

# THE NORTHEAST ARC USERS GROUP

## 31ST ANNUAL FALL CONFERENCE

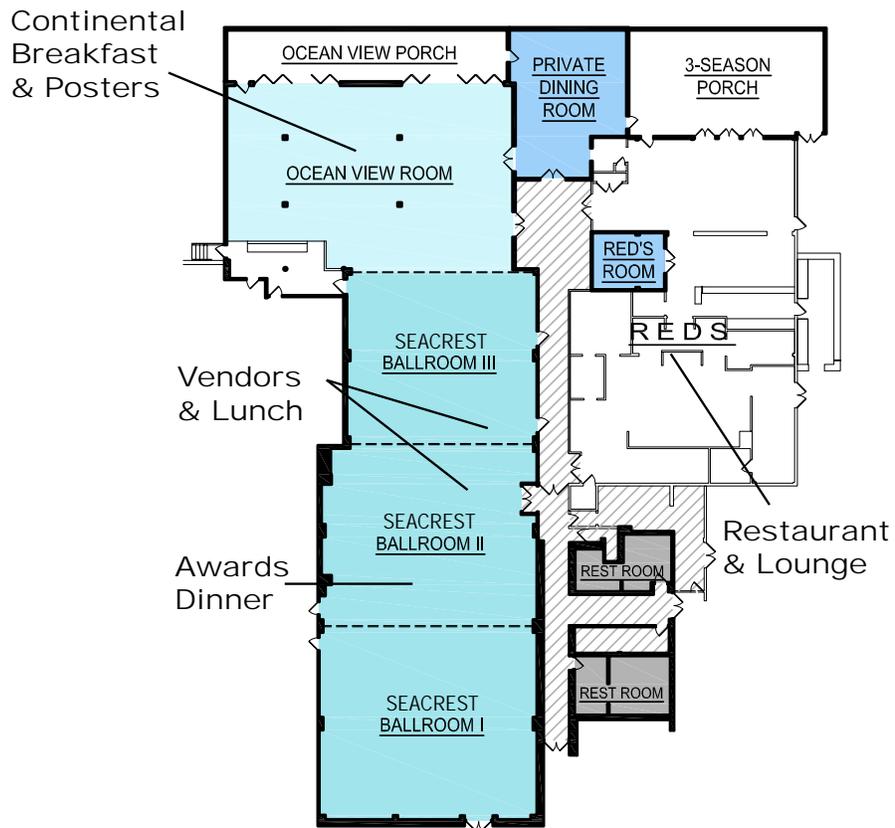
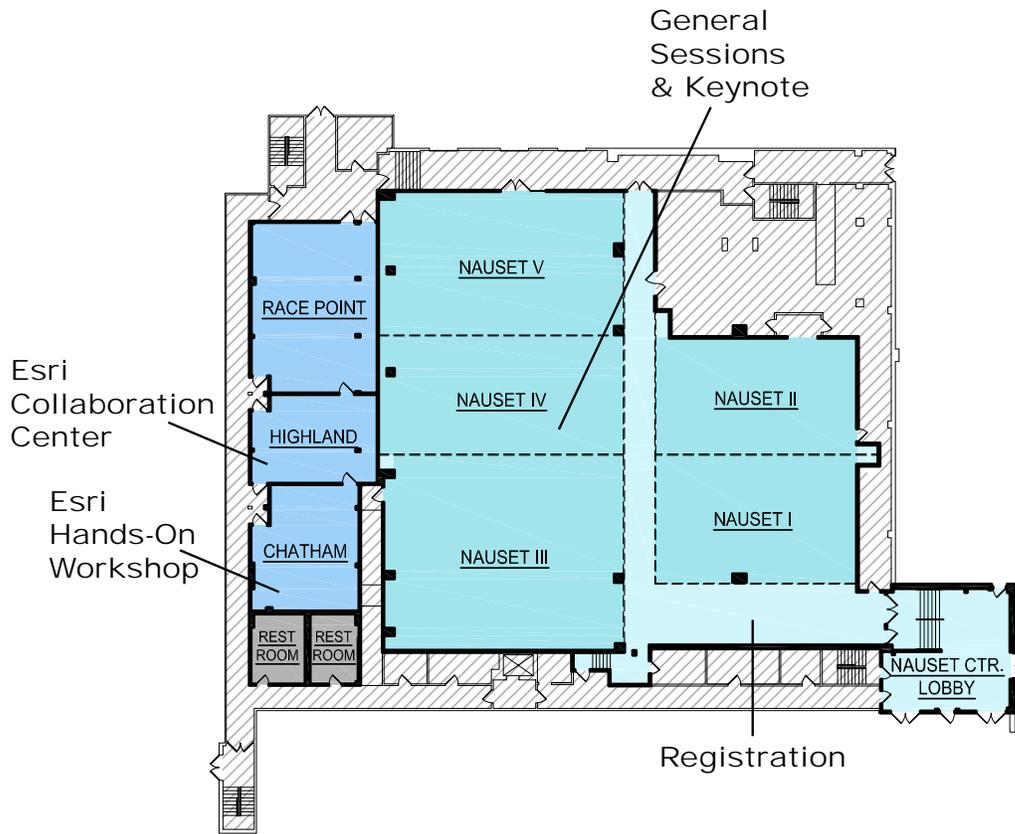
*From Summit to Sea: The Landscape of GIS*  
October 16-19, 2016 | Sea Crest Hotel | North Falmouth, MA

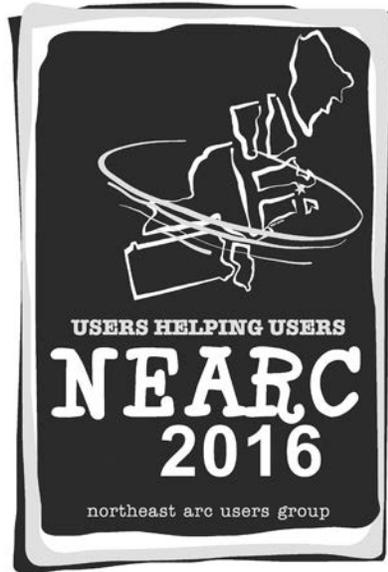


# FINAL PROGRAM

[www.northeastarc.org](http://www.northeastarc.org)

# SEA CREST BEACH HOTEL FLOOR PLAN





# TABLE OF CONTENTS

ACKNOWLEDGMENTS .....	2
GENERAL CONFERENCE INFORMATION .....	3
SOCIAL EVENTS .....	4
CONFERENCE SCHEDULE AT-A-GLANCE.....	5
KEYNOTE PRESENTATIONS .....	7
GIS EDUCATORS DAY SESSION GRID .....	8
CONCURRENT SESSION GRID .....	9
TECHNICAL PRESENTATION ABSTRACTS	
MONDAY SESSIONS .....	12
TUESDAY SESSIONS .....	20
WEDNESDAY SESSIONS .....	28
POSTER ABSTRACTS .....	33
VENDOR PROFILES .....	35
NEARC BUSINESS .....	39
DINE AROUND STORY MAP.....	44

## WELCOME!

Welcome to the 31st Annual NEARC Conference! The Massachusetts Host Committee, the Esri Staff and NEARC Board of Directors have developed an innovative and exciting program showcasing the latest GIS projects in the Northeast. We are pleased to bring you an excellent mix of individual presentations, hands-on workshops, lively panel discussions, plus cutting-edge technical workshops by Esri. Thank you for your support of NEARC and for joining us on Cape Cod, Massachusetts!

## ACKNOWLEDGMENTS

Thank you to the numerous people who helped make FALL NEARC 2016 possible and who worked hard to develop a unique and productive conference experience, including; the team at Delaney Meeting & Event Management, Mark Scott, Nora Sauter & Chris Nikola and the other Esri staff, and especially the Host Committee. Additionally, we are grateful to our vendors and sponsors for their financial support and participation.

### HOST COMMITTEE

**Co-Chair: Darren Mackiewicz** ▪ CDM Smith  
**Co-Chair: Anne Reynolds** ▪ Cape Cod Commission  
**Bob Shea** ▪ Town of Falmouth  
**Sean Sweeney** ▪ City of Cambridge  
**Katie Grillo** ▪ City of Cambridge  
**Jamie Carter** ▪ NOAA  
**Peter Steeves** ▪ USGS  
**Josh Williams** ▪ Esri  
**Jim Benoit** ▪ Town of Barnstable  
**Neil MacGaffey** ▪ MassGIS  
**Jeff Amero** ▪ City of Cambridge  
**Judy Colby-George** ▪ Spatial Alternatives  
**Dennis Corvi** ▪ Town of Avon  
**Claire Lane** ▪ City of Boston  
**Doug Greenfield** ▪ Town of Newton  
**Claire Brill** ▪ City of Worcester  
**Feng Yang** ▪ Town of Brookline  
**Jed Fehrenbach** ▪ Town of Brookline  
**Anita Beinikis** ▪ MassDEP  
**Sharon Benjamin** ▪ NOAA  
**Glenn Holcomb** ▪ USGS  
**Lyn Malone** ▪ WORLD VIEWS GIS

### NEARC BOARD OF DIRECTORS

**Brett Horr, President** ▪ Town of York, Maine  
**Jeff Amero, Treasurer** ▪ City of Cambridge, MA  
**Pam Brangan, Secretary** ▪ Chittenden County RPC, VT  
**William DiLibero, Esq.** ▪ NEARC Legal Counsel  
**Shane Bradt** ▪ University of New Hampshire  
**Darren Mackiewicz, GISP,**  
**President Ex Officio** ▪ CDM Smith  
**Leslie Pelch** ▪ VCGI, Vermont  
**Emily Wilson** ▪ University of Connecticut, CLEAR

### ESRI STAFF

<b>Adena Schutzberg</b>	<b>Lauri Dafner</b>
<b>Alex Brown</b>	<b>Mark Scott</b>
<b>Allen Carroll</b>	<b>Matthew Deal</b>
<b>Amy Niessen</b>	<b>Mike Jensen</b>
<b>Chris Nickola</b>	<b>Nicholas Furness</b>
<b>Jim Barry</b>	<b>Patrick Gahagan</b>
<b>Jon Pedder</b>	<b>Paul Rooney</b>
<b>Josh Williams</b>	<b>Tom Schwartzman</b>

## PROGRAM HIGHLIGHTS

- **GIS Educators Day** on Sunday is devoted to topics and issues pertaining to the use of GIS and other geospatial technologies in K-12, college and informal education.
- **User presentations** will showcase the diversity and depth of GIS activity in the northeast region, and highlight the emerging technologies that make our profession so interesting and exciting.
- **Program tracks** address many fields and all levels of expertise, from novice users to experienced analysts, developers and managers.
- **Esri Collaboration Center & Hands-on Exercises** will provide instruction and hands-on exercises using the latest software available. Discuss your spatial challenges with Esri staff on Monday and Tuesday, in the Chatham and Highland Rooms, and get advice to help your GIS projects succeed.
- **NEARC Squares Game Show!** Back after a 10-year hiatus! Come see the “celebrity” panel in the classic game show Hollywood Squares, played NEARC style! This is a “must-see” event, so come take part in the crazy shenanigans and learn about ArcGIS Online... and just maybe you will even walk away with a cool prize. Tuesday, October 18, from 3:30 PM – 5:00 PM in the Nauset Ballroom.

## NEARC BUSINESS

- **NEARC 101** — An orientation session designed specifically for first-time attendees and those interested in learning how to get the most out of the conference from those who know best! Come meet with NEARC Board members on Monday from 8:00 AM – 8:45 AM in the Nauset I room for the inside scoop.
- The **Annual NEARC Business Meeting** will be held on Monday from 3:15 PM - 4:15 PM in the Nauset IV Ballroom. The agenda for the meeting is on page 42. Everyone is strongly encouraged to attend. This is a perfect time to share your thoughts about how to update NEARC events and services to better meet your needs and goals. If you're interested in actively shaping the future of NEARC, nominations for three new Board members will be solicited during this meeting! Come discover what NEARC can do for you, and how you can get more involved and connected with fellow GIS professionals. Help us chart the course for future NEARC events and activities. All attendees will get a complimentary drink ticket to use on Monday evening at the **Vendor Reception & Poster Social**.
- Please fill out the **NEARC board election ballot** and return to the conference registration desk by 5:00 PM on Tuesday, October 18. Winners will be announced at the Awards Dinner. Thank you! Every vote counts!

## VENDORS

Be sure to visit with the vendors, located in the Seacrest Ballroom and open from 11:30 AM on Monday through 1:30 PM on Tuesday. No sessions have been scheduled during the period from 4:15 PM - 6:15 PM on Monday so that you can check out the displays and gather information on a wide range of useful products and services. For a complete list of exhibitors, please check out pages 35-38 in this program!

## MEALS & REFRESHMENTS

The Full Conference Registration fee includes the following meals and refreshments: The Vendor Reception & Poster Social on Monday, Awards Banquet on Tuesday evening, Continental Breakfast on Monday, Tuesday and Wednesday, as well as Lunch on Monday and Tuesday. Coffee Breaks are also provided daily. Please refer to the Conference Schedule for times and locations. The NEARC Welcome Social at Captain Kidd Restaurant on Sunday evening is not included with conference registration; tickets will be available for an additional fee of \$50. For other dining on your own, check out Red's Restaurant & Lounge within the Sea Crest Beach Hotel. Red's is named after one of sports all-time greatest personalities and philanthropist, Arnold Jacob “Red” Auerbach and is a casual eatery with views of Old Silver Beach.

## SUNDAY, OCTOBER 16

### OPTIONAL ACTIVITIES

Pre-registration required due to limited space. Transportation to and from activity is on your own. Meet in hotel main lobby for carpooling.

- Bike Ride to Woods Hole**  
 Led by Bill Guazzo. Come enjoy glimpses of Falmouth's varied ecosystems as you bike past marshes, cranberry bogs, beaches, and woodlands. A brief street ride leads to the path for 8.5 miles of flat, easy biking into Woods Hole. Bikes may be rented from the hotel for \$20. Check out our Story Map (<http://arcg.is/1NBGKoM>) to preview a short stretch of your ride!
- Hike the Knob**  
 Sheltering Quissett Harbor and reaching into Buzzards Bay, The Knob ([http://www.qhpt.org/quissett\\_maps.htm](http://www.qhpt.org/quissett_maps.htm)) is a spectacular spot to experience the Cape coast. Come join your guide for an easy walk along the wooded path and shore to see this secluded piece of Falmouth. 8 miles from Hotel. (Carpool to parking encouraged; approximately a 20-minute drive from hotel).
- Falmouth Historical Walk: Museums on the Green**  
 The Falmouth Museums on the Green contain a treasure trove of stories and artifacts that tell the story of the town of Falmouth, Massachusetts. The museums overlook the Village Green where members of the Colonial militia practiced in the 1700s and sea captains built their homes. Two 18th-century houses display period furniture, fine art, textiles and rotating exhibits that provide a glimpse into the town's rich historic past. \$5 fee.

### WELCOME TO CAPE COD SOCIAL AT CAPTAIN KIDD RESTAURANT IN WOODS HOLE / 6:30 PM - 8:30 PM

Pre-registration and additional fee of \$50 required. If you did not sign up in advance, check at the Conference Registration Desk for space availability. A century old bar in the charming village of Woods Hole with spectacular views. Fee will include a delicious dinner portion of Cape Cod Fish & Chips, one drink ticket, transportation and fun bar games! Come catch up with old friends and make some new ones at this laid back social gathering. **Transportation provided as follows:** If you plan to take advantage of the shuttle transportation to Captain Kidd, the bus will depart from the hotel main lobby **promptly at 6:15 PM**. The return trip back to the hotel will depart the restaurant at **8:30 PM** and again at **9:30 PM**. For reference, the restaurant is approximately a 30-minute drive from the hotel.

## MONDAY, OCTOBER 17

### VENDOR RECEPTION & POSTER SOCIAL / 4:15 PM - 6:15 PM / Seacrest Ballroom and Ocean View Room

*Sponsored by VHB*

Enjoy light hors d'oeuvres, check out the posters, and visit the vendor displays. This is the perfect time to visit with this year's exhibitors to learn about the latest services, software, and hardware solutions. Don't forget to vote for your favorite poster, the People's Choice Award! Poster award winners will be announced on Tuesday evening during the Awards Dinner.

### Esri GeoDev Meetup / 6:30 PM – 8:30 PM / Bear in Boots Gastropub / 285 Main St, Falmouth, MA

The GeoDev Meetup event is a social gathering for developers to discuss the latest in mapping, geo technology, geo services, web and mobile mapping apps, app design, cloud solutions, map data or anything else related to solving real-world "geo" problems. Developers of all levels of expertise are welcome, from seasoned GIS professionals to those new to geospatial development. Appetizers and beverages will be provided.

### DINE AROUND IN DOWNTOWN FALMOUTH AND DEVIOUS BAND AT GRUMPY'S PUB

Dine Around in Falmouth / 6:30 PM – 8:30 PM; Live Music at Grumpy's Pub / 8:30 PM – 11:30 PM

Following the Vendor Reception & Poster Social, head to downtown Falmouth to dine at one of the recommended establishments. Check out the interactive **Dine Around Story Map** at [gis.camb.ma/2016dine](http://gis.camb.ma/2016dine), or refer to the map in the back of this program. From 8:30 PM – 11:30 PM please plan to join your fellow NEARC attendees at **Grumpy's Pub** for live music by DEVIOUS, a classic rock & roll cover band! **Transportation provided as follows:** Downtown Falmouth is approximately a 15-minute drive from the hotel. Shuttle transportation will be provided and we encourage you to utilize it. The buses will depart from the hotel beginning at 6:30 PM and run until 7:30 PM. The drop off location will be the Morgan Stanley Building, near #10 on the map. The shuttle bus is also available to bring people from Morgan Stanley to Grumpy's beginning at 8:20 PM. The last bus returning to the hotel from downtown will be at midnight.



## TUESDAY, OCTOBER 18

### NETWORKING SOCIAL & AWARDS DINNER

Networking / 5:30 PM - 6:30 PM Dinner / 6:30 PM - 8:00 PM

*Sponsored by Esri*

### AFTER-HOURS NETWORKING SOCIAL / 8:00 PM - 10:00 PM / Ocean View Room

Live music by Alec Delphenich, a singer/songwriter from Boston, MA.

