

**Minutes**  
**October 5, 2018**

WAC met at the MAPC, 60 Temple Place, Boston

**Attendees/Contributors:**

**WAC:** Stephen Greene, Mary Adelstein, Taber Keally, Adrianna Cillo, Wayne Chouinard, James Guidod (AB), via phone: Karen Lachmayr (chair), George Atallah, Dan Winograd

**Guests:** Wendy Leo (MWRA), Sean Navin (MWRA), Katie Ronan (MWRA), Marcus Quigley (Opti), Kannan Vembu, Souheil Benzerrouk (Canopus)

**Staff:** Andreae Downs

**FUTURE MEETING DATES/TOPICS**

**NEXT:** Nov. 2, Becky Weidman, Toxics Reduction and Control at MWRA.

**VOTES:**

June 2018 minutes approved

**EXECUTIVE DIRECTOR'S REPORT:**

See attached

NOTE that February meeting on schedule will have to be changed, as Steve Estes-Smargiassi cannot make the Feb. 5 date. IT IS NOW SCHEDULED FOR **FEB. 12**

Save the Harbor/Save the Bay invites WAC members and others to the Nov. 13<sup>th</sup> OMSAP/PIAC meeting at Atlantic Wharf, Boston. (Outfall Monitoring Science Advisory Panel/Public Interest Advisory Committee)

**ADVISORY BOARD UPDATE:**

Matt Romero has left the AB staff to work for a MassPort advisory committee. Travis Ahern is returning to take his position. The annual Water & Sewer Rate Survey is underway.

**MWRA UPDATE**

**Personnel changes at MWRA, spring-summer 2018**

Dozens of retirements. Mostly filled by internal hires.

Operations

- John Vetere, one of two Deputy COOs retired, and **Carolyn Fiore's** title changed to reflect that she is now the only Deputy COO.

- **Steve Cullen** became Director of Wastewater, parallel structure to Waterworks (Director is **Mark Johnson**).
- TRAC Director, **Becky Weidman** (replacing **John Riccio**). She came over from DEP where she worked on watershed management.
- Clinton Superintendent – **Larry Thomas** replaced **Bob Gorham** who retired.
- Lab Superintendent – Dr. **Steve Rhode** replaced Dr. **Mike Delaney**, who retired.
- **John Colbert** is Acting Chief Engineer. **Brian Kubaska**, assistant director, engineering

#### Other senior managers

- **Kathleen Murtagh** is the first Director of the Tunnel Redundancy Program. She is a geotechnical engineer from CDM Smith. This new position reports directly to Fred, and the program will be set up like the old Program Management Division that built the Boston Harbor Project. Longtime MWRA engineer **Fred Brandon** was hired as Director, Design and Construction, under Kathy.
- **Carolyn Francisco-Murphy** (was Director of Procurement) is new General Counsel, replacing **Steve Remsberg** who retired.
- New Procurement Director **Douglas Rice** (promotion) – he used to work at DCR.
- Director of Human Resources **Andrea Murphy**, replacing **Karen Gay-Valente** on her retirement.
- State agencies now have to have workplace safety equivalent to OSHA standards, so created a new position for Manager, Occupational Health and Safety. Filled by **Mat Dam** who used to work in TRAC (but more recently at GE).

Lots of openings at [www.mwra.com](http://www.mwra.com) (engineers, maintenance, operators)

#### **PRESENTATIONS:**

##### **Canopus: Souheil Benzerrouk**

Company is 15 years old. Looks to disinfect water without chemicals—have looked at different technologies, from UV (mercury to LED lamps), plasma (which can remove PFAS in wastewater), ozone and advanced oxidation. Also looking at combinations. Currently working with UMass Amherst on full treatment of drinking water in a trailer-sized pilot.

## Our Product Lines



### UVC-LED based system

- Second to market with highest flow rate capability to address broader market.
- Scalable (to address Point-of-use and Point-of-entry)



### Plasma based system

- True differentiator (first commercial product).
- Expected to provide the best performance across a broad range of pathogens.



