EAST POND

MAINE

FIRST OF THE BELGRADES

This edition of the East Pond Association newsletter is a bit of a break with tradition. In order to provide as much information as possible about our update of the Watershed Protection Plan which is leading us to a possible alum treatment, we will forego our usual pretty graphics and pictures. Instead there is a summary of where we are in the process, some scientific articles, notes of meetings, and just a few things off the main topic. There is a letter from Ken Wagner, our consultant on water quality that gives his recommendation regarding an alum treatment. His recommendation is based on a report he prepared for us last summer. That report is much too long for the newsletter. It will be posted on our web site as will the full Huser article which is worth a look. Only the introduction to the Huser article is in the newsletter. It provides information about all of the variables that must be considered when planning an alum treatment. There is a position statement from the North American Lake Management Society (NALMS) regarding alum treatments as a tool for improving water quality. Also included is the annual membership appeal letter that emphasizes that we have done enough research and planning and now is the time to do something. Minutes of the first two Watershed Plan steering committee are included as well. There is a lot of content here intended to prepare those attending our annual meeting (July 22, 10AM at Birchcrest on Brickett Point) for asking any questions that are not answered here. Please do come to the annual meeting.

PLEASE FORGIVE SOME OF THE FORMATTING. SOME ARTICLES WERE DIFFICULT TO COPY AND PASTE- RLJ

Answers to Possible Questions about Possible Alum Treatment

Charlie Baeder, Executive Director, BRAC

- Phosphorus is the nutrient most responsible for algae blooms in East Pond
    - Phosphorus is natural, it is an ingredient in fertilizer. It is food for plants
    - Limiting the amount of phosphorus in East Pond will reduce algae blooms
- Phosphorus in lakes comes from external and internal sources
    - External phosphorus comes from dirt, waste, the atmosphere, and natural sources
        - Dirt comes from residential and commercial development, roads, forestry, and agriculture – we can limit phosphorus getting into lakes by reducing the erosion that results from human activity.
        - Waste comes from septic systems – we can limit phosphorus getting into lakes by maintaining septic systems (regular pumping and inspections).
        - Atmospheric deposition and natural sources (animals and plants) account for about 35% of external phosphorus loading to lakes – there is little we can do to reduce these sources
    - Internal phosphorus comes from lake sediments that have accumulated through erosion, waste, atmospheric deposition and natural sources
        - Phosphorus is stirred up when wind, waves, and ice disturb sediments

        - Phosphorus is also released from sediments when oxygen is reduced in deep areas of the lake, when the lake becomes "anoxic" (no oxygen)
- 2007 East Pond Watershed-Based Plan (written by Kennebec County Soil & Water Conservation District; approved by Maine DEP and US EPA): internal phosphorus loading represents ~50% of the annual phosphorus loading to East Pond
    - Because internal loading is significant, the plan recommended limiting both external and internal phosphorus loading to East Pond to reduce algae blooms
    - Three (3) internal loading treatments were recommended for consideration:
        - Alum treatment: adding aluminum to inactivate phosphorus in sediments
        - Biomanipulation: removing fish and changing the food web to reduce algae
        - Aeration: mixing air into the deep areas of the lakes to stop anoxia
    - Biomanipulation was tried, unsuccessfully, 2007-2012
    - Aeration was considered but was deemed to be unfeasible because the pumping equipment, maintenance, management, and costs required are substantial
- 2014 East Pond Watershed Survey: East Pond Association conducted a watershed survey to identify erosion and septic sites that contribute to external phosphorus loading. It found that many erosion sites identified in earlier surveys (2000) had been fixed. It recommended ongoing erosion control work.
- 2015-2017 Colby College water quality data: Colby substantially increased its water quality sampling and analysis work on East Pond.
    - Confirms that internal phosphorus loading represents 50% of total phosphorus loading
- 2016-2017 Ken Wagner, PhD, water quality analysis: Wagner is an outside consultant, and an algae expert, with substantial experience in lake remediation including alum treatments
    - Reviewed Colby and Maine DEP water quality data and supported its conclusions
    - Reviewed Colby sediment data to make alum treatment recommendations
- 2017 East Pond Watershed-Based Plan Update: plans must be updated every 10 years
    - Steering Committee: East Pond Association; Colby College; Ken Wagner, PhD; Towns of Oakland and Smithfield; camp owners; Kennebec County Soil & Water Conservation District; Belgrade Regional Conservation Alliance; EcoInstincts; Maine Lakes Resource Center
    - Sub-committees working on science, fundraising, and communications.
    - Plan Update to be approved by Maine DEP and US EPA
    - Needed for permitting of an alum treatment
    - Will review role of "back flushing" of Serpentine into East Pond
    - Will review potential role of dam management to increase flushing rate. An increased flushing rate could increase the longevity of an alum treatment.
- Alum Treatment
    - Recommended as a treatment option in 2007 plan. Recommended again in 2017.
    - Inactivates phosphorus in lake sediments by binding with phosphorus.
    - Treatment area: anoxic (no oxygen) area of about 670 acres.
    - Estimated treatment dose: 30 gm/m2
        - This estimate will be updated with jar testing fall 2017.
    - Estimated cost: $900,000
    - Estimated treatment longevity: 10-20 years
        - Becomes less effective over time because of continued erosion in the watershed and because phosphorus in deeper sediments slowly migrates to the surface of the sediment becoming available to algae.
        - Longevity will be increased by continued erosion control work to reduce external loading.
    - Permitting: takes 90 days

- Permits are provided by Maine DEP
- Planned for winter 2017-2018 to be ready for spring 2018

- Timing: alum is more effective when applied in the spring before stratification and before algae blooms
  - Current thinking is spring 2018 or spring 2019
  - Depending on the supplier, and their equipment, the treatment will take 3-5 weeks
  - Weather can delay treatment – to get the best application, it cannot be windy
- Impact on Recreation Activities
  - Buoys will be placed on the lake limiting access to the daily work area (20-50 acres per day)
- Results: some phosphorus is stripped from the water column when the alum is applied. Most is inactivated in the lake sediments. Improved water quality should be evident the first year of treatment.
- Safety: the alum is buffered to remain pH neutral when applied. Aluminum is natural and is used in water treatment systems. It does not hurt fish when applied properly.

- Fundraising
  - BRCA has submitted a grant application to Maine DEP for $200,000 to provide partial funding for the alum treatment. We expect to find out if the grant is awarded in November 2017.
  - We plan to fundraise with towns, businesses, lake residents, and foundations to raise the funds needed for this project.

Water Resource Services Inc.
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April 13, 2017

Mr. Charles Baeder
Belgrade Regional Conservation Alliance
137 Main Street, 2nd Floor
Belgrade, ME 04917

Dear Mr. Baeder:

I am writing to outline possible management approaches to East Pond, intended as a discussion document, not the final answer. We had discussed having something people could comment on and add to at our March 22, 2017 meeting, and this represents a start.

