

**Low Water Level Survey and Analysis**  
**Lake Anna Civic Association (LACA)**

**December, 2008**

## Executive Summary

The LACA Membership survey results are in and are quite conclusive:

The majority (62%) of responders indicate significant problems with docks, lifts, watercraft and recreational activities when water levels fall to 248', 2 feet lower than the normal elevation. This increases to 88 % at 3 feet low and 92% at 5 feet; 8% reported no impact even at 5'.

The number of "recreation days" lost is a staggering 4,239 days. "Lake-wide", this would be 19,414 days (see below for explanation). Almost half (49%) ran aground or struck objects; damage was limited to props and no injuries were reported.

151 of LACA's Membership of 909 (17%) responded; most (81%) are located on the public (cold) side and most (83%) are waterfront property owners.

The results given herein reflect the experiences and views of the 151 LACA members who responded to the survey. The results were NOT extrapolated to all 909 LACA members, although that technique is common in many surveys. We are simply not sure if the same tendencies apply to the 83% who did not respond.

However, in some instances, the numerical answers from the survey have been "bumped up" to "lake wide", which assumes the LACA experiences are relevant to all Lake Anna property owners; see page 7 for details. There was no attempt to "factor up" for "day users" as there is no basis to do so. Surveys of that segment need to be accomplished; see Recommendation # 2 (pages 5 & 13 for details).

The highlights of the survey results include:

1. Members reporting loss of use of docks and boat lifts at up to 5 feet low (see p.8):

- 139 of 151 or 92%
  - “Lake-wide”, this would be 637
2. The depth where waterfront facilities become unusable (p.9):
    - 1.79’ low “median”
    - 1.99’ low “average”
  3. The numbers of facilities that are adversely affected are (p.9):
    - 672 slips, piers, lifts/boathouses and ramps
    - 318 power boats, 132 personal water craft (PWCs) and 11 non-power boats.
    - “Lake-wide”, this would be 3,078 slips/docks/ramps and 2,111 water craft
  4. Even though the most recent low water period (August 07-January 08) was relatively “off-season”, the number of “recreation days” lost totaled (p.9-10):
    - 4,239 or 19,414 “lake-wide”

This number is likely to be significantly low as NONE of the POA reported “lost days” for their Common Areas as they could not speak for each Common area user. See Recommendation # 1 (p. 5 and 7) for an idea on how to get a more representative number.

5. The major accommodations for low water included (p.10):
  - 59 (or 39%) “pulled” their boat out early, typically by Labor Day
  - 18 (12%) modified docks/lifts
  - 16 (11%) dredged, with 2 reporting expenses of \$ 13,000
6. Operating problems reported before use ceased were (p.11):
  - 41 (27%) hitting submerged objects
  - 33 (22%) running aground
  - damage of \$ 2,640 was reported by 10 people (ave. = \$ 264) for props
  - Fortunately, no accidents or injuries were reported as more

navigation and recreation “caution” was exercised.

7. Recreational activities negatively impacted were (p.11):
  - 62 (41%) skiing, boarding and tubing
  - 45 (30%) swimming
  - 36 (24%) fishing

When asked about actions to help mitigate low water conditions, the Members were quite clear:

1. The vast majority (139 or 92%) favors the proposal to increase the Lake’s seasonal water levels by 3 inches (from 250’ to 250.25’); several recommended higher levels of 4”, 6” or even 12” and extending it to August or September (p.12).
2. Those opposed (only 8 or 5%) cited problems with rip rap or bulkheads. 4 Members (1%) had No Opinion (p.12).
3. 127 people (84%) offered to write or e-mail state or local officials or Legislators when needed to support LACA’s positions (p.12).
4. Surprisingly, 59 people (40%) irrigate their lawns and plant with water from Lake Anna. Of these, 41 (70%) indicated they would discontinue during low water levels if asked (p.13).

When asked if low water levels had any benefits, only 16 Members (11%) indicated any benefit, generally just the opportunity to fix shoreline protection or clean up debris (p.13).

Lastly, when asked what else could be done to improve conditions during low water levels, 41 Members (27%) were VERY succinct (p.13-14):

1. less water over the dam; reduce in anticipation of low water
2. equate that flow to inflow into the lake
3. locate and remove, or mark underwater hazards
4. reduce downstream consumption

Interestingly, no one suggested stopping the construction of the proposed Unit 3 at NAPS and only one even suggested changing (again) its cooling system.