### Ozone Platform

- Specific to address the aquaculture market, pharma, and specialty paper industry

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## Fouling in Wastewater

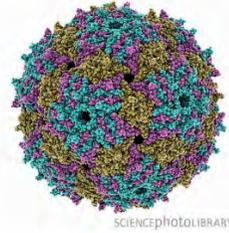
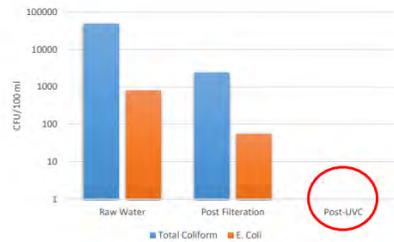
- Mechanisms that induce fouling:
  - Heat induced precipitation of metals:
    - Mercury lamps operate at high temperature (150°C for LP and 600°C for MP) resulting in a significant temperature gradient.
  - Gravitational Settling:
    - Many UV devices are designed for horizontal mounting. In this case gravitational settling causes metal deposits to form on the top surface of the lamp
  - Flocculation:
    - Significant fouling is found in areas of low velocity and where eddies are observed



With NO temperature gradient in the reactor, NO surfaces for settling, and NO obstacles to cause eddies, fouling is reduced to a minimum

As a result of using these technologies rather than chemicals, residual disinfection byproducts are minimal:

## Case Study: Bench-scale Treatment for DBP Control



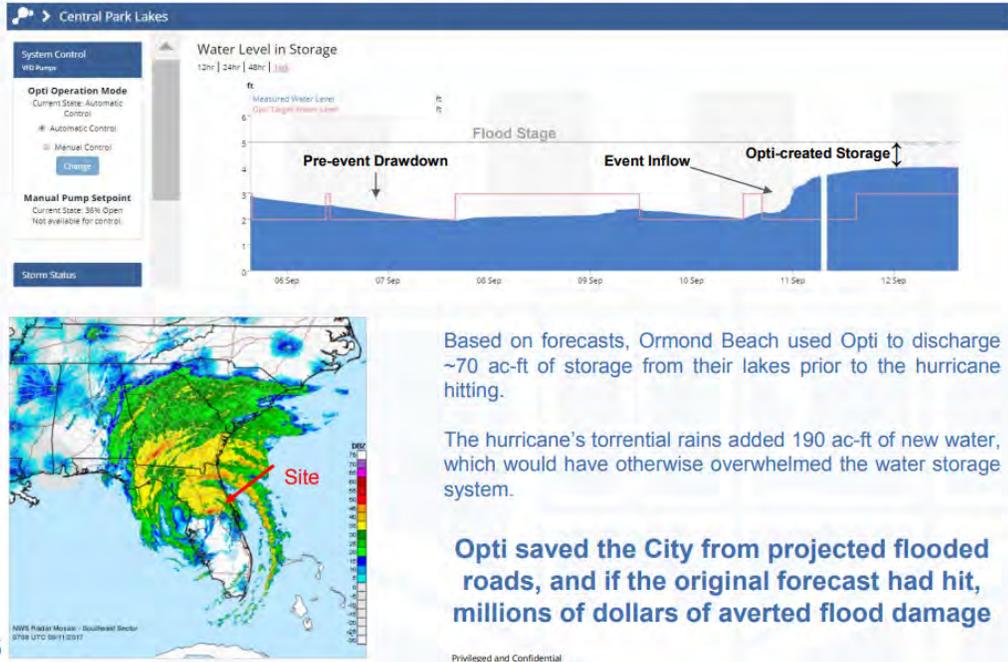
	Total Coliform (CFU/100ml)	E. Coli (CFU/100ml)
Raw Water	48390	782
Post Filtration	2419.5	54.8
Post-UVC (C-UV100)	0	0

### Opti—Marcus Quigley

Using technology to continuously monitor weather & remotely operate storm water infrastructure, Opti, launched in 2014, helps communities in 21 states avoid CSOs using current infrastructure with a subscription service in the cloud (internet).

