MINONG FLOWAGE ASSOCIATION

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DATE: August 18, 2015

TO: Whom it may concern

FROM: Dan Maxwell – MFA President

CC: D.A.S.H. – APM Demonstration file

SUBJECT: Summary of Contractor "EWM Hand-pulling" demonstrations on June 29 & 30, 2015

Executive Summary:

Through the course of the Minong Flowage Association's battle with EWM (Eurasian Water Milfoil), the option of hiring "hand-pulling" contractors has been repeatedly discussed, but not pursued. Since other Wisconsin lake associations have, and are using hand-pulling EWM harvest methods, we decided that it was necessary for us to have a first-hand evaluation of the process in our waters. The anticipated high cost per acre, diver safety in our stump infested waters and process-visibility in our darkly stained waters was always a perceived barrier to such an effort.

However, when unspent funds in our Education grant number AEPP-431-14 became available we sought and received DNR approval for the project.

Our goals were:

1. **To garner first-hand experience with such methods in our waters.** Thus, providing the MFA with a clearer understanding of how these processes might be incorporated in our on-going battle with EWM using non-herbicidal methods.
2. **To generate public interest, understanding and support for the EWM issue.** Thus, garnering more public support for controlling this, and other assorted invasive species in our waters and other lakes in the region.
3. **To inspire either of these two contractors, or other contractors, to more readily offer such services in northwestern Wisconsin.** Thereby enabling a variety of regional lake associations' greater availability to such resources.

Since I instigated and managed most of the project, this document is really a summary of my thoughts, observations and conclusions of the effort. **Hopefully, you, the reader will process this information in light of your own experiences and offer your comments, questions and insights to us. They will be genuinely appreciated.**

Did we achieve our goals?
Yes. We now have a much clearer understanding of the hand-pulling process (with and without a DASH machine) and how we might incorporate them into future efforts. We certainly generated public interest and understanding of the issues. Plus, APM would love a contract for 2016 and DASH would love to get a machine(s) operating in this region.

Is hand-pulling (DASH or APM) cost efficient?
Herbicide costs, safety (pro & con) and efficiencies are the standard by which other options are likely to be judged. Labor-intensive processes are expensive and this is confirmed in my "APM cost per acre" calculations on page #10, which show it to be about double the cost of herbicides. (I'm focused on APM's process because I see the DASH process to being irrelevant until a DASH service is operating in this region, although Many Waters, LLC may be an option.). Regardless of the details, it is hard to look at a pile of harvested EWM that is the size of the grass clippings when I mow my lawn and justify that it is worth the $7,000 we invested.

Can divers operate safely in our waters?
Yes, but certainly within limits. This was confirmed to me with their work in a stumpy area on the Cranberry Flowage on Tuesday morning. However, Matt Berg's insights get my greatest respect and they can be found on page #11.

Can divers harvest effectively in poor visibility conditions?
Yes, but certainly within limits. This was confirmed to me by APM's work on Minong's bed #15-1 where depths range for ~1.5' to 6.0' and DASH's work on Cranberry's bed #CL-15-2 where the depth exceeded 5'. The divers noted that they always work in obscured visibility due to the sediment that disperses when they disturb the vegetation. However, Matt Berg's insights get my greatest respect and they can be found on page #11.

What do I think of the DASH process?
Everybody enjoyed watching the DASH process, but I don't think it is a viable option for our waters and issues. The financial outlay is significant, but I see managing qualified operators to be the real challenge. Staffing and scheduling issues will take a concerted effort. The best scenario in my mind would be an owner-operator managing it as a small business, much like a landscaper or snowplowing contractor. The right person and a good business plan might qualify for financial assistance on the machine purchase.

What do I think of the APM process?
I like it. Its flexible, its nimble and needs very little oversight. However, if next spring's EWM control situation is identical to 2015's actual treatment parameters (several beds combining to about 15 acres), I would still want to use the herbicide process because it has proven itself to be the most efficient, effective, safe and economical (compared to all other options). I would, however, like to consider hiring them (or a similar organization) for a 3-day effort on optimum bed locations as an ongoing comparison study of efficiency and effectiveness.