## SUNDAY, OCTOBER 16

8:00 AM – 5:00 PM	<b>Conference Registration Desk Open</b>	<i>Nauset Ballroom Nook/ Foyer</i>
8:00 AM – 12:00 PM	<b>Esri HackerLab</b> [Hands-on Lab, BYOD] <i>(pre-registration required.)</i>	<i>Chatham</i>
8:30 AM – 5:00 PM	<b>GIS Educators Day Pre-Conference Event</b>	<i>Nauset III</i>
12:00 PM – 6:00 PM	<b>Vendor Set-up</b>	<i>Seacrest Ballroom II &amp; III</i>
1:00 PM – 4:00 PM	<b>Afternoon Optional Activities</b>	<i>See details on page 4</i>
6:30 PM – 8:30 PM	<b>Welcome to Cape Cod Social at Captain Kidd Restaurant in Woods Hole</b> <i>Additional fee of \$50 and advance registration required.</i>	<i>Offsite; Transportation provided - see details on page 4.</i>

## MONDAY, OCTOBER 17

7:30 AM – 5:00 PM	<b>Conference Registration Desk Open</b>	<i>Nauset Ballroom Nook/ Foyer</i>
7:30 AM – 9:00 AM	<b>Continental Breakfast</b>	<i>Ocean View Room</i>
7:30 AM – 11:30 AM	<b>Vendor Set-Up</b>	<i>Seacrest Ballroom II &amp; III</i>
8:00 AM – 8:45 AM	<b>NEARC 101: Orientation for first-time attendees</b>	<i>Nauset I</i>
9:00 AM – 10:15 AM	<b>WELCOME &amp; KEYNOTE ADDRESS</b> by <b>Allen Carroll, Esri</b>	<i>Nauset III, IV, &amp; V</i>
10:00 AM – 4:00 PM	<b>Poster Set-Up</b>	<i>Ocean View Room</i>
10:15 AM – 10:30 AM	<b>Refreshment Break</b>	<i>Seacrest Ballroom II &amp; III</i>
10:30 AM – 12:00 PM	<b>CONCURRENT TECHNICAL SESSIONS</b>	<i>See details on page 9</i>
10:30 AM – 4:15 PM	<b>Esri Collaboration Center and Hands-On Exercises</b>	<i>Chatham &amp; Highland</i>
11:30 AM	<b>Vendor Area Opens</b>	<i>Seacrest Ballroom II &amp; III</i>
12:00 PM – 1:30 PM	<b>Attendee Lunch &amp; Visit with Vendors</b> <i>Sponsored by Topaz Engineering Supply, Inc.</i>	<i>Seacrest Ballroom II &amp; III</i>
1:30 PM – 3:00 PM	<b>CONCURRENT TECHNICAL SESSIONS</b>	<i>See details on page 9</i>
3:00 PM – 3:15 PM	<b>Refreshment Break with Vendors</b>	<i>Seacrest Ballroom II &amp; III</i>
3:15 PM – 4:15 PM	<b>Annual NEARC Business Meeting</b>	<i>Nauset IV</i>
4:15 PM – 6:15 PM	<b>Vendor Reception &amp; Poster Social</b> <i>Sponsored by VHB</i>	<i>Seacrest Ballroom II &amp; III and Ocean View Room</i>
6:30 PM – 8:30 PM	<b>Esri GeoDev Meetup</b>	<i>Offsite: Bear in Boots Gastropub, 285 Main St, Falmouth</i>
6:30 PM – 8:30 PM	<b>Dine Around in Downtown Falmouth</b>	<i>Offsite; Transportation provided - see details on page 4</i>
8:30 PM – 11:30 PM	<b>Live Music by DEVIOUS at Grumpy's Pub</b>	<i>Offsite: Grumpy's Pub, 29 Locust St, Falmouth</i>

## TUESDAY, OCTOBER 18

7:30 AM – 5:00 PM	<b>Conference Registration Desk Open</b>	<i>Nauset Nook/Nauset Foyer</i>
7:30 AM – 9:00 AM	<b>Continental Breakfast with Vendors</b>	<i>Ocean View Room/Seacrest Ballroom II &amp; III</i>
7:30 AM – 1:30 PM	<b>Vendor Area Open</b>	<i>Seacrest Ballroom II &amp; III</i>
8:30 AM – 4:30 PM	<b>Esri Collaboration Center &amp; Hands-On Exercises</b>	<i>Chatham &amp; Highland</i>
9:00 AM – 10:00 AM	<b>KEYNOTE ADDRESS by David Gallo, Columbia University</b>	<i>Nauset III, IV, &amp; V</i>
10:00 AM – 10:30 AM	<b>Refreshment Break with Vendors</b>	<i>Seacrest Ballroom II &amp; III</i>
10:30 AM – 12:00 PM	<b>CONCURRENT TECHNICAL SESSIONS</b>	<i>See details on page 10</i>
12:00 PM – 1:30 PM	<b>Attendee Lunch &amp; Last Chance to Visit with Vendors</b>	<i>Seacrest Ballroom II &amp; III</i>
1:30 PM	<b>Vendor Area Closes</b>	<i>Seacrest Ballroom II &amp; III</i>
1:30 PM – 3:00 PM	<b>CONCURRENT TECHNICAL SESSIONS</b>	<i>See details on page 10</i>
3:00 PM – 3:30 PM	<b>Refreshment Break</b>	<i>Ocean View Room</i>
3:30 PM – 5:00 PM	<b>NEARC Squares Game Show</b>	<i>Nauset Ballroom</i>
5:00 PM	<b>NEARC Board Election Ballots Due</b>	<i>Nauset Nook/Nauset Foyer</i>
5:30 PM – 6:30 PM	<b>Networking Social</b>	<i>Ocean View Room</i>
6:30 PM – 8:00 PM	<b>Awards Dinner &amp; Keynote Address by Paul Niedzwiecki, Cape Cod Commission</b> <i>Sponsored by Esri</i>	<i>Seacrest Ballroom</i>
8:00 PM – 10:00 PM	<b>After-Hours Networking Social with Live Music by Singer/Songwriter, Alec Delphenich</b>	<i>Ocean View Room</i>

## WEDNESDAY, OCTOBER 19

7:30 AM – 12:00 PM	<b>Conference Registration Desk Open</b>	<i>Nauset Ballroom Nook/ Foyer</i>
7:30 AM – 8:30 AM	<b>Continental Breakfast</b>	<i>Ocean View Room</i>
8:45 AM – 10:15 AM	<b>CONCURRENT TECHNICAL SESSIONS</b>	<i>See details on page 11</i>
10:00 AM – 10:30 AM	<b>Refreshment Break</b>	<i>Nauset Nook/Nauset Foyer</i>
10:30 AM – 12:00 PM	<b>CONCURRENT TECHNICAL SESSIONS</b>	<i>See details on page 11</i>
12:00 PM	<b>Conference Adjourns</b>	

## KEYNOTE PRESENTATIONS

**MONDAY, OCTOBER 17 | 9:00 AM - 10:15 AM**

***The New Medium of Story Maps: Expanding the GIS Spectrum, Extending Our Reach***

### **Allen Carroll, Esri**

Allen Carroll is Program Manager for Storytelling at Esri. He leads Esri's Story Maps team, which develops open-source web apps that enable thousands of people to tell place-based stories combining interactive maps and multimedia content. The team also develops its own story maps in order to prototype new user experiences and to demonstrate best practices for map-enabled storytelling. The team's website is at [storymaps.arcgis.com](http://storymaps.arcgis.com).



Allen came to Esri after 27 years at the National Geographic Society. As chief cartographer at NGS, he was deeply involved in the creation of the Society's renowned reference and wall maps, globes, and atlases. He led the creation of the Seventh and Eighth editions of the World Atlas, incorporating satellite imagery and innovative thematic maps into the editions and integrating them for the first time with interactive Web resources. He spearheaded the publication of many new maps and Web resources, ranging from decorative wall maps and supplement maps for National Geographic magazine to special projects featuring biodiversity, conservation, and indigenous cultures. He is a former member of the National Geospatial Advisory Committee.

**TUESDAY, OCTOBER 18 | 9:00 AM - 10:00 AM**

### **David Gallo, Columbia University**

David Gallo is an American oceanographer and explorer. He is currently Senior Advisor for Strategic Initiatives at the Center for Climate and Life of the Earth Institute at Columbia University. Previously he was Director of Special Projects at the Woods Hole Oceanographic Institution - a preeminent, globally recognized scientific laboratory. For more than 30 years, David has been at the forefront of ocean exploration, participating in and being witness to the development of new technologies and scientific discoveries that shape our view of planet earth.



**TUESDAY, OCTOBER 18 | 6:30 PM**

### **Paul Niedzwiecki, Cape Cod Commission**

Paul Niedzwiecki has led the Cape Cod Commission in his role as Executive Director since 2007. He leads the agency in fulfilling its mission - "Keeping a Special Place Special" - by protecting the natural environment, enabling economic growth, increasing transparency and encouraging community engagement. Prior to joining the Cape Cod Commission, Paul was Assistant Town Manger in Barnstable, Ma., Special District Attorney for Barnstable County and General Counsel/CFO at Commonwealth Corp.



# SUNDAY GIS EDUCATORS DAY SESSION GRID

## 8:00 AM - 5:00 PM

8:00 AM - 8:30 AM	<b>Registration &amp; Continental Breakfast</b> - <i>Nauset Foyer</i>		
8:30 AM	<b>Welcome Remarks &amp; Introductions / Overview of the Day</b> - <i>Nauset Ballroom III</i>		
9:00 AM - 9:30 AM	<b>Lightning Previews of the Morning Sessions</b> - <i>Nauset Ballroom III</i>		
	<i>Racepoint</i>	<i>Nauset II</i>	<i>Nauset IV</i>
9:45 AM - 10:45 AM	<b>HANDS-ON, BYOD</b>  ArcGIS Online: It's not Your Father's GIS	<ul style="list-style-type: none"> <li>• Modules That Promote Interdisciplinary and Systems Thinking Using AGO</li> <li>• Assessing and Responding to the Opioid Epidemic Through GIS and Spatial Epidemiological Methods</li> </ul>	<b>HANDS-ON, BYOD</b>  Making Sense of the American Community Survey
11:00 AM - 12:00 PM	<b>HANDS-ON, BYOD</b>  Share Apps, Not Maps: Creating and Configuring ArcGIS Online Story Maps	<ul style="list-style-type: none"> <li>• Students as Researchers: How Does Watershed Land Use and Biodiversity Effect Water Quality</li> <li>• From Tree Hugger to Environmental Manager</li> </ul>	<ul style="list-style-type: none"> <li>• ArcGGIS Online: Using Esri GeoInquiries in AP Human Geography</li> <li>• Map@Syst: Promoting the Use of Online Mapping for Outreach and Engagement in Cooperative Extension and Beyond</li> </ul>
12:00 PM - 12:45 PM	<b>Lunch</b> - <i>Nauset III</i>		
12:45 PM - 1:30 PM	<b>Keynote Address by Scot Semmens, Original Wisdom</b> <b>The Ultimate Field Trip: Wildlife Tracking and Mapping in Southern Africa</b> <i>Nauset III</i>		
1:35 PM - 2:00 PM	<b>Lightning Previews of Afternoon Sessions</b> - <i>Nauset III</i>		
	<i>Racepoint</i>	<i>Nauset II</i>	<i>Nauset IV</i>
2:15 PM - 3:15 PM	<b>HANDS-ON, BYOD</b>  Many Ways to Bring Your Data into ArcGIS Online	<ul style="list-style-type: none"> <li>• Power of Data: Introduction to Spatial Analysis in ArcGIS Online</li> <li>• Finding and Using Open Educational Resources</li> </ul>	<b>HANDS-ON, BYOD</b>  Survey 123: Creating a Survey for Mobile Data Collection
3:30 PM - 4:30 PM	<b>HANDS-ON, BYOD</b>  Spatial Analysis in the Cloud: Analysis Tools in ArcGIS Online	<ul style="list-style-type: none"> <li>• Mapping Community Vulnerability to Sea Level Rise</li> <li>• Accessing the Impact of Climate Change on the New England Winter Sport Industry</li> </ul>	<b>HANDS-ON, BYOD</b>  Mapping History: Using Historical USGS Historical Topographic Maps in ArcGIS Online
4:30 PM - 5:00 PM	<b>GIS Educators Day Wrap-up and Distribution of Esri Books</b> - <i>Nauset III</i>		

# MONDAY CONCURRENT SESSION GRID

## 10:30 AM - 12:00 PM

USER PRESENTATIONS						Esri TECHNICAL SESSIONS (ArcGIS Online)
TRACK: EDUCATION	TRACK: MUNICIPAL 1	TRACK: MOBILE (DATA COLLECTION)	TRACK: UAV	TRACK: APPS	TRACK: COASTAL RESILIENCE	
<i>Racepoint</i>	<i>Nauset I</i>	<i>Nauset II</i>	<i>Nauset III</i>	<i>Nauset IV</i>	<i>Nauset V</i>	<i>Seacrest Ballroom I</i>
<p>GIS as a Service Learning Course</p> <p>GIS Professional Certification (GISP): Latest Changes to the Certification Program</p> <p>Map@Syst: promoting the use of online mapping for outreach and engagement in Cooperative Extension and beyond</p> <p><b>SEE PAGE 12</b></p>	<p>Assessing the Viability of a Small Drone and Esri Drone2Map to Provide Assessment Tools for Bridge Inspection</p> <p>Managing a City's Sewer System in a Sea of Snow</p> <p>Wastewater Planning with GeoDesign</p> <p><b>SEE PAGE 12</b></p>	<p>The evolving process of mobile data collection in the City of Boston</p> <p>ArcGIS Online Within the University: An Exercise in Collaboration and Technology</p> <p>GIS in the Field: Catch Basin to Pipeline Data Collection</p> <p><b>SEE PAGE 13</b></p>	<p>Considering a UAV - Now What?</p> <p>Best Practices for UAS Operations</p> <p>Supercharging Your GIS with Unmanned Aerial Systems</p> <p><b>SEE PAGE 13</b></p>	<p>You Are Here: Developing a Mobile Map for the Sebago Lake Land Reserve</p> <p>Building the Connecticut Rail Trail Explorer Web Application</p> <p>The Town of Winchester Connecticut's Parcel Mapping Solution</p> <p><b>SEE PAGE 14</b></p>	<p>Using Transportation Networks to Inform Valuation of Water Quality Changes for Saltwater Recreation on Cape Cod, MA</p> <p>Ocean Use Mapping in the Northeast</p> <p>NHD Stewardship in Maine: Focus on the Coast and Estuaries</p> <p><b>SEE PAGE 14</b></p>	<p>Introduction to Vector Tiles</p> <p>ArcGIS Smart Mapping Tools</p> <p>Story Maps: Telling the Story with ArcGIS</p> <p><b>SEE PAGE 15</b></p>

## 1:30 PM - 3:00 PM

USER PRESENTATIONS						Esri TECHNICAL SESSIONS (ArcGIS Pro)
TRACK: EMERGING TECHNOLOGIES (AGOL)	TRACK: MUNICIPAL 1	TRACK: MOBILE (ADA)	TRACK: UAV	TRACK: APPS	TRACK: COASTAL RESILIENCE	
<i>Racepoint</i>	<i>Nauset I</i>	<i>Nauset II</i>	<i>Nauset III</i>	<i>Nauset IV</i>	<i>Nauset V</i>	<i>Seacrest Ballroom I</i>
<p>Data Management Through ArcGIS Online</p> <p>Delivering Maps and Data from the Cloud: MassGIS and ArcGIS Online</p> <p>Peterborough's (NH) ArcGIS Online Implementation: Small Towns Can Do It</p> <p><b>SEE PAGE 16</b></p>	<p>Implementing the Parcel Fabric for Connecticut's Public Use &amp; Benefits Land Registry</p> <p>Integrating GIS with County Clerk/ Register Documents: The Ultimate Frontier</p> <p>The ArcGIS Parcel Fabric, Deconstructed: What, How, Why</p> <p><b>SEE PAGE 16</b></p>	<p>Building Mapping Applications for Accessibility</p> <p>GIS and Mobile Technologies for Assessing ADA Compliance</p> <p>Conditional Assessment of an Historic Resource - Fort Warren, Georges Island Boston Harbor</p> <p><b>SEE PAGE 17</b></p>	<p>PANEL: Commercial UAS Applications and Regulatory Update</p> <p><b>SEE PAGE 17</b></p>	<p>(not) Implementing an ArcGIS for Local Government Solution: Election Polling Places Application</p> <p>A Comparison of Open Source Viewers for ArcGIS Server</p> <p>Developing Our Own Cool, Cheap, and Easy Mapping Tool</p> <p><b>SEE PAGE 18</b></p>	<p>Collaboration and Customizing a Story Map Journal: Southern Connecticut Regional Framework for Coastal Resilience</p> <p>The Regional Resilience Projects App: Using Technology to Build Community Resilience</p> <p>Building Coastal Resilience on Cape Cod Through Innovative Tool Development</p> <p><b>SEE PAGE 18/19</b></p>	<p>ArcGIS Pro Foundational Workflows</p> <p>ArcGIS Pro and ArcGIS Online</p> <p>Getting Started with ArcGIS Pro Tasks</p> <p><b>SEE PAGE 19</b></p>

## TUESDAY CONCURRENT SESSION GRID

### 10:30 AM - 12:00 PM

USER PRESENTATIONS						Esri TECHNICAL SESSIONS (ArcGIS Apps)
TRACK: 3D	TRACK: ASSET MANAGEMENT	TRACK: MUNICIPAL 2	TRACK: REGIONAL DATA COLLECTION/ LIDAR	TRACK: EMERGING TECHNOLOGIES 2	TRACK: NATURAL RESOURCES	
<i>Racepoint</i>	<i>Nauset II</i>	<i>Nauset I</i>	<i>Nauset III</i>	<i>Nauset IV</i>	<i>Nauset V</i>	<i>Seacrest Ballroom I</i>
<p>WORKSHOP: Extracting 3D Features from Publicly Available LiDAR Data</p> <p><b>SEE PAGE 20</b></p>	<p>Facilities Capital Planning Using GIS at the City of Philadelphia</p> <p>A Risk Based Approach for Optimizing Water System Pipeline Renewal</p> <p>Web Based ArcGIS Solutions for Infrastructure Management</p> <p><b>SEE PAGE 20</b></p>	<p>ArcGIS in Support of Hydraulic Modeling Applications Including Municipal Dam Removals</p> <p>Topo-bathy LiDAR: The who, what, where, when, why and how</p> <p>City of Hartford - Document Scanning Project</p> <p><b>SEE PAGE 21</b></p>	<p>MassOrtho: Lessons Learned and Other Interesting Musings from the Tale of a Regional Ortho Project. Please Come and Learn from This!</p> <p>Combining Multiple Technologies to Make Statewide, Geospatial Information Available</p> <p>The Vermont Lidar Initiative: Acquiring, Sharing and Applying Lidar Data</p> <p><b>SEE PAGE 21</b></p>	<p>Pictometry Integrations with Esri</p> <p>Big Data Is the Answer... What Is the Question?</p> <p>Implementing ArcGIS Open Data in Rhode Island</p> <p><b>SEE PAGE 22</b></p>	<p>Unmanned Aircraft System Use [Drones] for Natural Resource Research and Management in the National Estuarine Research Reserve System</p> <p>Assessing the Impact of Climate Change on the New England Winter Sport Industry</p> <p>Mapping Across the Divide – Creating a Seamless Coastal Zone Soil Survey</p> <p><b>SEE PAGE 22/23</b></p>	<p>Insights for ArcGIS</p> <p>Drone2Map for ArcGIS: UAV Meets GIS</p> <p>Geoenabling Office Productivity Tools with ArcGIS Maps for Office</p> <p><b>SEE PAGE 23</b></p>