Based on the information received, this Report makes several recommendations:

1. **Recommendation #1:** that LACA attempt to survey all Property Owners Associations (POA) as only 8 POAs responded. This would indicate that the impact on Common Areas is not adequately represented in the responses, especially in regard to “lost” recreation days (p.7).
2. **Recommendation # 2:** that LACA attempt to get other groups (FOLA, LABRA, LABP, LAAC, etc.) to do a similar survey for all residents (but avoiding duplication of LACA Members), businesses and marinas, and “day users” to get a more comprehensive look at impacts of low water levels on the greater Lake Anna Community (p.8).
3. **Recommendation #3:** that LACA organize its e-mail listing to be able to quickly reach its Membership on issues dealing with lake levels, especially in upcoming Stakeholder or Permitting processes. 127 Members (84%) indicated that they were willing to write or e-mail government or elected officials about such matters (p.13).
4. **Recommendation #4:** That LACA distribute this Report to Federal and State environmental officials, local government officials and any other groups or individuals dealing with low water levels at Lake Anna and recommend that actions be taken ASAP and not wait until the proposed NAPS 3 is approved, nears construction, or begins operation (p.15).

# **Low Water Level Survey and Analysis**

## **1. Introduction**

Recommendation # 11 (page 18) of LACA's Lake Levels at Lake Anna Report (June, 2008), adopted by the LACA Board of Directors on June 4, 2008, read:

**Recommendation # 11: That LACA sponsor a survey of Lake Area residents (LACA members or entire population) in order to gather some specific data on the effects of low water on boating and to the likely impact of raising the lake level 3 inches in the winter and spring months.**

This survey and compilation are the only known efforts to quantify the affects of low water levels on Lake Anna recreation and shoreline facilities.

## **2. Survey Instrument, Method and Results Compilation**

The four-page, 13-question survey instrument (See Attachment 1) was developed by the Lake Level Committee of LACA. It was reviewed and endorsed by the Board of Directors at its September 4, 2008 meeting. It was forwarded for comments to Dominion Power and the Virginia Department of Environmental Quality (DEQ), which forwarded it for comment to the Virginia Department of Game and Inland Fisheries (DGIF) and the Virginia Department of Recreation and Conservation (DCR). The LLC received helpful comments from DGIF and DEQ but received no suggestions from Dominion Power and no response from DCR.

The survey was distributed via the LACA Fall Quarterly Newsletter (Volume 18, Issue 4) in late September 2008. Members were asked to respond by October 24, though results came in through early November.

The survey was mailed to 909 LACA members. 151 completed surveys were received (143 from individuals and 8 on behalf of an entire POA) for a response rate of 16.6%. This is a very good rate of response in light of the fact that Members may have been hampered by the fact that they had to provide their own envelope and postage, as LACA has no postage-paid or return envelope provisions, nor does LACA have on-line response capability.

The results were tallied by the LLC members using an Excel spreadsheet. Numerical answers were simply entered as numbers whereas "open responses" were typed in. The results are given in Attachment 2. The entire spreadsheet is 46 pages long so for purposes of this report; it has been shortened to the numerical tally for each of the questions but including the open responses where appropriate.

The data and responses quoted in this report and provided in Attachment 1 are the exact data provided by the Members; it was not “factored” up to all 909 Members as utilized by some surveying efforts. Because of the diversity of respondents (warm vs. cold, up lake and down lake and representing 67 different lake subdivision-see last paragraph below), it might be logical and accurate to do so. However, the LLC chose not to do so, as we are not sure that the other 83% would answer similarly to the 17% that did. If we had, the “LACA extrapolation factor” would have been 909/143 or 6.36.

However, the LLC did accept the fact that the experiences of the 17% responding LACA members could reasonably extrapolated IN THE SAME PROPORTION to the total number of Lake Anna properties. That is, if the owners of 17% of all Lake Anna properties had responded, the results would be similar to the 17% of LACA respondents, owing to the diversity mentioned above. From LACA’s previous work, there are 2,131 tax-paying Lake properties in Spotsylvania County and 2,035 in Louisa and Orange for a total of 4,166. Extrapolating the “LACA results” to all properties, certain numerical results could be “bumped up” by 4.58 (4,166/909). Thus, this procedure applies the same level of LACA response to all properties. Such figures are noted as “Lake-wide” in this report.

