



# Maquoketa River and Mon/Maq Dam Survey Results

Submitted to: Iowa DNR River Programs Office

Submitted by: Northeast Iowa RC&D Inc.

## Section 1. Background

The purpose of this survey was to be an objective part of an overall community listening strategy identifying key issues surrounding the Mon/Maq Dam and Maquoketa River's future. The *Maquoketa River and Mon/Maq Dam Public Input Survey* gathered information on the usage of the Mon-Maq Dam, resident's priorities on river and dam functionality, and resident's preference on five feasible options, from removing the dam and restoring the river, to leaving the dam the way it is. While the survey was not intended to be a referendum on the issue, it was intended to help clarify depth of support and detractor for specific types of actions.

On November 6<sup>th</sup>, 2018, 2,000 surveys were sent out to a random population of registered voters in Jones County. An additional mailing of 600 surveys was sent to another random sample of registered voters in Jones County on December 17<sup>th</sup> to ensure overall statistical validity. Because the river and the dam are adjacent to the community of Monticello, surveys were tracked to distinguish between Monticello residents and non-Monticello residents as distinguished by zip code. A total of 816 surveys were sent to Monticello addresses and the remaining 1,784 were sent to non-Monticello residents. As of January 4<sup>th</sup>, 2019, 409 total surveys had been returned to Northeast Iowa RC&D, 176 from Monticello residents, and 233 surveys from non-Monticello residents. The response rate for Monticello residents was 21.5%, while non-Monticello residents had a response rate of 13%, for a total of 15.7% response rate for all Jones County residents surveyed.

All surveys together reached an acceptable confidence interval between 95 and 99%. A confidence level is the percentage of all possible samples that can be expected to include a true representation of the surveyed population. Based on the population of Jones County (20,536), to get a confidence level of 95%, at least 378 surveys needed to be returned (received 409). Therefore, data from this survey is a statistical representation of the population of Jones County. Surveys were also analyzed by separating Monticello addresses and non-Monticello addresses and by question. When analyzing surveys by location, and by each question, the confidence level declines. Based on the size of the *population* of non-Monticello residents in Jones County (14,105), the confidence level of responses for non-Monticello residents is 85%. Unfortunately, *confidence intervals decrease as total population size decreases* so, although a higher *percentage* of respondents from Monticello returned the survey, the total number of Monticello respondents was still less than the total number of respondents from non-Monticello residents. (The confidence interval is not related to percent respondents.) The confidence level of residents with a Monticello zip code (6,431) is 80%. Neither *subset* of responses are statistically valid when making decisions about responses that are very similar.

## Response Summary

	Jones Co. Residents	Monticello Residents	Non-Monticello Residents
Total Population	20,536 <sup>1</sup>	6,431 <sup>2</sup>	14,105
Surveys Mailed	2,600	816	1,784
Surveys Returned	409	176	233
Response Rate	15.7%	21.5%	13%
Confidence Interval	+95%	80%	85%

<sup>1</sup> United States Census Bureau, 2017

<sup>2</sup> Zip-codes.com, 2018

## Section 2. Results

For all results, samples with an asterisk (\*) represent samples that are not statistically valid because they do not achieve a confidence level of 95%.

### Question 1)

How often have you been to the Maquoketa River at the Mon/Maq Dam Access in the last 3 years?

Figure 1.

