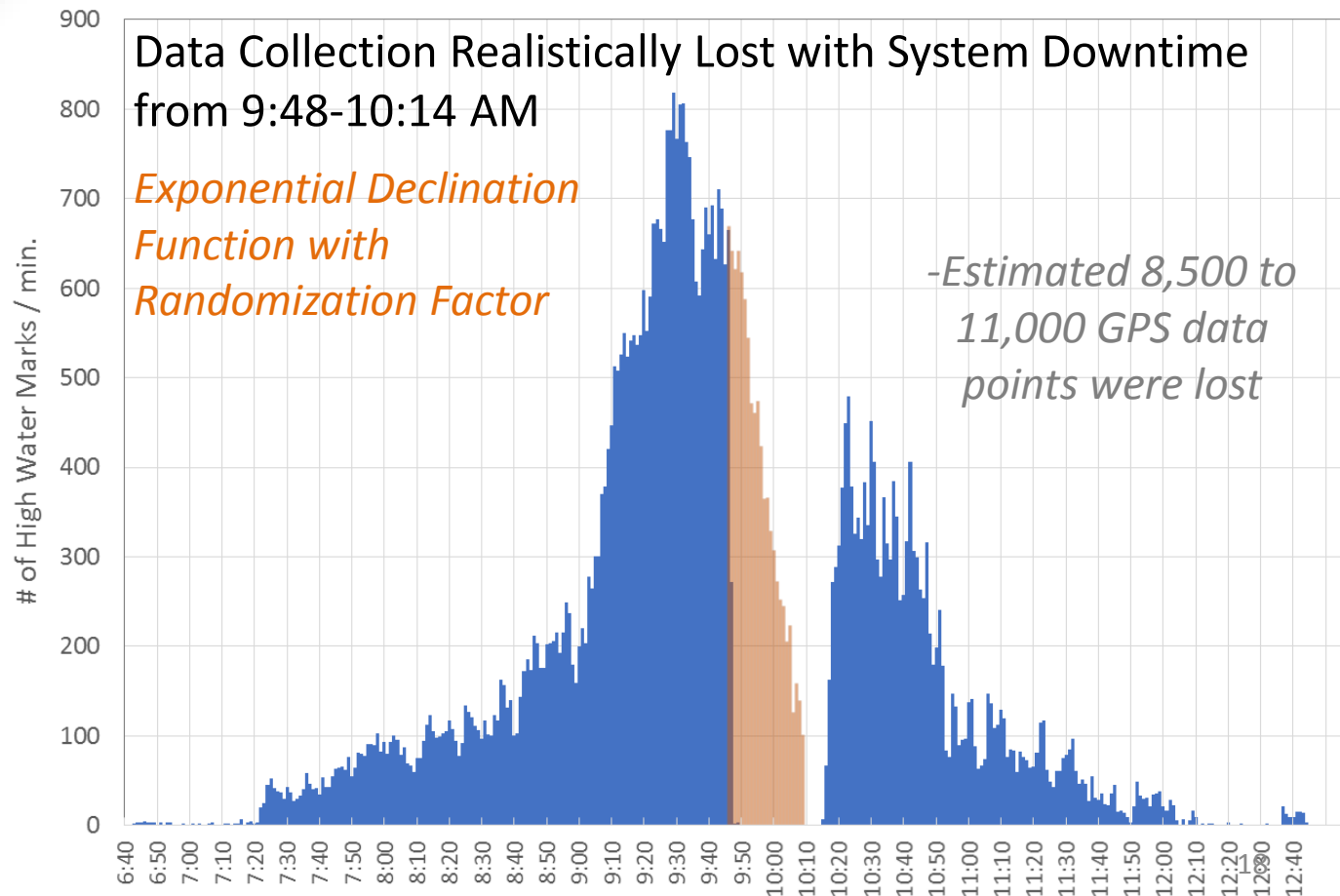   A. Our Volunteers
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Nov. 5ᵗʰ, 2017 King Tide Data Web Map (http://bit.ly/2zcS7Ba)
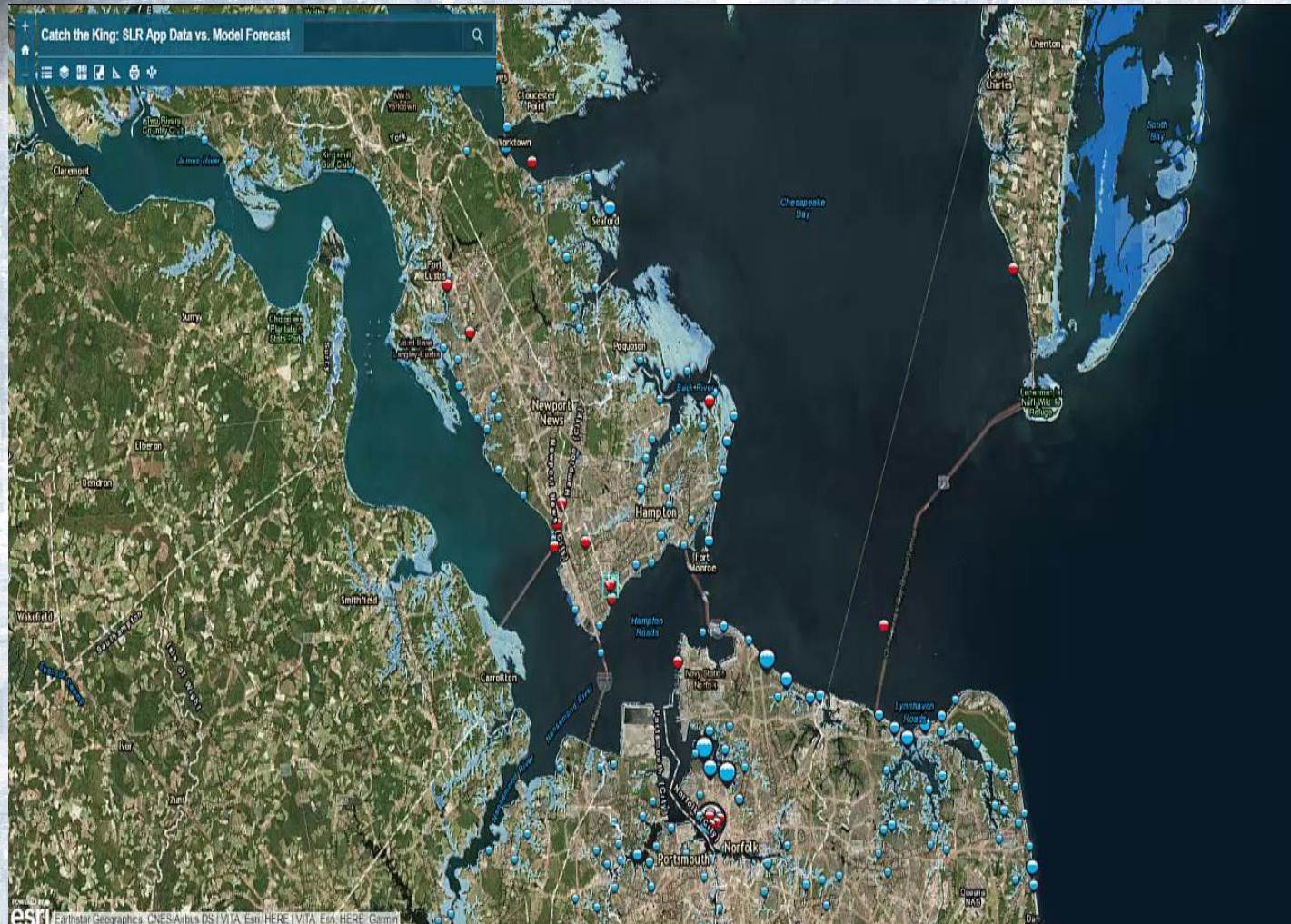
Review of App GPS Data