### **3. Identification Information of Respondents (Survey Introduction)**

Members offered their names and addresses so that LLC could eliminate any duplication of responses. However, the Members were assured that the results would be “tabulated for an aggregate report and no individual names would be released”; LLC and LACA will honor that commitment.

The vast majority of responders were waterfront property owners (126 or 83%) whereas 21 (14%) had “water-access”. Also, the vast majority (123 or 81%) were on the public (cold) side.

Only 8 responses represented entire Communities, filed by the following POAs: Aspen Hill, Sunset Harbour, Tara Shores, Wyndemere, Scott-McCoy, Clearwater, Tall Pines and Dukes Plantation. None provided estimates of “recreation days lost” (see page 9) so the LLC believes that this survey substantially under-represents the affect of low water on days lost by uses of POA Common Areas and thus the total number of days in Section 7 on Pages 9-10.

**Recommendation #1:** that LACA attempt to survey all Property Owners Associations (POA) as only 8 POAs responded. This would indicate that the impact on Common Areas is not adequately represented in the responses, especially regarding “lost” recreation days.

The large majority of responders (123 or 81%) are on the public (cold) side while fewer (27 or 18%) on the private (warm) side. This response is roughly proportional to

the number of residents on each side. Responses were received from 67 different subdivisions, indicating a very good mix of geographic diversification.

This survey was conducted for LACA Members only, which are generally individual homeowners around the Lake. Thus, there is no information herein on the effects of low water levels on businesses, or residents who are members of other associations, or no associations at all and no information on “day users” of Lake Anna. An attempt should be made to capture data from these groups.

**Recommendation # 2:** that LACA attempt to get other groups (FOLA, LABRA, LABP, LAAC, etc.) to do a similar survey for all residents (but avoiding duplication of LACA Members), businesses and marinas and “day users” to get a more comprehensive look at impacts of low water levels on the greater Lake Anna Community.

#### **4. Areas of Impact (Survey Question # 1)**

The survey begins with a question on the general areas of low water level concerns, directing the Member to appropriate questions for those conditions. The responses to those general conditions are as follows:

No impact-	11 responses or 7%
Problems with docks/boat lifts-	136 “ 90%
Problems with launch ramps-	37 - 24%
Problems with submerged objects	66 - 44%
Problems with in-water recreation	92 - 61%
Other	3 - 2%

Thus, 136 (90%) Members indicate that using their dock, lifts and boats are a problem in low water conditions.

#### **5. Lake Levels that First Inhibit Use of Facilities (Question # 2)**

The survey listed levels of low water in increments of ½ foot and indicated that the low point in 2007 was 2 ½ foot low and 5’ low in 2001. The Members were then asked to indicate which water level first inhibited the use of the facilities. The responses were as follows:

½ foot low-	5 responses	- 3 %
1 foot low-	19 responses	-13 %
1 ½ feet-	31 “	-20 %

2 feet-	39	“	-26 %	Cumulative- 94 of 151 or 62%
2 ½ feet-	25	“	-17 %	
3 feet-	14	“	- 9 %	Cumulative- 133 of 151 or 88%
3 ½ feet-	0	“	- 0%	
4 feet-	2	“	-1.3 %	
4 ½ feet-	2	“	-1.3%	
5 feet-	2	“	-1.3%	Cumulative- 139 of 151 or 92%
No Impact	11	“	- 8%	

These responses represent almost the traditional bell-curved, skewed slightly to the smaller numbers. The arithmetic mean of these numbers is 1.79 feet and the average is 1.99 feet.

### **6. Facilities and Watercraft Affected (Question # 3)**

This question explored the number and types of facilities impacted by low water levels at the “inhibiting” water level specified in the previous question. The totals were:

<u>Facilities</u>		<u>Watercraft</u>	
Boat slips	-341	Power Boats	-318
Piers	- 49	PWCs	-132
Boat houses/lifts	-161	Other	- 11
Launch ramps	- 38	[kayak , paddleboat, jon boat,	
PWC lifts/ramps	- <u>83</u>	sail boat, canoe, row boat]	
<b><u>Total</u></b>	<b>-672</b>		<b>- 461</b>
<b><u>“Lake-wide”</u></b>	<b>-3,078</b>		<b>- 2,111</b>

Note that of the 341 slips, 276 were in the Common Areas of the 8 reporting POAs. Most other respondents are waterfront property owners and use lifts/boathouses.