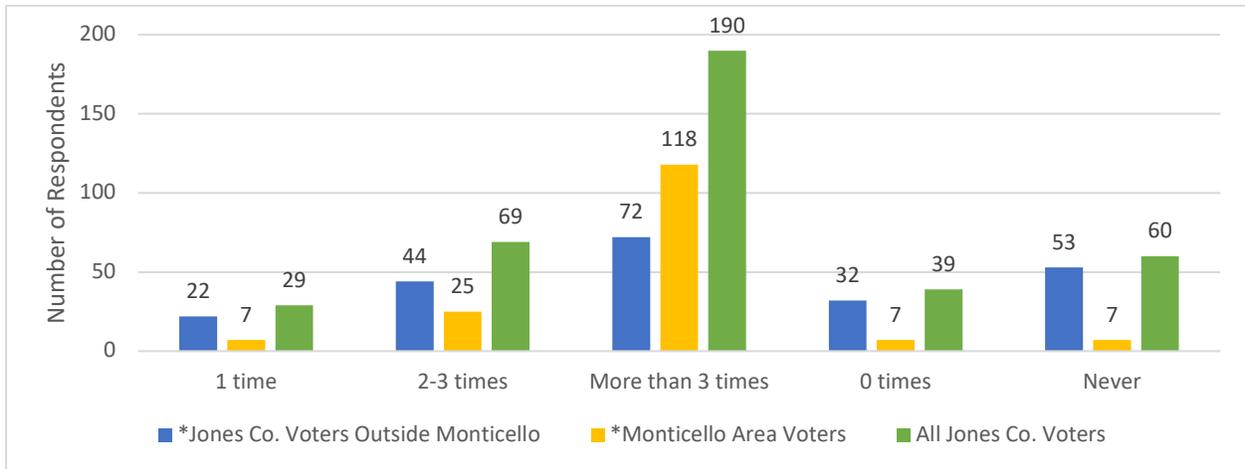
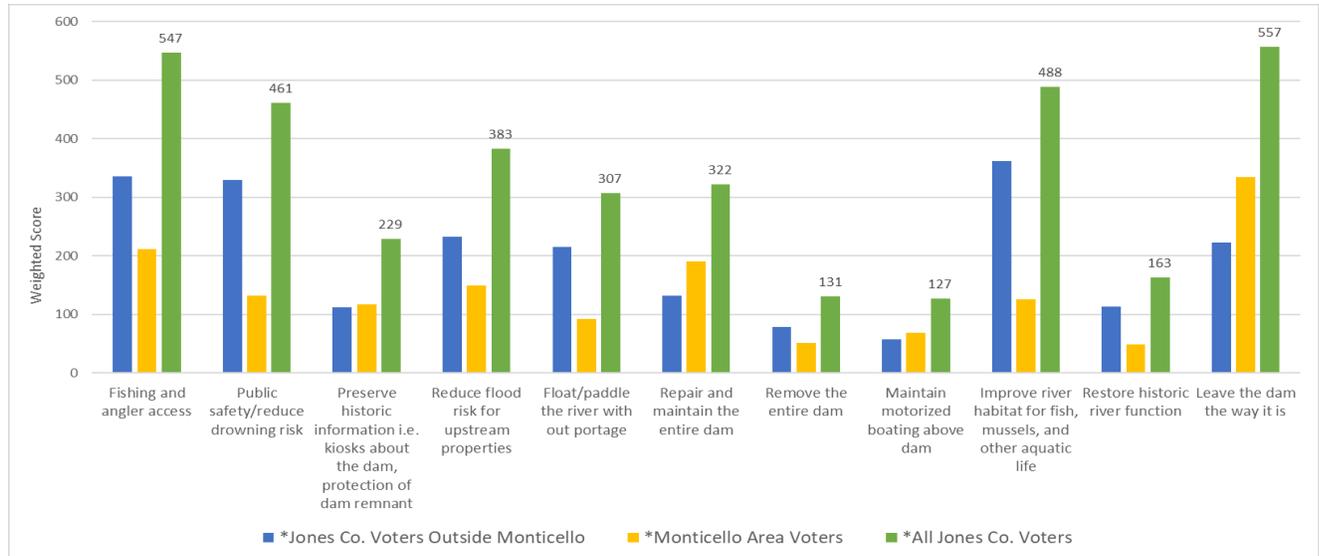


Figure 1 shows the number of respondents who use the Mon/Maq Dam Access and how often. The majority of Jones County residents have used the Mon/Maq Dam Access more than 3 times in the last 3 years.

## Question 2)

What are your top five priorities as related to the Maquoketa River at the Mon/Maq Dam Access?

Figure 2.

