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Water Quality Working Group Notes 2015

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Casco Bay Plan Revision – Water Quality Working Group Meeting

January 13, 2015
1:00 – 3:30 pm
211 Wishcamper Center, University of Southern Maine

Attendees: Tamara Lee Pinard (Cumberland County Soil & Water Conservation District); Peter Milholland (Friends of Casco Bay); Scott Firman (Maine Water Environment Association, Portland Water District); Susie Arnold (Island Institute); Kathleen Leyden (Maine Coastal Program); Ivy Frignoca (Conservation Law Foundation); Martha Shiels (New England Environmental Finance Center); Lisa Cowen (Studio Verde); Megan Sims (Maine Healthy Beaches Program); Jim Dusch (Maine Department of Environmental Protection); Don Witherell (Maine DEP); Jeff Dennis (Maine DEP); Peter Newkirk (Maine Department of Transportation); Paul Hunt (Portland Water District); Peter Lowell (Lakes Environmental Association); Mel Cote (US Environmental Protection Agency, Region 1); Allison Sirois (Maine Department of Marine Resources); Jeff Edelstein (Edelstein Associates); Curtis Bohlen (Casco Bay Estuary Partnership); Erin Love (CBEP, Island Institute); Marina Schauffler; Matt Craig (CBEP).

Major Threats

What's most threatening to Casco Bay's water quality?

- Ocean acidification
    - Look at the different factors. What about the parts that we cannot do anything about – e.g., regional and national scale issues? Need to at least acknowledge that some aspects of these issues are beyond our local control.
- Nitrogen / inputs / overload
- Sedimentation and runoff from stormwater
- Temperature increases
- Increases in precipitation.
    - Not many rivers gauged in Casco Bay. Flows will influence acidification, salinity.
    - Lack of gauges limits ability to model Casco Bay circulation, etc.
    - Impacts [on biota]?
- Data gaps
    - Casco Bay is not homogenous. Need more site specific information. Cannot assume each part of the Bay is the same. Need more data.
    - Linkage to land. With most assumed models and perceived models, what we do in land is important. Need more data to address specific issues.
    - Impervious cover - need more data on impacts to document impacts of impervious cover on Casco Bay.
- Bay circulation.
    - Need to improve circulation models

- Public awareness.
    - Is there sufficient public aware and by-in? For the Bay? For the entire watershed? Need to develop common themes / common awareness [campaigns] examples: The Ducky ad; milfoil. Need this kind of common understanding if we are to change policies or behaviors.
    - What is the overall health of Casco Bay? Does the public understand where we are today?
- Combined sewer overflows (CSOs)
- Challenges at multiple levels - -State, municipal. Need to connect with tangible things that matter to our communities. e.g., link ordinances and to water quality.
- Waste water treatment plants. Look ahead. Will need to expand of waste water treatment facilities (WWTFs). Tie to population. That's a threat [to the bay] for the long term. Population growth and increasing sewage discharges is already an issue outside of Casco Bay. This affects the size of closure areas around discharge points, etc. May also affect perceived water quality. At what point will that affect how the bay is perceived? [Local reputation, tourism, sense of place, local economies, etc.]
- Infrastructure that needs replacement. How are we going to fund that investment? We will need to prioritize these issues, [or costs will skyrocket]. How do we take things on [in sequence]?
- Plastics and marine debris
    - Are Nanoplastics a concern?

What can be done to address these threats?