### **7. Lost Recreation Days (Question #4)**

This question was designed to determine, based on the water levels each month, how many “recreation days” were lost via the inhibiting water levels and facilities described in the previous 2 questions. A recreation day lost is “any day that you would have likely used your facility or watercraft but you did not due to water levels”. An example was given: “a boater not able to use his facilities both weekend days each week would have lost 8 recreational days each month”. The survey requested the number of

such days each month from June 07 through May 08; the average water level each month was listed for reference.

Only 101 of respondents (and no POAs) answered this question so the results below represent only 67% of people completing the survey. These 101 people indicated these amounts of “lost recreation days”:

July, 2007	-182 days
August, 2007	-502
September, 2007	-819
October, 2007	-788
November, 2007	-572
December, 2007	-440
January, 2008	-396
February, 2008	-285
March, 2008	-160
April, 2008	- 38
May, 2008	- 7

**Total -4239 days - “Lake-wide” = 19,414 days**

Of the 101 Members who provide numerical answers, 13 listed 30 or 31 days each month, indicating daily boat use. Most others listed 8 days or less each month, reflecting weekend use only. The numbers by month closely track the water levels which reached the 2’ low level in mid-August 2007, stayed at 2.5’ low through the Fall and Winter and went back above the 2’ level in March, 2008. The numbers also track the seasonal pattern of less boating after October and further decreases in the Winter months.

**8. Adaptations due to Low Water Levels (Question # 5)**

Members made a number of adaptations to deal with low water levels including:

“Pulled” boat out early	- 59 responses - 37 %
Modified lift/dock	- 18 “ - 12%
Dredging	- 16 “ - 11%
Other	- 27 “ - 18%
None	- 52 “ - 34%

“Other” included 11 people who moored their boats in the water out past their docks. 2 people indicated spending \$ 13,000 on dredging while the other 14 listed no cost figure. Several indicated that they were unable to winterize their boats stuck on lifts. In frustration over persistent low water in Foremost Run, one person sold their boats while another simply “went to Florida”.

## **9. Safety-related Difficulties (Question # 6)**

A frequently-expressed concern of low water levels is danger and damage due to running aground in new “low water areas” or striking objects now within reach of a prop. Safety for those in the water is a big concern.

The results of this survey indicate that the typical responder exercised greater care and caution during periods of low water. As a result, no injuries were reported and property damage was not significant although almost half hit something or ran aground. The results are as follows:

Hitting submerged objects	-41 responses	-27%
Running aground	-33 “	-22%
No problems experienced	-86 “	-57%

17 people (11%) reported damaging props or/and lower units; 10 of these reported damages totaling \$ 2,640 (ave. = \$ 264) while the other 7 did not give a damage cost.

This low level of major problems was likely assisted by the large number of recreation days lost during this period and “local’s” familiarity with the waterways.

## **10. Recreational Activities Adversely Affected (Question # 7)**

Even with care and caution described in paragraph 9 above, difficulties in all facets of in-water recreation were experienced in July 2007 through April 2008 as follows:

Problems with skiing, boarding and tubing	-62 responses	-41%
Problems with swimming	-45 “	-30%
Problems with fishing	-36 “	-24%
Problems with canoeing/kayaking	- 5 “	- 3%
Other	-14 “	- 9%
None experienced	-86 “	-57%

The 14 “Other” Member comments ranged from less boating and more care to just stopping boating and sailing.

NOTE: Many Members indicated multiple responses so that the percentages do not add up to 100%.

**11. Any Other Difficulty (Question # 8)**

This “catch all” was for any items, techniques or problems not captured in the previous questions. 23 (15%) people listed a host of problems including:

- prohibited voluntary water quality sampling
- problems with getting elderly parents on-board
- negative affect on selling home
- hotter water
- “really looked ugly”
- plant growth in new “dry area” and in shallow water

**12. 3” Rise in Seasonal Lake Water Levels (Question # 9)**

In its June 2008 Report and Board Action, LACA had gone on record supporting this idea, first proposed by Virginia environmental officials when analyzing the water use of the proposed Unit 3 at NAPS.

There is a very high level of support for this action (139 respondents or 92%), with several suggesting higher levels of 4”, 6” and even 12”. This is an important level of support that should be made known to Virginia and Federal environmental officials.

The 8 (5%) Members who oppose this idea reported likely additional erosion, possible damage to shoreline protection (rip rap or bulkheads), loss of beach and low dock clearances. However, no major problems were cited. 4 Members (3%) had NO Opinion.