### 1:30 PM - 3:00 PM

USER PRESENTATIONS						Esri TECHNICAL SESSIONS (ArcGIS Apps for the Field)
TRACK: 3D	TRACK: ASSET MANAGEMENT	TRACK: MUNICIPAL 2	TRACK: REGIONAL DATA COLLECTION/ LIDAR	TRACK: EMERGING TECHNOLOGIES 2	TRACK: NATURAL RESOURCES (SOIL)	
<i>Racepoint</i>	<i>Nauset II</i>	<i>Nauset I</i>	<i>Nauset III</i>	<i>Nauset IV</i>	<i>Nauset V</i>	<i>Seacrest Ballroom I</i>
<p>Creating a 3D GIS Program in the City of Cambridge</p> <p>3DEP - 3D Elevation Program</p> <p>Historical Data Visualization for Contaminated Sites - In 3D and Online</p> <p><b>SEE PAGE 24</b></p>	<p>Mapping Boston's Fiber Assets</p> <p>Use GIS to Bootstrap and Enhance Your Asset Management Program</p> <p><b>SEE PAGE 24</b></p>	<p>Building a Pedestrian Multimodal Network in the Greater Bridgeport Region</p> <p>Mapping for a Regional Growth Policy</p> <p>Prioritizing Land Acquisition</p> <p><b>SEE PAGE 25</b></p>	<p>Recent Advancements and Future Directions in High Resolution Land Cover Mapping</p> <p>Exploring the Capabilities of High Resolution LiDAR in Mapping Utility Infrastructure and Roadside Vegetation</p> <p><b>SEE PAGE 25/26</b></p>	<p>PANEL: If You Could Tell a Story with a Map, What Story Would You Tell?</p> <p><b>SEE PAGE 26</b></p>	<p>Mapping the Difficult Stuff: Automated Feature Extraction of Wetlands, Vernal Pools, and Logging Roads</p> <p>Planning for the Flood: How New England Is Creating More Resilient Electrical Infrastructure Using GIS</p> <p>New Horizons: A Tour of Engineering Applications of the NRCS SSURGO Soils Data</p> <p><b>SEE PAGE 26/27</b></p>	<p>Collector for ArcGIS: Unlock Efficiency in the Field</p> <p>Survey123 for ArcGIS: Intelligent Form-based Field Data Collection</p> <p>Workforce &amp; Navigator for ArcGIS: Apps for your Field Workforce</p> <p><b>SEE PAGE 27</b></p>

## WEDNESDAY CONCURRENT SESSION GRID

### 8:45 AM - 10:15 AM

USER PRESENTATIONS						Esri TECHNICAL SESSIONS (Web GIS)
TRACK: AUTOMATION	TRACK: ANALYTICS	TRACK: MUNICIPAL	TRACK: PUBLIC HEALTH	TRACK: Esri WORKSHOP		
	<i>Racepoint</i>	<i>Nauset II</i>	<i>Nauset III</i>	<i>Nauset IV</i>	<i>Chatham</i>	<i>Seacrest Ballroom I</i>
	<p>Using Python to Automate Map Exports</p> <p>Automating Map Generation in ArcGIS with Python</p> <p>Taking Map Books to the Next Level. Using Arcpy to Create Dynamic Content in Your Maps</p> <p style="text-align: right;"><b>SEE PAGE 28</b></p>	<p>WORKSHOP: Introduction to ArcGIS Performance Analysis</p> <p style="text-align: right;"><b>SEE PAGE 29</b></p>	<p>PANEL: How to Simplify Esri's Utility Templates to Work for Your Organization</p> <p style="text-align: right;"><b>SEE PAGE 29</b></p>	<p>Assessing and Responding to the Opioid Epidemic Through GIS and Spatial Epidemiological Methods</p> <p>Providing Situational Awareness During Public Health Emergencies Using Complimentary Paper Map and Web Mapping Resources</p> <p>Avian Flu Planning in MA: A lesson in Inter-Agency GIS cooperation</p> <p style="text-align: right;"><b>SEE PAGE 29/30</b></p>	<p>Esri Public Safety Workshop: Preparing for and Supporting Special Events with ArcGIS Online Part I*</p> <p>*Please note: this is a 3-hour workshop that runs from 8:45 AM – 12:00 PM BYOD</p> <p style="text-align: right;"><b>SEE PAGE 30</b></p>	<p>ArcGIS GeoEvent Extension for Server: Monitoring Assets &amp; Feeds in Real Time</p> <p>WebGIS Platform Concepts: Configurations Across the Enterprise</p> <p>WebGIS at 10.5: A Preview</p> <p style="text-align: right;"><b>SEE PAGE 30</b></p>

### 10:30 AM - 12:00 PM

USER PRESENTATIONS						Esri TECHNICAL SESSIONS (ArcGIS Solutions for Government)
TRACK: OPEN DATA	TRACK: AUTOMATION	TRACK: APPS	TRACK: NATURAL RESOURCES 2	TRACK: Esri WORKSHOP		
	<i>Racepoint</i>	<i>Nauset II</i>	<i>Nauset III</i>		<i>Chatham</i>	<i>Seacrest Ballroom I</i>
	<p>Getting Your Data into ArcGIS Online</p> <p>Bringing Your Legacy Data into the Future (Using MS Access and ArcGIS Together)</p> <p>Real-Life Python Geoprocessing in the Cloud</p> <p style="text-align: right;"><b>SEE PAGE 31</b></p>	<p>WORKSHOP: Making Sense of the American Community Survey</p> <p style="text-align: right;"><b>SEE PAGE 31</b></p>	<p>National Hydrography Requirements and Benefits Study</p> <p>Examining the Scallop Fishery Through Biological, Regulatory, and Landings History</p> <p>Farm GIS for Animal Welfare, Water Health, and Aesthetic Enjoyment</p> <p style="text-align: right;"><b>SEE PAGE 32</b></p>		<p>Esri Public Safety Workshop: Preparing for and Supporting Special Events with ArcGIS Online Part II*</p> <p>*Please note: this is a 3-hour workshop that runs from 8:45 AM – 12:00 PM BYOD</p> <p style="text-align: right;"><b>SEE PAGE 32</b></p>	<p>ArcGIS Solutions for Crowdsourcing: Engaging Your Community</p> <p>ArcGIS Solutions for Flood Mitigation, Planning, and Response</p> <p>ArcGIS Solutions for Vector-Borne Disease Surveillance and Control</p> <p style="text-align: right;"><b>SEE PAGE 32</b></p>

\*Technical Sessions are organized by Date, Time and then Track Name as shown on Concurrent Session Grid in previous pages.

## MONDAY 10:30 AM - 12:00 PM

### TRACK: Education

MEETING ROOM: Racepoint

MODERATOR: Brett Flodine

**10:30 AM**

#### GIS as a Service Learning Course

*Peggy Minnis, Pace University*

Pace University requires each student to complete a service learning course. Over the years, GIS has served as such a course, sending students into communities and organizations to determine how GIS can help provide information and maps for making decisions. Along the way, students learn the complexity and difficulty in dealing with volunteer or community organizations and in getting accurate or useful information. Several class projects will be used as examples. Projects that were undertaken and abandoned will be reviewed, with possible reasons why they could not be completed by an undergraduate class.

**11:00 AM**

#### GIS Professional Certification (GISP): Latest Changes to the Certification Program

*Steve Sharp, GIS Certification Institute (Board Member)*

The GIS Certification Institute (GISCI) and its Member organizations have supported the creation and evolution of the GIS Professional (GISP) certification program for over a decade. The GISP certification process has evolved and matured over this time, with the most recent change being the introduction of a certification exam. This presentation will outline the requirements of the GISP certification program, with specific focus on recent changes that will impact existing and new GISPs.

**11:30 AM**

#### Map@Syst: Promoting the Use of Online Mapping for Outreach and Engagement in Cooperative Extension and Beyond

*Shane Bradt, University of New Hampshire*

Map@Syst website provides an opportunity to both inspire people with examples of how online maps can be used for outreach and engagement, and provide support for those who need help learning how to make and share maps online.

### TRACK: Municipal 1

MEETING ROOM: Nauset I

MODERATOR: Claire Lane

**10:30 AM**

#### Assessing the Viability of a Small Drone and Esri Drone2Map to Provide Assessment Tools for Bridge Inspection

*David Day, Keystone Aerial Surveys; Josh Persson CP, PPS, GISP WSP, Parsons Brinckerhoff*

Beginning in 2016, the Delaware River and Bay Authority sought to assess the feasibility of using drone technology to compliment the bridge inspection process. WSP | Parsons Brinckerhoff was already contracted to complete the traditional bridge inspection for the Delaware Memorial Bridges and was a working partner with Keystone Aerial Surveys through their Geospatial group. As a cross-disciplinary team, we developed a workflow that combined Keystone's UAV expertise and WSP | Parsons Brinckerhoff's Geospatial capabilities to provide a user friendly way for bridge inspectors to view imagery captured from a DJI Inspire Pro quadcopter in ESRI's Drone2Map application. This presentation will cover UAV logistics and permitting, the image acquisition process and importation into Drone2Map.

**11:00 AM**

#### Managing a City's Sewer System in a Sea of Snow

*Kelsey Quinlan, Stephen Lopez, Jerrard Whitten – Merrimack Valley Planning Commission*

Merrimack Valley Planning Commission (MVPC) is a regional planning agency that provides professional planning services to Northeastern Massachusetts. Established as a public, nonprofit organization, MVPC is chartered to promote the orderly development of the 15 cities and towns of the region. During the historic winter of 2014/2015, nearly 10 feet of snow fell in the region which resulted in a catastrophic failure of Newburyport's vacuum sewer system on Plum Island. To address this problem, MVPC collaborated with Newburyport's Department of Public Services to map the sewer system and created a mobile GIS application to manage each of the system components. Using this application in conjunction with an online viewer, City officials are able to record functional information about the sewer system and alert the public as to its status 24/7. Troubled locations are symbolized with a red line and when the system is restored, the lines revert back to green. The application allows the City to better respond to operational glitches and expedite the process in locating any mechanical failures and the online viewer keeps the residents informed.

**11:30 AM**

#### Wastewater Planning with GeoDesign

*Philip "Jay" Detjens, Cape Cod Commission*

This presentation will examine the track of a wastewater planning scenario through the Cape Cod Commission's wastewater planning process. Scenarios are developed and analyzed through a series of web applications that are backed up by a centralized SQL database and feed a developing API. All scenarios are geospatially created in our web mapping application, watershedMVP, and these scenarios are stored and shared to other applications including SAM, the Scenario Assessment Model, and FIM, the Financial Impact Tool. The presentation will briefly touch on leveraging transparent GIS data, communicating complicated wastewater concepts simply and a tour of some custom applications developed by the Cape Cod Commission.

## 10:30 AM - 12:00 PM CONTINUED

TRACK: Mobile (Data Collection)	
MEETING ROOM: Nauset II	MODERATOR: Adam Kurowski
<p><b>10:30 AM</b>  <b>The Evolving Process of Mobile Data Collection in the City of Boston</b>  <i>Bill Toussaint, GIS Data Manager, City of Boston</i></p> <p>The GIS Team at the City of Boston has been involved in a number of mobile data collection projects over the years. The process has evolved from using the City's 311 case management software to create points, and Runkeeper to track the progress of data collection to most recently using Esri's Collector applications to manage the collection of several city assets such as wifi hotspots, speed limit signs and parking facility information. The data has been made available to City Departments using BostonMaps, the City's branded version of AGOL.</p>	
<p><b>11:00 AM</b>  <b>ArcGIS Online within the University: An Exercise in Collaboration and Technology</b>  <i>Pamela Locke, GISP, University of Massachusetts, Lowell</i></p> <p>Commencement at UMass Lowell is a huge event encompassing many different departments. In previous years, it was coordinated on paper with different versions of the same data compiled into one large manual. ArcGIS Online offered solutions regarding data collection, coordination, and sharing. It also was a great conduit for "non GIS" users to access, edit, and share spatial data about the university. While using ArcGIS Online was supposed to be a pilot project for Commencement, we ended up utilizing the Apps we created to efficiently coordinate departments and standardize their data. Public and internal apps were created and used before and during the event. These apps also provided a more portable means of transporting and accessing the data. While there were cases of trial and error, we were able to provide Campus Police, Emergency Services, Parking and Transportation, and the Events Departments with data that was useful and necessary to all involved. The more people see what we can do, collect, and share, the more requests have been coming in for data collection, apps and online maps. It is great to see people get excited about data collection and being able to help a growing number of departments around campus.</p>	
<p><b>11:30 AM</b>  <b>GIS in the Field: Catch Basin to Pipeline Data Collection</b>  <i>David W. Pollock, SGC Engineering</i></p> <p>The collection of data in the field, both spatial and attribute, has come a long way from pen and paper. Today's state of the art data collection software enables an easier, more streamlined process, allowing it to be applied in more field situations than ever before. This presentation will take look at the use of Collector and ArcGIS Online/ArcGIS Server and its application on several distinctly different projects and uses to demonstrate its versatility in field. These projects span from the typical catch basin cleaning, to manhole and ditch inspections, to pipeline construction pipe tally/materials tracking. The visualization of the data collected using Operations Dashboards and Business Intelligence Tools will also be revealed for a couple of the projects. Another piece of the puzzle, the GPS/positional options, will be examined based on the varying requirements of each project. The lessons learned, including on the hardware used, will be shared in the hopes that both people thinking about getting started or those implementing similar solutions can take away something valuable.</p>	
TRACK: UAV	
MEETING ROOM: Nauset III	MODERATOR: Jed Fehrenbach
<p><b>10:30 AM</b>  <b>Considering a UAV - Now What?</b>  <i>Bill Timmins, GIS Services; Laura Ramage, LizardTech</i></p> <p>This presentation will discuss variety of UAVs and sensors as well as basics of site planning for data collection and access. Once collected the ability to share imagery by compressing it at a variety of ratios for ease will be addressed. This presentation will briefly review these concerns leaving time at the end for discussion and questions.</p>	
<p><b>11:00 AM</b>  <b>Best Practices for UAS Operations</b>  <i>Matthew Mitchell and Tayler Engler, The University of Vermont</i></p> <p>Learn tips and tricks on conducting safe and effective UAS operations in support of GIS-based mapping.</p>	
<p><b>11:30 AM</b>  <b>Supercharging Your GIS with Unmanned Aerial Systems</b>  <i>Jarlath O'Neil-Dunne, Tayler Engel, Noah Ahles, Sean MacFaden* – University of Vermont Spatial Analysis Laboratory</i></p> <p>Up-to-date imagery, high-resolution terrain models, precision base maps - this presentation will highlight the many ways in which Unmanned Aerial Systems (UAS) can supercharge your GIS with better, more accurate, and current data. Drawing from a broad range of natural resources, transportation, and urban planning case studies, we will show how UAS platforms provide near-immediate, GIS-ready products for mapping and analysis, and we will also discuss the field and data-processing workflows needed to capture high-quality, actionable information.</p>	

## 10:30 AM - 12:00 PM CONTINUED

### TRACK: Apps

MEETING ROOM: Nauset IV

MODERATOR: Pam Brangan

#### 10:30 AM

##### **You Are Here: Developing a Mobile Map for the Sebago Lake Land Reserve**

*G. Andrew Smith-Petersen, Laurel Jackson, Keith M. Crogan – Portland Water District*

The 1,700 acre Sebago Lake Land Reserve is a managed forest intended to protect Sebago Lake, the water source for 200,000 people in greater Portland. The Reserve, which is open to the public, features over 13 miles of trails and kiosks at 12 points of entry. The majority of these are found at one central 500 acre parcel, but several other smaller parcels and trail systems exist, making the upkeep of paper-based maps a challenge. Our staff envisioned a system whereby visitors could scan a QR code on their mobile device at any kiosk to see a map depicting their location. We wanted a solution that was low cost, easy to distribute, GPS-enabled, and with the ability to overlay our own data. We looked at a couple of options and settled on CarryMap, an ArcMap add-in that produces an offline iOS or Android map from a working ArcMap document. We will share the pros and cons we found in various solutions, as well as lessons learned in the process of producing the mobile map and distributing it to the public.

#### 11:00 AM

##### **Building the Connecticut Rail Trail Explorer Web Application**

*Sam Berg, VHB*

For the Connecticut Department of Energy & Environmental Protection (DEEP), VHB designed and built a modern web mapping application to serve as an improved hub of information about State Park trails throughout the state. Visitors to the Connecticut Rail Trail Explorer are able to search for and interact with detailed maps and descriptions of the trails, lookup contact information, find parking locations, and generate turn by turn driving directions to the many access points along the trails. During this talk, we will demonstrate the application and discuss how the ArcGIS API for JavaScript and the Web Application Builder framework from esri were used to develop the site.

#### 11:30 AM

##### **The Town of Winchester, Connecticut's Parcel Mapping Solution**

*Steven Sadlowski, Town of Winchester; Randy Trott, Timmons Group*

The Town of Winchester recently partnered with Timmons Group firm for the development of a high quality digital parcel database and an on-line GIS tool accessible through their website. Tasks associated with this effort include the completion of the Town's GIS parcel layer and then create an on-line accessible GIS application that can be utilized by Town staff, residents, developers and other professionals. The Town's Online solution was developed using HTML5/Javascript and was specifically architected using responsive design methodologies. The resulting portal enables both internal and external users of the system the ability to access mapping and assessment information on a wide variety of devices and platforms. This presentation provides a mid-level technical overview of the project efforts, including the use of Esri Desktop technologies such as Data Reviewer and Data Driven Pages, as well as ArcGIS Server Technologies.

### TRACK: Coastal Resilience

MEETING ROOM: Nauset V

MODERATOR: Pete Steeves

#### 10:30 AM

##### **Using Transportation Networks to Inform Valuation of Water Quality Changes for Saltwater Recreation on Cape Cod, MA**

*Justin Bousquin, US EPA/ORISE; Nate Merrill, US EPA; Marisa Mazzotta, US EPA*

Estimating the non-market value of beaches for saltwater recreation is complex. An individual's preference for a beach depends on beach characteristics and perception. When choosing one beach over another, an individual balances these personal preferences with any additional costs, in travel time and/or fees to access the beach. This trade-off can be used to infer how people value different beach characteristics and evaluate changes in beach characteristics, such as water quality. Especially when beaches are free to the public, beach value estimates rely heavily on accurate travel times.

Our goal is to evaluate the benefits of different levels of water quality improvements to saltwater recreation on Cape Cod. Observed visitation data and beach characteristics will be used to construct a model for how much people prefer different beach characteristics, including water quality and travel time. On Cape Cod, saltwater beach recreation participants include both local residents and those making seasonal day trips from other parts of the region, making the scale of analysis large and transportation congestion significant. We will describe several of the transportation networks and route services available and compare a few based on their ability to meet our specific requirements of scale and seasonal travel time accuracy.

#### 11:00 AM

##### **Ocean Use Mapping in the Northeast**

*Nick Napoli, NROC; Jenna Ducharme\*, RPS ASA; Rachel Schmookler, RPS ASA; Kelly Knee, RPS ASA; Emily Shumchenia, NROC; Kate Longley-Wood, SeaPlan*

The Northeast Ocean Data Portal is an online data and information system developed by a consortium of private, nonprofit, and governmental organizations to support ocean planning in New England. The portal provides access to Cloud-based data products and interactive web maps that characterize marine resources and the use of ocean space, while also harnessing and providing access to a range of ocean management and planning resources within and outside of the region. Recently, the Portal has undergone a number of updates to habitat, marine life, economic, and national security data, in conjunction with the draft Northeast Ocean Plan, and has undergone a public comment period. This presentation will discuss the latest additions to the Portal and the culmination of this collaborative 5 year regional ocean planning effort.