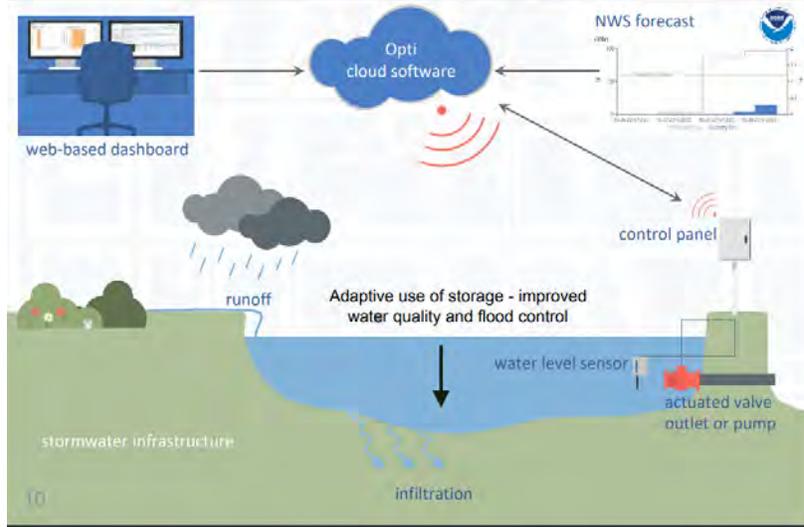
Examples:

# Ormond Beach Florida Opti Prevented Flooding During Hurricane Irma



By using existing lakes, parks, and stormwater infrastructure with remote controls and continuous weather monitoring, Opti can help communities improve water quality, reduce flooding and CSOs, and restore ecological flows.

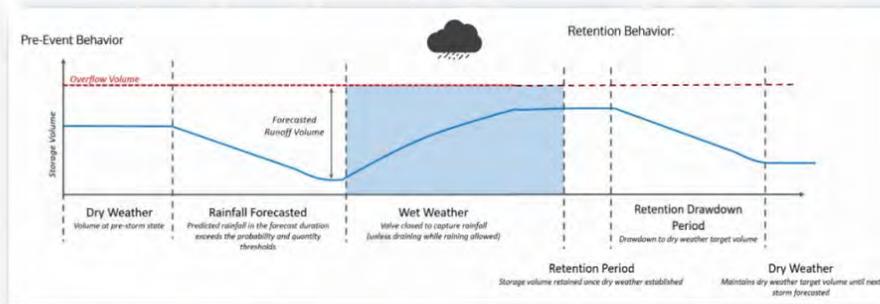
## How Continuous Monitoring and Adaptive Control works



## Example of CMAC Hardware in Suburban Setting Pond Retrofit

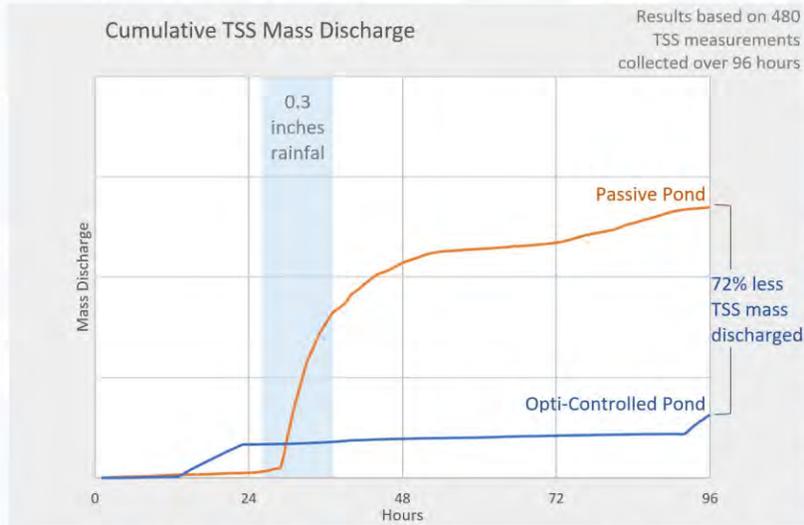


# CMAC Behavior Modes



Albany CMAC Sites are Configured to Reduce Wet Weather Runoff

## Passive vs. Active



## Director's Report

### 9/19/18 MWRA Board

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**Personnel:** MWRA continues to backfill positions opened by promotions & retirements. Also hiring the key team members for the tunnel redundancy project. Doug Rice promoted to Director of Procurement replacing Carolyn Francisco-Murphy who was picked to succeed Steve Remsberg as General Counsel; Fred Brandon appointed as Tunnel Redundancy's Director of Design & Construction