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Crowdsourced Hydro-correction

Review of App GPS Data

CATCH THE KING

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Accuracy Filtering-- Different Phone Models

What We Learned from ➔

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Take-Aways:

1. Tidal Flooding is becoming more than a nuisance, as flooding during "blue sky" day on Nov. 5th gently flooded numerous low-lying sections of Hampton Roads.

2. The tide forecast models were pretty accurate. Generally, the model came within about one-tenth of a foot:

≈1.4 in. (3.5 cm)   ≈19.3 ft. (5.9 m)

What We Learned from ➡

CATCH THE KING

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3. Catch the King effectively crowdsourced hydro-correction. Ground-truthing information is valuable. Some waterways weren't accurately represented by LiDAR:
   - Including ditches and narrow creeks
   - Areas canopied by trees during flyovers

4. The hydrodynamic model's digital elevations will be modified with Catch the King's GPS ground-observations.

5. Anyone can help us better understand flooding in Hampton Roads.

Q&A Panel

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Panel Participants:

- Skip Stiles, Wetlands Watch

- Tom Manos, Concursive

- Dave Mayfield, The Virginian-Pilot

- David Hendrickson, Daily Press

- Qaren Jacklish, Volunteer Coordinator

- Derek Loftis, W&M, VIMS, CCRFR

- Esteemed Media Partners