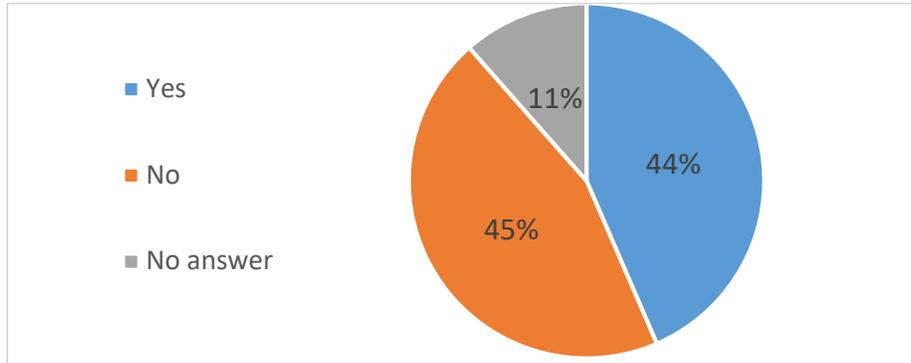


*For Question 2 of The Maquoketa River and Mon/Maq Dam Public Input Survey respondents were asked to rank their top 5 priorities out of 12 options (1 being their highest and 5 being their lowest priority) Answers were added together based on a weighted scoring system. A 1 ranking was given a score of 5, a 2 ranking was given a score of 4, and 3 ranking was given a score of 3, and so on. Answers left blank were given a score of 0. Scores were added together; higher scores represent higher priority. Data shows “Fishing and Angler Access” and “Leave the dam the way it is” had the highest priority from Jones County respondents. Note that because the question only asked participants to rank five of the twelve options, the results associated with any single priorities did not reach a confidence interval of 95%.*

**Question 3)**

Do you think the County should spend local taxpayer and/or privately raised money to repair and maintain the dam?

**Figure 3.**

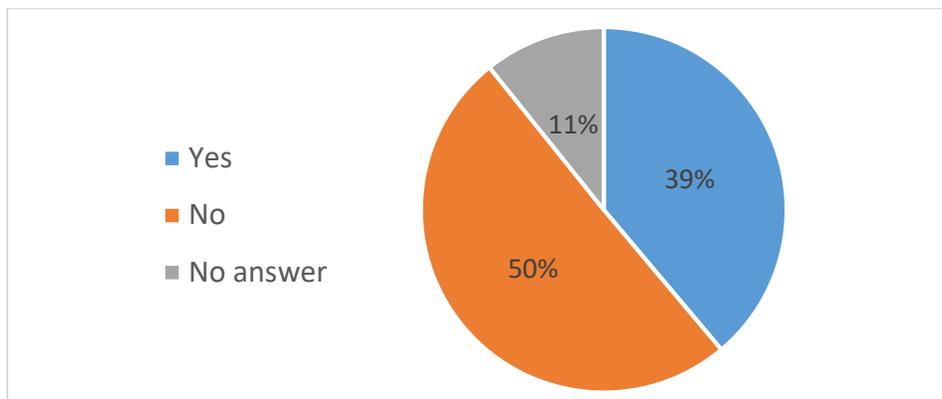


*Figure 3 represents a statistically valid representation of all Jones County voters. However, the difference between “Yes” and “No” responses is not significant based on the 95% confidence interval. There is a difference of six voters between the “Yes” and “No”, which is within the margin of error of 6.12 voters.*

**Question 4)**

Do you think the county should spend local taxpayer and/or privately raised money to add to the \$800,000 in federal and state funds already raised to remove the dam and replace it with rapids or habitat features?

**Figure 4.**



*Figure 4 shows a pie charts for Questions 4. Results are statistically valid and show majority of Jones County Voters do not think the county should spend local taxpayer and/or privately raised money in addition to the \$800,000 dollars in federal and state funds already raised to remove the dam and replace it with rapids or habitat features.*

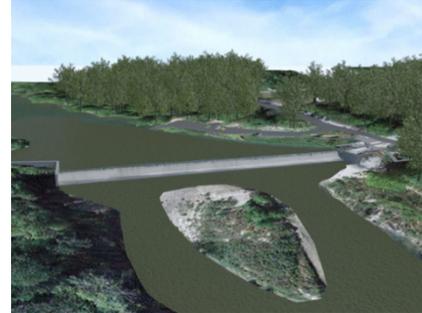
## Preference for alternatives being considered.