## 10:30 AM - 12:00 PM CONTINUED

**11:30 AM**

### **NHD Stewardship in Maine: Focus on the Coast and Estuaries**

*Becky Schaffner, Maine Department of Environmental Protection; Vicki Schmidt, Maine Department of Environmental Protection; Anji Auger, MEGIS*

The NHD Stewardship process in Maine is active and ongoing. The standard editing process prioritizes coastal and urbanized areas where many anthropogenic changes to hydrology have occurred. These changes include development-related modifications such as channelization and diversion of waterways, construction of retention basins and reservoirs, and dam construction and removal. Additional feature edits are driven by the need to correct errors (e.g. missing and mislocated streams) observed during field data collection and monitoring efforts. Layers and methods used to update and correct NHD features include high resolution LiDAR elevation data, high resolution imagery (NAIP, Google Earth), Esri ArcGIS Hydrology Tools, and the TauDEM (Terrain Analysis Using Digital Elevation Models) hydrology tools. In addition to the standard editing process, a special project was undertaken to add and update statewide estuary features. Refining estuarine waters in the NHD was particularly important because state regulations such as Shoreland Zoning are based on the location and status of such waters. More accurate delineations increase the likelihood that such rules fulfill their purpose, without imposing undue burdens on property owners. The location and extent of estuary features was determined based on the best available state-wide salinity, head-of-tide, and habitat datasets.

### **TRACK: Esri ArcGIS Online**

MEETING ROOM: Seacrest Ballroom I

**10:30 AM**

### **Introduction to Vector Tiles**

*Alex Brown, Esri Philadelphia*

Esri now offers new Vector Tile Layers! With these vector basemaps, you are able to turn on and off layers, change symbology, and even update boundaries and label. The session will provide an overview of vector tile mapping, demonstrate how to create vector tiles using ArcGIS Pro and how you can change your map through vector tiling styling.

**11:00 AM**

### **ArcGIS Smart Mapping Tools**

*Tom Schwartzman, Esri Boston*

Making visually beautiful and meaningful maps should be within everyone's reach - and Esri's Smart Mapping capability does just that. New mapping and cartography workflows in ArcGIS Online automatically analyze your data and suggest the best way to represent it, taking some of the guesswork out of setting up your map. Additionally, new rendering capabilities and styles allow you to go beyond the basics and design maps that bring your data to life.

**11:30 AM**

### **Story Maps: Telling Your Story with ArcGIS**

*Lauri Dafner, Esri Philadelphia*

Everyone has a story to tell. Or, more likely, you have many stories to tell! Esri Story Maps have been a hugely popular way to put maps, images, videos and other media into an interactive web application that brings attention to a particular topic. But, like other GIS projects, the management of the content and story maps that you create can be a challenge. That's where My Stories comes in. With error checks, sharing tools and more, My Stories is a one-stop place to view, manage and create your story maps.



## MONDAY 1:30 PM - 3:00 PM

### TRACK: Emerging Technologies

MEETING ROOM: Racepoint

MODERATOR: Pam Brangan

#### 1:30 PM

##### Data Management Through ArcGIS Online

*Michael McGill, Quinn Molloy - MassDOT GIS Services*

MassDOT's GIS Services has been working to expand service and functionality of GeoDOT and GeoDOT for MPOs, the Massachusetts Department of Transportation official ArcGIS Online enterprise portals for GIS data sharing in the Commonwealth. GeoDOT has been identified as a successful tool to enhance GIS collaboration within and between state agencies and other stakeholders, and GeoDOT for MPOs has increased the quality of expert data creation by knowledgeable regional entities. Using these new technologies, the MassDOT Road Inventory has moved from traditional maintenance through interpretation of physical documents, to a versioned, dynamic, web-based platform. MassDOT hopes that in sharing this information with a wider professional group, we will be able to foster interest in relevant parties, and create better, more accurate state transportation spatial products.

#### 2:00 PM

##### Delivering Maps and Data from the Cloud: MassGIS and ArcGIS Online

*Michael Trust, MassGIS - Commonwealth of Massachusetts MassIT*

MassGIS has been using ArcGIS online (AGOL) extensively to support web mapping application, development, and ideas. Using the cloud, MassGIS is able to deliver datalayers and orthoimagery tile caches as web services to its users. Now, users do not need to have their own copy of the data; rather, they can simply add it to their map project as a MassGIS provided map service. In addition to providing an important platform to deliver data, maps and online applications to the public, AGOL has served as a primary tool to respond to the many requests from state agencies asking to depict a specific story through a simple interactive web map. This presentation will provide an overview of MassGIS' work with AGOL; it will also detail how MassGIS creates and publishes tile caches for orthoimagery, parcels and base maps, and leverages its own ArcGIS Server implementation in conjunction with the cloud.

#### 2:30 PM

##### Peterborough's (NH) ArcGIS Online Implementation: Small Towns Can Do It

*Fash Farashahi, Town of Peterborough (NH); Ray Corson, CorsonGIS Solutions*

Over the last 16 years, Peterborough NH (pop. 6300) has built one of NH's most comprehensive GIS system. Originally, most of this data was only available to a limited audience using Desktop and ArcGIS Server Intranet sites. This presentation will describe how Peterborough utilizes ArcGIS Online combined with custom applications built utilizing the ArcGIS API for JavaScript to rapidly deploy desktop and mobile solutions both to field staff and the general public.

### TRACK: Municipal 1

MEETING ROOM: Nauset I

MODERATOR: Amy Haas

#### 1:30 PM

##### Implementing the Parcel Fabric for Connecticut's Public Use & Benefits Land Registry

*Keene Morrow\*, Andrew Kinlock\*, Beth Doran, Brian Florek - CT DEEP*

The Parcel Fabric is a continuous surface of connected parcels capable of managing control points, COGO dimensions, and their linked boundaries stored in a GIS. The Connecticut Department of Energy and Environmental Protection (CT DEEP), in the fulfillment of Public Act No. 14-169, is using the Parcel Fabric to establish a public use and benefit land registry capable of providing deeds, easements, land surveys, maps, location, ownership, and management plans for each parcel owned by CT DEEP, other state agencies, and land conservation organizations. This talk will cover the technical challenges, steps of implementation, established benefits of using the fabric, and the future of CT DEEP's Public Use & Benefits Land Registry.

#### 2:00 PM

##### Integrating GIS with County Clerk/Register Documents: The Ultimate Frontier

*Alfredo Frauenfelder, Xerox*

Advances in technology now provide the ability of interfacing Document Management Systems with GIS. In the past these documents had to be linked to the corresponding geographic feature by way of a property identifier. For that reason, the integration of County Clerk/Register documents was particularly difficult to integrate with GIS. With the increasing capabilities of Optical Character Recognition and Web Browser-based technology, it is now possible to integrate land records, such as deeds and mortgages with GIS technology. This talk will illustrate these concepts through live demonstrations and actual case studies. An amazing demonstration of powerful technology solutions, including OCR, internet search engines, and live integration of multiple systems.

#### 2:30 PM

##### The ArcGIS Parcel Fabric, Deconstructed: What, How, Why

*Thad J. Dymkowski, GISP, Prime 3SG*

The parcel fabric was introduced by Esri in ArcGIS 10. It has been adopted by many municipalities for improving, enforcing, and maintaining an increased level of spatial accuracy in their land records data. Despite the benefits, there are still many who are slow to adopt or hesitate implementing because of the perceived complexity of the process and supporting maintenance. This presentation will provide information to demystify the parcel fabric and all the moving parts and pieces involved.

## 1:30 PM - 3:00 PM CONTINUED

### TRACK: Mobile (ADA)

MEETING ROOM: Nauset II

MODERATOR: Feng Yang

#### 1:30 PM

##### **Building Mapping Applications for Accessibility**

*Michael Funaro, Latitude Geographics Group Ltd.*

With recent advancements in technology, opportunities for communicating with the public have grown exponentially to include social media, mixed media, and many other forms of content... including maps and mapping applications. These expansions in technology hold the promise of increased participation for all, but present challenges for the full inclusion of persons with disabilities. Mapping applications have escaped the use of web accessibility guidelines for years under the pretense that it is just too difficult to do. Not anymore! We will explore the World Wide Web Consortium (W3C) recommendations for Web Content Accessibility Guidelines (WCAG 2.0) as well as Federal Guidelines and show you how we've built our apps to be compliant. With the rest of the internet meeting stringent guidelines for accessibility, your apps should be no different. Be legally compliant and impress your cities and towns, employees and the public with incredibly powerful tools for people with disabilities - with the click of a button.

#### 2:00 PM

##### **GIS and Mobile Technologies for Assessing ADA Compliance**

*Matt von Wahlde, Geonetics, Inc.*

GIS and mobile technologies play an important role in the collection, analysis, and remediation of assets governed by the Americans with Disabilities Act (ADA). Field inventory and auditing of assets such as facilities and public transportation infrastructure are a natural fit for mapping tools. Determining accurate locations of assets such as bus stops, curb ramps, signs and signals, and features internal to buildings is especially important first step in a developing a comprehensive GIS-driven data management system. GIS analysis using social factors and other location-based data is critical in assessing issues such as path of travel and developing location based prioritization metrics. This presentation will focus on real-world application of GIS and related data management technologies relevant to ADA assessment. This product-neutral presentation will discuss technologies and approaches from a lessons-learned perspective. It is intended to help accessibility stakeholders make informed geospatial data management decisions when for their data management initiatives.

#### 2:30 PM

##### **Conditional Assessment of an Historic Resource - Fort Warren, Georges Island Boston Harbor**

*Daniel J. Boudreau, Jr, GISP, GZA GeoEnvironmental, Inc.*

In 2016 GZA GeoEnvironmental, Inc. was engaged by MA DCR to conduct a detailed assessment of conditions of Fort Warren and related site features on Georges Island in Boston Harbor, Massachusetts. GZA's scope of work included a review of the significant history of Georges Island and Fort Warren, a review of similar Third System forts, an assessment of the Site for safety and structural concerns, observation and documentation of general conditions of the Site, consideration for potential window closure options, observation of code and Americans with Disabilities Act (ADA) compliance issues, and recommendations to address items observed during field activities. GZA documented field observations in a geospatial database, using mobile GIS, to provide a viable and useful way to sort and view the observations. This database is to be utilized by the DCR as an asset management tool in the future as a way to document changes in conditions, repairs, and operational/seasonal needs and is accessible via a web application from desktop and mobile devices.

### TRACK: UAV

MEETING ROOM: Nauset III

MODERATOR: Jamie Gaynor, Terracon

#### 1:30 PM – 3:00 PM PANEL PRESENTATION

##### **Commercial UAS Applications and Regulatory Update**

*Jason Wise, Terracon; Jon Budreski, AirShark; Chris Poreda, Poreda Aviation Law; Tayler Engel, UVM Spatial Analysis Laboratory*

Rapid advancements in drone technology enable us to collect accurate and timely data for nearly limitless commercial applications in the engineering and consulting industry. New rules, which took effect in late August, provide the necessary framework to safely integrate this technology into the national airspace. Until now commercial use has been authorized on a case-by-case basis under a Section 333 Exemption. This program will examine the regulatory requirements of Part 107 and Section 333, and discuss innovative applications of UAS technology in the geospatial industry.

## 1:30 PM - 3:00 PM CONTINUED

### TRACK: Apps

MEETING ROOM: Nauset IV

MODERATOR: Anne Reynolds

#### 1:30 PM

#### **(not) Implementing an ArcGIS for Local Government Solution: Election Polling Places Application**

*Claire W. Brill, GISP, City of Worcester, MA*

Esri is offering more and more applications to leverage your GIS data and ArcGIS Server or ArcGIS Online infrastructure. Using a free application seems like a good starting point to deliver interactive access to GIS data on the City of Worcester website. The Election Polling Places application, one of the ArcGIS for Local Government solutions, would take advantage of existing, well-maintained data. Plus, it is a timely need during this presidential election cycle. With the help of a capable intern, the app is configured and ready to go. So why didn't it launch? What did I learn in the process? Would I work with another Local Government solution in the future? Join me for an overview of the project and answers to these questions.

#### 2:00 PM

#### **A Comparison of Open Source Viewers for ArcGIS Server**

*Joseph Doherty, Microdesk*

The ArcGIS API for JavaScript provides an extensive collection of tools, widgets, and code samples. Putting together a cohesive application may require a significant level of effort to coordinate a combination of technology options that create a useful suite of GIS tools for the end users. Fortunately there are open source projects that can be implemented which will streamline the effort while providing a rich set of features through configurable mechanisms. The General Purpose Viewer (GPV) and the Configurable Map Viewer (CMV) open source frameworks will be explored and compared. The results of this effort will be presented to the audience.

#### 2:30 PM

#### **Developing Our Own Cool, Cheap, and Easy Mapping Tool**

*David Dickson\*, Cary Chadwick\*, University of Connecticut Center for Land Use Education and Research (CLEAR)*

Almost exactly a year ago, educators from the University of Connecticut shared three "cool, cheap and easy" smartphone mapping apps at NEARC. The ultimate goal of using these apps was to allow budget-conscious organizations to collect spatially referenced field data, notes, photographs and forms and maintain and publish these data in the cloud. The path to get there required at least two different apps. In an effort to emphasize the "easy" part, UConn's Center for Land Use Education and Research (CLEAR) set out to develop (with the help of savvy computer science students) our own field data collection app. The result is TractNotes, an app for Android devices (and hopefully iOS soon) that simplifies data collection and eliminates the need for clunky GPS receivers, clipboards, cameras, pencils, backpacks, audio recorders, compasses, a degree in GIS or deep pockets. This presentation will showcase the TractNotes app, the journey it took to develop it, and how we envision it being used for a wide variety of field data collection needs on a budget.

### TRACK: Coastal Resilience

MEETING ROOM: Nauset V

MODERATOR: Justin Bousquin

#### 1:30 PM

#### **Collaboration and Customizing a Story Map Journal: Southern Connecticut Regional Framework for Coastal Resilience**

*Mark Hoover\*, Connecticut Metropolitan Council of Governments; Kevin Deneault\*, The Nature Conservancy; Matt Fulda, Connecticut Metropolitan Council of Governments; Adam W. Whelchel, The Nature Conservancy; Mark Goetz, Connecticut Metropolitan Council of Governments*

The story map journal provides the ideal platform to combine project processes and final results in a useable and useful format for the public. In this presentation, we will discuss how we customized the story map journal to publicize and summarize a unique and critical coastal resilience project in Connecticut. Topics include using Bootstrap to implement grids, clever ways to use images in the 'Swipe' app, as well as ways to work across organizations to collaborate on an application. We will also discuss how all levels of government, as well as other institutions, came together to establish a Regional Framework for Coastal Resilience in Southern Connecticut. The project was driven by two COG's - South Central Regional Council of Governments (SCRCOG) and Connecticut Metropolitan Council of Governments (METROCOG) in partnership with The Nature Conservancy and ten municipalities alongside supporting NGOs, state and federal agencies, academic institutions, youth engagement organizations, businesses, and civic groups. The main objective of this project was to comprehensively assess, prioritize and advance resilience opportunities to simultaneously reduce risk at local and regional scale. Key successes included the integration of natural/green infrastructure concepts, principles, and priority projects into core hazard mitigation, comprehensive planning and capital expenditure efforts.

## 1:30 PM - 3:00 PM CONTINUED

<p><b>2:00 PM</b>  <b>The Regional Resilience Projects App: Using Technology to Build Community Resilience</b>  <i>Kevin Deneault, Adam W. Whelchel – The Nature Conservancy</i></p> <p>In 2014, The Nature Conservancy's Connecticut Coastal Resilience team successfully secured a large "Sandy" grant to advance a "never before tried" approach for resilience in Connecticut. This team has been advancing a community resilience building project with two core partners – Connecticut Metropolitan Council of Governments and the South Central Regional Council of Governments. Development of a geospatial database, containing 326 green/natural infrastructure projects, identified through field reconnaissance along Connecticut's coast and associated watersheds, was a central task for the partnership. This "Southern Connecticut Regional Framework for Coastal Resilience" project was funded through the Hurricane Sandy Coastal Resiliency Competitive Grants Program as part of the Department of Interior Sandy Grant. Overall, this project will help to advance "smart" investments in proactive risk assessment, community engagement, and green infrastructure projects. This will help reduce the consequences of large-scale storms and sea level rise, while strengthening the resilience of existing and future natural ecosystems. The project area includes 10 municipalities from Fairfield to Madison, encompassing the two largest population centers in Connecticut (Bridgeport and New Haven). As part of the overall project, the geospatial database has been converted into an interactive web application called the "Regional Resilience Projects App".</p>
<p><b>2:30 PM</b>  <b>Building Coastal Resilience on Cape Cod Through Innovative Tool Development</b>  <i>Cally Harper, PhD, CFM, Cape Cod Commission</i></p> <p>Being resilient requires taking a look back at past damages from hazard events and reviewing models of future climate scenarios. Individuals, governments, institutions and businesses can only change if they have a clear path forward. In this session, the speaker will describe collaborative approaches being used to increase Cape Cod's resilience to severe storms and climate change impacts. Collaborative efforts involving multiple partners include hazard mitigation planning, vulnerability assessments of transportation assets using an online Sea Level Rise Viewer, and a 3-year grant from the National Oceanic and Atmospheric Administration (NOAA) to build GIS-based resiliency strategies for municipal officials and the general public. Mapping tools developed by the Cape Cod Commission are used to translate technical data into understandable and actionable language, estimate loss of individual and government assets, communicate adaptation strategies, assess people's willingness to pay, communicate the need for action, and engage the public in selecting and implementing site-specific strategies.</p>

### TRACK: Esri ArcGIS Pro

MEETING ROOM: Seacrest Ballroom I

<p><b>1:30 PM</b>  <b>ArcGIS Pro: Foundation Workflows</b>  <i>Patrick Gahagan, Esri New York City</i></p> <p>ArcGIS Pro is the premier professional desktop GIS application from Esri. With ArcGIS Pro, you can visualize, edit, and analyze your geographic data in both 2D and 3D. After you create projects, maps, layers, tools, and more, ArcGIS Pro has several options for sharing your work with others. ArcGIS Pro is a 64-bit application, using a faster graphics library, and a ribbon-based toolbar, it provides a framework for the next generation of ArcGIS for Desktop.</p>
<p><b>2:00 PM</b>  <b>ArcGIS Pro and ArcGIS Online</b>  <i>Patrick Gahagan, Esri New York City</i></p> <p>ArcGIS Pro is seamlessly integrated with ArcGIS Online. See how it can be used to publish web maps, and feature layers as 2D services, or web scenes, and scene layers as 3D services. Attend this technical session to see how easy it is to publish content from ArcGIS Pro.</p>
<p><b>2:30 PM</b>  <b>Getting Started with ArcGIS Pro Tasks</b>  <i>Mark Scott, Esri Boston</i></p> <p>Learn how to use Tasks in ArcGIS Pro to chain together steps into a packaged workflow. They can then be used as a tool to maintain a standard workflow, streamline common sets of activities, or help a user new to learn a new pattern.</p>

## TUESDAY 10:30 AM - 12:00 PM

### TRACK: 3D

MEETING ROOM: Racepoint

MODERATOR: Patrick Cunningham

#### 10:30 AM – 12:00 PM WORKSHOP

##### Extracting 3D Features from Publicly Available LiDAR Data

*Patrick Cunningham, Blue Marble Geographics; David McKittrick, Blue Marble Geographics*

As LiDAR data permeates the mainstream, its use and utility is becoming much more widespread and diverse. As a spatial commodity, LiDAR is the raw material from which a wide variety of 3D datasets are generated. Using a series of customizable algorithms applied to the geometric structure and other attributes of the point cloud, buildings, vegetation, utility cables, and other features can be effectively identified, classified, and ultimately extracted into vector models of the features they represent. Subsequently ground points can be isolated and gridded to form an accurate terrain model as the basis for precise volumetric calculation, terrain analysis, and change detection. In this workshop, we explore the workflow whereby features are identified and extracted from publicly available data. We walk through the procedures for point cloud filtering and noise removal; identification and automatic reclassification of ground points; 3D building model creation; height calculation of forest canopy and individual trees, and delineation of above-ground utility cables. We will also demonstrate the workflow for manually digitizing identifiable objects in a 3D environment.