- Better understand people's roles, facilitate municipal action, non-profit. Getting them to do more. There are holes in what is getting done, as well as duplication. We need to get more organized.
- Low impact development (LID).
    - Still a lot of hesitancy on LID and things like conservation subdivisions. How does the market view those approaches? General assumption is that market does not like them. Don't overlook real estate, development, and lending communities. Ned to think about the market forces that support LID / conservation efforts.
    - It's always cheaper to do new development, but there is lots of evidence on the cost effectiveness of LID techniques. There is a recurring problem with acceptability. The Portland stormwater utility will push LID.
    - Need to consider rules at the state level. The guiding docs at the state level are prescriptive, and make LID [especially creative uses of LID] difficult.
    - We now do a pretty good job getting BMPs on the ground that have LID components. We don't do so well on implementing the planning and design components of LID. Those components of LID are still not widely used…Minimizing impervious cover, protecting sensitive areas
- Policies should push better versions at time of replacement of infrastructure - -e.g. use of pervious pavement, properly sized culverts

- Focusing on Portland and the core communities. Increasingly recognizing that leadership from a couple of communities can lead to regional change - -example of the plastic bag ban. Portland was the leader, but other towns are now also looking onto the idea.
    - A related concept come up during the Communities discussion – a municipal "Report Card" show who's doing what, give visibility to leaders, emphasize best practices.
- Identify sources of nitrogen
- Cost/benefit (cost effective analysis) of different nitrogen control strategies might be important. We need to look for the best bang for the buck, considering land conservation, development, WWTFs, and stormwater retrofits together.
- We have mixed pollutants with sources. We might want to look at what sources are best to go after. Stormwater has been popular – in part because it is hard to address
- Messaging – to different audiences. We know about all this stuff, but how do we get it across [to target audiences] regionally?
- Consider opportunities for remediation, such as preserving marine photosynthesizers like eelgrass, or using seaweed or shellfish aquaculture to reduce nutrients in the water column. Place shell hash back into tidal flats to reduce effects of acidification of the flats.
- Develop a clearing house of where data is available. A data warehouse where we and the towns could go and learn of what's going on.
- How do we fill in the data gaps?
- There should be opportunities to work with municipalities to improve on these things. For example, don't require large parking lots
- Standardized (volunteer-based) monitoring protocols have been used elsewhere….
- Leverage existing resources. Example - Northeast Ocean Data portal. Make sure we leverage those (and related) efforts
- Involve the development community - very important.
- Developers interested in phosphorous impact fees, transferable development rights (TDRs)
    - Make clear that these are cost-effective tools. These ideas [and others like them] have not been marketed effectively. Local communities sometimes create barriers to implementation. Should emphasize making these things an option [throughout the region].
- A lot of standards come across as "here's what you have to do". We need to create a menu of options. We have many developers who would be interested and can be sensitive to resource concerns. Lots of data supports the idea that people support environment. That should be captured in markets but need to simplify regulations dramatically.

[Break]

Following the break, CBEP presented the group with a list of topical categories for breakout group discussions based on the large group discussion about threats and solutions. The themes were:

- Nutrients (nitrogen) and acidification
- Data gaps

- Development / LID / land use
- Other pollutants – legacy contaminants, bacteria, Nanoplastics, pesticides
- Prevention – Protection / green Infrastructure
- Remediation (e.g. aquaculture, shell hash, woody debris)
- Data management and delivery [to key audiences]
- Outreach

Following a discussion about whether to prioritize these themes, a consensus emerged to combine related topics into breakout groups, and drop outreach as a stand alone topic, recognizing that it was a tool. The modified breakout group categories were:

- Nutrients (nitrogen) and acidification [combined with] Other Pollutants
- Data Gaps [combined with] Data Management/Delivery
- New development and LID – preventative, protection, green infrastructure
- Existing development and land use – remediation on the land, in the water

Goals - Small Group Discussions

Transcribed notes for each breakout group follow.

