Overview/Panelist presentations

On Wednesday, November 1, 2017, more than 100 members of the Squam community met to address the concern of recent findings of environmentally significant levels of persistent organic pollutants (POP) in sediments of certain streams draining into Squam Lake. The SLA, in partnership with Plymouth State University's Center for the Environment, cohosted this panel discussion to address concerns Loon Preservation Committee's work uncovering toxic contamination in unviable loon eggs and Squam Lake tributary sediment.

The panel was moderated by CFE director and SLA board member Joe Boyer. The panel of experts included SLA Executive Director EB James, LPC Executive Director Harry Vogel, Dick McGrath, Principal Environmental Consultant with the Isosceles Group, Ted Diers, Watershed Management Bureau Administrator for NH Department of Environmental Services, and Bob Lucic, SLA board president and attorney with Sheehan Phinney.

Each panelist was invited to give a brief presentation. EB James began by explaining that "Squam is ours to lose." While the SLA has been monitoring water quality on the lakes since 1979, the current monitoring protocol does not test for POPs. As the watershed group for Squam, this is an important issue to the SLA. EB provided a summary of SLA's work including the Squam Watershed Report, the Watershed Plan, water quality monitoring, milfoil removal, advocacy with the recent loon and lead law, and inform the public on the hazards of lead in the environment, and work protecting loons through the Loon Chick Watch program. EB also highlighted the importance of partnerships in all of the SLA's work.

Harry Vogel of the LPC, followed with a presentation summarizing the LPC's work on loons and the POPs identified in the Squam Watershed. (Link to squam lake loon initiative and DES report here). To summarize, the LPC began testing unviable loon eggs following a dramatic decline in the Squam loon population in 2004-2005. Eggs were tested for a host of different contaminants, and high levels of PCBs and flame retardants were observed. As part of the effort to pinpoint contaminant sources, the LPC began testing sediment in select tributaries and found high levels of PCBs in a tributary that drains Kesumpe Pond and DDT in sediment in Bennett Brook and a tributary that drains from Eagle Cliff. (REFERENCE REPORTS AGAIN.)

Dick McGrath presented information on a PCB remediation project he has worked on in Massachusetts Hoosatonic River, which is one of the most PCB contaminated rivers in the country. The Hoosatonic project included a wildlife study that looked at the effects of PCBs on kingfishers and osprey. According to Dick, the situation in Squam is not good, but it could be much worse, as is experienced in the Hoosatonic. PCBs levels in the Hoosatonic are much higher than what has been measured in Squam; Hoosatonic River PCB levels were measured in parts per million, while Squam samples were measured in parts per billion. He mentioned the disconnect between expected impact to birds using toxicology literature and models with actual field assessments of populations. Even at high PCB levels, they could not document impact to community. Dick showed how many samples were taken in the Hoosatonic, and that there is a huge variety in samples both spatially and temporally. He recommends more extensive sampling to understand the extent of the POP in Squam and also recommends a much cheaper "screening survey using the much less-expensive Method 8082 (Aroclors)" and then going back to address impacted areas with comprehensive Method 1668. He is of the opinion that there is insufficient data to link the decline in the loon population to the toxic substances measured in the Squam

Watershed. More information is needed about specific test locations. More samples and study are need as there are many unanswered questions.

Ted Diers from NH Department of Environmental Services was the next to speak. He began by stating that he is convinced there is an issue with the loon population on Squam and there is a reason to be concerned. He emphasized that DES is also a public health agency. He explained that DES receives most of its funding from federal sources, and the situation on Squam falls between the cracks of federal funding programs. Ted addressed the concerned about the impacts of the POPs on human health. He said it is safe to wade and swim in the lake. Currently the measured levels of POPs in tributary sediment are below DES soil remediation standards, which are conservative; contact with sediment is not particularly dangerous. He did suggest following the fish consumption advisory already in place in New Hampshire. (LINK TO ADVSIORY).

Ted then discussed next steps. At this point there is no funding source to address this issue. The EPA will fund fish tissue sampling. DES, with the SLA and LPC, will coordinate fish sampling in the coming months. SLA, DES, and LPC will work together on watershed town outreach, to educate residents and town officials and to understand historical practices on town-owned roads. Another next step to determine if Squam should be considered legally impaired for toxic substances. This could open up a stream of funding to address the issue. Moving forward it is important to think about whether this issue is something we can remediate. Sometimes remediation can make the contamination issue worse by release more toxic substances into the environment. DES has also lead a culvert study at the three contaminated sites (LINK TO REPORT).