Rankings for each alternative were averaged and displayed for each sample (all Jones County Voters, Monticello area Voters, and Jones County voters outside Monticello). Lower number indicates higher preference.

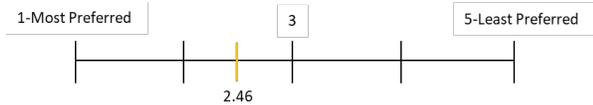
(\*) represents samples that do not achieve a confidence level of 95%, and are not statistically significant.

### Alternative A. No action

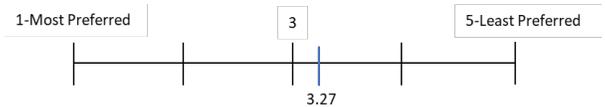
#### All Jones County Voters



#### \*Monticello Area Voters

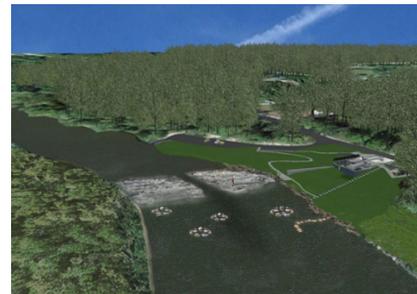
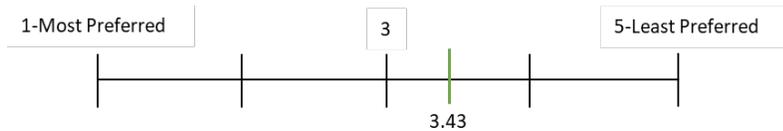


#### \*Jones County Voters Outside Monticello

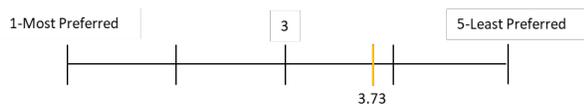


### Alternative B. Dam Removal with Constructed 3- to 4-Foot-Tall Boulder Riffle and Habitat Features.

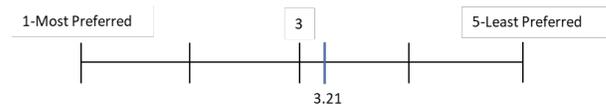
#### All Jones County Voters



#### \*Monticello Area Voters

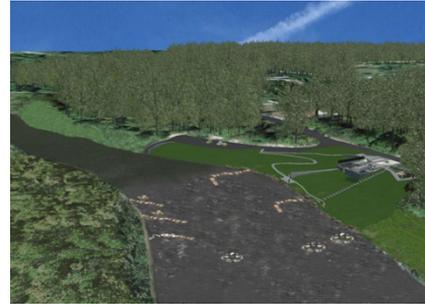
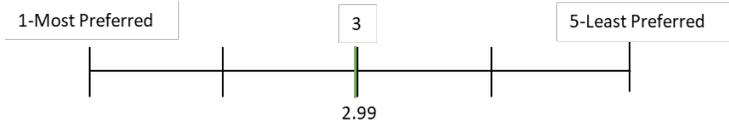