1. Nutrients / Acidification / Other Pollutants Small Group Discussion Notes

- More instrumentation to monitor acidification
- Can't this just be as simple as just saying we need to reduce nutrient loading?
- Do we understand the loadings? Like the role of response indicators in Maine's [still not approved, freshwater] phosphorus standards. A similar concept [of response-based standards] would be useful [for marine nutrient standards].
- What's the goal of N reduction? Where is it coming from? Why do we care? What [harms] are we trying to avoid? A quantitative understanding the goal matters for [selecting] tactics [for nutrient reduction]. E.g., how much do we need to address [different sources]. Cost-benefit analysis. And getting rid of N where we need to get rid of it [to avoid harms]. [This was an explicit call to be clear on the benefits of N reduction, coupled with some geographic refinement]. Still, we need to minimize new development [impacts] as much as possible
- Information needs to feed into communications. Make it clear why we care. Also, need to track relative contributions [of different sources]. What are the things that will impact nutrient loading? What are their relative contributions?
- Nitrogen science in the next five years. What kind of eutrophication are we looking at? Is this a problem now? A potential problem for the future? How will temperature changes affect eutrophication? Where do we expect to see impacts? Light? Water clarity? Acidification? Toxic algal blooms? Are we concerned primarily about effects of plankton, or of periphyton?

- CBEP could support the conversations. Discuss what the solutions might look like. Removal on N from WWTPs is expensive.
- Agriculture? Farms are fairly rare, and typically small in Casco Bay watershed, especially the lower watershed. But agriculture in the region is changing, and this is an area that may grow in importance in coming years.
- It's worth remembering that many [Agricultural?] BMPs do not do as well on N or P removal as they do on some other pollutants….
- Other pollutants. What are the issues for Casco Bay on bacteria? There's been a lot of interest in pet waste from Portland and South Portland. Bacteria issues have significant public health implications. Many stormwater BMPs not effective against bacteria and nitrogen --exception – gravel wetlands. Pet waste campaigns may be of greatest value as part of a larger campaign of public engagement in protecting water quality.
- Let's revisit the remediation ideas. The OA report includes some explicit ideas for remediation of acidification. It also identifies some regulatory barriers that may get in the way of implementing remediation. E.g., it's very difficult to get permits to transport and place shell hash into tidal flats. CBEP could help support pilot projects for shell hash placement
- Photos and images of clam spat that dissolves/ disappears. These are dramatic images, which people understand. They "get it". How do we develop similar information to engage people in finding a solution?
- Discussion of Portland CSO program / stormwater fee marketing campaign
- Gather stories from people who grow up in Portland in an era when we could not / should not swim in Casco Bay. Make it clear that things are better, and that access to the water matters to people.
- Bacteria discussion continues. Should there be more heat placed on coastal bacteria issues? Bacterial contamination is very much interconnected to other water quality issues (stormwater, CSOs, etc.) But we need to recognize that in terms of high bacterial events, rainfall is a key driver. [Not only because of CSOs, but also for other, often unexplained, beach closures and shellfish bed closures].
- DEP's OBD removal programs have been quite successful, and continue. But "all the easy ones are done". It has gotten to the point where remaining projects are more difficult and more costly. We need more resources to push for continued progress.
- Infrastructure issues – cross connections. WWTPs and OBDs have closure areas established to protect public health. That's hard to discuss / explain. The water quality generally looks good, but DMR has to have a closed areas to protect public health in case of problems.
- WWTPs - -what could plants do? Where will they have to put their resources to meet future WQ goals?

Summary

(1) Reduce nutrient loading
(2) Develop science and articulate goals and communicate purpose of reducing nutrient loads to Casco Bay.
(3) Support regional conversations how to address water quality issues - especially nutrients. Multiple potential avenues for nutrient load reductions, but different strategies have different cost implications, and require actions of different people and organizations.
(4) Work with agricultural community (as necessary) to address regional change in agriculture and minimize water quality impacts.
(5) Bacterial pollution continues to be a problem.
(6) Regulatory barriers may impede certain creative solutions to water quality problems, like in-situ remediation
(7) Pilot projects are needed to look at the effects of proposed remediation strategies, like placement of shell hash to address acidification on tidal flats.

[Another topic that came up, but we failed to flag in our meeting summary was the problem of long term infrastructure needs and replacement for water and wastewater.]