East Pond:

Evaluation of phosphorus (P) loading to East Pond by several approaches applied by separate groups suggests a total load of 800 to 850 kg/yr. The target load to provide desirable water quality, especially for clarity, varies by approach, and is affected by the residence time in the lake, which has been estimated by multiple means. The TMDL prepared by ME DEP uses a detention time of 4 years, but this does not adequately account for direct precipitation, and the WRS estimate is closer to 2.5 years. Both are long periods for water to remain in a lake, but affect loading calculation projections substantially. With the shorter residence time, a target load of 420 kg/yr is derived, equating with an average P concentration of 10 µg/L, water clarity close to 4 m, and a minimal (<1%) probability of cyanobacteria blooms. Confidence intervals around estimates are not especially tight, but for planning purposes it would be reasonable to set a goal of a 400 kg/yr reduction in P loading to East Pond.

The loading summary provided by WRS in 2016 (Table 1) indicates that internal loading represents a little less than half the total P load. For a targeted reduction of 48%, that internal load must be addressed. It is not realistic to expect to cut the load in half with watershed management that addresses a load that represents about a third of the total P load, and there is not much that can be done about atmospheric or waterfowl inputs.

Table 1. East Pond Phosphorus Loading Summary

	Water	P Load		
	(MM3/yr)	(kg/yr)		
Source	[Average]	[Low]	[High]	[Best Est]
Direct Precipitation	7.46	48	375	140
Direct Groundwater	0.51	26	116	70
Watershed Direct Drainage	5.53	160	364	206
Waterfowl	0	10	40	20
Internal Release	0	200	1000	400
Total	13.5	444	1895	836

Internal loading can be most efficiently accomplished by treatment with aluminum compounds that inactivate P in surficial sediment. However, complete elimination of internal loading is not to be expected from any approach; effective management of internal P sources can be expected to provide a reduction of 75-90% in this case. That would provide a reduction of 300 to 360 kg/yr, leaving 40 to 100 kg/yr to be removed by other means. The internal load is mainly a summer phenomenon, however, making it disproportionately important during the bloom season; substantial improvement can be expected with internal load control alone. Yet it would be prudent to both enhance and protect the investment made in internal load control by seeking watershed improvements. Such an effort has been underway for some time, but needs to continue.

The most we can reasonably expect from watershed management is a P load reduction of 2550%, which equates to 69-138 kg/yr. This would be sufficient, however, and worthwhile. The exact amount of reduction achievable with the LakeSmart program has not been quantified, but as this program addresses properties near the lake with the most potential to impact the lake, it is a highly desirable approach. A target of 75% compliance with LakeSmart objectives is suggested as a reasonable goal. Ongoing effort relating to roads is also encouraged, such as the work conducted by the Youth Conservation Corps through BRCA. The other structural approach worthy of attention is on-site wastewater disposal system management, as these could be a significant source for lakeshore properties.

Treatment to reduce internal loading does not have to wait for watershed management to achieve its goal, but progress on watershed management will further improve the lake and aid longevity of benefits. Indeed, watershed management has been ongoing at East Pond, but should be reinvigorated by the major P load reduction that internal load reduction represents. Desirable conditions can be established quickly, and maintaining them will then depend partly on watershed management efforts. Eventually P from beneath the inactivated zone will seep upward and internal loading will increase, but this is expected to take at least 15 years and the process has required an average of 21 years based on analysis of treatments worldwide. Watershed improvements will help set conditions during that period and can prolong it to some degree.

As the primary problem in East Pond has been cyanobacteria blooms by species known to be favored by internal loading processes, the potential to eliminate those blooms by P inactivation is very high, and other than supplemental watershed management, no additional in-lake management measures should be needed.

Hopefully this review provides a framework for considering management options for East Pond. Management does not have to wait for every possible question to be addressed, but when it involves major expenditures, it would be appropriate to improve our understanding before acting. Watershed management through the YCC or LakeSmart programs is simple, direct and appropriate now, with limited cost. Use of a P inactivator over a large portion of East Pond is justifiable from existing data.

As always, contact me with any questions.

Sincerely yours,

Kenneth J. Wagner, Ph.D., CLM Water
Resources Manager, WRS Inc.

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The Use of Alum for Lake Management

Aluminum sulfate, called alum, when added to lake water removes phosphates through precipitation, forming a heavier than water particulate known as a floc. This floc then settles to the lake bottom to create a barrier that retards sediment phosphorus release. There are two policy-related issues with the use of alum:

1. Whether alum is safe for humans and aquatic life, and
2. Balancing the use of alum as it is used to mitigate eutrophication symptoms versus the more tedious, but more direct approach of mitigating the causes of eutrophication.

There has also been recent discussion about whether alum is considered an algaecide in the context of NPDES rules. The concern is, if a product makes a claim that it controls algae, then it is presumed to be an algaecide and therefore can be regulated under NPDES. For purposes here, alum is not considered an algaecide for the simple reason that any algae control effects following an alum application are the result of phosphorus reduction rather than any direct toxic effects on algae control.

How Safe is Alum?

Alum is applied to lake water as aluminum sulfate, or $Al_2(SO_4)_3 \cdot 14\ H_2O$. As aluminum sulfate is added to water, it forms aluminum ions, which are hydrated (combined with water):

$$Al^{+3} + 6\ H_2O \rightleftarrows Al\ (H_2O)_6^{3+}$$

In a series of chemical hydrolysis steps, hydrogen ions are liberated, which may lower the water pH, and ultimately forms aluminum hydroxide ($Al(OH)_3$), which is a solid precipitate:

$$Al^{3+} + H_2O \rightleftarrows \text{intermediate reactions} \rightleftarrows Al(OH)_3(s) + H^+$$

The solid precipitate forms a flocculent material, referred to as a floc, that has a high capacity to adsorb phosphates. The aluminum hydroxide blanket, when applied appropriately, separates the sediment from the water column, which reduces internally supplied phosphorus.

Free aluminum may persist at pH less than 6 or other hydroxides may form at pH greater than 9; although toxicity may occur at pH > 8 in some conditions. Both forms may be toxic to aquatic life. As a practical matter, the use of buffered alum has mitigated this concern by controlling the pH to acceptable ranges. Indeed, there has been only one reported case in the United States in recent years where toxicity has been a problem.

Human health concerns are largely avoided simply because people do not drink untreated lake water. However, even if they did, aluminum concentrations in lake water are normally within EPA drinking water standards very shortly after bulk applications.

There is an obvious concern with lakes or reservoirs used as drinking water supplies. However, the water treatment process at many, if not most, water utilities uses alum as a clarifier before filtration anyway. Again, the raw water supply does not exceed drinking water standards shortly after an alum application.