Assorted notes, insights, observations & perspectives:

1. **DASH method contractor:**
    a. Naturally DASH & Dredge, LLC ("DASH" for this report)
    b. 4750 Woerner Road / Manitou Beach, Michigan / 49253
    c. Gary Marzolf - Manager
    d. 517/438-0120
    e. DASH@NaturallyDASH.com
    f. NaturallyDASH.com
    g. On-site staff/operators: Gary Marzolf (President), Dan Cullen (long-time diving employee) & Jake Meredith (1st year "top-side manager" employee).
    h. Agreement: 2 days activity on the Cranberry/Minong chain-of-lakes for $5,000, which was fully paid from MFA's funds and will be reimbursed by the DNR grant.
    i. Note: DASH is in the business of contract-harvesting EWM in Michigan **and** selling the DASH machines. They have 5 in inventory, which sell for approximately $30,000 each depending on size. A significant component of his interest in traveling outside of his normal area of operation was due to his interest in developing sales activity.
    j. They usually bring a Personal Watercraft with them to pull the DASH boat to the sites. They didn't have it in this case, so our volunteers did the towing.
    k. 
    l. DASH equipment photo

2. **Hand-pulling method contractor:**
    a. Aquatic Plant Management, LLC ("APM" for this report)
    b. 1696 Silver Beach drive / Lac du Flambeau, Wisconsin / 54538
    c. Andrew McFerrin - Manger
    d. 715/892-2681 (Andrew's cell)
    e. Andrew@AquaticPlantManagement.com
    f. AquaticPlantManagement.com
    g. On-site staff: Nick Johnson (248) 202-7787 and 3 summer laborers

h. Agreement: 2 days activity on the Cranberry/Minong chain-of-lakes for a maximum of $2,500. We were actually invoiced, and agreed to pay $2,052.50 from MFA funds, which will be reimbursed by a DNR grant. This was $447.50 less than the expected amount due to their delayed arrival on Monday and two thunderstorms on Monday that interrupted harvest activity for most of that day.

i. 