2. Data Gaps & Data Management/Delivery

Threats

- Water temperature increase is the one unifying factor that threatens all of Casco Bay and the watershed
- The biggest water quality issues in Casco Bay have yet to be identified, at least spatially, because we are not looking at the right scale or perhaps the right locations. The estuaries and "transition areas" have been neglected [under-studied]

Goal – work toward developing nutrient criteria for Casco Bay

- More communication between water quality monitoring entities for efficiency, to address gaps, and to make use of limited funding and staff resources
- Develop a clearinghouse of what we have for water quality data, who has it, what format, how much, quality
    - Would inform where the gaps are
    - Identify and compile work has been done, but where is it?
        - CBEP did this 10 years ago – Lee Doggett.
    - Federal, state, local
    - Wells NERR work, Bowdoin work, pull it all together
    - Can get notes re. work to pull work together into a centralized database. Haven't come to fruition because incompatible data.

- Follow up on GOMOOS effort to create a data portal – ended up falling off. Work of identifying who has what has been done, but to go further and make it accessible is a harder task. Contact Tom Shyka follow up – are these available, where are things at.
- Identify organizations, agencies that have data and have them provide what they have (format, quality, etc.) then identify what additional data that we need
  - Bowdoin, Bates… more local resources. Feds, NOAA, ACOE, Coast Guard
- Frustration – many of the models use data developed in the Potomoc River
- Review historic data. Are we comfortable with historic data. What is the state of long term baseline parameters – pH, temperature, salinity?
- Good for Casco Bay, not as good for other parts of the state

- Develop enough data to calibrate, validate, and utilize flow, concentration, response models (WQ, nutrient, circulation, tidal)
  - Address data gaps
    - Transition areas/estuaries
    - Develop flow data from Presumpscot, Royal.
      - USGS gauging station to allow accurate loadings from the watershed and calibration of water quality models
    - Determine how the health of rivers and streams affects ecosystem function in the larger Bay. Need a bottom-up assessment
    - How will current and projected storm events will affect the periodic freshening (and acidification) of estuaries and coastal areas to predict how biota might respond
  - Tidal circulation
  - Bay is complex – there are still places around the bay that we don't know as much as we need to. Nutrient loading – we don't have a handle on that. FOCB goes up to head of tide. Royal, Presumpscot, Harraseeket – pretty far up in the estuaries. Kennebec doesn't get talked about. Has a strong influence on eastern bay – there is a gauge on the Kennebec.
  - 6 dischargers for modeling of nutrient criteria
  - DEP focus areas for nutrient modeling
    - Fore River – good handle there
    - Presumpscot – Falmouth, Westbrook/Windham, Peaks, East End/Portland
    - Falmouth, Yarmouth, Freeport

Goal – Establish high resolution sentinel monitoring sites

- Need high resolution, comprehensive monitoring of physical, chemical, biological parameters at sentinel sites throughout the Bay.
- Use National Estuarine Research Reserve system SWMP model; incorporate recommendations from NERACOOS Sentinel Monitoring work group
- Engage college students in water quality science & monitoring

Goal – Assess marine habitat restoration potential

- Need for more comprehensive monitoring that more completely assesses the variety of parameters needed to determine habitat suitability in the present and future
- Investigate potential for neutralizing acidic flats with shell material
- Marsh habitat protection with "living shorelines" should be explored

3. Preventive Measures: Land Protection, Green Infrastructure, Low-Impact Development

5-year goals:

- Foster more collaboration between scientists and communities, potentially in partnership with the land trust community
- Engage developers and engineers in jointly developing better LID guidance for Maine (focusing in on approaches that are cost-effective, feasible in cold climates, low-maintenance and widely applicable)
- Focus public actions on approaches that have greater impact, rather than feel-good measures that are not particularly effectual (*e.g.,* rain barrels)
- Generate more LID demonstration projects (*e.g.,* at schools) and "success stories." Disseminate these stories to help reduce current misconceptions (draw examples from elsewhere as needed—as long as they're cold climate settings)
- Help distribute the results LID/green infrastructure research already done in the region (*e.g.,* work on economic and water-quality impacts done by the UNH Stormwater Center)
- Provide incentives and support for municipalities to more actively pursue land protection and water quality protection measures
- Create more demand for LID techniques in the region so that manufacturers like asphalt companies have enough of a market for porous pavement
- Generate more support for land protection and forge more alliances with land trusts to direct efforts toward tracts critical for watershed protection
- Explore ways to incorporate more economic incentives for better stormwater management, LID, voluntary land protection