**Orange Notebook:** water use—more than last year, less than drought year of 2016. Quabbin is 98.3% full; Wachusett is a little high. Unaccounted for water has declined significantly as MWRA replaces its steel pipes.

DI maintenance metrics: well within industry standard. Each year a goal is met, it is moved higher for the next. Trend line is improving maintenance over time.

**Budget:** Variances are \$14 m over budget for the fourth quarter, which will go to defeasance. The LIBOR settlement and lower expenses are the biggest contributors. Also, more income from short-term savings accounts.

Overtime is 11%, partly because of high-intensity rain events triggering CSOs—need staff for evening thunderstorms, etc.

**Wastewater:** Cost of sodium hypochlorite is up 25% due to international (mostly Asian) demand, higher pay for truckers (up 10%), and hurricane Harvey closing some sources.

Activated carbon costs up 16%—raw materials from China. Tariffs are impacting here. Seeing in all contracts for supplies.

Struvite & clog removal: tends to form after digestion & can clog pipes. Blockages in other parts of the plant need specialized equipment to clear & dispose of. Gravity thickeners particularly difficult to clear.

Chelsea Headworks change order: \$400K concrete foundation for the new microwave antenna—soil capacity at site requires a deep design, micro-piling. Also need to put concrete rebar at angles of the water main, adding piling to make sure pipe won't settle. Epoxy lining of new channel is complete. New electrical gear is powering up. Early 2019 will be able to open the first new channel. Carbon-only odor control will be ready by Thanksgiving 2109.

HEEC cable: looking to pay during construction to reduce interest and save on the cost of construction.

**Water:** monitoring—includes in communities for total coliform.

## **9/20/18 Advisory Board/WSCAC/WAC joint meeting**

Challenges Ahead:

Fred Laskey:

- Workforce retirements, internal promotions, means MWRA is always playing catch-up and struggles to meet its optimal staffing levels of just over 1,100.
- New OSHA safety standards—have hired a new director to help comply
- Drinking water quality—with warmer water, less turnover, seeing higher levels of total coliform. Issue in Stoneham with e-coli.
- Construction: Northern Intermediate High water main redundancy project going slowly. Alewife Brook Pump Station (sewer) is 79.4% done. Chelsea Creek Headworks is 44.5% complete. Southern Extra High main—making progress, but hit bedrock. Will microtunnel under Rt. 95.
- Metro tunnel (more on that later)
- Wastewater metering upgrade—now pushed out to 2019 while assess whether want to add new meter locations permanently rather than estimate flows, what technology to use.
- Pellet Plant—study
- HEEC Cable—on schedule for completion 12/19
- Wachusett railroad—had a derailment near the Reservoir this summer. Fortunately, no leak. MWRA is trying to buy the rails to ensure better maintenance.
- Climate: studying all headhouses and siphons for proper elevations in light of probable sea level rise.
- Finance: looking to lower debt.

Joseph Favaloro:

Accomplishments: 3.07% rate increase; \$985m 5-year CIP cap Pleased that MWRA had about a \$14m surplus to add to defeasance.

## Challenges:

The Advisory Board has challenged MWRA to get down to a 2.4% increase in rates by 2024.

## Environmental:

Co-permittees

Stormwater (keep MWRA out of the stormwater business)

Outfall monitoring (worried about OMSAP getting into other harbor/bay issues)

CSO assessment

## Pellets:

More are being used in-state (nearly 30% vs. 4%) since Molybdenum limit raised. Now the challenge is Phosphorus—Department of Agriculture regulations restrict all phosphorus. AB wants UMass to test pellets to show that their phosphorus doesn't leach.