j. APM equipment photo

3. <u>DASH's activity:</u>

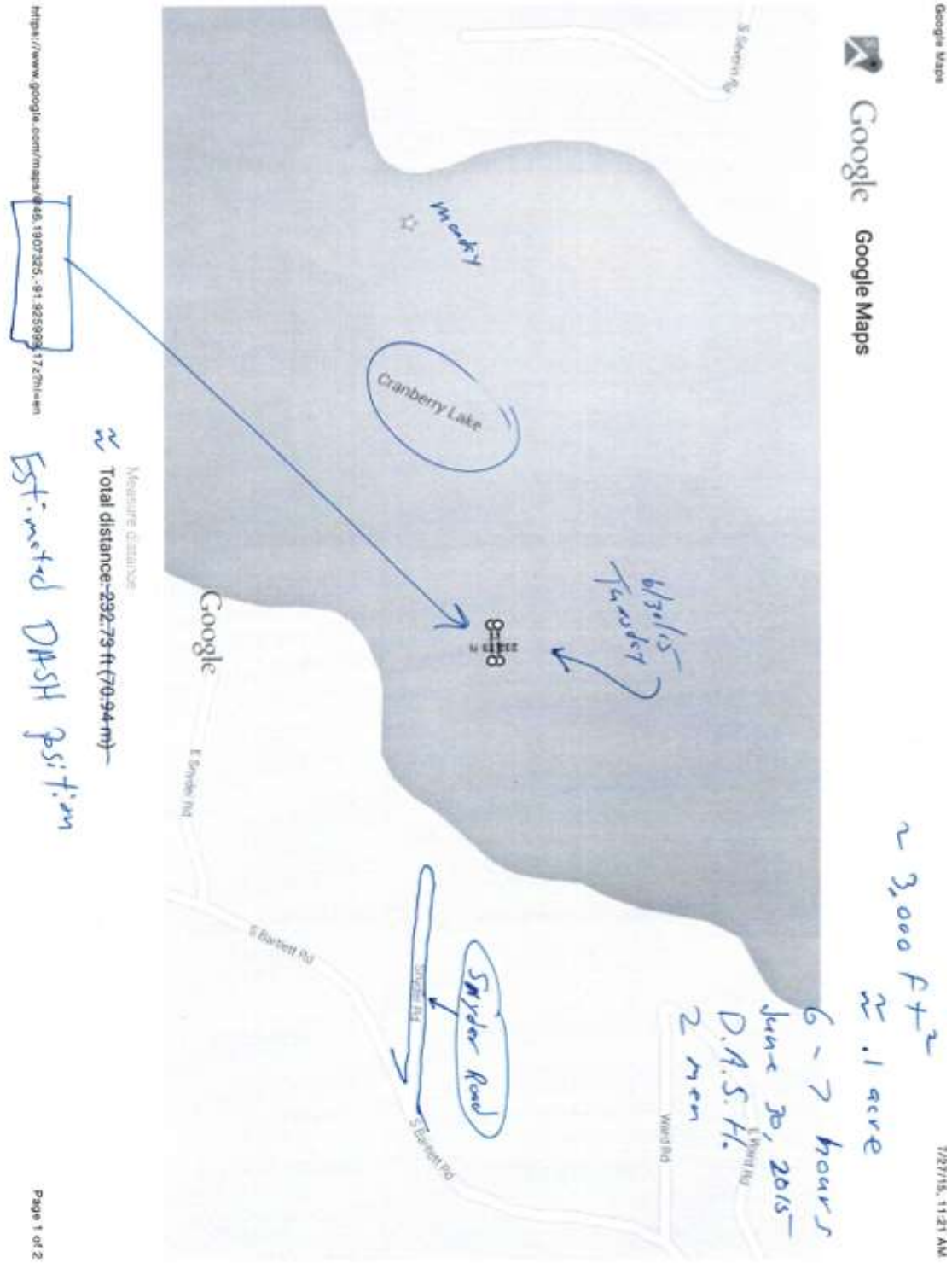
a. DASH started on a site along the west side of Cranberry Lake on Monday, but the EWM density wasn't ideal for demonstrating DASH's efficiency. They were also getting too many native plants, so they moved to a site on the east side of the lake on Tuesday.

b. The "east-side site" was good for the demonstration. However, it was inside of a large bed that was destined for a herbicide treatment which did occur the next day (July 1st). Therefore, monitoring the long-term characteristics (DASH harvest vs. herbicide treatment) of the site may be difficult. On the other hand, maybe this will offer a keen side-by-side insight to the two control methods… I **<u>think</u>** I have identified the GPS point at the center of the harvest activity, but I marked it a few days **<u>after</u>** the activity, so accuracy must be considered as "approximate".

c. The "Rake Fullness Rating" of this site would be a "3", using my interpretation of Matt Berg's scale. It is important to note that the APM crew worked in regions with a rating of "1".

d. 46.1907325, -91.925999 ~ center-point of work site, which I think was in bed # CL-15-2.