There have been reports that aluminum is a cause of Alzheimer's disease. However, recent epidemiological studies have found no association. In fact, the form of aluminum in lake water after an alum application, aluminum hydroxide, is the active ingredient in over-the-counter antacids. The issue here is the form of aluminum. While it is true that "free" aluminum has toxic properties, it is also very reactive and does not persist in this form. Where applied, the trade-off of short-term toxicity risk against phosphorus control is implicitly accepted.

When is Alum Appropriate?

This question may be as much a question of lake management philosophy as one of lake management policy. We know alum can control internal phosphorus release, and we know alum can also control phosphorus inputs when applied directly to inflowing water. Most often, the question to ask is, "when is the use of alum appropriate in terms balancing the management of the cause of excess phosphorus versus simply neutralizing excess phosphorus in the lake?"

There are a number of ways to consider this question. Managing the cause of excess phosphorus is the preferred approach. This view is widely held by lake management practitioners. Why keep treating symptoms without addressing the underlying causes? This watershed approach is advocated by the US EPA, NALMS and many others.

In light of the watershed approach espoused above, there are many cases where using the watershed approach exclusively may neither mitigate excess phosphorus in lakes nor even be feasible (see Welch and Jacoby 2001; Osgood 2000). Thus, the use of alum may be the only practical way to accomplish meaningful and timely water quality improvements. Using alum as an element of a comprehensive watershed and lake management program will often be needed to achieve meaningful results in a timely and cost-effective manner.

Considering that alum applications may be effective for 5 to 15 years (Welch and Cooke 1999), as well as the fact that watershed phosphorus control seldom goes far enough, repeated applications on some periodic basis will likely be necessary. In extreme cases, annual alum applications have been proposed (Osgood & Nürnberg 2002).

Increased water clarity following alum applications can have the unintended effect of increasing light availability and therefore increasing the area of rooted plant growth in lakes.

Issues & Concerns

Alum is a safe and effective method to mitigate excess phosphorus in lakes and reservoirs. Note, there are many other methods and approaches to consider in managing lakes (see Wagner 2001). The concerns with using alum cited here can be managed or balanced.

NALMS Positions

1. Alum is a safe and effective lake management tool.

2. **Alum applications should be designed and controlled to avoid concerns with toxicity to aquatic life.**

3. **Watershed management is an essential element of protecting and managing lakes. In cases where watershed phosphorus reductions are neither adequate nor timely, alum is an appropriate tool to accomplish meaningful water quality objectives.**

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Longevity and effectiveness of aluminum addition to reduce sediment phosphorus release and restore lake water quality

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114 lakes treated with aluminum (Al) salts to reduce internal phosphorus (P) loading were analyzed to identify factors driving longevity of post-treatment water quality improvements. Lakes varied greatly in morphology, applied Al dose, and other factors that may have affected overall treatment effectiveness. Treatment longevity based on declines in epilimnetic total P (TP) concentration averaged 11 years for all lakes (range of 0e45 years). When longevity estimates were used for lakes with improved conditions through the end of measurements, average longevity increased to 15 years. Significant differences in treatment longevity between deeper, stratified lakes (mean 21 years) and shallow, polymictic lakes (mean 5.7 years) were detected, indicating factors related to lake morphology are important for treatment success. A decision tree developed using a partition model suggested Al dose, Osgood index (OI, a morphological index), and watershed to lake area ratio (related to hydraulic residence time, WA:LA) were the most important variables determining treatment longevity. Multiple linear regression showed that Al dose, WA:LA, and OI explained 47, 32 and 3% respectively of the variation in treatment longevity. Other variables (too data limited to include in the analysis) also appeared to be of importance, including sediment P content to Al dose ratios and the presence of benthic feeding fish in shallow, polymictic lakes.

1. Introduction

Excess phytoplankton biomass, caused by elevated levels of anthropogenically derived nutrients, is common in many limnic systems during the growing season. This condition often leads to degraded water quality, impaired aesthetics and recreation opportunities, odor problems, and byproduct formation during drinking water treatment. To address these problems, water quality standards related to nutrient status (water transparency and algal biomass) have been developed, requiring reductions in phosphorus (P, generally the limiting nutrient in lakes) and occasionally nitrogen. Even after external sources of P are reduced, however, accumulated legacy P in sediment can continue to drive algal blooms (Welch and Jacoby, 2001) and delay water quality recovery for

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decades (Sas, 1990; Jeppesen et al., 2005). Thus, the recycling of legacy P in the sediment must be considered when designing and implementing measures to meet water quality standards.

Aluminum (Al)-salts have been used to reduce P cycling in lakes around the world for nearly half a century (Landner,1970; Kennedy et al., 1987; Cooke et al., 2005; Jensen et al., 2015). The success of past treatments has varied greatly, with studies showing longevity of water quality improvements ranging from months to 20 years (Welch and Cooke,1999). While changes in nutrient-related surface water quality indicators are often determined following Al treatment (see review in Cooke et al., 2005), there are few quantitative analyses of the effects of Al dose, sediment mobile P (including pore-water, reductant soluble, and labile organic fractions), lake morphology, or other causal factors potentially affecting treatment longevity.

Multiple factors can positively (or negatively) affect longevity of improved water quality after Al addition to reduce internal P cycling. Water residence time, water column stability, and the relative magnitude of internal to external P loads can all affect the perceived effectiveness of internal P loading management (Sas, 1990). Al dose calculations based on lake water alkalinity, as opposed to sediment P pools that contribute directly to internal loading, affect treatment longevity due to the potential for over- or more likely under-dosing (Cooke et al., 2005). Furthermore, longevity of Al treatment in shallow, polymictic lakes is generally lower than in deeper, stratified systems (Welch and Cooke, 1999). It has been suggested that macrophyte presence (Welch and Kelly, 1990) and invertebrate bioturbation (Nogaro et al., 2006; Steinman and Ogdhal, 2012) can affect the efficacy of alum treatment in shallow systems, but recent work has shown that shortterm binding efficiency between Al and P may be improved via increased mixing of the treatment layer (Huser et al., 2015). Shallow lakes, however, have received generally lower Al doses because alkalinity available to buffer acid producing Al hydrolysis reactions is limited simply due to the lower volume of water (i.e. alkalinity) available relative to sediment surface area.

Benthic feeding fishes, such as the common carp (Cyprinus carpio), have been shown to degrade water quality (Parkos et al., 2003; Weber and Brown, 2009) and deepen the sediment mixing zone, thereby increasing the mass of sediment P available for release to the water column (Huser et al., 2015). Aging and crystallization of newly formed amorphous $Al(OH)_3$ may reduce binding capacity, especially in the absence of P (de Vicente et al., 2008a). Steeply sloping lake bathymetry or large fetches can lead to focusing of added Al, increasing amounts of Al in one location and leading to crystallization in the absence of P (Huser, 2012; Egemose et al., 2013). Organic carbon (de Vicente et al., 2008b) and pH (Egemose et al., 2009) may also limit P binding by Al in lake water, but no significant relationship was found when comparing Al to Al bound P ($Al:P_{Al}$) ratios and organic matter content of sediment in Al treated lakes (Huser, 2012).