### TRACK: Asset Management

MEETING ROOM: Nauset II

MODERATOR: Darren Mackiewicz

#### 10:30 AM

##### Facilities Capital Planning Using GIS at the City of Philadelphia

*Stuart Rich, PenBay Solutions*

Large organizations like the City of Philadelphia have many departments with large facilities portfolios to manage. Each of these departments may have their own systems to track facilities operations and maintenance expenses. Each also has their own facilities-related capital investment needs. The City of Philadelphia is using GIS to harvest facilities data from a wide variety of different systems and organize them using location as the organizing principle. Using this approach, the Mayor's office can make better informed facilities capital investment decisions across the entire city portfolio rather than on a department by department basis. Stu Rich will discuss the value that the City has received from this approach along with some of the challenges encountered along the way. Stuart is the Chief Technology Officer of PenBay Solutions with more than 15 years experience developing innovative geographic information systems and custom IT applications for government and non-government environmental organizations across the US and the world. He has worked extensively in the area of bringing GIS indoors including leading information modeling work and software solution design.. Stu leads the technology team responsible for bringing PenBay's InVision product suite to life.

#### 11:00 AM

##### A Risk Based Approach for Optimizing Water System Pipeline Renewel

*Mark Zito and James Carolan, CDM Smith*

Prioritizing replacement of water mains can be a challenge, especially in New England with water mains dating back to the late 1800's. Past methods for prioritization typically involved a simplistic formula of counting past breaks and the age of the water main, however this method does not take into account many of factors that influence a water mains lifespan. The new method of prioritization takes into account the consequence and likelihood failure. These are then combined to establish a risk score for each individual asset that is used to prioritize replacement. The likelihood of failure is established using the Linear Extended Yule Process (LEYP) statistical model to predict the number of failures within a specified time interval. The consequence of failure assesses the impact a failure may have on the ability to deliver water, disruption to the public, and damage to other assets. The Risk score is computed using a bi-direction matrix of the consequence and likelihood of failure values. The process utilizes a series of GIS-based tools to effectively manage and present the data in an understandable format. The tools are adaptable, repeatable and efficient for developing a comprehensive assessment of an entire water main system.

#### 11:30 AM

##### Web Based ArcGIS Solutions for Infrastructure Management

*Roy Apostle, StreetScan Inc; Salar Shahini Shamsabadi, StreetScan Inc*

The American Society of Civil Engineers estimates that by 2020 an investment of \$3.6 trillion is needed to maintain our nation's infrastructure in state of good repair. However, it is also estimated that there will be a funding gap of \$1.6 trillion (ASCE, 2013). To efficiently utilize limited funding, GIS web platforms allow cities and state agencies to better maintain and monitor the health of their infrastructure and assets. ArcGIS's web-based Flex interface can be used to create a customized web portal. This type of system, combined with recently collected infrastructure data, can utilize a suite of custom spatial analysis tools to better visualize data, develop statistics, and create data driven repair decisions to efficiently allocate funding. The City of Beverly employs such a web based application and has effectively used the GIS spatial analysis and visualization tools to maximize repair funding. The City also incorporates much of their own infrastructure and asset management data into the web portal to assist in the visualization of problem areas. Such real-world applications suggest that future expansion of web-based GIS platforms can increase the efficiency of repair decisions and methods which can have a significant impact on the health of the nation's infrastructure.

## 10:30 AM - 12:00 PM CONTINUED

TRACK: Municipal 2	
MEETING ROOM: Nauset I	MODERATOR: Claire Brill
<p><b>10:30 AM</b>  <b>ArcGIS in Support of Hydraulic Modeling Applications Including Municipal Dam Removals</b>  <i>Tim Sullivan, GISP, Gomez and Sullivan Engineers</i></p> <p>Rivers in the Northeast contain hundreds of aging dams which no longer serve their original purpose, are not up to design standards, and often need to be removed. Municipalities and industrial land owners across the Northeast have had to address the challenges of aging dams for decades and will continue to address them in the future. Gomez and Sullivan has conducted numerous dam removal feasibility studies and removals across the Northeast in response to these challenges. ArcGIS is an integral tool in supporting this process. This presentation will focus on how ArcGIS has been utilized in support of municipal dam removals in the Northeast. Discussion will focus on field data collection including bathymetric and site surveys which utilize various GPS and mobile GIS technologies; post processing of bathymetry data and development of terrains using ArcMap and ArcScene; and development of a hydraulic model using HEC-GeoRAS, an ArcGIS extension. Once developed, the hydraulic model is used for a variety of purposes ranging from examination of the existing hydraulic conditions (dam in place) to examination of the anticipated future hydraulic conditions (dam removed). Examples of other ArcGIS and hydraulic modeling applications will also be provided including fish passage and other environmental studies.</p>	
<p><b>11:00 AM</b>  <b>Topo-bathy LiDAR: The Who, What, Where, When, Why and How</b>  <i>Drew Meren, GISP, Quantum Spatial</i></p> <p>Airborne Topo-bathy LiDAR has become more widely used in recent years to assist in the management of water (coastal and river) projects either for maintenance, like floodplain mapping, or incident response, like in the wake of Hurricane Sandy. We will discuss what Topo-Bathy is, how it is acquired, and what dataset can be generated to assist your municipality.</p>	
<p><b>11:30 AM</b>  <b>City of Hartford - Document Scanning Project</b>  <i>Brett Flodine, City of Hartford</i></p> <p>In the fall of 2011 the City of Hartford went out to bid for a large document scanning project. The project covered plans and documents created between 1894 – Current that are stored in various locations in the City. The documents to be scanned included: Permits, Housing Code Violations, Building Code Violations, Planning/Zoning Documents, and small/large format Architectural drawings. The project was funded in 2013 as a four year project and it is currently ongoing. This presentation will cover the project setup, indexing, storage/backup, and document retention/archiving.</p>	

TRACK: Regional Data Collection/LIDAR	
MEETING ROOM: Nauset III	MODERATOR: Brett Horr
<p><b>10:30 AM</b>  <b>MassOrtho: Lessons Learned and Other Interesting Musings from the Tale of a Regional Ortho Project. Please Come and Learn from This!</b>  <i>Adam Kurowski, Town of Arlington, MA</i></p> <p>The Massachusetts Orthoimagery Consortium was well intentioned and had the support of 60 communities in Massachusetts, with collaborations from state and regional entities. The magnitude of the project area and potential to create a lasting initiative was impressive. This thing had legs! Little did we realize the perfect storm was brewing. Come find out what happened next and help us find the silver lining by learning from this experience. You'll laugh, you'll cry, you'll learn lessons that can be applied to most project management scenarios.</p>	
<p><b>11:00 AM</b>  <b>Combining Multiple Technologies to Make Statewide, Geospatial Information Available</b>  <i>Emily Wilson, Cary Chadwick – University of Connecticut</i></p> <p>What do you get when you combine shiny, new servers with new and enhanced web apps, maps, services, loads of imagery, Lidar, vector layers and an attractive website? The new Connecticut Environmental Conditions Online (CT ECO)! The University of Connecticut Center for Land Use Education and Research (CLEAR) and the Connecticut Department of Energy and Environmental Protection (DEEP) have updated the CT ECO website from the front end to the back end. CT ECO is a website designed to make Connecticut's geospatial information available to a wide range of users. Come hear about the improvements and how the pieces are being integrated to create a satisfying user experience for newbies and professionals alike.</p>	
<p><b>11:30 AM</b>  <b>The Vermont Lidar Initiative: Acquiring, Sharing and Applying Lidar Data</b>  <i>Mike Brouillette, State of Vermont</i></p> <p>Five years after its humble beginnings in 2011, the Vermont Lidar Initiative (VTLI) has achieved full state lidar coverage (including both available and in-process data) with the help of various state and federal partners through the USGS Broad Agency Announcement grant under the 3D Elevation Program (3DEP). Once the current lidar "collection" is completed in 2017, Vermont will have 80% of its land area covered by Quality Level 2 (QL2) data and the remainder at the QL3 level. While data collection efforts will be ongoing to maintain the "QL2 coverage every 8 years" recommended by the 2012 National Enhanced Elevation Assessment, the VTLI's primary focus is evolving to embrace a wider range of data dissemination strategies that best serve myriad applications across a broad range of users. In addition to a brief overview of data acquisition and how the dissemination options evolved from data product and file download to the advantages of our new web services, use cases will also be highlighted. The VTLI is managed by the Vermont Center for Geographic Information (VCGI), formerly a public non-profit and now a Division of the State Agency of Commerce and Community Development (ACCD).</p>	

## 10:30 AM - 12:00 PM CONTINUED

### TRACK: Emerging Technologies 2

MEETING ROOM: Nauset IV

MODERATOR: Sean Sweeney

**10:30 AM**

#### **Pictometry Integrations with Esri**

*Jon Langstaff, Pictometry*

Pictometry provides numerous integration possibilities to streamline workflow for GIS professionals. In this talk we will review: 1) Pictometry ArcGIS Desktop toolbar - allowing for retrieval, display and analysis of a Pictometry-captured oblique or orthogonal image from a desired location. 2) ArcGIS uploader for Connect - allowing Pictometry users to upload GIS data directly to their Pictometry CONNECT cloud-based viewer directly from an MXD, therefore maintaining symbology. 3) We will also review the recently released Pictometry for ESRI Web AppBuilder integration.

**11:00 AM**

#### **Big Data Is the Answer... What Is the Question?**

*Steve Anderson, VHB*

"Big Data" is a generic phrase that is often used to describe what people are doing with extremely large amounts of data, but the concepts behind it are not often understood. This presentation will provide an overview about Big Data and answer a number of questions including: What is Big Data? How does Big Data work? What is being done with Big Data and how is it different from traditional data and approaches to solving problems. It will also cover some of the latest advances in Esri technology that will make it easier for us to work with Big Data.

**11:30 AM**

#### **Implementing ArcGIS Open Data in Rhode Island**

*Erica Tefft, Greg Bonyng - University of Rhode Island Environmental Data Center; Peter August, University of Rhode Island Department of Natural Resources Science*

This presentation will offer a road map for implementing a new ArcGIS Open Data website. The University of Rhode Island Environmental Data Center is developing an ArcGIS Open Data website on behalf of the Rhode Island GIS (RIGIS) consortium, building upon the consortium's adoption of an open data distribution policy in 2014. Although the standard RIGIS data distribution website will live on, we believe that an ArcGIS Open Data site will further expand the RIGIS user base and be more inclusive of prospective users and developers who do not necessarily work with Esri software and data formats. During this presentation I will focus on the process of getting an ArcGIS Open Data site up and running. First, I will discuss data preparation – creating field aliases and removing empty or sparsely populated fields. Then I will discuss metadata preparation – ensuring metadata have been exported from ArcCatalog in the ArcGIS metadata format so that it can be imported to ArcGIS Online. Finally, I will discuss some of the logistics of creating an ArcGIS Open Data site, including creating and assigning groups, and uploading data to these specially designated groups.

### TRACK: Natural Resources

MEETING ROOM: Nauset V

MODERATOR: Sharon Benjamin

**10:30 AM**

#### **Unmanned Aircraft System Use [Drones] for Natural Resource Research and Management in the National Estuarine Research Reserve System**

*Susan Bickford, Wells National Estuarine Research Reserve*

The use of Unmanned Aircraft Systems (UAS) within the National Air Space is fraught with controversy including safety and privacy concerns and complex regulatory rulemaking. But the social and ecological benefits of their use are enormous, from disaster response and search and rescue missions to wildlife surveys and shoreline erosion studies. The twenty-eight Reserves that comprise the National Estuarine Research Reserve System have been struggling individually with the issue of UAS missions for several years. This year, a UAS Roadmap was published as a resource for all of the Reserves and their partners. This Roadmap explains this complex situation clearly and concisely and provides resources that enable each Reserve to progress at their own pace with developing UAS projects. Proof of concept projects that focus on precision and accuracy of the resulting products are scheduled to occur at five Reserves within the next year. This will also enable clear procedures and protocols to be established that will ensure safety and privacy considerations and adherence to current regulations are built into mission planning at all levels. This talk will give an overview of the current UAS situation and showcase its use in fulfilling Reserve missions across the United States.

**11:00 AM**

#### **Assessing the Impact of Climate Change on the New England Winter Sport Industry**

*William Hansen, Worcester State University*

The winter sport industry is an important part of the New England economy as well as an integral component of the New England psyche. The impacts of climate change has caused great uncertainty in the industry and will require economic and technologic innovations to deal with the fluctuations in the length of the winter season, temperature variation and snow pack fluctuation. To examine in detail the continuing changes at the largest ski resort in Massachusetts, the Earth Science program at Worcester State has entered into a cooperative monitoring and assessment program with Wachusett Mountain ski resort and the Mass Department of Environmental Conservation. Continuous monitoring weather stations and soil probes will be installed on Mount Wachusett and vegetation and small mammal surveys will be conducted to examine the environmental and physical changes that have occurred and will occur.

## 10:30 AM - 12:00 PM CONTINUED

**11:30 AM**

### **Mapping Across the Divide – Creating a Seamless Coastal Zone Soil Survey**

*Maggie K. Payne, USDA NRCS; Jim Turenne, USDA NRCS*

Current and accurate maps are an important tool for making use and management decisions regarding land and water resources. With ongoing concerns of sea level rise and coastal change, accurate information about the structure of the coastal upland and nearshore subaqueous environments is an important tool in planning for the future of these areas. The National Cooperative Soil Survey has is responsible for documenting the nation's soil resources to be used in making land use interpretations. In recent years, the need for coastal resource assessments has led the soil survey to update the mapping in certain areas to include more detailed information on the soils of coastal uplands, salt marshes, and subaqueous soils beneath shallow water (generally < 5 m). Seamless maps of the coastal and shallow subtidal soil types have been created and interpretations are in development including flooding hazard, dredge disposal concerns, mooring field construction, shellfish habitat suitability, and eelgrass replanting suitability. Methods for mapping these soils include use of LIDAR and bathymetric data as well as a significant element of field data collection and lab analysis.

## TRACK: Esri ArcGIS Apps

MEETING ROOM: Seacrest Ballroom I

**10:30 AM**

### **Insights for ArcGIS**

*Lauri Dafner, Esri Philadelphia*

We all know that GIS allows us to learn more about where, why and how things happen - but we also know how challenging it can be to sort through a variety of large or complex datasets looking for that understanding. Insights for ArcGIS is a new application that will change the way you work with your data - it provides a new interactive analysis environment that puts the focus on the visual exploration of your data to gain better understanding - and insight.

**11:00 AM**

### **Drone2Map for ArcGIS: UAV Meets GIS**

*Tom Schwartzman, Esri Boston*

Drone technology is fundamentally changing long-held field work practices and business models, and enterprises are learning how to effectively leverage this emerging technology. With Drone2Map for ArcGIS, drones become more than just image capture devices – they are enterprise GIS productivity tools. During this session we will demonstrate how to create orthomosaics, point clouds and 3D meshes with Drone2Map for ArcGIS, and quickly share the results with your organization.

**11:30 AM**

### **Geoenabling Office Productivity Tools with ArcGIS Maps for Office**

*Tom Schwartzman, Esri Boston*

ArcGIS Maps for Office is an application integration that enables the use of Esri's Location Platform, ArcGIS with Microsoft Office. You can quickly create dynamic, interactive maps of your Excel data and start exploring your data in a whole new way. This workshop will demonstrate the value of the product using a number of use case scenarios as well as the key new features of the latest releases.



## TUESDAY 1:30 PM - 3:00 PM

### TRACK: 3D

MEETING ROOM: Racepoint

MODERATOR: Jed Fehrenbach

#### 1:30 PM

##### **Creating a 3D GIS Program in the City of Cambridge**

*Jeff Amero, City of Cambridge*

The City of Cambridge has been working on integrating 3D into the GIS workflow for the past several years. Many of the technical challenges of working with 3D maps have improved significantly as both GIS software and computer hardware have evolved. The Cambridge 3D project has focused on 3D data development, internal workflow within City departments, interactive mapping, and a 3D Web page with data download capabilities. The City now has a plan in place for data maintenance and for developing a 3D city map which will be integrated with 2D GIS and related tabular data. In this presentation we will look at all aspects of building a 3D model, collaborating with our Community Development Department, creating a workflow for both staff and the developer community, building a 3D program within the GIS framework, getting 3D out to the public, and the road ahead.

#### 2:00 PM

##### **3DEP - 3D Elevation Program**

*Dan Walters, US Geological Survey*

The primary goal of 3DEP is to systematically collect enhanced elevation data in the form of high-quality light detection and ranging (lidar) data over the conterminous United States, Hawaii, and the U.S. territories over an 8-year period. Interferometric synthetic aperture radar (IfSAR) data will be collected over Alaska. A 2015 USGS Broad Agency Announcement (BAA) established a competitive solicitation procedure for partnering with federal agencies for lidar acquisition. So far 3DEP has provided funds in partnership with 54 projects yielding over 200,000 sq. mi. of high-quality elevation products. This presentation will describe the program, review its impact on the northeast and highlight the tools used to make the program successful.

#### 2:30 PM

##### **Historical Data Visualization for Contaminated Sites - In 3D and Online**

*Kelsey Lanan, Katie Budreski, Dan Voisin, David Healy - Stone Environmental*

Data visualization is an indispensable tool for understanding the nature and extent of contamination at contaminated sites. Such sites, especially large and heavily contaminated areas like superfund sites, have often been studied for long periods of time, and have decades' worth of historical data for contaminant concentrations in soil, water, air, etc. Unfortunately, these data are often contained in myriad reports, maps, and files in various formats, from multiple labs and companies, and with varying degrees of legibility and data completeness. In addition, it is difficult to visualize years' worth of data (often hundreds of samples) on traditional static maps, especially when the contamination at many sites is a complex 3-dimensional problem involving geology, groundwater flow, multiple contaminants, and multiple sources of contamination. To solve all of these problems, Stone Environmental has developed a systematic way of compiling all historic data into a single comprehensive site database and visualizing that data in 3D models and with ArcGIS online. These tools allow us to visualize highly complex and detailed sites in intuitive and data-rich formats that are easier to use, share, understand, and present than traditional methods.