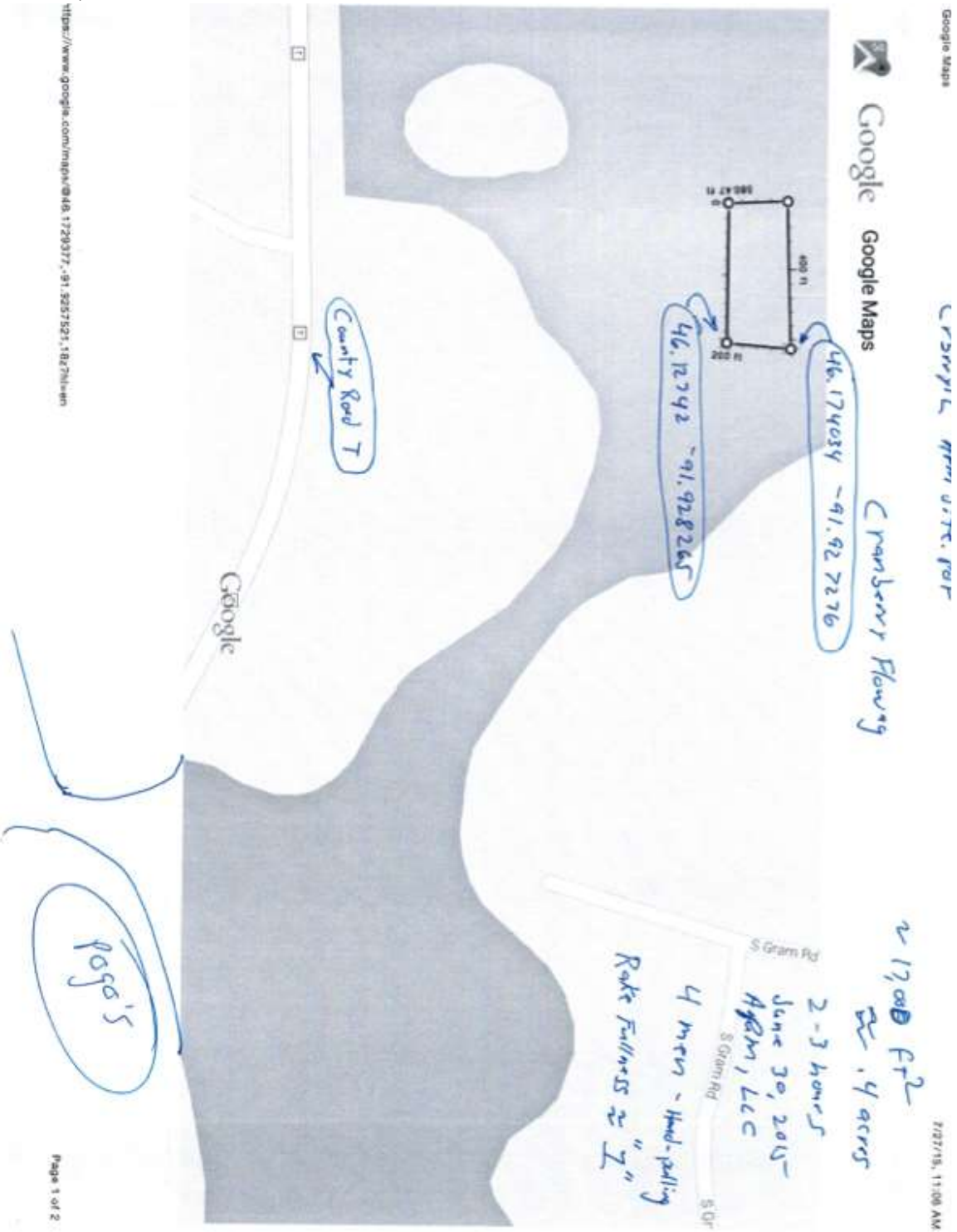
e. .



f. DASH Location.

4. **<u>APM's morning activity:</u>**
   a. APM started Tuesday morning at a site near the southern end of the Cranberry Flowage. It was where the channel takes a 90-degree turn northward.

b. The four-man crew spent about 3 hours at this site and harvested enough EWM to fill about three 5-gallon pails.
c. The "Rake Fullness Rating" of this site would be a "1", using my interpretation of Matt Berg's scale. It is important to note that the DASH crew worked in a region with a rating of "3".
d. 46.12742, -91.928265 = southeast corner of work site.



e.
f. APM's morning location.

5. **APM's afternoon activity:**
    a. APM started Tuesday afternoon at a site near the southern end of the Minong Flowage on "Bed #1-15", and also worked near the "DNR landing".
    b. The four-man crew spent about 3 hours at these sites.
    c. The "Rake Fullness Rating" of this site would be a "1", using my interpretation of Matt Berg's scale. It is important to note that the DASH crew worked in a region with a rating of "3".
    d. 46.127297, -91.929279 = southern corner of work site.

e. .

f. APM's afternoon location.