In order to determine factors related to longevity of water quality improvement in Al-treated lakes, we examined 114 lakes previously treated with Al to reduce internal P loading from the sediment. Both short-term post treatment changes and total longevity for total P (TP), water clarity (Secchi depth), and biomass of planktonic algae (as chlorophyll a; Chl a) were determined from available data. Lake chemical characteristics, Al dose, morphology, mobile sediment P, and other variables were then evaluated to determine the main factors influencing treatment longevity and effectiveness. A decision tree based on critical thresholds and a multiple linear regression model were developed for predicting the probable success of future Al treatments.

The following notes summarize the discussion at the September 2, 2016 East Pond Watershed-Based Plan Update Steering Committee Meeting # 1 held at the Maine DEP offices in Augusta, Maine.

MEETING ATTENDEES:

The following people attended the meeting:

- Mary Ellen Dennis- Maine DEP
- Linda Bacon, Maine DEP
- Jeff Dennis, Maine DEP
- Dale Finseth, Kennebec SWCD
- Rob Jones, East Pond Association
- Mel Croft, East Pond Association/BRCA
- Jerry Tipper, East Pond Association/BRCA
- Charlie Baeder, BRCA
- Whitney King, Colby College
- Brenda Fekete, Maine Lakes Resource Center/Colby College
- Jennifer Jespersen, Ecological Instincts
- Ken Wagner, Watershed Resource Services (by phone)

WELCOME & INTRODUCTIONS

- Jen Jespersen kicked off the meeting, welcomed everyone, and asked everyone to introduce themselves.

PROJECT WORK PLAN & SCHEDULE

- Jen provided an overview of the Maine DEP/KCSWCD work plan including details about the roles and responsibilities for project partners for individual tasks. After reviewing the project schedule, she emphasized the need for flexibility in the timing of project deliverables due to the many partners involved as each part is reliant on the next. After reviewing tasks and the project schedule she asked for questions from the committee.
- Mel asked when fundraising should begin for implementing management recommendations. Consensus was that fundraising can begin anytime, but costs and timelines that are outlined in the watershed management plan will be helpful and may be essential for lining up grants and other donor support.
- Jeff asked about the modeling task and how much modeling is needed. The consensus was that the types of model and level of modeling is yet to be determined. This will likely depend on additional needs beyond what WRS will provide and what Colby is planning to do with their data. This should be revisited at the first Scientific Review Committee meeting.
- Whitney brought up the need for a common web-based data sharing application so that all project related data can easily be shared with the committee and the public moving forward. Dropbox and Google Drive were suggested, though both have limitations. Whitney and Linda Bacon will both look into this.

EAST POND SAMPLING

- Whitney and Brenda provided an overview of the sampling efforts that Colby has been involved in this summer on East Pond including a summary and slide presentation of some of the results:

- High resolution water quality data (SDT, DO, temp, nutrients, plankton, water level and sediments) collected at Station 1 once/week all summer long.
- Bathymetry data (~ 1/2 million depth measurements) shows that the lake is shaped like a bowl and that the island on the north end of the lake affects mixing
- Phosphorus concentration maps (created by former Colby student)
- 2007 - 2008 thermistors collect temperature every 15 minutes. Provides evidence of onset of mixing, DO crash and algal bloom. Stratification sets up around 5m (do not see this 1m shallower). When the lake becomes anoxic and the lake mixes then there is a bloom approximately one week to 10 days after mixing (end of July). Timing of mixing is pretty consistent.
- Phosphorus concentrations are 39 ppb at the bottom of the lake which equates to about 18 - 19 ppb in the water column. Fairly close to mass loading estimate of 470 kg P.
- 2016 data was collected from mid April through the end of August. Saw some stratification in July around day 210. Jeff Dennis asked about a surge in April with possible anoxia and mixing under the ice associated with SDT < 2m.
- Colby put buoys on all of the Belgrade Lakes at the deep holes to get reproducible data.
- Whitney showed a video of the bottom of the lake and described the gelatinous nature of the sediment. It is so soft that you can reach your hand down into your shoulder without any resistance. Below 5m the bottom is dominated by mussels and everything is dead when the lake goes anoxic.
- Question about elodea tying up nutrients in water <5m, and whether it affects floccing?
- Whitney mentioned the drone flights that Colby conducted on Great Pond to map macrophytes and metaphyton. They have two drones that could be used for East Pond.

- Colby has also been concentrating efforts on sampling in the Serpentine to get a better understanding of its relationship with East Pond:

  - Colby currently has 3 sensors in the Serpentine. This includes an ADCP that belongs to DEP. The ADCP was deployed near the middle of the Serpentine for a month and measures flow using a sonar beam. Downloaded data shows low flow activity during the boating season largely due to a dry summer.
  - Colby also deployed water level sensors at the north end of the Serpentine and at the mouth of East Pond. The sensors measure relative water level height. Each sensor is mounted on a steel pole into the substrate and therefore are stationary relative to each other. There is ~ 2 km between them (flat with no trees). They have not been surveyed, but it is advisable to survey them in. Jeff/Linda suggested a DEP engineer to assist with the task. A third sensor is planned and will be placed near the ADCP unit.
  - Whitney hypothesizes that the Serpentine is acting as a ballast or giant sponge that is driven by the wind. The wind causes the water levels to go up and down in the Serpentine as the wind blows from the south across East Pond. Iron concentrations in East Pond may be affected by the Serpentine as the wetlands drain back into the pond.
  - It was suggested that the ADCP gets redeployed for the fall to capture fall rain events.

WRS DRAFT REPORT

- Ken Wagner was asked to talk about the draft phosphorus loading report he prepared on East Pd in August. The report was sent by BRCA to several stakeholders for review. He is looking for feedback on the report. Jerry noted that the water does not back up over the dam during low flow (p. 4). Charlie offered to be the point of contact for collecting comments from the group and sending them to Ken.