### TRACK: Asset Management

MEETING ROOM: Nauset II

MODERATOR: Stu Rich

#### 1:30 PM

##### **Mapping Boston's Fiber Assets**

*Amy Haas, VHB*

VHB was hired by The City of Boston to build an inventory of the shadow conduit and dark fiber resources at the City's disposal, included Boston Transportation Department collected assets that exist in the City of Boston. To integrate seamlessly with the City's existing infrastructure, ESRI's ArcGIS Platform was used throughout the development, creation and presentation of the product. Making the data available about the fiber assets will foster the first use and development of the assets that have been installed since 1998 for the City of Boston.

The project included: Retrieving 20+ year old source materials required to create the inventory; Building a flexible data model in ArcGIS Desktop to support the characteristics that need to be collected; Creating an inventory from documents provided by the city; and, Developing an ArcGIS Online application for retrieval and display of the collected data. The presentation will describe the project, discuss the benefits and advantages of the chosen approach and demonstrate the end product.

#### 2:00 PM

##### **Use GIS to Bootstrap and Enhance Your Asset Management Program**

*Dave Kealey, CDM Smith*

Asset management programs are becoming essential to how local government, public works, utilities, infrastructure and facilities organizations measure and monitor their operations while providing better service to their customers. These organizations are realizing their assets' locations are critical business information that can reveal the spatial context of their work and generate enhanced analysis and forecasting capabilities. GIS is great fit for the role of enabling location within asset management (AM), but there are many factors to consider when developing the GIS component. We will cover essential guidelines to planning for a GIS-based AM program, including: setting up a new GIS for AM, upgrading an existing GIS to conform with AM systems, bootstrapping a new asset inventory from GIS, and continuing to support legacy applications while moving forward into asset management. Finally, we will review key factors for success while looking at the geospatial intelligence and other benefits that can be unlocked from this methodology.

#### 2:30 PM

OPEN

## 1:30 PM - 3:00 PM CONTINUED

<b>TRACK: Municipal 2</b>	
MEETING ROOM: Nauset I	MODERATOR: Neil McGaffey
<p><b>1:30 PM</b>  <b>Building a Pedestrian Multimodal Network in the Greater Bridgeport Region</b>  <i>Mark Hoover, Mark Goetz, George Obeng – Connecticut Metropolitan Council of Governments</i></p> <p>As a transportation planning agency we are tasked with modeling the movement of people and goods in our region. The majority of this activity leverages road and rail networks to model movement, it does not adequately represent the choices pedestrians actually make when moving safely from place to place. When modeling pedestrian transit choices ¼ and ½ mile buffers from existing bus routes are used as surrogates to model walksheds and accessibility to transit. This crude approach often has confusing results. We decided to build a complete sidewalk network and incorporate it into our larger multimodal network. The sidewalk network was derived from planimetrics in a labor intensive process. This presentation will detail that process that resulted in a connected sidewalk network as well as a complete sidewalk inventory. The network was designed to model use by pedestrians as well as individuals with disabilities. FHWA travel speeds were utilized as well as weighted travel times to cross streets. Individuals with various disabilities are restricted from traveling on stairs, ground, and other challenging conditions in an effort to accurately model areas of concern. This pedestrian network was then combined with our road and bus routes to create a pedestrian multimodal network.</p>	
<p><b>2:00 PM</b>  <b>Mapping for a Regional Growth Policy</b>  <i>Heather Cormier, Chloe Schaefer – Cape Cod Commission</i></p> <p>As the regional land use planning and regulatory agency for the County of Barnstable, Massachusetts, the Cape Cod Commission is responsible for preparing a Regional Policy Plan (RPP). The RPP articulates a growth policy for the region that strives to balance preserving the vital natural resources and historic charm of Cape Cod while strengthening the region's economy. Key to this is a regional land use policy and vision map that aims to direct future planning efforts by focusing new growth and development in appropriate areas throughout the Cape while maintaining those areas that should remain as they are. The geodesign process has been used to identify centers of activity across the region that will be the major focus of future growth, using three main factors—civic activity, business activity, and physical form. Land use character was modeled and parcels were scored based on their form (building size, enclosure, etc.), business activity, and proximity to community resources. The result is a map which identifies both regional and local centers of activities. With further location-specific information, planning efforts and capital resources can be more efficiently directed towards these centers across the Cape.</p>	
<p><b>2:30 PM</b>  <b>Prioritizing Land Acquisition</b>  <i>Gary Prahm, Cape Cod Commission</i></p> <p>The Cape Cod Commission (CCC) GIS Department collects geospatial data and performs analysis for the County of Barnstable, Cape Cod's municipalities, and non-profit agencies. Recently completed analysis is being promoted to conservationists to maximize the benefits of their preservation efforts related to purchasing open space. Towns voted to establish a land bank (1999-2005) to acquire land "for the protection of public drinking water supplies, open space, and conservation land, the creation of walking and bicycling trails, and the creation of recreational areas. The land bank is now the Community Preservation Act. The CCC's Regional Policy Plan and Development of Regional Impact reviews contain regulations to ensure that adverse impacts to wetlands and wildlife habitat are avoided, and that development proposed on undeveloped land requires acquisition of land with high natural resource values. As funds to purchase and protect land becomes scarce, conservation agencies need to prioritize purchasing undeveloped parcels that have the highest resource protection value. The Commission has long had natural resource maps to aid in evaluating land, but GIS capabilities allowed parcels to be prioritized with a count of the number of desired factors that overlay each individual parcel. This score helps rank the value of potential purchases.</p>	

<b>TRACK: Regional Data Collection / LiDAR</b>	
MEETING ROOM: Nauset III	MODERATOR: Ray Corson
<p><b>1:30 PM</b>  <b>Recent Advancements and Future Directions in High Resolution Land Cover Mapping</b>  <i>Nate Herold, NOAA Office for Coastal Management; Jamie Carter, TBG, NOAA Office for Coastal Management</i></p> <p>NOAA's Office for Coastal Management (OCM) provides technical assistance, data, tools, and training to the coastal management community. Through its Coastal Change Analysis Program (C-CAP), OCM has been producing moderate resolution land cover for almost two decades. Over the past 5 to 10 years, OCM has also worked to establish an operational higher resolution land cover product line. These products bring the national C-CAP framework to the local level, enabling additional, site specific applications. Recent increases in imagery and LiDAR data availability and improvements in processing techniques are enabling more cost-effective production of high resolution land cover products. This presentation will describe techniques NOAA and its partners are using to develop detailed land cover maps across broadening geographies.</p>	

## 1:30 PM - 3:00 PM CONTINUED

**2:00 PM**

### **Exploring the Capabilities of High Resolution LiDAR in Mapping Utility Infrastructure and Roadside Vegetation**

*Jason Parent\*, John Volin, Tom Meyer, David Wanik, Wei Zhang, Manos Anagnostou – University of Connecticut*

Light Detection and Ranging (LiDAR) systems have great potential to facilitate monitoring of infrastructure and vegetation across large areas. In this research, we conducted a pilot study to explore the capabilities of using high resolution LiDAR (>25 pts / m<sup>2</sup>) to assess utility infrastructure and roadside vegetation in Connecticut. We further explored ways to reduce costs associated with LiDAR acquisitions in order to make recurring data collections more feasible. In the pilot study, a vendor acquired airborne and mobile LiDAR data for a 30 km<sup>2</sup> area in Greenwich, CT. The vendor used the data to map poles, lines, and tree crowns from aerial data; mobile data were used to inventory and assess pole attachments as well as measure pole lean and height and assess vegetation near lines. In the pilot study, feature extraction costs were 50% of the acquisition costs; to reduce collection future costs, we are developing in-house computer programs for mapping utility infrastructure and vegetation. We are also exploring opportunities for agencies to partner in LiDAR acquisitions to maximize benefits as well as minimize the cost for any given agency. Future research will explore other technologies (e.g. Geiger LiDAR), that may provide more cost-effective alternatives to conventional LiDAR.

**2:30 PM**

OPEN

### **TRACK: Emerging Technologies 2**

MEETING ROOM: Nauset IV

MODERATOR: Paula Lazrus

#### **1:30 – 3:00 PM PANEL PRESENTATION**

#### **If You Could Tell a Story with a Map, What Story Would You Tell?**

*Shane Bradt, UNH Cooperative Extension; Paula Lazrus, St. John's University; Richard Quodomine, NYS Office for People with Developmental Disabilities*

Whatever your field, Story Maps can be a powerful way to connect with your audience. A Story Map is a multimedia format that allows for the integration of interactive webmaps, images, weblinks, and video into a single visual presentation. The use of Esri Story Maps is expanding across sectors and disciplines. People have been creating these maps for a wide range of purposes, including: analysis, introducing your employees to colleagues, the public or your customers, outreach and advocacy, highlighting environmental issues, explaining the results of research, and generally sharing maps and the results of geospatial projects. In this panel we will explore the range of applications for Story Maps in different disciplines. Our panel members, hailing from state government, traditional academia, and an outreach organization, have all used Story Maps or helped others to do so. In addition to highlighting how these maps are used by different constituencies, we will also consider how different Story Map formats might best suit specific needs. We will share some of our best practices, as well as, highlight some common pitfalls. We also hope to bring different views into the conversation by learning about the Story Map work of audience members.

### **TRACK: Natural Resources (Soil)**

MEETING ROOM: Nauset V

MODERATOR: Alice Doyle

**1:30 PM**

#### **Mapping the Difficult Stuff: Automated Feature Extraction of Wetlands, Vernal Pools, and Logging Roads**

*Sean MacFaden, Jarlath O'Neil-Dunne - University of Vermont Spatial Analysis Laboratory*

Automated feature extraction of small, irregularly-distributed landscape features has long been a challenge for remote sensing-based land-cover mapping. Natural features such as vernal pools and wetlands may be obscured by vegetation or easily confused with other landscape elements, complicating feature discrimination and reducing classification accuracy. Anthropogenic elements such as previously-unmapped logging roads are similarly difficult to identify and then isolate from other linear features. The growing availability of high-resolution imagery and LiDAR is changing this dynamic, however, especially when these datasets are combined with object-based image analysis (OBIA) techniques. In a series of projects in Vermont and other northeastern states, we developed OBIA modeling routines that improved capture of these difficult-to-map features, using LiDAR-derived digital elevation models (DEMs) to first identify candidate features and then evaluating them with a combination of object characteristics and contextual criteria. The high-resolution DEMs were essential to mapping workflows, permitting characterization of fine-scale landscape transitions with compound topographic indices (wetlands), slope-derived depressions (vernal pools), and geomorphometric indices such as landform and dissection (logging roads). Overall, modeling focused on over-prediction (errors of commission are much harder to diagnose) and was efficiently performed on large geographic extents (county-sized) using the enterprise processing capabilities of OBIA software.

## 1:30 PM - 3:00 PM CONTINUED

**2:00 PM**

### **Planning for the Flood: How New England Is Creating More Resilient Electrical Infrastructure Using GIS**

*Kelsey Gabriel, Lee Curtis, George Andrews, Melissa Kaplan – BSC Group, Inc.*

Climate change research continues to show that storms are intensifying, sea levels are rising, and areas are becoming more susceptible to flooding. As a result, National Grid is taking a proactive stance to implement flood protection measures at substations in MA and RI to allow the continuous, reliable delivery of electric service in light of future increases in flooding and storm events. In order to identify the high risk substations in MA and RI, BSC prepared various map sets including hurricane storm surge locations, sea level rise and coastal impact, limit of moderate wave action, and environmental resources. This preliminary GIS effort assisted National Grid in their planning, design, and permitting of temporary flood protection measures. BSC is now working to provide site specific inundation mapping, including sea level rise and storm surge, as National Grid begins to design permanent flood protection measures. These maps will take into account site specific criteria including topography, mean high water line, high water marks, and tides. Different scenarios, such as variations in sea level rise and hurricane categories, will be evaluated to create the resilient design solutions.

**2:30 PM**

### **New Horizons: A Tour of Engineering Applications of the NRCS SSURGO Soils Data**

*Ian Sleeper, Terracon Consultants Inc.*

The NRCS Soil Survey Database is a rich and detailed dataset with wide applications across many fields; however, the data is held in a complex relational database format which can be confusing to casual or unfamiliar users, and can continue to surprise even experienced users with its breadth and depth of information. Several years of experience with SSURGO data has brought to light several interesting uses that provide insight into both the wealth of data available and the capabilities and uses of a relational database to represent complex three-dimensional attribute information. Some uses include slope stability risk modeling, engineering project development overviews, pre-field-task planning, and other thematic mapping and analysis applications. These uses highlight the value of the SSURGO data in the application of geotechnical and environmental engineering (due to the nature of experience and educational background), but the data is equally applicable to other study areas such as Forestry, Natural Resources, Agriculture, Municipal Planning, and others, given the proper background knowledge.

## TRACK: Esri ArcGIS Apps for the Field

MEETING ROOM: Seacrest Ballroom I

**1:30 PM**

### **Collector for ArcGIS: Unlock Efficiency In The Field**

*Mark Scott, Esri Boston*

Collector for ArcGIS gives you a powerful and easy to use app that runs on iOS, Android, and Windows 10 devices, to perform field data collection tasks. Learn how to collect data live or offline. Additionally, learn important design considerations for your web maps, feature services, and what desktop tools can be used.

**2:00 PM**

### **Survey123 for ArcGIS: Intelligent Form-based Field Data Collection**

*Patrick Gahagan, Esri New York City*

Survey123 for ArcGIS is a simple and intuitive form-centric data gathering solution that makes creating, sharing, and analyzing surveys possible in just three easy steps. First: Ask Questions. Quickly design powerful surveys and publish them into ArcGIS. Second: Get the Answers. Enable your workforce with the Survey123 for ArcGIS mobile app to capture answers in the field. Third: Make the Best Decisions. Analyze answers from the field in ArcGIS to support decision making.

**2:30 PM**

### **Workforce for ArcGIS & Navigator for ArcGIS: Coordinating Your Field Workforce**

*Mark Scott, Esri Boston*

Workforce and Navigator are field data collection apps available to ArcGIS Online users. See how they work with Collector or Survey 123. Navigator uses Esri data as well as your own data to provide turn-by-turn directions to multiple stops for your workforce needs, while Workforce for ArcGIS is an app that will integrate field data collection (Collector), getting to work locations (Navigator) into an app that includes work order information for your teams in the field.

## 3:30 PM - 5:00 PM

### GENERAL SESSION

MEETING ROOM: Nauset Ballroom

**3:30 PM**

### **NEARC Squares Game Show**

*Larry Spraker, VHB; Darren Mackiewicz, CDM Smith; Brett Horr, Town of York; Sam Wear, Westchester County; Carol Baker, Town of South Kingstown; Stu Rich, Penbay Media; Niels laCour, UMass Amherst; Peter August, URI; Pete Steeves, USGS*

After a 10 year hiatus, we are back! Come join us for an informative and hilarious version of the classic game show Hollywood Squares, played NEARC style! Our "celebrity" panel comprised of current and past NEARC Presidents will educate and entertain the audience, as you compete for fabulous prizes while learning strategic information, tips and tricks about ArcGIS Online. This is a "must-see" event, so come take part in the crazy shenanigans and learn about ArcGIS Online... and maybe, just maybe you will even walk away with a cool prize.

## WEDNESDAY 8:45 AM - 10:15 AM

### TRACK: Automation

MEETING ROOM: Racepoint

MODERATOR: Judy Colby-George

#### 8:45 AM

##### Using Python to Automate Map Exports

*Don Katnik, Maine Department of Inland Fisheries and Wildlife*

A MapBook can export maps showing the same data for different geographic extents but not different data for the same extent. For Maine's 2015 State Wildlife Action Plan (SWAP), we needed to produce a geographic range map for 354 "Species of Greatest Conservation Need." These maps combined presence/absence data and the distribution of potential habitat to predict where each species could occur. Expecting this to be an iterative process as the input data, layout design, and SWAP evolved (many times), we used Python to automate the work. Steps for each species included: 1) standardizing data across multiple input sources; 2) combining data while retaining the source for each observation; 3) overlaying the observations across Landscape Sample Units (LSUs = Maine townships for terrestrial species and sub-watersheds for aquatics); 4) calculating the proportion of potential habitat in each LSU; and 5) generating a map with the species' name, a custom legend, potential habitat distribution, and presence/absence in each LSU color-coded by data source. By automating this process, we could create a new generation of maps after each public meeting. We used persistent data dictionaries and log files to allow partial runs and resume-where-you-left-off-when-it-crashed processing, respectively.

#### 9:15 AM

##### Automating Map Generation in ArcGIS with Python

*Jenna Ducharme, RPS ASA*

Presenting spatial information through maps and figures is a common task performed by the GIS community. Often, there is a need to create dozens of maps to accurately relay information on the topic of interest. This presentation demonstrates an approach to automating the task of creating maps in ArcGIS using Python. Following the generation of a template map in ArcGIS, a python script can be used to manipulate the data sources for each layer in the template, the titles and text, map extent, definition queries on data layers, and the locations of graphical elements. This approach allows the user to export hundreds of maps and change elements in each map without opening ArcGIS, and with limited manual effort. Automating map generation reduces human error and increases efficiency. A demonstration of the capabilities of map generation using Python will be held during this presentation, as well a high-level description of the code written to perform such tasks. Finally, other advantages of automated map generation will be highlighted, including the ability to use several standalone maps to create videos (AVIs), to show a time series of an oil spill over a number of hours.

#### 9:45 AM

##### Taking Map Books to the Next Level: Using Arcpy to Create Dynamic Content in Your Maps

*Melissa Albino-Hegeman, New York State Department of Environmental Conservation*

Map books a great way to share a lot of information and compare one location to others. Unfortunately, Data Driven Pages has its limits. Using Python and the arcpy library you can create your own custom map book tool that allows you to automatically run a custom analysis on each page of your map book based on the visible extent and create layout elements based on the results. Creating your python code with an eye toward reuse will give your publications a consistent, professional look and allow you easily create similar projects based on other map templates.



## 8:45 AM - 10:15 AM CONTINUED

### TRACK: Analytics

MEETING ROOM: Nauset II

MODERATOR: Michael Mannion

#### 8:45 AM – 10:15 AM WORKSHOP

##### Introduction to ArcGIS Performance Analysis

*Michael Mannion, Mannion Geosystems*

As ArcGIS continues its evolution from a desktop, to client-server, to web GIS architecture, the complexity of the supporting software stack is increasing. Usually, things work fine - but sometimes they don't. When users report poor performance, is the problem the network? The database? A poorly designed map service? This session will help GIS managers, analysts, developers, and others responsible for maintaining their ArcGIS infrastructure understand the tools and techniques available for monitoring and quantifying system performance at various tiers of the software stack. The presentation will discuss popular ArcGIS deployment architectures, and include live demonstrations analyzing common performance bottlenecks. No prior performance analysis experience is required, though a working knowledge of ArcGIS will be helpful.