6. **I am a novice at "dropping GPS pins" on a Google Map**, but hopefully you can click on this link and see the pins I dropped for tracking the site locations noted above: https://www.google.com/maps/@46.1567625,-91.9287119,13z?hl=en

7. **Harvest "Value" - APM:**
    a. 4 divers operated in two areas of light EWM density for 1 full day.
    b. Their harvest report noted about 17 cubic feet of biomass (my measurements put the amount closer to 12 cubic feet).
    c. Raw cost per cubic foot calculation: $2,052.50 / 17 ~= $120 per cubic foot.
    d. Modified cost per cubic foot calculation: Since they were really only actively harvesting for one day it is more realistic to use the "$1,250 quoted daily rate" / 17 cubic feet ~= $74 per cubic foot.
    e. They processed about 2 acres of lake-area in one day (combining all 5 locations).
    f. Raw cost per acre calculation: $2,052.50 / 2 ~= $1,000 per acre.
    g. Modified cost per acre calculation: Since they were really only actively harvesting for one day it is more realistic to reference the "$1,250 quoted daily rate" / 2 ~= $625 per acre
    h. 
    i. The biomass was virtually all EWM, meaning it had very little non-EWM content (native plants, snails, clams, silt, etc.).

8. **"Harvest Value" – DASH:**
    a. 1 diver and 1 topside manager operated in one area of heavy EWM density for 1 full day.
    b. They harvested about 33 cubic feet of biomass (~~2 times the quantity of APM).
    c. Raw cost per cubic foot calculation: $5,000 / 33 ~= $150 per cubic foot.
    d. Modified cost per cubic foot calculation: Since they were really only actively harvesting for one day it is more realistic to reference the "$2,500 quoted daily rate" / 33 cubic feet ~= $76 per cubic foot.
    e. They processed about 0.1 acres of water in one day.
    f. Raw cost per acre calculation: $5,000 / 0.1 ~= $50,000 per acre.
    g. Modified cost per acre calculation: Since they were really only actively harvesting for 1 day it is more realistic to use the "$2,500 quoted daily rate" / 0.1 ~= $25,000 per acre.

h. .

i. The biomass had a noticeable amount of non-EWM content (native plants, snails, clams, silt, etc.

9. <u>Comparative numbers for "loose interpretation":</u>

a. The MFA treated 15.69 acres of EWM on May 19th, 2015 with herbicides. Dale Dressel's services and herbicide cost $4,965, so the cost per acre was $316.44.
b. It took Dale Dressel a portion of one day to perform the treatment of moderate density beds.
c. APM processed about 2 acres of light/moderate density EWM in one day. Therefore, it could be inferred that they could have processed the 15.69 acres in about 8 days (15.69 / 2 = 8 days). Using their quoted daily rate of $1,250 this option would have cost about $10,000 (8 * $1,250 = $10,000), which would equate to $637/acre ($10,000 / 15.69 = $637). Thus, in this "scenario", APM's method is roughly twice as expensive as herbicide method ($637.00 / $316.44 ~= 2).
d. It is important to note that I did not include the cost of Matt Berg's survey service (2015 @ $3,575) in the cost of either calculation because that cost would be incurred regardless.
e. It is also important to consider that herbicide does not depend on visibility and thus offers 100% coverage to an area. Hand-pulling requires that the plant be high enough in the water for the hand-puller to be able to see it. (Thus, short new-growth plants might be passed over in the hand-pulling process).