#### \*Jones County Voters Outside Monticello

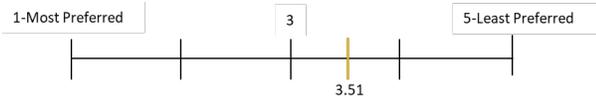


**Alternative C. Dam Removal with Constructed Habitat Features**

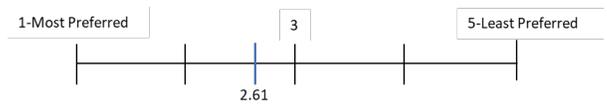
**All Jones County Voters**



**\*Monticello Area Voters**

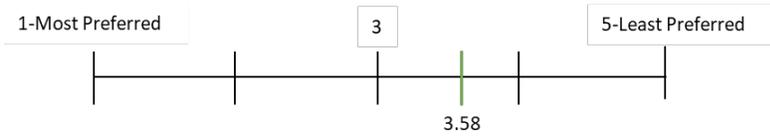


**\*Jones County Voters Outside Monticello**

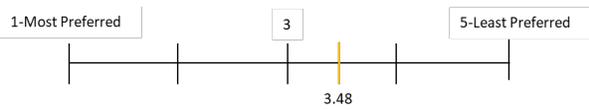


**Alternative D. Dam Remains and Fish Bypass Constructed**

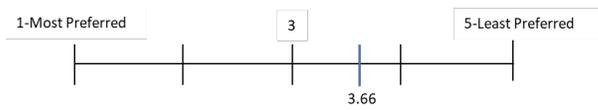
**All Jones County Voters**



**\*Monticello Area Voters**

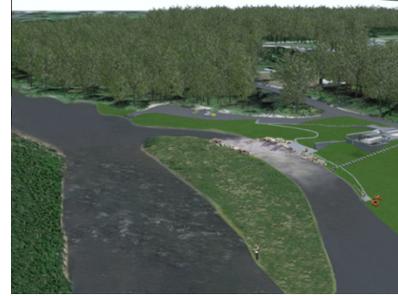
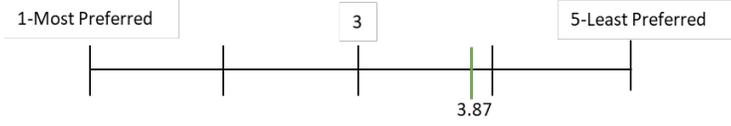


**\*Jones County Voters Outside Monticello**

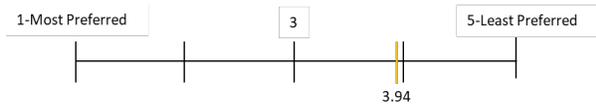


**Alternative E. Dam Modification and Constructed 6- to 8-Foot-Tall Rapids and Habitat Features**

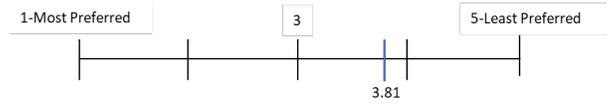
**All Jones County Voters**



**\*Monticello Area Voters**



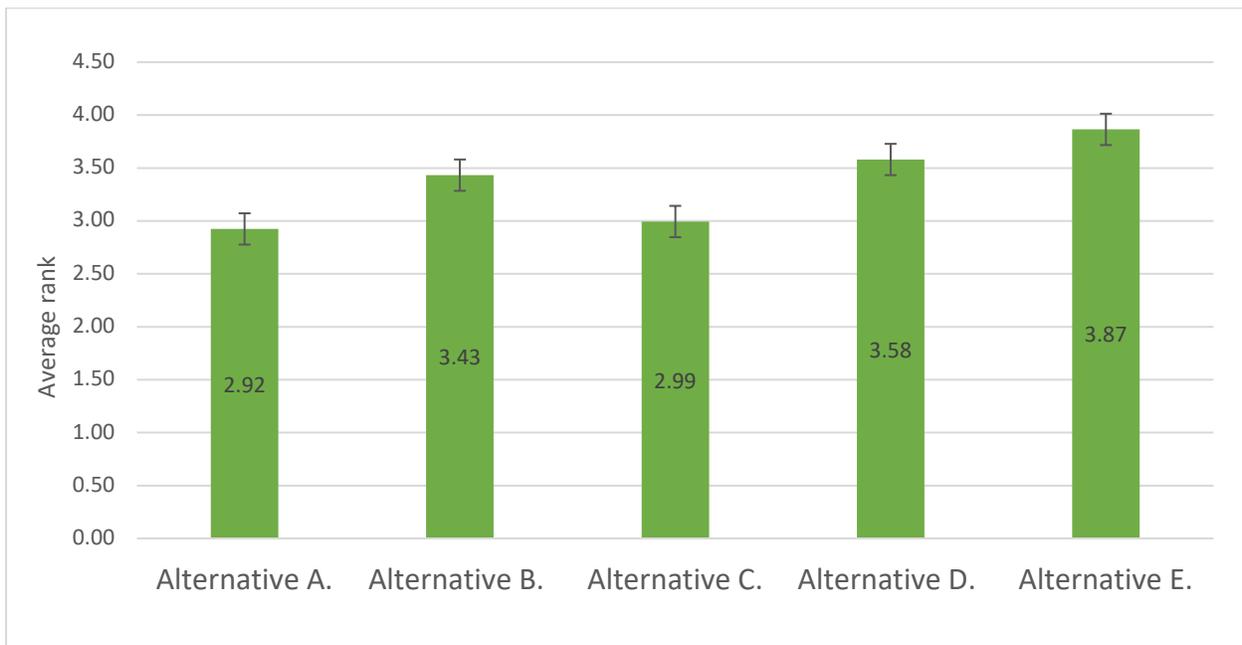
**\*Jones County Voters Outside Monticello**