TRAC fees—AB thinks it's time they went up to better cover costs

## Legislative:

Get more state involvement in water infrastructure. Working on engaging elected officials and residents with MWRA

Ware River—Mt. biking has let up.

DCR—17-19 positions are paid by MWRA. DCR has not been filling key staff. AB feels that DCR shouldn't be able to use MWRA funds for other expenses if they aren't filling key positions.

## System Expansion:

Crescent Ridge Dairy is connecting to the sewer

Still working on Union Point, aka Tritown, for a water expansion

## WAC

### Accomplishments:

New leadership, new membership

### Upcoming year:

Focus on innovation & engineering.

Looking at common sewer clogs in communities and ways to prevent them with education

Meetings on CSO monitoring, TRAC, MWRA Master Planning, data visualization

## WSCAC

Focusing on MWRA's carbon footprint

DCR forestry

Conservation/drought

Smart irrigation

Still want a 3<sup>rd</sup> party to oversee forestry

## Tunnel Redundancy:

Kathy Murtaugh

60% of daily water demand comes via the non-redundant City Tunnel  
1950s—built 6-70 tunnels. Those valves can't be exercised and are beyond their useful life.

Redundancy will include 2 legs at once—north and south. 14 miles. Tunnel boring machines,  
200-500 feet below surface

Update at October MWRA Board meeting

## 9/28 EBC Climate adaptation—Law & Governance

[https://www.umb.edu/news/detail/umass\\_boston\\_report\\_laws\\_revamp\\_for\\_good\\_governance\\_in\\_climate\\_change\\_era](https://www.umb.edu/news/detail/umass_boston_report_laws_revamp_for_good_governance_in_climate_change_era)

**Ralph Child**, Metz Levin: Boston built on bedrock—also on assumption that climate remains same. Now & future—“stationary is dead.” Law built on precedent will not protect adequately. Need to adapt.

www.resilientma.com

MA State mitigation and adaption plan; city of Boston flood resiliency zoning overlay district. Environmental Bond Bill 2018—authorizes (not appropriates) funds for climate adaptation.

**David Cash**, dean of UMass Boston graduate school of Policy & global studies: Barr Foundation: Green Ribbon Foundation, funding for the studies on climate adaptation/mitigation for Boston.

1. Financing climate resilience
2. Feasibility of Harbor-wide barrier systems
3. Governance for a changing climate

Major challenge will be to communicate well.

Assured of changing climate, but not sure how that will look. Governance needs to be more nimble to deal with it.

Needed from Government:

1. Communicate information for communities
2. Plan and engage stakeholders
3. Prioritize—needs to be transparent, objective, equitable. The poor are disproportionately affected & storms widen inequality
4. Create laws, regulations, policies
5. District-scale flood protection

6. Figure out how to finance infrastructure—avoided uncertain costs in the future—tougher to finance than solar or wind or efficiency—keeping the lights & heat on, keeping the trains & busses running
7. Monitor and evaluate outcomes

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**Key recommendations**

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- Revamp existing tools—Chapter 91?
  - Adaptive management and science — governmental structures that change over time and change rules & regulations to reflect science. New science should change the regulations
  - Think about transformative government tools to meet the challenge
  - Building code
  - New zoning overlay districts
  - Update wetlands protection
  - Increase permitting flexibility— certainty for business
  - Convene a climate research advisory organization—Boston Research Advisory Group—continue/expand. Establish a state-level climate research panel
  - Infrastructure coordination committee—informal coordination now, but could be formally established with an MOU or via legislation
  - Governance for district-scale coastal flood protection—possibly a single organization (they like the MWRA—expand?) New authority? Multi-organization coordination
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**Janet Coit:** DEM of RI—Resilient Rhody: RI’s first comprehensive climate preparedness strategy. RI has sued the oil industry. Oversees fish & game, parks, etc.

Narragansett Bay—primary water body. Cleaned up industrial pollution, but hit 80 degrees this summer. Harmful algae, seaweeds.