10. <u>Observers Comments:</u>

a. **<u>Dave Blumer of Lake Education and Planning Services:</u>** Dave is our lake-planning consultant. "Based on how much they were able to suck out yesterday, I agree with you completely. And it is kind of what I expected. I think the system these guys have is very good, and in the right lakes could help a lot. Maybe Cranberry, but not likely much good on Minong unless it is in shallow water where a person can actually walk with their head above water and work on the shallow flats. Again I applaud the guys from Naturally

Dash and Dredge for coming over here and demonstrating their equipment. I believe it could be much more efficiently operated if a lake group or small business would work out all the bugs and find out just where it can be most effectively operated. I doubt they sucked enough EWM out of the one location to have made a significant dent in the bed. Although I am sure they got a lot more than there were able to at the first site along the west shore. If there were not a lot of native plants mixed in with the EWM and the bottom were firmer, and clarity a bit better, selective suction would work better. It did not work well along the west shore, which is why we moved."

b. **Matt Berg of Endangered Resource Services:** Matt is the research biologist who performs our plant survey work. He used the DASH equipment to get a hands-on experience. "I finally got to go out with the divers yesterday after the storms moved through. As not part of the "sales pitch", I thought you might be interested in what I thought. **Super Impressed:** The suction really works/grabs fragments/nothing floats away which is always a big concern with just diver removal. Very little sediment is taken up/based on the bags, and it looks like it pretty much is all immediately returned to the lake. **Less Impressed on Minong/Potential elsewhere?:** If you have low density, it's really hard to find plants in low visibility lakes like Cranberry. However, and this is why I CC'd the Barnes group and others, in good visibility, **this could be an amazing and highly effective tool for CLP** (Eau Claire Lakes) or even some of the really low EWM density lakes I work with (Tomahawk/Sandbar/George/Horseshoe - both/Echo/Gilmore/Ham/Round). I think this could also be a LOT more effective than hand pulling in standing water as well. Having that hose, you could strip that sand bar on the south side of the Minong Flowage bare in no time at all. **Concerned:** Low visibility/underwater obstacles. Granted we were moving around a lot and I was a rookie, but having SNUBA rather than SCUBA means your air is tethered and you're trailing a hose – with two divers, we really got tangled up as we tried to find plants/there wasn't much were we were. In an obstacle filled environment, it would be extremely easy to catch a hose on stumps/become entangled. Because of this, I can confidently say there is **no price point** that I would risk my life of my employee's lives to work in a stump field with low visibility. Maybe others would, but this is way too much liability for me to ever incur. The people diving yesterday didn't seem excited about it either, and they were smoking over gas tanks (you saw that right Blumer ?). The DASH people said they decontaminated before moving from lake to lake, but there were plant fragments on gear/gloves in their boxes. It could have been from earlier in the day, but that's the kind of thing that makes me nervous with someone bringing gear from a long ways away; especially when they're using it to remove Invasives like Starry stonewort that aren't even present in northern WI. **Other thoughts:** I think this could be a great tool to control EWM/CLP in NW WI. The trouble as I see it is the start up cost. 30K plus for a lake to get a system is a lot of upfront cash, but perhaps this is where we are headed. Could the Minong Township or Town of Barnes apply for a grant to purchase one and share locally? Just thinking out loud at this point. Thanks to Dan and Dave for putting this together – it was great to actually get out there and see it."

c. **Andrew McFerrin of Aquatic Plant Mgt.:** "… As for the DASH machine, Nick filled me in on the general process along with the pros and cons of suction harvesting. I have seen these machines in the past and truly believe there is benefit to this technique in specific scenarios. My personal opinion: I believe there is an opportunity for both DASH and snorkel hand-harvesting to work together for maximum effectiveness and efficiency. While I don't know what that would exactly look like, Nick has provided the contact information for the DASH Company you hired and I will make sure to follow up with him. Thank you for setting that up and allowing us to work with the other firm."

d. **Nick Johnson of Aquatic Plant Mgt.:** Nick is the crew-leader for the APM group and he used the DASH equipment to get a hands-on experience. His initial report was, "that thing is *bleep* awesome!"

e. **Dale Dressel of Northern Aquatic Services:** "Yes the (herbicide) treatment happened July 1. I should note that the area 15-4, the one near to which the DASH team operated, well they apparently did not have any GPS information delineating their activities so I

took a good look at that bed before treating and could see no signs of their work in that bed. There was EWM on all of the corners and in the middle, lots of it." (I, Dan Maxwell, think DASH was actually in bed #CL-15-2, but I'm not sure).