Possible actions:

- Create a toolbox (or incorporate in some larger municipal toolbox) guidance for towns to help them map lands with the maximal ecosystem services that merit protection. Include case studies of communities and developers that have successfully saved money doing LID (incorporating geographic and economic diversity in the examples)
- Encourage towns to undertake a self-assessment on land protection/water quality measures that help them see how they compare to other communities
- Distribute LID guidance to more developers, engineers and consider having some sort of certification for those that adopt significant LID measures.
- Create a Land for Casco Bay's Future Fund where local land trusts within the watershed could get modest grants to help provide "local match" on larger grant requests to complete land conservation projects (*e.g.,* helping fund land protection around Sebago Lake, reducing the need for a costly filtration plant). Businesses that benefit from clean water (e.g., hospitals, breweries,

industry) could make voluntary contributions. The fund might be established within the Maine Community Foundation, with a board created to review projects and award grants.

4. Existing development and land use – remediation on the land, in the water

The existing development breakout group came up with the priority actions (next 5 -10 years) listed below to address the overarching goal of reducing loading from existing development (**bolded** items were the reported out actions; additional information conveys the group's discussion points)

Develop and implement a strategy for getting compelling information in front of municipal decision makers, engineers, and contractors.

- Show economic benefit of implementation of retrofits; use of green infrastructure; and use of LID principles in design.
- Demonstrate economic advantage of providing treatment when doing reconstruction of roads.
- Use studies such as LEA's that documented 40% failure rate for installation of planning board approved design plans to highlight the benefits of having the planning board require third party inspectors during construction.
- NOTE: Need to think about what is the role of the Partnership – influence policy or information source for municipalities, engineers, and consultants? (we did not answer this, merely raised the question).
- Enforcing existing rules and ordinances – think about statutory changes & what might be important to achieve the goal [thought process is that we don't need new rules; there is a lot in existing state and local rules, but it needs to be understood (local planning board level needs to understand that they can ask for third party inspectors for construction, for example) and enforced (both local and state level)].

Build mechanism for funding – one of the most effective ways to address the impacts from existing development is to retrofit the existing landscape. This takes money.

- Do everything in our power to ensure Portland is successful w/stormwater service charge (success breeds success).
    - Local feedback regarding the Portland service charge focused on the need for Portland to ensure that the money they are spending is actually having positive impact on water quality.
        - This speaks to the need for a better understanding of the impacts on Casco Bay from the City of Portland's streams and rivers so that Portland can allocate their funding in the most effective way possible to positively impact Casco Bay's water quality.
    - Provide support to educate the service charge payers about the positive water quality work that Portland is undertaking.
- Sponsor a regional Does It Make Sense (DIMS) study – this will involve bringing the municipal decision makers (council & staff) together and identifying what the greatest barriers would be to regional implementation of a stormwater service charge.

Set up a clearing house/group buys for porous pavement – one of the greatest barriers to using porous pavement is cost; facilitating large batches of porous pavement will reduce the cost.

Build system for regional maintenance and management of assets/stormwater infrastructure

- Maintenance cooperative to meet the changing maintenance needs of maintaining green infrastructure
- Identification/mapping of stormwater infrastructure
- Provide tools to local municipalities for asset management (lesson learned touted by Portland Chamber re: Portland stormwater service charge – "let this be a lesson regarding the cost of deferred maintenance").

Expand use of green infrastructure and LID design principles

- Explore opportunistic opportunities with redevelopment – redevelopment can be some of the best opportunity to provide treatment, but developers might be hesitant to
- fund pilot projects
- Bring technical assistance/best practices to the community level
- NOTE: How can we catalyze this work?