**13. Political/Legislative Action (Question # 10)**

This question asked if the Members would help promote solutions to help keep more water in the lake. A large majority (85 or 79%) indicated a willingness to contact write or send e-mails to the appropriate officials with a smaller level of support for other actions as follows:

Write or e-mail government or elected officials-	127	responses	-84%
Attend meetings to discuss issues-	-75	“	-50%
Help develop strategies	-25	“	-16%
Participate on committees	-22	“	-15%
None of the above	-12	“	-18%

Based on this high level of willingness to make contact, this Report makes the following recommendation:

**Recommendation #3:** that LACA organize its e-mail listing to be able to quickly reach its Membership on issues dealing with lake levels, especially in upcoming Stakeholder or Permitting processes. 127 Members (84%) indicated that they were willing to write or e-mail government or elected officials about such matters.

#### **14. Irrigation Practices (Question # 11)**

In its June 2008 Lake Levels at Lake Anna Report, LACA estimated as many as 1,000 people may be irrigating lawns and plants directly from Lake Anna waters. This survey indicates 59 LACA Members (40%) do so.

When asked if these 59 Members would discontinue such practices during low water levels, 70 % (41 of the 59) said YES (if asked) while 30% (18 of the 59) indicated NO.

If 40% were applied to all property owners, the irrigation number would be 270 people “lake-wide”, such that the estimate of 1,000 in the Report is likely too high and the total water level impact is “over-stated” in the June Report. However, the projected total use of water by the estimated 1,000 users was miniscule, and based on this assumption, would now be 73% less. However, it would be a very symbolic gesture if property owners would discontinue watering lawns in low water periods to show support for others who will have to make changes.

#### **15. Low Water Benefits (Question # 12)**

The Membership was asked if they realized any benefits to low water levels. The vast majority indicated NO (137 or 91%). 16 Members (9%) noted opportunity to work on rip rap or bulkheads and clean up debris.

#### **16. Suggestions to Lessen Impacts of Low Water (Question #13)**

39 Members (25%) provided a response. Almost all dealt with lessening the flow of water out of the lake:

- Reduce flows over the dam
- Earlier flow restrictions based on weather and at 250’ and/or 249’
- Water Resource Management Plan; anticipatory actions
- Relate dam out-flow to lake in-flow
- Re-evaluate agreements with downstream users

Other suggested these ideas:

- Dry cooling for the proposed NAPS 3
- Locate or remove underwater hazards; more warning markers
- Dominion schedule shutdowns in Dec-Feb.
- Build other reservoirs
- No one should irrigate after 1” low; \$ 60 fine like in North Carolina
- Oppose water withdrawals for golf course and by the County

## **17. Conclusions and Recommendation**

Three Recommendations have already been indicated in the text above:

**Recommendation #1:** that LACA attempt to survey all Property Owners Associations (POA) as only 8 POAs responded. This would indicate that the impact on Common Areas is not adequately represented in the responses, especially in regard to “lost” recreation days (p. 7).

**Recommendation # 2:** that LACA attempt to get other groups (FOLA, LABRA, LABP, LAAC, etc.) to do a similar survey for all residents (but avoiding duplication of LACA Members), businesses and marinas, and “day users” to get a more comprehensive look at impacts of low water levels on the greater Lake Anna Community (p.8).

**Recommendation #3:** that LACA organize its e-mail listing to be able to quickly reach its Membership on issues dealing with lake levels, especially in upcoming Stakeholder or Permitting processes. 127 Members (84%) indicated that they were willing to write or e-mail government or elected officials about such matters (p.13).

As stated earlier, this is the first known effort to survey Lake Anna residents on specifics about the affects of low water levels on their facilities and recreational activities. As such, these results should be communicated with State and Federal environmental officials, the involved local governments, and the Associations and Organizations concerned with Lake Anna issues. This information may be vital as the efforts of the proposed NAPS Unit 3 continue to be studied and debated.

However, LACA believes that this information may be useful in dealing with the current problems of low water levels (LONG before NAPS 3 is operational) and encourage all to use it now, especially with any upcoming stakeholders or permitting processes.

**RECOMMENDATION #4:** That LACA distribute this Report to Federal and State environmental officials, local government officials and any other groups or individuals dealing with low water levels at Lake Anna and recommend that actions be take ASAP, and not waiting until the proposed NAPS 3 is approved, nears construction, or begins operation .