**Table 1:** Proposed Alternatives Defined

Alternative A	No action
Alternative B	Dam removal with constructed 3-4 foot tall boulder riffle and habitat features
Alternative C	Dam removal with constructed habitat features
Alternative D	Dam remains and fish bypass constructed
Alternative E	Dam modification and constructed 6-8 foot tall rapids and habitat features

**Figure 5.** Average Rank (Mean) preference for proposed alternatives by all sampled Jones County Voters. NOTE: THE LOWEST NUMBER DENOTES THE HIGHEST RANK.



The Bar Chart shown in Figure 5 illustrates the average ranking for all Jones County residents for each of the five presented proposed Alternatives for the Mon/Maq Dam Access. (Each Alternative is explained in Table 1.) Because a rank of 1 was the highest priority, a lower mean represents a higher preference for any given Alternative. It is important to note that the chart includes margin of error lines that represent the amount of error associated with a 95% confidence interval for the data. For example, when comparing Alternative A with Alternative C, the means associated with Alternative A and Alternative C are not statistically different, because the mean value for Alternative A (2.92) fits within the margin of error for Alternative C (2.85-3.14) and vice versa. Values that are not statistically different should not be used to rank one value as a priority over the other. Although Alternative A and Alternative C are virtually tied, the means for Alternative A and Alternative C are statistically different from Alternative B, D, and E.