f. **Steve Schieffer of Ecological Integrity Services who's consulting business specializes in lake planning consultation and he is also a property owner on Cranberry Lake.** Thus, he does the plant survey work on Cranberry Lake. "I have some experience with DASH and it is really only cost effective in small areas. When the areas get big, it is very labor intensive and calculates out to a very high per acre cost."

g. **Cranberry Lake Loon Family:**
   i. They thought the whole process was very interesting and they plan to nominate Dan Maxwell as an honorary loon at their convention in Orlando next November.
   ii. There were 3 chicks. I think the adult on the left is looking for chick #3…
   iii. .

h. Loon family

11. **Cranberry Lake & Cranberry Flowage property owners:** Through the course of the pre-event promotional activity and the on-lake activity, a few folks (less than 10) voiced support and/or interest in the effort.
12. **In general, both days had very little "public activity" (boat traffic, etc.) happening, so we got very few casual observers** (other than the Loon family). This surprised me since it was the week leading into the Independence Day holiday. On the other hand, they were "work days" and such traffic didn't really start to pick up on the lakes until Thursday.
13. **Visibility issue:** The DASH diver (using a pumped air-supply system) said he can tell EWM and Curly-leaf Pondweed by feel and thus doesn't necessarily need to see the plant. APM (no pumped, or scuba air supply system) said they look for the visible portion of the plant near the surface and follow it down to the base.

14. **Diver safety issue regarding stumps:** DASH & APM said they can generally work around such obstacles, but they wouldn't venture too far into stump fields. Rather, they focus their efforts in the navigation channels, etc. For example, they both would work the navigation area of the entire Cranberry Flowage. Likewise, they would work the "navigation channel" from Pogo's southward, then eastward towards the mouth of Serenity Bay.
15. **Harvested biomass was disposed in a dry "burn-pile" site behind the Totogatic Campground.** The only complication was that much of the DASH biomass was entangled in the polypropylene mesh onion bags from the DASH process. I removed that which came out easily and brought the rest home to dry out and dispose separately. Large harvest volume would pose a big disposal issue because de-bagging would not be a viable option.
16. **DASH fill rate:** @ 3:00pm when it was "running in-stride", bag fill rate was about a 3 minute cycle, but this is very dependent on the diver's easy access to plants as opposed to searching for plants. I have no doubt that this rate could triple in the right conditions. However, I also envision that if the conditions are that good for high harvest rates, the process would never be able to address the shear volume of EWM in which our lake would be strangled.
17. **DASH effectiveness:** Gary said that herbicide treated areas will grow back at a rate of 100%, while hand-pulled areas grow back at a rate of 10% (presumably because native plants now have a chance to get more firmly established) and that herbicides leave the dead bio-mass in place which can be a problem (some regional laws require bio-mass removal).
18. **DASH future business:** For them to come back for future work, it would be best to book a full week and have all harvest areas well marked in advance. However, we are so far out of their region of operation as to be difficult to support/service us regularly.
19. **APM future business:** They are ready, willing and able to work with us in the future. I would recommend a minimum of 2 days and efficiency would improve with more days.
20. **Volunteer hours:**
    a. Dan Maxwell: Estimated at 103 hours. My efforts entailed a great deal of pre-event planning, event support on the 29th and 30th, and post-event administration and reporting.
    b. Chuck Youngquist: 12 hours combined for both days, using his pontoon boat for towing the DASH machine, shuttling people around the site and general safety support.
    c. MFA board meeting discussions: these hours will likely be split between the bathymetric study portion of the grant.
    d. Dave Blumer: paid consultant, not a volunteer
    e. Matt Berg: paid consultant, not a volunteer
21. **Photos:** Additional photos are available on request (Dan.Maxwell@Comcast.net).
22. **Video:** Of the operating DASH machine are available on request (Dan.Maxwell@Comcast.net).