**17. Attachments**

Attachment # 1     The Survey Instrument

Attachment # 2     The Survey Results

**ATTACHMENT # 1**

**Lake Anna Civic Association (LACA)**  
**Low Water Level Survey**

The June 2008 Report "Lake Levels at Lake Anna," adopted by the LACA Board of Directors (see <http://www.lakeannavirginia.org/library.html>), calls for a survey to help quantify the effects of low lake levels on waterfront facilities and recreation. Your cooperation in answering the following questions is greatly appreciated. Results will be tabulated for an aggregate report (no individual names released). This survey is for LACA members and member Property Owners Associations (POA) s.

Name \_\_\_\_\_

Mailing Address \_\_\_\_\_

Subdivision \_\_\_\_\_ Check one:  Public (cold)  Private (warm)

Location: Water front:(\_\_\_\_) Off water with community Access: (\_\_\_\_) Off water: (\_\_\_\_)

**NOTE:** If this is being completed for a POA, please indicate your position (\_\_\_\_\_) in the POA and complete this survey for all facilities owned by the POA (all slips in "common area", ramp, etc.).

**# 1. Normal lake elevation is 250 feet. Please indicate what impact low (249' or below) have on you. Mark all that apply:**

- |  |         |                                     |
|--|---------|-------------------------------------|
| No impact                                  | (____)- | <b><u>Go to Question # 9</u></b>    |
| Difficulty using docks, piers or boatlifts | (____)- | <b><u>Questions #2 thru # 5</u></b> |
| Problems with launching watercraft         | (____)- | <b><u>Questions #2 thru # 5</u></b> |
| Problems avoiding submerged obstacles      | (____)- | <b><u>Question #6</u></b>           |
| Problems with in-water recreation          | (____)- | <b><u>Question #7</u></b>           |
| Other                                      | (____)- | <b><u>Question #8</u></b>           |

**# 2. The lake level dropped to 247.5' (2 ½' low) in 2007 and 245' ( 5' low) in 2001. Please indicate which water level first inhibits the use of your facilities. Check only one (the point where problems begin).**

- |                          |        |         |        |
|--------------------------|--------|---------|--------|
| <b><u>Lake Level</u></b> |        |         |        |
| ½ ft. low                | (____) | 3 ft.   | (____) |
| 1 ft.                    | (____) | 3 ½ ft. | (____) |
| 1 ½ ft.                  | (____) | 4 ft.   | (____) |
| 2 ft.                    | (____) | 4 ½ ft, | (____) |

2 ½ ft. (2007) (\_\_\_\_)

5 ft. (2001)(\_\_\_\_)

**# 3. Please indicate the type and number of facilities and watercraft impacted:**

<u>Type</u>	<u>Number</u>	<u>Type</u>	<u>Number</u>	<u>Type</u>	<u>Number.</u>
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**Facilities:**

Boat Slip (____)	Boat House/Lift (____)	PWC Lift/Ramp (____)
Pier (____)	Boat launch ramp (____)	_____ (____)
		(other-specify)

**Watercraft:**

Power Boat (____)	Personal WaterCraft (PWC) (____)	_____ (____)
		(other-specify)

**# 4. On a monthly basis, how many “recreation days” did you lose\*\* during the low water period of the 2007- 2008 season? The average monthly water level is noted.**

<u>Month</u>	<u>Ave. Level</u>	<u>Days Lost</u>	<u>Month</u>	<u>Ave. Level</u>	<u>Days Lost</u>
June 07	( normal)	(____)	Dec 07	( 2 ½ ft)	_____
July 07	( 1ft low)	(____)	Jan 08	( 2 ft)	_____
Aug 07	( 1 ½ ft)	(____)	Feb 08	( 1 ½ ft)	_____
Sept 07	( 2 ft)	(____)	Mar 08	( 1 ft)	_____
Oct 07	( 2 ½ ft)	(____)	April 08	( ½ ft)	_____
Nov 07	( 2 ½ ft)	(____)	May 08	( normal)	_____

\*\* A lost recreation day is any day that you would have likely used your facility or watercraft but you did not due to the water levels. **For example**, a person who normally boats every Saturday and Sunday of every month, but can’t get a boat out beginning at 2 feet, would have lost 8 recreational days in each month between Sep 2007 and Jan 2008.