Tourism biggest industry.

Seen over 10 inches of SLR since 1930s. 10 more inches of rain. Climate change is here, now, and is affecting people.

EC4—coalition of 11 state agencies, coordinates greenhouse gas reduction goals and resiliency plan—includes health, transportation, planning, emergency management...

Plan: natural systems—wetlands, beaches, barriers, forests, water resources. Protecting natural systems for their services. I.e. Tiverton marsh restoration.

Community health—disasters make social vulnerabilities worse. Need to make connections, communicate, helping communities design own solutions. Used CDC funds for Health Equity Zones—home assistance includes cooling, weather inaction, retrofits.

Emergency preparedness—pre-disaster planning, evacuation shelters, routes, building design. Recognized municipalities for being “storm ready”.

Critical infrastructure and utilities-in harm’s way—water & wastewater, dams, fishing ports

Financing: really challenging—loan, bond and grant programs for climate resilience—suing Big Oil to see if can get \$\$

Actions: partnerships—engage communities

Dam removal—668 + dams, now classified by hazard & likelihood of failure. 96 high-hazard. 6 completed. Mitigates flood risk and restores habitat.

When rebuild state facilities—raise utilities, LEED certified, flood protection, back flow preventers.

Using tools: SLAMM, Beach SAMP, STORMTOOLS—updating

Looking at aboveground tanks, trying to mitigate risk in flood-prone areas. Assessed all WWTP for flood risks, upgraded for resilience.

Funding with a green bond (\$47.3 m), green economy is worth \$25 billion to the economy.

**Barbara Landau**—regulations for rising tide

Who supervises, how finance

E Boston flood adaptation—into water—harborwalks, parks, etc. —need to adapt building code, zoning code, environmental regulations

Building code covers flood protection—overrides local codes, except if municipal codes are more restrictive. Have to apply to state. Never yet successful.

Zoning code (state) prohibits municipal overrides of building code materials or methods.

Chapter 91 (environmental regulations)—protecting the environment from development. But need to also protect development from the environment.

Army Corps regulations—section 404 permits. New York — living reefs off Staten Island. Made a case that project was self-mitigating. Rain gardens and constructed wetlands could qualify if NY can get permitted.

Mass wetlands protection act: one purpose is flood control, preventing storm damage, prevent pollution— can use & look more broadly at protecting coastal interests.

What if we can't adapt regulations? — built environment polluted the water—sandy, Irene, Harvey.

Flood protection can prevent pollution, destruction. Can keep structures and storage of haz mat. Safe, can provide co-benefits—parks, heat island mitigation.

Iram Farooq, assistant city manager—resilient Cambridge—legal & governance challenges

2010 climate action committee recommended that city look at adaptation as well as mitigation. Looking at flooding (SLR, rivers), temperature. Temperature danger zones (e Cambridge, MIT, Harvard square, alewife area, porter square, “quadrangle (north of fresh pond). Vulnerability assessment—flooding, heat. 2030, 2070. Identified key physical assets, biggest areas of vulnerability.

Climate Preparedness plan: social resilience, buildings, infrastructure (speedy recovery), ecosystems.

Looking for strategies that benefit all areas—resilience, net zero plan, envision Cambridge—comprehensive plan (livability, equity, diversity, economic opportunity, health & well-being).

Flood elevations—moving target—based on current science, but we know new knowledge may change this. Assuming 3.4 ft. of SLR by 2070. Could be better, but also could be worse. Currently, events match the most extreme change predictions. Another challenge is the probability of both storm surge and heavy rains—now factoring them together since that matches Harvey and Florence. Know don't have perfect information, need to keep revisiting, but can act now.

How to adjust to new flood elevations? Now need to think about streetscape, and raising first floor—raising sidewalks 4' up near stores. Can require elevation, but not resiliency. Ask nonprofits to do these things, harder for others. Ability to regulate stormwater—so ask to go above and beyond. DPW strong partner for this.

Dams protect Cambridge until 2045 (Amelia Earhart), and 2065 (Charles River dam). Solutions need to be collaborative across municipalities. Need new models of governance for regional regulations.