- Below are some key findings from the WRS report:
  - The loading analysis focused on 6 ways things get into the lake. WRS compared model results with results in the East Pond TMDL and for the most part they agree, though his results showed a lower load than the TMDL.
  - Groundwater seepage is not significant; overland flow- East Pond has a small watershed where 27% of land uses are not natural. Loading is localized.
  - Internal loading is significant! The modeling provided a range of loading estimates for East Pond rather than a single number. A best estimate (not an average) is that the internal loading accounts for 1/2 of the load.
  - TMDL= 886 kg P/yr: WRS=836 kg P/yr.
  - Ken indicated a discrepancy in the calculated flushing rate compared to the TMDL. He believes that the TMDL calculated the flushing rate (0.25 flushes/yr) much lower than it actually is (0.4 flushes/yr). This is important because the target phosphorus concentration will be lower (meaning greater reduction in P) (10ppb vs. 15 ppb in TMDL) using the revised flushing rate. In a small watershed like East Pond, flushing rate can make a big difference to the modeling. Jeff and Ken discussed the methods behind calculating flushing rate in the TMDL- looks at regional runoff not surface runoff which means you end up under estimating the amount of water going through the lake. Jeff concurred that Ken's analysis may well be correct.
  - We have to deal with internal loading on East Pond, but that does NOT mean that you don't deal with the external load. There is a huge benefit to inactivating the internal load.
  - Ken used 5 different models and estimated that loading needs to be reduced to <500 kg/yr which is equivalent to 11 ppb.
  - The model does not account for inputs from the Serpentine.
  - There was discussion about the types of algae that Colby is seeing in their flow cam. Brenda indicated that is it *Anabaena* but unclear on the species. One sample is collected/month. Colby indicated that they could send Ken some screen shots to see if he could ID them. It would be interesting to compare the results from July and August. Jeff would also like to look at the algae (possibly at the MLRC when Brenda runs the flow cam)
  - It was suggested that Colby increase their algal sampling to every 2 weeks, especially when the shift between species is occurring (eg, July). .
  - Linda mentioned that she has archived plankton samples for past 6-7 years from the biomonitoring study if anybody wanted to run them.
- There was a general discussion about the efficacy of an alum treatment on East Pond:
  - Question about whether the treatment will last as long if you don't deal with the external load. Answer- the duration of the treatment is dependent on the watershed inputs. For a shallow lake this may be close to 11 years, deeper lake maybe 21 years. Estimate for East Pond is around 15 years.
  - Question about the implications of an alum treatment if algae is the driver (vs. DO) - is there a need to treat a bigger area? Ken indicated a 400 acre minimum up to a maximum of 900 acres.
  - Question about the financial resources needed to treat a large area. Ken said that the treatment can be phased- example Grand Lake in Ohio (6,000 acres, began by treating 1/2 lake at 1/2 dose).
  - Mixing not as efficient because blue/green algae will be gone but not other algae.

- Suggestion to make measurements of oxygen in the sediments to get an idea of treatment are (5m vs. 6m depth). Colby can use their sensors to get into the sediments to collect this data.

- Suggestion to collect more sediment data to 10cm and to conduct winter (under ice) sampling and early spring ice out sampling to look at diatoms.

Wrap Up

- In conclusion, it was agreed that:

  - The ADCP unit would be deployed again in September, as would a third sensor. Jeff will look into surveying the sensors.
  - Weekly WQ data will continue to be collected till fall turnover.
  - Sediment samples will be collected at multiple sites. Samples will be taken at different depths (eg, 3m, 4m, 5m and 6m).
  - Sediment mapping will be done to show oxic and anoxic sediments, and will be used to help determine alum treatment areas.
  - Additional algae data collection and analysis is needed.

SCIENTIFIC REVIEW COMMITTEE (SRC) MEETING

- Charlie asked for suggestions for additions to the Scientific Review Committee (SRC). Peter Kallin was suggested. Charlie will invite him.

- First SRC meeting tentatively planned for October. Ken indicated he would be available in October. Charlie will send out a Doodle Poll.

OTHER/DISCUSSION

- Next Steering Committee meeting tentatively planned for March following data analysis by Colby.

[Meeting Adjourned at 11:45 am]

POST MEETING DISCUSSION

- Several members of the committee stayed to discuss monitoring. Here's a brief summary of the discussion:

  - Rob Jones has wind data he can share. Whitney suggested plotting the wind coming from the south, looking at wind vectors and wind lag.

  - BRCA will look into purchasing a 3rd sensor to go in at the site of the ADCP. Colby will deploy it with the ADCP in September. Sensors are $500/unit. (Done and deployed with ADCP.)

  - Colby is interested in collecting sediment and oxygen profiles in early Nov/Dec before ice in and then again in the spring at ice out, and possibly during ice on.

TO: East Pond Water Quality Technical Review Committee

FROM: Charlie Baeder, BRCA & Jennifer Jespersen, Ecological Instincts

SUBJECT: **EAST POND WATER QUALITY REVIEW COMMITTEE MEETING #1 NOTES**

DATE: April 4, 2017

The following notes summarize the discussion at the March 22, 2017 East Pond Watershed-Based Plan Update Water Quality Technical Review Committee Meeting # 1 held at the Maine DEP offices in Augusta, Maine.

MEETING ATTENDEES:

The following people attended the meeting:

Linda Bacon, Maine DEP

- Charlie Baeder, BRCA
- Mary Ellen Dennis- Maine DEP
- Brenda Fekete, Maine Lakes Resource Center/Colby College
- Dick Greenan, BLA/BRCA
- Dave Halliwell, Maine DEP
- Jennifer Jespersen, Ecological Instincts
- Rob Jones, East Pond Association
- Peter Kallin, BRCA, MLS
- Whitney King, Colby College
- Boyd Snowden, Town of Oakland
- Ken Wagner, Watershed Resource Services

WELCOME & INTRODUCTIONS

- Charlie Baeder kicked off the meeting, welcomed everyone, and asked everyone to introduce themselves. This is the first Water Quality Technical Review Committee meeting of the project.

COLBY 2015 - 2016 DATA COLLECTION & ANALYSIS

- Whitney King gave a presentation of monitoring results for water quality data collected in East Pond by Colby College in 2015 and 2016. Below is a summary of key points from this presentation and discussion.
  - Historically East Pond has had regular blooms and SDT measurements <2m lasting approximately 2-3 weeks, and occurring every other year or so. In recent years, blooms occur almost every year.
  - Slide of Colby student doing EDTA extraction (%TP) shows a "bull's eye" of highest TP in the middle of the lake at the deepest areas, with lower TP in shallower areas.
  - Previously thought East Pond was well-mixed, but HOBO sensor data indicates persistent stratification of 2-3 degrees. Change of 4-5 degrees from top to bottom, with stratification setting up at 5m in the spring. Mixing occurs around August 6th of each year and stays mixed for the rest of the year. Mixing is a result of the surface water cooling down rather than bottom waters warming up. SDT is <2m at mixing and declines to ~ 1m, and TP at 20 ppb through the water column after mixing.
  - Whitney indicated the need to look at 2010 data as it was a particularly hot year, and according to Rob, there was a bloom at ice off that year. Recent data collection has been more systematic (spring through fall in 2015-2016) compared to previous years that ran on an academic schedule.
  - 2016 plots of Temp/SDT, Temp/Fe, and Temp/Al. Iron is released as organic complexes, precipitates when it hits O_2 and shows a similar pattern to TP. Aluminum in the water column is low compared to iron. It is ~ 76 ppb at its highest concentration at the bottom after mixing.

- Sediment maps were created to show the extent of Al, TP and Fe in the lake, and to develop Al/Fe ratios to inform the treatment of the internal load. Sediment samples were collected at two depths, frozen at -80 degrees, and run in duplicate. Some samples are left to run (not until the end of May) to complete the map. Al/TP ratio ~ 10. Al/Fe ratio ~ 6-7, and lower Al/Fe ratio in the center of the lake (2.5-4).
- Based on available sediment data, there could be a lot more release from the sediments then is occurring now. Ken indicated that eutrophic lakes typically have ratios on the order of 10-20+.