**#5. Describe any adaptations you made to accommodate low water levels (Check all that apply):**

None	(____)
Initiated or accomplished dredging	(____)
Pulled boat out early in the season	(____)
Modified boat lift or dock	(____)
Other (Please describe in space below)	(____)

**# 6. Describe any safety related recreational difficulties you experienced during the recent low water level period (Jun 2007 thru May 2008) due to low water levels:**

None	(____)
Hit submerged obstacle	(____)
Ran aground	(____)
Other (Please describe in space below)	(____)

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**Please include details about the number of incidents and any damages, injuries, or costs incurred.**

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**# 7. What recreational activities were adversely affected by low water levels during the most recent low water period (Jun 2007 thru May 2008):**

None (\_\_\_\_)  
Fishing (\_\_\_\_)  
Swimming (\_\_\_\_)  
Skiing,tubing et al (\_\_\_\_)  
Canoeing, kayaking et al (\_\_\_\_)  
Other (Please describe in space below (\_\_\_\_)

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**Please add any details about impediments listed above:**

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**#8. Describe any other type of water-related difficulty experienced during the period (Jun 2007 thru May 2008):**

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**# 9. LACA is studying ways to adjust the impact of low water levels. Would you favor or oppose raising levels by 3 inches between April-July in order to “store” water to lessen the chance of low water periods?**

**Check one: Favor : (\_\_\_\_)                      Oppose : (\_\_\_\_)**

**Please explain any problems you would anticipate with shoreline, riprap, docks, etc:**

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**# 10. LACA is planning to request that state authorities and other stakeholders adjust water flows over the dam to retain more water in the lake during the summer months.**

**If political action is needed to achieve this, would you be willing to ?**

- Write or e-mail government or elected officials (\_\_\_\_)
- Attend meeting where these issues are discusses (\_\_\_\_)
- Help develop other strategies to reduce lake level losses (\_\_\_\_)
- Participate on committees working on specific issues (\_\_\_\_)
- None of the above (\_\_\_\_)

**# 11. If you irrigate lawns or plants with water from Lake Anna, would you agree to discontinue this practice during low water levels (less than 248') ?**

Check one: **YES** : (\_\_\_\_)      **NO** : (\_\_\_\_)      **I Don't irrigate**: (\_\_\_\_)

**#12. If low water levels were a good thing for you, please indicate how you were able to benefit from low water levels during the period Jun 2007 thru May 2008.**

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**#13. Please provide any suggestions you have that could lessen the impact of low water levels:**

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**Thank you for participating in the Low Water Level Survey. Please complete by 24 Oct 2008 and mail to LACA, PO Box 217, Mineral, VA 23117.**

**Results will be published as a separate report and summarized in the LACA Newsletter.**

## ATTACHMENT # 2

LACA Low Water Level Survey												
Identification												
Identification Info												
Name	POA ??	Survey #	Address	Subdivision	Public	Private	Waterfront	Water Acc	None			
Allan		1	15512 Sunset Har Blvd, Mineral	Sunset Harbour	1		1					
Robert		151	1689 Drewlaine Drive	Rockland Creek	1		1					
<b>Totals</b>		8			123	27	126	21	2			
Question #1 Impact of low water												
Response #	No impact	Difficulty using docks/lifts	Difficulty with launch ramp	Submerged Obstacles/Run Aground	In-water recreation	Other						
1		1			1							
151		1	1	1	1							
<b>Totals</b>	11	136	37	66	92	3						
Question #2 Level where problem arises												
Response #	.5 ft	1 ft	1.5 ft	2 ft	2.5 ft	3 ft	3.5 ft	4 ft	4.5 ft	5 ft		
1			1									
151			1									
<b>Totals</b>	5	19	31	39	25	14	0	2	2	2		
Question #3 Type and number of facilities and watercraft impacted												
Response #	boat slip	pier	boat house, lift	boat launch ramp	PWC lift, ramp	Other	Power Boat	PWC	Other			
1	2				1		2	1				
151			1	1	1		1	1				
<b>Totals</b>	341	49	161	38	83	0	318	132	11			
Question #4 Lost recreation days												
Response #	No answer give	July 2007	Aug 2007	Sept 2007	Oct 2007	Nov 2007	Dec 2007	Jan 2008	Feb 2008	Mar 2008	April 2008	May 2008
1			16	8	8	8	4	4				
151				5	5	2						
<b>Totals</b>	50	182	502	819	788	572	440	396	285	160	38	7
												<b>TOTAL</b>
												4239
Question #5 Adaptations made												
Response #	None	Dredging	Pulled boat early	Modified lift, dock	Other							
1			1									
151	1											
<b>Totals</b>	52	16	59	18	27							