**Figure 6.** Violin Chart of Preference of All Jones County Voters for Proposed Alternatives.

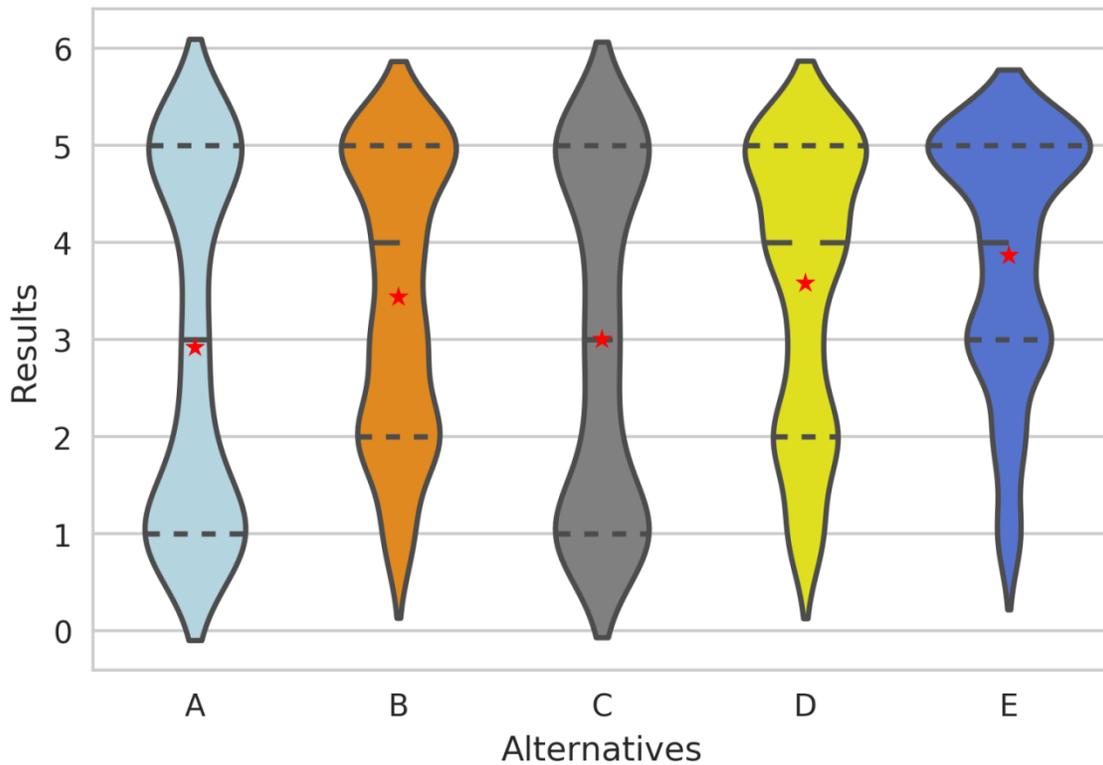


Figure 6 shows is a violin chart created from the responses for the proposed Alternatives that are explained in Table 1. A violin chart is used to visualize distribution of responses (data) and the density of responses<sup>3</sup>. Similar to a Box plot, this violin chart includes the “average” or “mean” (red star), minimum and maximum (dotted lines), and median of responses (thick dotted line). The outer shape represents the distribution and density of responses, the wider the shape the more responses. This chart helps viewers understand the average values and the distribution of preference for each proposed Alternative. As shown in Figure 5, Alternative A and C had the most preferred (lowest) “averages.” However, Figure 6 illustrates the density of those answers as split between the highest and lowest possible scores. This indicates strong opposing viewpoints, most favored – least favored.

<sup>3</sup> [https://datavizcatalogue.com/methods/violin\\_plot.html](https://datavizcatalogue.com/methods/violin_plot.html)

### **Section 3. Summary**

Distribution of the Maquoketa River and Mon/Maq Dam Public Input Survey was completed to allow for a confidence interval of 95% for all Jones County voters. Although data from multiple sample groups was analyzed, the only sample group that achieved the 95%+ Confidence Interval is the sample group *all* Jones County residents. Even with the 95%+ Confidence Interval, the margin of error is a very important factor when reviewing the data set. It allows the data user to determine if answers for a question were significantly different from each other.

#### *Observations:*

1. When considering this data, it is important for all parties to remember that the confidence interval is 95%, which means that the data is a statistically valid representation of the total population of the county (unless otherwise noted with a (\*)).
2. The Mean, Median, Confidence Interval and Margin of Error provide different information. The “mean” is the sum of all the numbers in the set divided by the amount of numbers in the set. The “median” is the “middle” point of a number set, in which half the numbers are above the median and half are below. The “Confidence Interval” is the range of values so defined that there is a specified probability that the value of a parameter lies within it. In the case of Jones County residents, the confidence interval is a range of values that you can be 95% certain contains the true mean of the population. The “Margin of Error” tells us that if the survey were conducted 100 times, the data would be within a certain number of points above or below the percentage reported in 95 of the 100 surveys. As sample size increases, the “Margin of Error” decreases.
3. Figure 1 shows the Mon/Maq dam is used more than 3 times in 3 years by the residents of Jones County.
4. The difference between “Yes” and “No” for Question 3 is *not significant* (Figure 3) based on the Margin of Error of +/- 6.12 votes. The population is evenly split on this answer.
5. Results shown in Figure 4 *are* significantly different and are a statistical representation of Jones County voters.
6. Among the alternative concepts researched and shown in Figures 5 and 6, Alternatives B, D, and E were less favored than either Alternative A or Alternative C. However, responses to Alternative A and C are *not* statistically different and therefore are effectively a “tie” in terms of preference. This can be seen in Figure 5.
7. Even though they have averages that indicated they are the most preferred alternatives, preference for Alternative A and C are very strong for or against the alternatives. Voters either chose them as their highest preference (rank of 1) or their lowest preference (rank of 5). This is best illustrated in Figure 6.
8. Alternative E was statistically the least favored alternative as illustrated in Figures 5 and 6 by the “mean” as well as by the violin plot, which shows the distribution of answers regarding preferences.