REVIEW KEN WAGNER ANALYSIS

- **Lake and watershed loading estimates** were reviewed, including some alum treatment recommendations. Below is a summary of key points:
  - Flushing rate in East Pond was estimated as once every 2.5 years vs. every 4 years as calculated by DEP. The DEP estimate did not consider lake precipitation, only watershed precipitation.
  - Watershed improvements will only result in a 10-15% reduction in TP loading to the lake. Given that the internal load is estimated as >50% of the total load, internal load MUST be dealt with or there will be no improvement in water quality.
  - Based on internal load reduction estimates, it is believed that in-lake TP concentrations could be reduced to 10 ppb (420 kg/yr) vs. 15 ppb (622 kg/yr) called for in the TMDL. This will require both watershed and in-lake work to achieve.
  - Ken reviewed some of Brenda's FlowCam data to compare blue/green (B/G) to total algae. The B/G's start out absent in the spring and slowly increase in the water column, eventually dominating the population at mixing (~ 50%). They get abundant when the combination of TP release from the sed/water interface and TP in the water column provides ideal conditions. Ken thought that without the mixing event B/G's may not be sustained in the water column.

- **Three primary methods for inactivating phosphorus in lakes:** 1) Dredge it (not practical on many levels); 2) Inactivate it through Alum Treatment (capital expenses needed); or 3) Oxygenate it (physical limitations, and does not get rid of algae, only B/G's, requires more maintenance than inactivation)
  - The available phosphorus mass is typically in the top 4-20 cm of sediment at the bottom of the lake. The mass increases in deeper water. Approximately 10% of P is released from sediments in a given year.
  - Alum is the most common treatment for internal phosphorus load. In East Pond areas below 4 m contribute to internal phosphorus loading and may be considered for treatment. Not treating shallow areas may result in growth of metaphyton.

- **Dosing recommendations.** Good results have been shown when applying 10X the amount of Aluminum than available mobile P. A preference is 20X (fantastic results).
  - Ken reviewed two data plots on the handout showing Dose vs. Depth and P mass vs. Depth. Dose vs. depth plot indicates that there is no cost/benefit for dosing >30 g/m^2. The P mass vs. Depth shows that the P mass increases around 6m water depth.
  - It is expected that alum treatment will result in a ~ 80% reduction of internal loading with treatment of all areas 6m and deeper. This will result in a shift in the N/P ratio and "knock out" the B/G's while still allowing for other biological productivity in the lake (e.g. fish).
  - The key is not to dose too low (under dose), or the treatment will not be effective. An average alum dose in many lakes is ~ 47 mg/m^2. Ken recommends between 29-33 g/m^2 for depths >6m in East Pond. This is equivalent to 20X the average P mass at the corresponding depth. This dose can be tailored for different depths.
  - Ken described some alternative treatments he has used in shallow urban lakes including "water column stripping" and dosing stream inlets during storm events using polyaluminum chloride.
  - Alum treatments can fail when: 1) P in the sediments is replaced by P entering from the watershed (over decades); 2) if organic P is released (very shallow lakes); or 3) if the inactivated P below the treated surface

sediment migrates up through the sediment profile (can move 0.5 cm/yr) (can take 20 years or longer if work is simultaneously being done to reduce P inputs from the watershed).

- **Cost.** Ken estimated $1.1 million to treat do an alum treatment in East Pond at all depths 5m and greater. This represents an area equal to 901 acres based on bathymetry.
  - Treating everything 6m and greater (668 acres, or ~ 1/3 of the lake) at a dose of 30 g/m^2 will cost approximately $900,000.
  - Ken provided a breakdown of costs for the reagent, labor/equipment and monitoring. The cost is ~ $45-60/$g/m^2$/acre treated.
  - There are several companies that apply alum from Massachusetts to Florida and a company in Nebraska that uses a large barge. The smaller outfits can apply 12,000 gallons/day, while the larger outfit can put out 60,000 gallons /day. Boyd thought that Shurtleff in Portland might be a supplier.
  - The question of toxicity was discussed. Aluminum sulfate (Alum) is very acidic, so is applied 2:1 with sodium aluminate (a caustic chemical) to create the right pH balance. These chemicals are commonly used in wastewater treatment plants as they floc P and other ions in water. This is what is used under the MLRC. There may be some drift outside of target areas, but research has shown that 90% of materials applied are within the target zone after 1-2 years.
  - Ken's team follows the barge in a boat, tracking the pH as the alum is applied to ensure the proper pH during application. If pH shifts, Ken notifies the applicators to check that equipment is not clogged. The lake is monitored for up to 2 years after application.
- **Logistics.** The group review some logistics associated with treatment in East Pond. This will be the biggest treatment area that Ken has worked on. His largest to date is 370 acres.
  - Treatment should be applied as early in the year as possible (in April or May, as soon as ice is out). This will allow the work to move forward before thermal stratification when there is good mixing, and with less boat traffic.
  - Ken expects that between 30-50 acres/day could be treated with the larger barge.
  - If it is windy (>20 mph), they will not treat.
  - Public notice, signs at the lake and buoys will be set up w/in 1 week of ice out.
  - Possibility of having an on-site containment tank that can be stored on the shore.
  - Ken recommends another set of jar tests based on the recommended dose. This requires mixing 5 g of sediment in 50 g of water and mixing.

IDENTIFY UNCERTANTIES, DATA GAPS

- **Backflushing Study.** Whitney discussed results of the 2016 back-flushing study in the Serpentine. Results show that the Serpentine is not an issue and that it is time to move on from this theory. Some key points:
  - Very little fluctuation in water level in 2016 (~ 1-2 mm over entire length). Any fluctuation in water level appears to be wind-driven based on a review of 8 hour average wind vector data.
  - Peter pointed out the extreme lack of precipitation in 2016. Ken pointed out that the concentrations of P in the lake match up with the model indicating that the Serpentine is not an issue. If any P would flow back into the lake it is likely that it is organic bound P coming in and then settling out in the shallows at the edge of the lake.
  - Rob has local wind data that he can provide to Colby if the want it.
  - Colby plans to redeploy the sensors in the Serpentine for the summer of 2017 hoping to observe big precipitation events to further assess the Serpentine as a P loading source.
- **Watershed Modeling.** Jen asked the group if they felt that a watershed model is still needed given the work that Whitney and Ken have done to date. She distributed a hand-out describing the proposed use of the Lake Loading Response Model (LLRM) including its usefulness in updating the existing (and outdated) land cover data for the watershed.