<b>Question #6 Safety related difficulties due to low water</b>							
Response #	None	Hit submerged obstacle	Ran aground	Other	<b>COMMENTS</b>		
1				1	no damage or injury		
151		1			\$ 280 to replace prop		
<b>Totals</b>	86	41	33	7			
<b>Question #7 Recreation activities adversely affected by low water</b>							
Response #	None	Fishing	Swimming	Skiing, tubing	Canoeing, Kayaking	Other	<b>COMMENTS</b>
1						1	more careful, avoided shallow areas
151						1	boating
<b>Totals</b>	57	36	45	62	5	14	
<b>Question #8 Other water related difficulties</b>							
Response #	None Reported	Difficulty	<b>COMMENTS</b>				
1		1	1 problem with elderly parents getting on-board				
151		1					
<b>Totals</b>	126	23					
<b>Question #9 Favor or oppose raising water levels 3 inches between April and July</b>							
Response #	Favor	No Impact	Oppose	IMPACTS	<b>Comments</b>		
1	1	1					
151	1	1					
<b>Totals</b>	139	130	8				
<b>Question #10 Support political action to adjust water flows through -</b>							
Response #	Write or email	Attend meetings	Help develop strategies	Participate on committees	None		
1	1	1	1	1	1		
151	2	2					
<b>Totals</b>	127	75	25	22	12		
<b>Question #11 Agree to discontinue irrigation during low water levels</b>							
Response #	Don't irrigate	Yes	No				
1	1						
151	1						
<b>Totals</b>	89	41	18				
<b>Question #12 Benefit from low water levels</b>							
Response #	No benefit	benefit	<b>COMMENTS</b>				
1		1	1 maintained rip rap				
151		1					
<b>Totals</b>	137	16					

Question #13	Suggestions																			
Response #	No Suggestions	Suggestions	COMMENTS																	
1			1 reduce flows over dam																	
2			1 reduce flows over dam																	
3			1 reduce flows over dam; dry cool Unit 3																	
5			1 build other reservoirs																	
12			1 restrict flows at early stages of drought; Dominion schedule maintenance in Dec-Feb.																	
15			1 reduce flows over dam																	
19			1 locate and remove underwater hazards that are no problem at normal pool																	
24			1 NAPS shut downs in Sept, Oct and April are significant, adding to problem																	
25			1 reduce flow at 249'																	
26			1 continue 3" increase thru Sept.																	
29			1 Keep up the good work !																	
31			1 cease pumping downstream																	
37			1 reduce flows at 250'																	
38			1 more warning signs for low areas																	
42			1 water resource management plan for the lake; anticipatory actions																	
49			1 stop 24 hour watering																	
52			1 reduce flows before drought																	
57			1 reduce requirements to dredge																	
67			1 dredging would help but too expensive																	
70			1 another storage facility to release water when lake is low (too costly?); continued low water will severely impact property																	
73			1 noone should irrigate when lake is 1' low																	
76			1 \$ 60 irrigation fee; funds for more danger markers																	
80			1 need more info on situation																	
84			1 relate watershed inflow to dam outflow																	
86			1 you are doing everything possible; please keep up the good work ! Thank you !																	
89			1 raise by 6 "																	
102			1 re-evaluate agreements with downstream principals; conditions are different than when negotiated																	
103			1 fines for lawn watering; plant watering OK																	
106			1 keep more water in the lake																	
107			1 agree on 3 " rise and reducing dam flows; oppose withdrawals for golf course and by the County																	
108			1 dam flow should reflect flow into the lake																	
110			1 maintain certain water levels during high season																	
113			1 ban on lawn watering during low water																	
116			1 properly mark all obstructions, low spots in lake																	
121			1 stop lawn watering during low water																	
128			1 study feasibility of uplake reservoir to feed LKA, like Gaston and Kerr; or uplake wells																	
138			1 stop filling pools and hot tubs in low water water																	
139			1 ban all irrigation at low water, don't allo any commercial withdrawals; provide dredging "procedures" of businesses																	
140			1 with new evaporation from Unit 3, won't the elevation in the hot side, and thus cool side, have to be reduced below																	
			250' at all times just to make the hot side "drain" ??																	
142			1 ban irrigation at low water																	
149			1 Convience Domion not to build 3rd Reactor without a plan to always keep lake at 250'.																	
151	1																			
Totals		105	41																	