### TRACK: Municipal

MEETING ROOM: Nauset III

MODERATOR: Heidi Blank

#### 8:45 AM – 10:15 AM PANEL PRESENTATION

##### How to Simplify Esri's Utility Templates to Work for Your Organization

*Scott E. Roberts, CGCIO, GISP, MPA, Town of South Windsor, Coventry and Tolland CT; Heidi S. Blank, GISP, Hilltop Northeast Enterprises, LLC; Dan Goodrich, The Connecticut Water Company*

Have you ever tried to get a Public Works Director or Utility Superintendent to discuss your geodatabase utility template? First of all, you would be lucky if that request did not scare them off completely. Secondly, they are hoping GIS is going to streamline their operations and not require additional meeting time. Sitting in a meeting filled with technology jargon involving field names, relationships and whether a value needs to be an integer, text or blob value is far from anything they would agree to. So, how do you get your utilities into the Esri utility templates? Please join us, in an open presentation format, as we discuss our experiences with and share our tips on making these templates work for DPW and Utilities alike. We hope this forum will foster questions, create dialog and initiate ways to raise local adoption of these valuable utility templates.

### TRACK: Public Health

MEETING ROOM: Nauset IV

MODERATOR: Claire Lane

#### 8:45 AM

##### Assessing and Responding to the Opioid Epidemic Through GIS and Spatial Epidemiological Methods

*Thomas J. Stopka, Ashley Donahue, Marga Hutcheson, David Meyers, Kenneth Chui – Department of Public Health and Community Medicine, Tufts University School of Medicine*

The opioid epidemic presents a major public health challenge and contributes to a larger syndemic, which includes non-prescription opioid misuse, heroin injection, opioid overdoses, and hepatitis C virus (HCV) and HIV clusters. Over the past decade, Massachusetts has experienced major syndemic challenges with increases in all opioid-related morbidities and mortalities, including an increase of 163% in fatal opioid overdoses, from 525 in 2005 to 1,379 in 2015, an increase of 137% in reported HCV cases among 15-29 year olds, and elevated HCV infection rates among Baby Boomers, born between 1945-1965. As this syndemic continues to grow, it may be a harbinger of future increases in HIV and HIV-HCV co-infection rates. Little is known, however, about the overlapping spatial distributions of these disease outcomes and geographic clustering patterns. We combined surveillance and primary data to map and derive a greater understanding of the Massachusetts syndemic. Through the use of various GIS and spatial epidemiological methods, we identified spatial hotspot clusters ( $p < 0.05$ ) on the neighborhood, census tract, municipality, and state levels. We identified locations where injection drug use, overdose, HCV and HIV clusters were a concern, and where enhanced prevention, treatment, and care can help combat the opioid epidemic in Massachusetts.

#### 9:15 AM

##### Providing Situational Awareness During Public Health Emergencies Using Complimentary Paper Map and Web Mapping Resources

*Presenters: Peter Young, MA, GISP and Emma Gause, BA – Vermont Department of Health*

During an emergency, geographically diverse partners must collaborate to execute a unified response. Establishing common ground is essential for maintaining clear communication and is an integral piece of standard "Incident Command System" emergency response procedures. In past public health emergency situations, GIS wall maps of each of Vermont's 12 health districts have been available to assist with coordinating situational awareness between the Health Operations Center (HOC) at the Vermont Department of Health Central Office and the local health district offices. In 2015, a new series of paper wall maps was developed to include improvements such as map collars for quick reference and standard map scales for use with measurement protractors. In 2016, a matching web map was created to provide the same map data content to a wider audience. The new VDH emergency response web map is highly interactive and includes a geocoding tool for quickly zooming to map collar coordinates (eg. E4) as well as to street addresses or lat/long coordinates. This NEARC conference session will provide recommendations and advice to other organizations that might be working to produce similar situational awareness paper map and web mapping resources.

## 8:45 AM - 10:15 AM CONTINUED

**9:45 AM**

### **Avian Flu Planning in MA: A Lesson in Inter-Agency GIS Cooperation**

*Tara Manno Richer, MassDEP; Desiree Kocis, MEMA; Brian Brodeur, MassDEP; Dake Henderson, MDAR*

Midwestern states endured an outbreak of Highly Pathogenic Avian Flu in the Spring of 2015. Tens of millions of birds were euthanized and cascading effects rippled through the food supply. How might Massachusetts manage such an outbreak? Is human health a concern? Are domestic &/or wild bird populations at risk? Where are birds of concern located? How might we triage, test and depopulate flocks? How and where would we manage the carcasses of deceased birds? Is this a 24/7 emergency situation? Which agencies will be involved? How can we streamline processes and avoid duplication of effort when 10 State and Federal agencies are involved? What role might GIS professionals play in this situation? Can we share data and play nicely in the sandbox? Please join us for the answers to these and other questions ... and a little bit of bird humor.

### **TRACK: Esri Workshop [Bring your Own Device]**

MEETING ROOM: Chatham

**8:45 AM – 12:00 PM**

### **Esri Public Safety Workshop: Preparing for and Supporting Special Events with ArcGIS Online**

Special Events can present unique challenges to the Public Safety community and require that different agencies work together to provide a safe experience for all types of Special Events. This workshop will focus on how to support Special Events with ArcGIS Online. This enables planners to operationalize traditionally static content in mission focused applications so that this information provides context for the situation during the event which results in faster decisions during the event due to the thorough understanding of the context of the situation. The presenters will share lessons learned and experiences from past events and discuss a range of ArcGIS information products that have proven very useful, including Operations Dashboard for the Command Center, Story Map Journal for briefings, and Collector for ArcGIS for getting information in to and out of the field. Attendees will learn about the collection of ArcGIS resources, templates, and tools that are available to help their communities be better prepared and more successfully support Special Events, large or small, in their jurisdiction. This will be accomplished both through presentations as well as hands on exercises. **Please bring your own device to the workshop.**

### **TRACK: Esri Web GIS**

MEETING ROOM: Seacrest Ballroom I

**8:45 AM**

### **ArcGIS GeoEvent Extension for Server: Monitoring Assets & Feeds in Real Time**

*Alex Brown, Esri Philadelphia*

GeoEvent Extension for ArcGIS for Server connects to common sensors and data feeds, including in-vehicle GPS devices, mobile devices, and social media providers, among various others. Learn an overview of the technology, how to connect to real time data, transform it into a streaming service and access your feed through various applications.

**9:15 AM**

### **Web GIS Platform Concepts: Configurations Across the Enterprise**

*Mark Scott*

Web GIS is a type of distributed information system, comprising at least a server and a client, where the server is a GIS server and the client is a web browser, desktop application, or mobile application. In its simplest form, web GIS can be defined as any GIS that uses web technology to communicate between a server and a client. Come see how the components of the ArcGIS Platform can independently, or in concert, provide you with the WebGIS solution.

**9:45 AM**

### **WebGIS at 10.5: A Preview**

*Alex Brown, Esri Philadelphia*

Learn what changes are coming to ArcGIS Server and Portal for ArcGIS in this major release at 10.5! This presentation will provide an overview of upcoming features for WebGIS, including a brief look at the new GeoAnalytics Server Extension and server-based distributed Raster Analytics.

## WEDNESDAY 10:30 AM - 12:00 PM

### TRACK: Open Data

MEETING ROOM: Highland

MODERATOR: Alexander Stepanov

#### 10:30 AM – 12:00 PM WORKSHOP

##### Getting to Know Data Interoperability Extension for ArcGIS. Do More with Less

*Alexander Stepanov, Niels La Cour – University of Massachusetts, Amherst*

ESRI ArcGIS is a powerful geo-spatial platform which includes desktop, server, web and cloud components. In general, operations with data within the platform are straight forward due to common data formats and standards. In many cases, users need to bring data from external sources/organizations and multiple formats such as CAD, BIM, Excel, Social Networks, XML, text-based formats into the ArcGIS environment. ArcGIS has a Data InterOperability extension, which allows users to build powerful ETL (extract-transform-load) and automation workflows. In this hands-on workshop, we will show practical examples of bringing data from/ to CAD (utilities, architectural drawings), harvesting and processing CAD attributes, creating complex PDF reports and data maintenance automation workflows (bulk attribute renaming, remapping data schema, QAQC, merging multiple data sources, etc). The workshop targets users with some ArcGIS Desktop experience. Some experience with Model builder is useful. No programming experience is required.

### TRACK: Automation

MEETING ROOM: Racepoint

MODERATOR: Judy Colby-George

#### 10:30 AM

##### Getting Your Data into ArcGIS Online

*Leon Scott, Town of Easton, Massachusetts*

ArcGIS Server and ArcGIS Online platforms are both used by the Town of Easton to provide GIS services. As the demand for services has begun to outgrow the current capabilities of our IT infrastructure, many services have been shifted from ArcGIS Server to ArcGIS Online. By leveraging ArcGIS Online, we have been able to grow our services and also unburden some of the work load from our own servers. This presentation will take a closer look into the workflows and tools used to publish and maintain services hosted on the ArcGIS Online platform. Python scripting and the REST API resources used to automate workflows will be explored.

#### 11:00 AM

##### Bringing Your Legacy Data into the Future (Using MS Access and ArcGIS Together)

*Melissa Albino-Hegeman, New York State Department of Environmental Conservation*

NYS Department of Environmental Conservation (NYSDEC) has a large amount of historical and legacy data that has yet to be digitized. This data exists in a variety of formats including the original paper data forms. I've quickest way to pull this historical spacial data into the ArcGIS environment is using MS Access and Python. MS Access is available and familiar to all employees where as ArcGIS has limited availability to staff and there are only a small number of people trained to use it. By using a combination of arcpy and open database connectivity (ODBC) python libraries staff are able to quickly enter data into a form and update the information in the ArcGIS geodatabase. This new workflow is helping to alleviate data entry backlogs and will hopefully allow the data to be used both in-house and shared with the public via open data portals.

#### 11:30 AM

##### Real-Life Python Geoprocessing in the Cloud

*Jason Wise, Terracon*

Is your computer a habitat for complicated geoprocessing scripts that nobody else can use? Do you need to run processes overnight, make the results available online, or let your coworkers run the tools themselves? Do you need a back-end database for your Web application? These are all good reasons to do your geoprocessing in the Cloud. Come and see real-world examples of complex, data-intensive geoprocessing on cloud servers with Python, ArcGIS for Server, ArcGIS for Desktop, and scheduled tasks. Learn how we publish services painlessly, reuse Python code on the server, process nightly datalogger uploads, and use a JavaScript application to interact with a geoprocessing service.

### TRACK: Apps

MEETING ROOM: Nauset II

MODERATOR: Alexandra Barker

#### 10:30 AM – 12:00 PM WORKSHOP

##### Making Sense of the American Community Survey

*Alexandra Barker, David Kraiker – U.S. Census Bureau, Data Dissemination Branch*

The American Community Survey (ACS) is an ongoing survey that generates estimates on social, economic, housing, and demographic topics. Data users can access these estimates down to neighborhood level (tract and block group) using the American FactFinder. This presentation will cover background information about the ACS, an explanation of the ACS datasets and topics, and a demonstration of accessing data using American FactFinder.

## 10:30 AM - 12:00 PM CONTINUED

### TRACK: Natural Resources

MEETING ROOM: Nauset III

MODERATOR: Pete Steeves

#### 10:30 AM

##### **National Hydrography Requirements and Benefits Study**

*Dan Walters, US Geological Survey*

The National Hydrography Requirements and Benefits Study (HRBS) was performed to establish a baseline understanding of national business uses, needs, and associated benefits for national hydrography data, and to inform the design of an enhanced future program that balances requirements, benefits, and costs. The study was sponsored by U.S. Geological Survey (USGS) and the U.S. Department of Agriculture's Natural Resources Conservation Service and was completed in May 2016. Study participants included 21 federal agencies, non-profits, private and commercial entities, and local, state, and tribal governments from across the 50 states, Washington, D.C., and American Samoa. An analysis of the results found that an improved national hydrography program has the potential to help users realize an estimated \$602.5 million in annual program benefits if all reported requirements were met. This presentation will provide a review of the HRBS and USGS plans for using the results.

#### 11:00 AM

##### **Examining the Scallop Fishery Through Biological, Regulatory, and Landings History**

*Sharon Benjamin, NOAA Northeast Fisheries Science Center, Social Sciences Branch / Integrated Statistics, Inc.; Min-Yang Lee, NOAA Northeast Fisheries Science Center, Social Sciences Branch; Dvora Hart, NOAA Northeast Fisheries Science Center, Population Dynamics Branch*

This study describes the Atlantic Sea scallop (*Placopecten magellanicus*) fishery using metrics of biological productivity and fishing activity over a 20 year study period. Distant ports and fishing communities are connected at sea by shared fishing grounds; we describe the extent to which ports in the Northeast United States have utilized similar areas of the ocean in the Atlantic Sea Scallop fishery from 1996-2014. During this time period, spatially delineated regulations have become increasingly important in the scallop fishery. To better understand intra-port competition, we integrate multiple data sources, including: an index of fishing activity overlap among ports; biological data on scallop populations; and the scallop fishery's management history. We used a novel mapping method to improve upon the single reported point, and built a comprehensive, high-resolution dataset of fishing activity for commercial fisheries in the Northeast US.

We conclude that regulatory changes in available fishing grounds – and thus in access to exploitable biomass – impact fishing behavior among scallop fishing ports. Competition among ports is sharpened when exploitable biomass is limited due to environmental factors, overfishing, or regulatory closures. This multifaceted approach helps us better understand implications of regulatory as well as environmental change in regional fishing economies.

#### 11:30 AM

##### **Farm GIS for Animal Welfare, Water Health, and Aesthetic Enjoyment**

*Mike Doyle, Hilltop Northeast Enterprises, LLC*

When we moved into a farm in Brimfield, MA we knew we wanted animals. We also knew we were moving to a piece of sloped land that went directly into a eutrophic pond. This piece of land has since become about as GIS'd as most Superfund sites. We have analyzed impacts from every proposed land use, and have used visualizations for specific projects to minimize any possible detrimental views.

### TRACK: Esri Workshop CONTINUED

MEETING ROOM: Chatham

#### 8:45 AM – 12:00 PM

**Esri Public Safety Workshop: Preparing for and Supporting Special Events with ArcGIS Online** {Continued from morning session}

### TRACK: Esri ArcGIS Solutions for Government

MEETING ROOM: Seacrest Ballroom I

#### 10:30 AM

##### **ArcGIS Solutions for Crowdsourcing: Engaging Your Community**

*Tom Schwartzman, Esri Boston*

In this session, you'll learn how the ArcGIS Online Crowdsourcing web application templates can be used to engage citizens in your community.

#### 11:00 AM

##### **ArcGIS Solutions for Flood Mitigation, Planning, and Response**

*Lauri Dafner, Esri Philadelphia*

The ArcGIS for Flood Solution delivers maps and applications to support the mission of Emergency Management organizations which facilitate work in preparedness, response, recovery, and mitigation of flood events. Come learn how these maps and apps work to support this critical work.

#### 11:30 AM

##### **ArcGIS Solutions for Vector-Borne Disease Surveillance & Control**

*Lauri Dafner, Esri Philadelphia*

Esri's location platform helps you utilize your organization's geographic information to improve communication, heighten awareness, promote collaboration and enhance decision-making. During this presentation we will showcase ArcGIS solutions and show how they can be used to rapidly collect and share information, as well as streamline workflows between Federal, State, County and Municipal levels. Learn how Esri's ArcGIS platform affords you an immediate, Consumer-Off-The-Shelf (COTS) approach to mosquito control and mitigation efforts.

## POSTER ABSTRACTS

*\*Posters are organized in alpha order by primary/presenting author last name.*

*Posters will be set up according to the number identified here, P1, P2, etc*

P1	<p><b>Creating a Multi-Stage Image Classification Model for Identifying Sandbars in the Connecticut River</b>  <i>Bogumila Backiel*</i>, University of Massachusetts, Amherst; <i>Christian Marks</i>; The Nature Conservancy; <i>Keith Nislow</i>, Forest Service</p> <p>Active geomorphic features of the Connecticut River in New England provide habitat for several floodplain species. An object based segmentation model in GIS was created to identify and map sandbars through orthophotographs for the entire Connecticut River and its major tributaries. The multi-stage model, segments pixels from aerial images based on proximity and color, then compiles these pixels representing sandbars together through an unsupervised classification. Spatial habitat information on New England's floodplain plant and animal species was collected to identify where sandbars provide critical habitat. Human development, particularly dams and channelization, have altered flow and sediment regimes, thus impairing formation of sandbars. Information regarding sandbar location and species presence in these features will subsequently allow policy makers to identify places for conservation. Large scale automated mapping of the geomorphology in both general river ecosystems and the Connecticut River is necessary to understand the dynamics of these features and preserve habitat.</p>
P2	<p><b>Telling Connecticut's Stories with Story Maps</b>  <i>Cary Chadwick*</i>; <i>Emily Wilson</i>, University of Connecticut Center for Land Use Education and Research (CLEAR)</p> <p>The University of Connecticut's Center for Land Use Education and Research (CLEAR) has a long history of making applied research results both usable and accessible to audiences covering a wide range of technical ability. The Story Map is the latest and perhaps most compelling way to make technical information available to local decision makers, regulatory agencies, the public, students and everyone else. CLEAR's Story Maps showcase everything from wildlife to stormwater regulations to tracking trends in land cover and landscape change. This poster highlights these along with CLEAR's new Story Map gallery. Check it out at <a href="http://clear.uconn.edu/storymaps">http://clear.uconn.edu/storymaps</a>.</p>
P3	<p><b>Establishing a Plant Communities Inventory</b>  <i>Heather Cormier</i>, Cape Cod Commission</p> <p>Stormwater runoff can create significant discharge of scour and sediment buildup, leading to pollution of local waterways and contamination of drinking water. Cape Cod's already sensitive coastal resources need stormwater solutions that include landscape management alternatives to help mitigate nutrient and pollutant loading. An assessment of existing vegetation was conducted within Massachusetts' Route 6 right-of-way from the Sagamore Bridge in Sandwich to the Orleans/Eastham Rotary. Using a combination of high-resolution aerial photography and LiDAR data, plant species were classified, invasive species were located, and density and health of vegetation was evaluated for future landscape management planning.</p>
P4	<p><b>A Cartographic Analysis of Landcover Changes in Nauset Spit: 1947-2014</b>  <i>Corey Dickinson*</i> and <i>Mark Adams</i>, Cape Cod National Seashore GIS Branch, NPS</p> <p>The Nauset Marsh barrier beach spits are part of an Atlantic-facing estuarine system within Cape Cod National Seashore. Inlet migration and coastal retreat have resulted in enormous changes in land cover types at Nauset. In the past 70 years, approximately 150 meters of shoreline retreat and 2.5 kilometers northward inlet migration have been observed. A major redistribution in landcover was mapped in the marsh, including loss of salt marsh habitat connected to the spit. This study seeks understand what patterns may be present in this system and to quantify the effects of these patterns on salt marsh and dune environments. This project was conducted using GIS software to analyze various aerial photographs from between the years of 1947 and 2014, and using said software to classify various land cover types in the study area. This data has been compared in a time series, and has been used to analyze some of the major trends shaping the development of the spit. The results of this project are important not only for the general understanding of the Nauset Marsh system, but for the overall understanding of how Cape Cod's salt marsh/barrier spit systems affect uses and management within Cape Cod National Seashore.</p>
P5	<p><b>Inverse Least Cost Distance Weighting: Application and Uses</b>  <i>Christopher Dunn</i>, <i>Ramboll Environ</i></p> <p>Traditional Inverse Distance Weighting (IDW) uses Euclidean distances when weighting values associated with each interpolated raster cell. While this may be the simplest approach computationally, it may not be the most accurate way to represent the complex features and barriers in a real-world system. Using values from a least-cost-distance raster to represent the true distance can result in a more accurate interpolated surface. The poster outlines application methods for Inverse Least Cost Distance Weighting as well as advantages, disadvantages, and applicable situations.</p>