- Ken mentioned that he developed the original model many years ago and elaborated on its usefulness and transparency.
- Others felt that the model would be an excellent public relations tool that could be used in the future for looking at effects of redevelopment on water quality and P loading.
- Jen talked about how the model can be set to "natural conditions" by taking away all developed land to determine what "pre-development" conditions were like in the lake and make comparisons to existing and modeled alum treatment conditions.
- The group gave the green light to move forward with modeling. Jen reinforced the need for receiving final water quality monitoring results (mainly final internal loading #'s), and DEP's 20152016 water quality data.

DEP Grant Deliverables. Jen reviewed a few outstanding deliverables as outlined in the Maine DEP Work Plan:

- Sampling & Analysis Plan (SAP). A second draft of the SAP was submitted to DEP on January 13, 2017. Linda indicated that she would review the second draft as soon as she could, but didn't expect many edits compared to the first round.
- Secondary Data Quality Assurance Guide. A draft of the Secondary Data Quality Assurance Guide was submitted to Mary Ellen on March 21, 2017. Jen distributed Table 1 from the document and asked the committee to review it to make sure all data that will be used in the analysis is on there. Whitney indicated that bathymetric data was collected in 2004. The group discussed the usefulness of the DEP frozen plankton samples collected between 2004-2014. Samples were archived in 60 mL bottles. In the end, the group decided that while the data may be interesting to look at changes in species composition in the future, it was not a necessary part of the current project given that Colby has been collecting plankton samples for 2 years and using the FlowCam for imaging.
- Water Quality Analysis & Memo. Jen was seeking clarification on who is conducting the water quality analysis as outlined in the DEP Scope of Work. Whitney indicated that Colby did not plan on conducting a historical analysis, but could provide a memo summarizing the results of the 20152016 monitoring work so that it can be incorporated into the watershed plan update. Linda indicated she would send the 2015 and 2016 DEP data within a couple weeks.

DEVELOP FOLLOW-UP SCHEDULE

Colby Data. Brenda provided and updated on the status of Colby's lab analysis.

- All flow cam data is up to date, ICP (TP) is done, 2/3 of the Lachat is done (East Pond is complete), waiting on the results from HETL (Linda to check on this), nitrate will be completed this summer, and sediment data is expected to be completed by the end of June.
- Ken would like to see the rest of the sediment data for East Pond and asked Colby to conduct some jar tests (using homogenous mixture and recommended dose).
- Colby will add chlorophyll data collection in 2017 and will have additional FlowCam capacity for algae analysis.

Permitting. Charlie asked Ken about the timing of the permitting.

- The process is expected to take <3 months. The goal would be to have a permit in place in Jan/Feb 2018. This would permit an alum treatment as early as spring 2018. Alum treatment permits are good for five years.
- Once a final dosage has been determined (following sediment analysis in early summer), Ken can go to alum treatment companies for bids. Aluminum suppliers will need to be notified in advance to have enough stock.

Fundraising. The goal would be to raise $900,000 within one year.

- The group agreed that this summer is the time to start raising funds to pay for the treatment. It's estimated that the cost of treatment is ~ $200/shorefront property owner/year.
- Improving lake conditions may raise property values and make East Pond a more desirable place for people to buy property.

- The public "pitch" should be carefully crafted and should be led by a subcommittee. Charlie mentioned that the MLRC has hired a fundraiser.
- Linda discussed EPA cyanotoxin limits and explained that they were lower than she expected. The State has plans to develop a Statewide Advisory. In East Pond DEP has sampled at the deep hole and the "downwind scum". Microcystins (liver toxins) are a concern. So far no anatoxins (neurotoxins) have been documented in Maine lakes. The group agreed that "scare tactics" should not be used to motivate people to fund the alum treatment.

- **Steering Committee.** Charlie mentioned that he'd like to organize the second steering committee meeting and invite people from the watershed community to participate. This may include planning board members or selectmen from the area towns.

  - East Pond Association's annual meeting with be held on July 22nd.

East Pond Watershed Plan Steering Committee Has Second Meeting

On Thursday evening, June 29, the East Pond Steering Committee held its second meeting with an expanded membership to address water quality degradation and annual algae blooms in East Pond. Those attending represented the town of Smithfield's Planning Board, Smithfield Selectmen, the East Pond Lake Association, the Belgrade Regional Conservation Alliance, Maine Lakes Resource Center, Eco Instincts, Camp Manitou, Camp Matoaka, Camp Somerset, individual home owners, and summer residents. A representative from the Maine Department of Environmental Protection was unable to attend due to our pending grant application. The East Pond Steering Committee was formed to oversee a process aimed at improving the quality of the water in East Pond and reducing the yearly blooms. In that interest, the management plan for East Pond will be updated.

Charlie Baeder facilitated the meeting, beginning with a historical overview. He displayed a series of slides and gave a briefing on the increasing imbalance within the lake, which causes the blooms. In explaining efforts to date, he mentioned LakeSmart and the work of the Youth Conservation Corps. Charlie then introduced Brenda Fekete, Lake Science Manager from the MLRC, who has been sampling and analyzing the water and sediment in East Pond and the other Belgrade Lakes as a part of an exhaustive research project with Colby College. That study has been underway for several years under the leadership of Miselis Professor of Chemistry, Dr. Whitney King. Brenda Fekete explained slides showing increased phosphorous levels in the lake over time. The most recent samples had been taken the day of the meeting.

Ken Wagner participated in the meeting over speakerphone. Dr. Wagner is a nationally known limnologist who has visited our watershed several times and independently compiled his own research findings, which concur with the methods and the conclusions of the Colby study. Dr. Wagner addressed the group about sources of the phosphorous, "internal load" and "external load." For many years we have taken aggressive action against external load: phosphorous that flows into the lake in the runoff from camp roads and the yards of lakeside homes. Internal load is a build-up of phosphorous in the sediment beneath the lake, where it continues to be released into the water. A lack of oxygen in the deep water triggers the release of phosphorous from the sediment, resulting in algae blooms. A vicious cycle is created, such that the more algae blooms, the greater the call for oxygen, causing more phosphorous release, and so it goes on and on.

Dr. Wagner's conclusion about East Pond is that it has reached a point where 50% of its phosphorous is coming from internal load, or from the sediment. In his experience working with lakes all over the country, he has found that any reading higher than 25% signals the need to take decisive action. He stated that internal load is now the driving force causing phosphorous levels to rise in summer, and we cannot change that through our usual conservation efforts. He then detailed the possible treatments for the lake and invited questions.

The East Pond Steering Committee will spearhead a series of informational meetings. They will work with the Maine Department of Environmental Protection and all concerned parties to restore health to East Pond. Three subcommittees were formed: Science, Fundraising, and Communications. Charlie Baeder will work on a timeline of meetings and necessary steps to be taken in order to facilitate a broad base of involvement and agreement on a course of action to restore natural balance and clarity to East Pond.