Support continued success of ISWG

- Group felt that ISWG provided an avenue for discussion, dissemination of information, piloting new ideas (GI, LID, regional funding mechanism, etc.)

Act locally, think Casco Bay – make connections between existing development and impact on Casco Bay (I neglected to highlight this in the report out).

- Successful local action as impetus for regional action – ripple effect. Report card concept with listing of municipal best practices to encourage widespread adoption.
- Funding for infrastructure upgrades.
- Clearinghouse of data – place where municipality can go to see how their water resources are doing. Incorporate shared symbols of good/bad (i.e., green = good, red = bad).
- Ultimately need to identify data gaps and develop and implement a strategy for filling data gaps.

Flip Chart Transcript

Challenges / Threats:

- Ocean acidification
- Nitrogen inputs/overload
- Sedimentation runoff/ stormwater events
- Temperature increase
- Freshwater/ increased precipitation
    - Lack of adequate gauges-lack of trend information
    - Inhibits monitoring efforts
- Casco Bay not homogeneous-need more place specific information/data on different scales
- Need more data on impervious cover and runoff impacts from this
- Improved modelling of circulation patterns
- Marine debris and microplastics (nanoplastics)
- Public awareness/perception of water quality problems in watershed – Need a shared awareness (symbol, logo, identity)
- Combined sewer overflows (CSOs)
- Better understanding needed of land-water connections and impacts (land use impacts on bay and the supporting science)
- What is overall health of the bay where we are now, what needs to be done
- Better understanding roles of different partners (MUNICIPAL, NGOs)
    - Gaps, duplication –need more synthesis
- Building municipal infrastructure systems that support water quality
- Identifying/acknowledging what elements, influences we can't control
- Population increase impacts on wastewater treatment-potential effects on shellfish beds (anticipating capacity challenges)
- Neonicotinoids – shellfish impacts, pollinators (class of insecticides used quite widely)
- "Legacy" issues of pollutants and toxic contaminants in particular parts of the bay
- Bacteria-key in first plan
    - Sediment oxygen demand (SOD)
- Sediment/dissolved oxygen (mill legacy)

Regional Responses / Ways to Address:

- Successful models like Long Creek RDA – replicate with other impaired urban streams
- Nutrient criteria – nitrogen, phosphorus
- Greater investment in land conservation/green infrastructure – preventive approach
    - Get better balance of investment here
- Hesitancy at low impact development with smaller municipalities
    - Developers-market forces for LID, common of lenders-engineers need to be informed
- Almost always incorporating LID in new development. A lot of misinformation about costs/feasibility
- Rules at state level- inadequate LID provisions

- Cost/benefit analysis for nitrogen inputs and other pollutants
- Incorporate measures when municipalities make changes anyway (culvert replacement, porous pavement when repaving)
- Ripples outward from measures like plastic bag ban (municipalities following lead of those taking progressive actions)
- Report card concept – municipal best practices. Show where each is with these in some sort of matrix
- Funding for infrastructure upgrades (depends on public understanding of how important the work is)
- How do we prioritize with so much that needs to be done? Stormwater part challenging here
- Exploring legislature and other means of advancing LID, green infrastructure
- "Messaging"- how to convey for different audiences
- Remediation- preserving native photosynthesizers (eelgrass)
    - Shellfish/algal aquaculture
- Better sense of what is out there for data
- Regional information cleaning house- "data warehouse"
- Shared symbols/color coding of what is good and bad
- Filling in data gaps- coordinated approach
- Many BMPs now include LID, but sit design is still an issue (protecting sensitive areas)
- Ordinance changes (parking lot size, vertical growth) – Casco Bay could use stronger measure than other parts of the state
- Linking into the National Ocean Plan – Northeast Ocean Data Portal
    - Leveraging opportunities
- Marketing to/involving development community more – transfer to development – give them a menu of options
    - Simplifying guidance to developers
    - Getting their buy in – Need to understand many techniques are cost effective