**Rep. Kristin Jacobs**—south Florida. World changes as things you can't do become possible. Just keep moving in same direction. Ex. Dir, of Resiliency Florida. Business and government non-profit.

Getting hit with 1,000-year storms (2x one year). King Tides are flooding south Florida 2x month. Know that property damage is mostly along coasts, inland, where people are moving. Electrical generation. Potable water saltwater intrusion—municipal water systems are having to

look beyond their borders. Same happens with hurricane shelters not built for regional needs. State spends .04% of budget on water—far too little. Not caught up to 2007. 11% on transportation. Issue is also political—folks in power who can't say "climate change." Legislature & governor not moving, but cities and counties are taking on pragmatic projects. Regional collaboration—public & private. Adaptation action areas—changed building code for certain areas. Seawall liens. Raising habitable levels of buildings. Retrofitting for tidal flooding. Raising the electronics for sewer pumps. Building dunes, seawalls. Climate task forces for 4 counties working together—1/year meeting. SE Florida regional compact on climate change. Adopted same assumptions & revisit them—bring in all the new electeds to make sure that projects pass. Involve counties, cities, academia, nonprofits, religious, media. Insurance is now an issue for effects that investments on public assets have on the private sector.

Elected officials need to put things into play. Find some champions. Educate the legislators' staff—make sure are on-board. Understand colleagues. Be respectful of other points of view. Listen. Be flexible and gracious. Make law with a good majority. Back off to make sure bring everyone along. After bill passed—don't let words get in the way of passage.

[Kristin@resiliencyflorida.org](mailto:Kristin@resiliencyflorida.org)

Embrace media—failure is going to happen & can't envision everything. But know that we need to try. Manage expectations.

Need business community—engage early.

Mitigation—not focus of panel, but is part of what each does. Garbage and food waste are part of mitigation.

NE buildings change about 1%/year. Need to advance by regulation or by innovation. Zero energy buildings? Created 1,000 exemplars. Can government incentivize?

Adaptation—for every \$1 spent, save \$6. Saw newer mobile homes survive the last hurricane. RI—retreat is an option, rather than fortifying. Need a big buyout fund for when nature reclaims an area.

## **10/2 Water Infrastructure Alliance**

State's Water Infrastructure Committee—still meeting.

Imagine a Day without Water 10/10/18

Social media campaign with materials out by 10/3. NEWater Communications Collaboration. Region-wide communications across DPWs. Positive public outreach. Guides for open houses, etc. No water no beer.

Marijuana industry-may have implications for water pollution/TRAC

Supplemental budget FY2018—letter about ready to go. WAC has signed on. UCANE taking the lead. \$30million for Clean Water Trust included. House and Senate are still working on how to move forward. Have until Oct. 31<sup>st</sup>. One legislator can block this—it doesn't need a public hearing. Area impacted by the gas lines may be part of the supp. Budget. UCANE pressed the issue of utility coordination, so when replacing gas not ripping up same street later for water. Currently, \$1b surplus.

Air BNB legislation (surtax that could be used to fund sewer infrastructure on the Cape)—passed and Baker sent back to legislature with minor language changes. Should get passed.

Lead disclosure legislation is still pending. Passed the senate, but stuck in house. CSO notification bill still alive. Significantly rewritten. In other states where this has passed, it's helpful in creating more investment for wastewater infrastructure. (Mass Rivers research—can share).

Next session—> asking Dykema to file bond bill again.

CPA model—can raise up to 3% for a water fund, with a state match without an override.

UCANE—utility infrastructure coordination—gas AND water. Same hole, fix both. Real vulnerabilities have to address anyway—tie to MVP. Identify urgent needs/disrepair—a way to leverage more for MVP communities—doing a comprehensive plan.

Removing “flushable” from wipe labels?

Event for new legislators early in 2019? Talking with MAPC—freshman briefing on water.

MMA tracks renewable energy, recycling, public works grants—roads and bridges.

MassWorks grants can be used for water & sewer projects.

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