P6	<p><b>Building Hydraulic Models in GIS to Quantify Floodplain Storage</b>  <i>Abigail Ericson, University of Massachusetts Amherst; Dr. Richard Palmer, University of Massachusetts Amherst</i></p> <p>Throughout history, people have settled near rivers and in floodplains, placing communities at risk to flooding, as demonstrated recently by the detrimental impact of Tropical Storm Irene. An active area of research in water resources planning and management involves understanding and quantifying the benefits and costs of high flows in rivers. This study explores the potential of flood attenuation by enhancing floodplain storage in portions of the Connecticut River. The study looks at quantifying the benefits of floodplain storage through the use of a simpler Hec-ResSim model and a sophisticated Hec-RAS model. The Hec-RAS model, built in ArcGIS using Hec-GeoRAS, incorporates detailed LiDAR and orthogonal imagery, USACE collected bathymetry, and measurements taken in the field. The analyses confirm that increased floodplain capacity attenuates high flows, and the Hec-RAS model has the added benefit of being able to incorporate projections to alternative flows based on floodplain and land cover changes. The Hec-RAS model allows comparison of its more detailed result to that from Hec-ResSim, to determine if the simpler model is sufficient to estimate changes in flows. Both models are powerful tools that can quantify floodplain benefits and provide justification for floodplain conservation and restoration for city planners and conservation groups.</p>
P7	<p><b>Big Data, Little Birds: A GIS Approach for the Characterization of Bird Movements in the Gulf of Maine</b>  <i>Walt Jaslanek, PhD Student; Jack Finn, Professor - Environmental Conservation Department, UMass</i></p> <p>Our research the last year has focused on an initial understanding of the way data is being collected and processed on bird telemetry data sets on USFWS Northeast coastal refuges and how the development of a spatially explicit database framework could work to address better data organization and decision support. Bird telemetry studies especially from radio telemetry require the processing of big data sets and estimating movement locations. A common question coastal refuges face is whether wind developments could pose threats to known bird populations. This a complex question for biologists to answer without an inventory of data and a structured approach to processing multi-dimensional data. Our presentation will explain our big data approach, and modelling for a case study in the Gulf of Maine.</p>
P8	<p><b>The Use of GIS in Complete Streets Prioritization Planning</b>  <i>Isabel C. Kaubisch, Principal Clarendon Hill Consulting LLC</i></p> <p>This year MassDOT issued the Complete Streets program, setting aside funds for towns able to demonstrate their eligibility for respective projects. Planning for Complete Streets (CS) aims at making communities more walkable and more accommodating for bike travel and enhanced transit services and as such more livable whilst providing for safe and accessible multi-modal travel. This poster shows the CS planning approach, conducted GIS analysis, prioritization criteria and results for one of the towns participating in the program. Together with Green International, we assisted towns with developing the necessary steps for their Complete Streets Prioritization Plans. Starting with the assessment of the current transportation situation and based on research and crash information, a needs assessment was conducted. Then, we ran a gap and vulnerability analysis' for specific locations. Based on the analysis results, areas for improvement were identified and CS project ideas developed. Using our prioritization strategy allowed towns to identify opportunities and CS projects most relevant for their community. Those CS projects deemed to make streets safer, more accessible and more complete are now potentially eligible for funding from MassDOT.</p>
P9	<p><b>Connecticut Elevation: A Statewide Lidar Virtual Mosaic</b>  <i>Emily Wilson, University of Connecticut; Cary Chadwick, University of Connecticut</i></p> <p>A shaded relief map of Connecticut is displayed using a statewide elevation dataset created from eight different Lidar datasets that were captured at different times by different agencies. The mosaic dataset is used extensively to manage thousands of DEM tiles and LAS files of the different datasets and then pull them together into one ArcGIS Server image service with multiple functions (hillshade, shaded relief, slope and aspect) applied. The image services are available through REST as well as an easy-to-use viewer. The Connecticut Environmental Conditions Online (CT ECO) website is the home of the Elevation Viewer that contains all elevation layers, locators and swipe. The site also contains instructions for connecting to the services, metadata, FAQs and more <a href="http://cteco.uconn.edu/lidar">http://cteco.uconn.edu/lidar</a>.</p>
P10	<p><b>Scales of Environmental Justice: Combining GIS and Health Risk Assessment of Tribal Exposure through Subsistence Lifeways</b>  <i>Angelique Hawk-Arachy, Harvard University</i></p> <p>In the Northwest Pacific tribal areas of the Columbia River Basin, fish consumption is important to riverine tribal cultures, and represents deeply held beliefs that have roots in spiritual practices, subsistence lifestyles and community. Therefore, typical fish consumption may exceed levels usually reported for the general U.S. population. A principal exposure pathway of contaminants to riverine tribes is through fish consumption. This study was designed to determine if mercury concentrations in fish in regions of the Columbia River Basin where tribal members fish were high enough to be a health concern. A large Columbia River Basin database on concentrations of mercury in fish, compiled mainly from state and federal monitoring programs, was used to evaluate trends for mercury contamination in fish from the Columbia River Basin waterways for a range of consumption rates. Trends were analyzed on data aggregated by site and by state, using samples of the same fish species. Site-based trends were evaluated from 1999 to 2010.</p>

## VENDOR PROFILES

***Be sure to visit with the vendors, located in the Seacrest Ballroom II & III and open from 11:30 AM on Monday morning through 1:30 PM on Tuesday afternoon.***

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# NEARC BUSINESS MEETING MINUTES

## NOVEMBER 9, 2015 | BURLINGTON, VT

### Board Members Present:

Jeff Amero  
 Brett Horr  
 Leslie Pelch  
 Darren Mackiewicz  
 Emily Wilson  
 Pam Brangan

### 3:20 PM - Meeting was called to order

#### Brett Horr - Welcome and Board of Director Introductions

- Motion - Carol Baker moves to skip the reading of the minutes. Seconded by Stu Rich & Jason Wise – motion passes unanimously

#### Brett Horr calls for the reading of the Treasurers report that is printed in the NEARC booklet

- Jeff Amero reads the Treasurers Report. No questions for Treasurer.
- Motion – Stu Rich moves to accept the Treasurers report as written. Seconded by Paula Lazrus – motion passes unanimously

#### Brett Horr calls nominations for one open NEARC Board seat

- Brett Horr announces that Jeff Amero's term is up and that there is one 3 year term NEARC Board seat.
- Jeff Amero expresses interest in remaining on the Board.
- Angelo Marino nominates Jeff Amero. Seconded by Stu Rich.
- No other nominations.
- Angelo Marino moves to close the nominations. Seconded by Stu Rich. Motion passes unanimously.
- Motion - Angelo Marino moves to have the Secretary cast one ballot for Jeff Amero. Seconded by Jason Wise. Motion passes unanimously and Jeff Amero is elected to the NEARC Board for a 3-year term.

#### Brett Horr asks Lyn Malone for an update of Educators Day

- Lyn Malone gives an update about Educators Day. Highlights: Slightly down on numbers, but made up for it in quality; more proposals submitted than ever before; great planning team; thanks to many

#### Brett Horr opens the discussion about Spring 2015 NEARC

- Brett Horr reviews the 2015 Spring NEARC survey results.
- Brett Horr announces Spring NEARC will be Monday, May 9, 2016 at UMASS Amherst

#### Brett Horr opens the discussion about Fall 2016 NEARC

- Brett Horr reviews the 2014 Fall NEARC survey results.
- Brett Horr announces Fall NEARC will be October 16 – 19, 2016 at SeaCrest Falmouth, MA
- Brett Horr informs the attendees that volunteers are needed for next year's host committee.
- Peter Sandgren commented he would look like to see a Public Health Track. Peter mentioned that public health has its own user's group in CT as a way to reach out. He also commented they are on the NEARC listserv as well.

### **Brett Horr opens Other Business Discussion**

- Brett Horr reminds the group there was a box to put agenda ideas in at the registration desk. There were 2 suggested items. "Review of the Spring and Fall surveys" and "Has the Board considered charging dues?"
- Brett Horr comments that dues would probably change our charitable status.
- Carol Baker asks what we would get as a benefit of the dues.
- Jeff Amero explained how the financials works in a cycle. Jeff Amero states that the account has been going down, not dramatically, but it was a bit healthier a few years ago. Jeff comments that the Board is just trying to break even on the account.
- Angelo Marino does not think we would lose any charitable status.
- Leslie Pelch asks if anyone wants to advocate for the idea.
- Johnathan Croft states that organizations probably wouldn't pay for it. Johnathan Croft comments he would rather see it rolled into the price of the conference – easier to get organizations to pay.
- Stu Rich is not a big fan of dues.
- Carol Baker suggests increasing the registration fee by \$25. Keep it simple. No need to track who is a member and who isn't.
- Larry Spraker states we don't want to be in the money-making/income producing business with dues. 400 at \$10/year – big headache for little benefit.
- Jeff Amero mentions that we try to encourage student participation.
- Brett Horr mentions NEURISA sponsored student presenters at Spring NEARC last year and we hope they will be willing to do that this year as well.
- Jeff Normandin asks the Board what we think of the collecting dues idea. None of the Board members are in favor of it.
- Darren Mackiewicz explains that the Board doesn't pick the rates out of the air – we work with Delaney to look at the trends and past conferences to come up with the rate.
- Stu Rich gives a big shout-out to the Burlington Host Committee!!
- Carol Baker gives a shout out to vendors and reminds attendees to talk to the vendors.
- Brett Horr states we are working on vendor sponsorship for the ESRI UC NEARC SIG (Special Interest Group).
- Larry Spraker suggests adding an option for vendors to be a student sponsor.
- Johnathan Croft asks if there is a student call for papers.
- Brett Horr and Paula Lazrus discuss ideas about how to expand the opportunity for student speakers. Paula Lazrus suggests reaching out to school job centers.
- Pete Steeves suggests offering a critique of student talks and/or posters
- Judy Colby-George mentions the URISA Vanguard Cabinet
- Peter Sandgren asks how the tracks are chosen.
- Leslie Pelch explains how it typically is done – host committee chooses tracks ahead of time – and how it was done this year. Presenters were asked to assign up to 5 tags (from a list) when submitting abstract. Talks were then organized using the most popular tags.
- Stu Rich comments sometimes you will have someone on the host committee that is passionate about a specific topic. They will recruit those that will address that topic.
- Motion - Angelo Marino made motion to adjourn. Seconded by Carol Baker. Motion passes unanimously.

**Meeting adjourned at 4:07 PM**

# 2016 NEARC TREASURER'S REPORT

## AS OF JULY 31, 2016

### Starting Balance August 1, 2015

Beginning Balance **\$71,891.18**

### Income

Fall NEARC 2015 (Vendors)	\$34,750.00
Fall NEARC 2015 & Ed Day (Users)	\$100,945.00
Fall NEARC 2015 (Other Income)	\$5,500.00
Spring NEARC 2016 (Vendors)	\$2,199.54
Spring NEARC 2016 (Users)	\$13,240.94

**Total Income** **\$156,635.48**

### Expenses

Spring NEARC 2016	\$16,182.35
Operational Expenses	\$3,195.10
Fall 2015 Conference & Ed Day	\$106,522.15
Event Management	\$25,523.64
Website Hosting	\$348.00
Fall 2016 NEARC Expenses	\$6,577.86

**Total Expenses** **\$158,349.10**

**Ending Balance 7/31/2016** **\$70,177.56**

Submitted by Jeff Amero, NEARC Treasurer 2015-2016

# NEARC BUSINESS MEETING AGENDA 2016

## OCTOBER 17, 2016 | NORTH FALMOUTH, MA

### AGENDA

- Welcome and Introductions
- Reading of the Minutes of the Business Meeting from November 09, 2015
- Treasurer's Report
- Nominations for 3 Open NEARC Board Seats
- Review of the Pre-Conference GIS Educators Day
- Review of Spring 2016 NEARC
- By-laws amendment discussion
- Spring 2017 NEARC
- NEARC 2017, November 5-8, Newport Marriott Newport, RI
- Other Business

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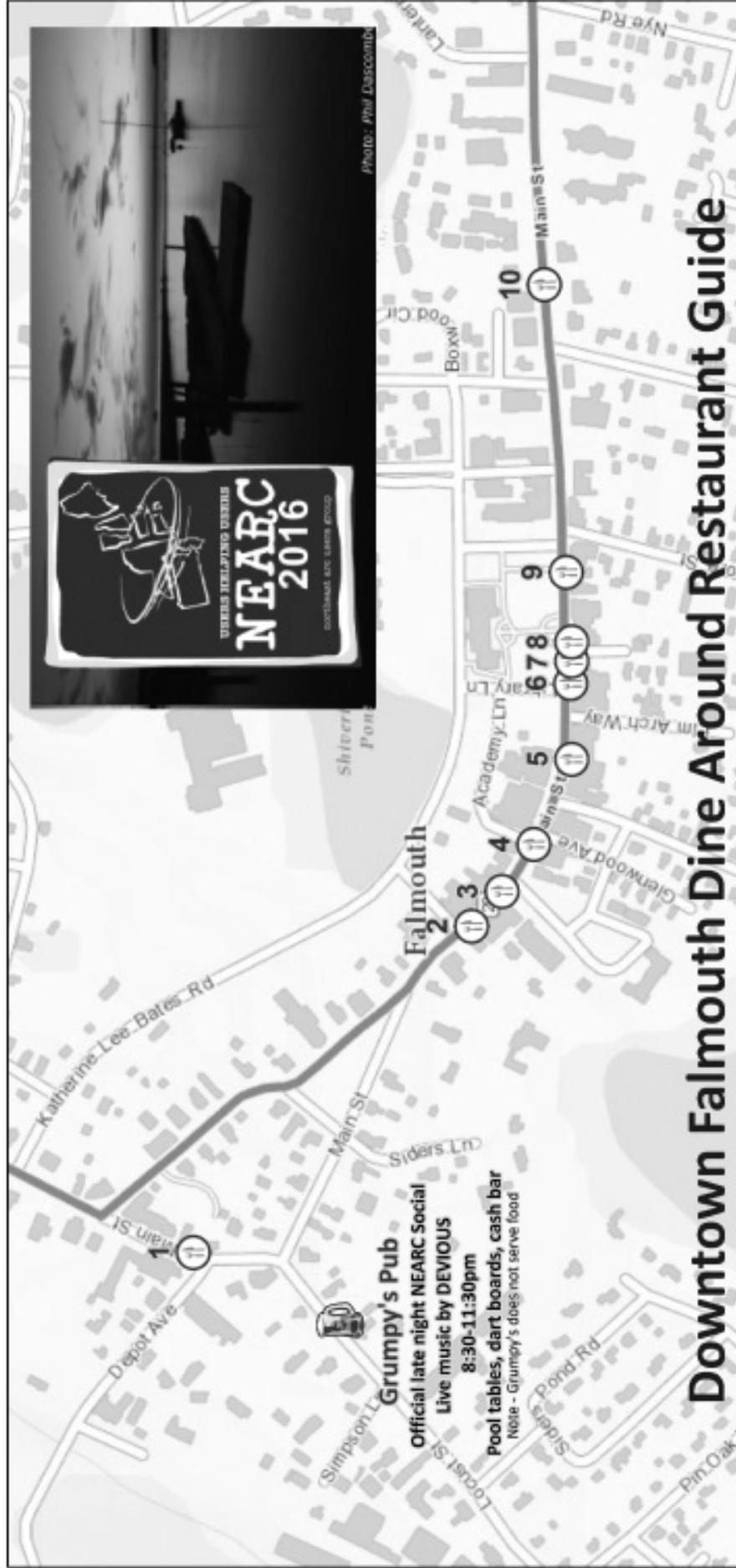
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Photo: Phil Dascombe



**Grumpy's Pub**  
 Official late night NEARC Social  
 Live music by DEVIUS  
 8:30-11:30pm  
 pool tables, dart boards, cash bar  
 Note - Grumpy's does not serve food

# Downtown Falmouth Dine Around Restaurant Guide

<b>1 The Glass Onion</b>	\$\$\$ • Upscale Restaurant Elegant eatery with a 1920s vibe pairs refined New American cooking with global wines Address: <b>37 N Main St</b>	<b>6 Simply Divine</b>	\$ • Pizza Restaurant Delicious hand-tossed, wood-fired oven pies with creative toppings, pasta dishes and more Address: <b>271 Main St</b>
<b>2 Osteria La Civetta</b>	\$5 • Italian Restaurant Housemade pastas and an Italian wine bar in a space with wood-beamed ceilings Address: <b>133 Main St</b>	<b>7 Liam Maguire's</b>	\$5 • Irish Pub Classic Irish fare, draft beers, in a relaxed pub setting Address: <b>273 Main St</b>
<b>3 Quartetdeck</b>	\$5 • American Restaurant Casual spot for mouthwatering bacon cheeseburgers and traditional surf 'n' turf in a historic, nautical-themed setting Address: <b>164 Main St</b>	<b>8 Bear in Boots</b>	\$5 • Gastropub Homemade comfort food from around the world Address: <b>285 Main St</b> ESRI GeoDev Meetup -- 6:30-8:30pm
<b>4 Anejo</b>	\$5 • Mexican Restaurant Hip, contemporary venue featuring Tex-Mex dishes, Mexican-style street food, fantastic margaritas and an array of tequila Address: <b>188 Main St</b>	<b>9 Golden Swan</b>	\$5 • Indian Restaurant Spacious and elegant with delicious authentic eats at a reasonable price Address: <b>323 Main St #1</b>
<b>5 La Cucina Sul Mare</b>	\$5 • Italian Restaurant Busy Italian spot offering pizzas, seafood and wine Address: <b>237 Main St</b>	<b>10 Gourmet Garden</b>	\$5 • Asian Restaurant Chinese, Japanese, Thai and Polynesian cuisine in a spacious setting, plus a sushi bar Address: <b>452 Main St</b>

Check out the interactive Story Map at [gis.camb.ma/2016dine](http://gis.camb.ma/2016dine)



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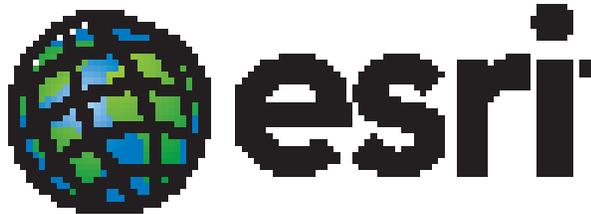
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