Lastly, Bob Lucic addressed the crowd. As a board member and lawyer, Bob said that we need to get to the bottom of this issue. This is not an issue of human exposure, and the identified levels are considerably lower than what is observed in seriously contaminated sites. Bob identified DES as a great resource to further this investigation, and that we need more data.

At this point, EB James invited Rebecca Hanson, SLA Director of Conservation to join the panel for the question and answer session.

Question and Answer session

- Q: What kind of landowner liability is associated with this type of contamination?
    - BL: At this point, no. There is nothing actionable. This is not a Superfund site.
- Comment: There is long history of dredging Bennett Brook and spreading the spoils on surrounding land..
- Q: Any data on loon populations when DDTs (~1950s) were being used?
    - HV: No. 1978 – LPC did study on PCBs – higher back then
- Q: Who it taking charge of future research?
    - HV: LPC is committed to continue testing unviable loon eggs.
    - EB: Collaborative effort – multiple parties committed to finding problem
        - Communication between parities will be clear and have single message to provide to the Squam community
        - No single organization is taking full charge of this issue
- Q: Where were the samples taken by the LPC?

    - HV: Sediment samples have been from tributaries
        - Weighted sampling towards northern part of lake
        - Samples were not actually in the lake; they took at the mouth of tributaries, then would work upstream depending on result of 1st sample
- How far can these contaminants spread?
    - HV: likely large rain event brought PCBs into lake and into food chain
        - More rain events are occurring as years progress
- Does DDT break down quicker when exposed to environmental factors?
    - Maybe, takes 20-30 years to break down naturally
    - Levels of DDT decreased between 2015-2016
    - Breakdowns increased afterwards – more accessible contaminants
- Are PCBs transported bound to sediments, or are they soluble?
    - DM: "PCBs" includes a group of 209 different chemical compounds, 170 of which are in the environment
        - Generally adhere more to silt (higher organic matter) than sand, and do dissolve some in water (very little)
        - Due to fact that there is typically much more water than sediment, it can almost be that PCBs can be present bound to sediments and dissolved in the water in equal amounts, after accounting for all of these factors. However, the concentrations in sediments are orders of magnitude higher than in the water.
        - Potential remediation method: activated carbon binds PCBs to sediment, which makes it less available to living organisms
- Is there something we could put into the lake that would bind to the PCBs or break them down in some way?
    - DM: There isn't any sort of remedy like that in existence
        - It's technologically easy to remove PCBs from the sediment and then incinerate them – but it's very expensive
        - PCBs have a range of bioavailability
            - When sediment is higher in organic carbon, the PCBs are less bioavailable
- So can we mend sediment with active carbon? (ex: aquarium filter)
    - DM: Active carbon is not very toxic, and it will sequester PCBs in the sediment
- Will there be further sediment testing in Squam Lake?
    - Grant apps are in the works for this, but samples are very expensive
    - Also want to get turbidity meters (measure how much sediment is suspended in the water column) and other sampling equipment
- Comment: We just had a major rain event – TEST NOW
- Comment: There has been poor consistency of lake water level as well as a lot of siltation and flushing when it rains
- What effect does lake level have on loon survival?

    - HV: Changes in water levels during May- Aug. (nesting season) can impact loon nesting, loons need constant levels during nesting so nests aren't moved
- Can we expand DES programs through legislative action so that problems like this will not "fall through the cracks"
    - TD: 90% of DES's programs are federally created programs, are very hard to edit
        - 90% of DES's funding is from federal, and a majority is for human health concerns
    - BL: The 303(d) list of impaired waters list comes out every 2 years
        - There is a public comment process, some impact could be made potentially through that
- Is collaboration happening/are all the organizations doing research combining data?
    - RH: Squam Watershed Plan currently being updated, and multiple parties (including the LPC) heavily involved in the updating process, planning to cover these issues and concerns as a united front
- How much is a test?
    - HV: To test one egg or one sediment sample, up to $3,000
- Can the SLA ask for generous donations from its wealthy/devoted members?
    - EB: without a direct cause for loon population decrease found, parties are unwilling to throw money at it, we want efforts going towards identifying the cause first
- No clear evidence DDTs and PCBs are having effect on loon populations?
    - HV: Difficult to study on loons in captivity, but current experiments are being tested on other birds to test their effect
    - Contaminants may have greater effects with more stressors present (Higher amounts of stress lead to decrease of immune system capabilities)