Reprint of Our 2017 Membership Letter

East Pond Friends and Neighbors,

Over the past few years there have been some folks who have expressed frustration about all the studying of the lake, but nothing has happened. Here is some background. The Belgrade Regional Conservation Alliance (BRCA) twice applied for grants from the Maine Department of Environmental Protection (DEP) for funds to help continue to reduce phosphorous from getting into the lake. After turning us down the second time, the DEP let us know that a primary reason for not approving the application was our lack of evidence that reducing additional phosphorous loading would help solve our algae bloom problem. They recommended renewing our watershed survey and updating our watershed protection plan. We did the survey in 2014 and are now in the process of updating the plan.

Charlie Baeder (BRCA) and I, as part of the Science Advisory Committee for the watershed plan update, met with folks from the Maine DEP in March. I wish you all had been there with us. Whitney King (Colby College) presented the latest data gathered last year that reinforced what he has been telling us for the last several years. When the deep water goes anoxic, even for a very brief time, the phosphorous is released from the sediment mixes in the water column and the lake blooms. This process is known as internal loading. Property owners have done a lot to reduce run off and external phosphorus loading, but if algae blooms are to be prevented, something must be done about internal loading.

Ken Wagner, our consultant from Water Resources Services, Inc., also attended the meeting. He made a strong case for using an alum treatment to lock up the phosphorous in the sediment to reduce internal loading. He estimates that by treating about one third of the lake, a ninety percent reduction of the phosphorous release during anoxic conditions can be achieved. He believes that the treatment would be effective for UP TO 20 years.

Ken is still working on a final estimate of the cost of a treatment of this size. His current thinking is that it would cost close to one million dollars to treat 668 acres which is the area of the lake deeper than 6 meters. He is contacting the two companies that do the treatments to get a better estimate on costs.

Charlie let me know recently that the DEP folks were so impressed with the science behind Whitney and Ken's presentations that they encouraged us to apply for a grant to help fund an alum treatment. They have 2-3 hundred thousand dollars available for a 50/50 matching grant. To me, this is a very good sign that the alum treatment is not only the way to go, but also achievable. I believe, as Bob Joly often said; *"it is time to stop planning and do something"*. It is critical that we continue with efforts to reduce additional external phosphorous as the success of an alum treatment depends on limited increase in phosphorous from outside of the lake.

I am aware that there are concerns about the side effects of alum treatments. Ken Wagner, who has monitored many alum treatments in New England, reported in his findings and recommendations that there have been no fish or other wildlife harmed using the new methods of treatment. PH levels are monitored while the treatment is applied to assure that there are no problems. Ken is finalizing his reports on his findings and his recommendations. Those reports will be posted on our web site when available. More information will be in our upcoming newsletter and presented at the annual meeting on July 22nd at Birch Crest.

Charlie Baeder is working on the application to Maine DEP for help in funding this proposed project. DEP will only award funding if they are convinced that the treatment will work and last for 20 years or so. Even with DEP funding, the association will have to conduct a major fund-raising effort. We are currently working on strategies and would welcome additional suggestions.

Please continue, or begin, your support of the association so that we can move forward to improve our water quality for years to come. Please also support the Courtesy Boat Inspection Program. Prevention is our best method of keeping invasive plants from establishing themselves in East Pond. Due to the increase in minimum wages, our cost for hiring the boat inspectors has gone up significantly this year.

Thank you for your past, and hopefully future, support,

Rob Jones, President, *East Pond Association*

East Pond Association is now enrolled in Amazon Smile

The East Pond Association is now enrolled in Amazon Smile. If you shop on Amazon you can now choose to have Amazon donate .5% of your purchase price to the East Pond Association. Doing so will not cost you anything. For more information and to set up Amazon Smile go to smile.amazon.com.

North American Versatile Hunting Dog Association(NAVHDA).

By Andy Doak

Located in the Town of Smithfield is a parcel of land that has remained the same for more than 50 years and we would like to keep it exactly the same forever. The property is located just across the road from the Smithfield Town office, and has a large open field with a long sweeping view to the East and towards "The Serpentine". We call it "The Versatile Place". Yes, a play on words as we are the Sebastiook Chapter of the North American Versatile Hunting Dog Association(NAVHDA). For a decade, we have been allowed to use the land by holding dog training clinics and tests. In addition, we have been holding youth events with University of Maine 4H Bryant Pond Conservation Camp and this year in September our first on site Veterans event. If you have traveled by the property on a weekend and seen a number of cars parked in the field that is likely us hosting one of our events.

We are in the process of raising funds to purchase the land. Our intent is to keep the property as open space, establish an easement to limit development, essentially keep it like it is, a beautiful open pasture and strip of woods along the Serpentine River. We plan to make this property available to the public and in particular the community of Smithfield.

For the residents of Smithfield, and the Belgrade Lakes regions we see this land as high value with respect to protecting water quality in East Pond and the Belgrade Lakes watershed, as well as preserving a place for people to recreate and enjoy the waterfowl, upland species and access to fishing along the Serpentine which this property offers.

We hope our dream of having a place to hold events for our chapter, youth, veterans, bird watchers of the great marsh and others along the Serpentine can be a forever a Versatile Place yet remain in character as you see today.
For more information about this property and this fund-raising effort please contact Sebasticook NAVHDA at:

TheVersatilePlace@gmail.com
Bob England at newfogo@gmail.com 207-798-9275
Greg McNeal at uplandhunter@roadrunner.com 207-215-7849
Visit our Website at www.sebasticook.com

2017 East Pond Association Membership

Please place a check mark next to the level of East Pond Association Membership you wish and then transfer the value shown for that level to the space provided in the right hand column:

____ Individual ($15.00)………………………………………………………………………………… $___________

____ Family ($30.00)……………………………………………………………………………………… $___________

____ Supporting ($50.00)………………………………………………………………………………… $___________

____ Benefactor ($100.00)……………………………………………………………………………… $___________

____ Commercial ($75.00)……………………………………………………………………………… $___________

Invasive Plant Fund Contribution……………………………………………………………… $___________
This additional donation is used to help prevent invasive plants from getting into East Pond primarily by funding Courtesy Boat Inspections ($80 = 8 hour shift).

Total Donation $___________

________Please contact me about becoming a volunteer courtesy boat inspector for East Pond.

________Please contact me about the LakeSmart/LoonSmart program.

Name(s) and Address
(a return address label works great):

____

____

____

To help keep our records up to date,
please describe your location on the pond:

____

____

____

Phone #: ____

If you would like to receive occasional updates and East Pond news during the year, please fill in your email address. Your address will not be shared.

E-mail: ____

Send this completed form, along with your check for the total donation to:

East Pond Association c/o David Jackson, Treasurer
83 Loon Lane
Smithfield, ME 04978

East Pond Association
c/o David Jackson
83 Loon Lane
Smithfield, ME 04978

Address Service Requested

EAST POND ASSOCIATION ANNUAL MEETING
SATURDAY, JULY 22
10 AM BIRCHCREST
BRICKETT POINT
COOK OUT TO FOLLOW