World Record Muskie Alliance

Cal Johnson Summary Report

June 13, 2008

All Tackle World Record Muskellunge

International Game Fish Association

Angler, Mr. Calmer Johnson

July 24, 1949

Length 60 ¼” girth 33 ½” weight 67lb. 8oz.

Lac Court Oreilles, Wisconsin, USA

Introduction To The WRMA Johnson Summary Report

The World Record Muskie Alliance (WRMA) was formed in January of 2004, assembling a dedicated group of sportsmen who felt strongly that the controversy over the legitimacy of the current All Tackle World Record Muskellunge could be resolved by the use of modern technology and unbiased methods of authentication.

Our pledge is to hold the World and Canadian records to the same standard of measure by confirming the length, weight, and method of capture for each. Our hope is that this effort will also help to unite muskellunge anglers by providing a general consensus in the various recognized muskellunge records.

The WRMA authentication process has relied heavily upon the work of independent experts who evaluated known photographs and other remaining evidence relevant to the IGFA All Tackle World Record Muskellunge. All historical eyewitness testimony, statements, and photographs have been carefully scrutinized to help determine their relevance and accuracy.

For those readers familiar with our earlier research, there are of course many similarities and parallels that can be drawn between this 2008 WRMA Johnson Summary Report and the 2005 WRMA Spray Summary Report.

For anyone seeking further information or additional reference material regarding the work performed by the WRMA and their experts, a comprehensive review of the 2005 Spray summary report can be obtained free of charge by visiting

www.worldrecordmuskiealliance.com

We humbly ask the IGFA, media, and the entire angling community to please accept this report as our findings regarding Mr. Johnson's 1949 muskellunge records.

Photogrammetry Introduction

The following is a brief pre-face that will provide a general background for interpreting the photogrammetric solution that DCM Technical Services provided and Imaging Forensics peer-reviewed.

Photogrammetry is the art, science, and technology of obtaining reliable information about physical objects and the environment through the processes of recording, measuring, and interpreting photographic images. It can also be thought of as the sciences of geometry, mathematics, and physics combined that use the image of a 3D scene on a 2D piece of paper (photograph) to reconstruct a reliable, and accurate model of the original 3D scene.

In short, photogrammetry basically reverses the photographic process described above by converting the flat 2-dimensional photographic images back into the original 3-dimensional world.

Photogrammetry has been successfully used tens of thousands of times to accurately determine the locations of marks and objects long after the items in the scene are not available for measurements. It is fast becoming a staple in courtrooms for law enforcement reenactment crime scenes due to its exactness.

DCM Technical Services

Mr. Dan Mills of Toronto, Canada-based DCM Technical Services is the number one expert and instructor in the use of the Photomodeler software which was employed to determine the maximum possible length of the muskellunge in the photographs said to represent the current IGFA record.

Camera / Case Measurement

The co-owner of Esox Angler Magazine, Mr. David Fornara, used a calibrated Nikon D-70 camera with an AF-S Nikon 17-55mm 1:2.8 G ED lens to take the photographs of Mr. Cal Johnson's mounted muskellunge under the direction of DCM Technical Services. Noted muskellunge historian Mr. Larry Ramsell, also working under the direction of DCM Technical Services, measured the bottom front interior width of the wooden frame of the case surrounding Mr. Cal Johnson's mounted muskellunge at 65 11/16".

What is a Peer Review

The peer review process aims to make authors meet the standards of their discipline and of science in general. Since reviewers are generally experts from a given field, the process of peer review is often considered critical to establishing a reliable body of research and knowledge.

Imaging Forensics

The results of DCM Technical Services findings on the IGFA record muskellunge were formally peer reviewed by Imaging Forensics, an independent firm located in Fountain Valley, CA. Mr. George Reis of Imaging Forensics was the reviewer and is regarded as another top expert in the field of photogrammetry. His peer review of Mr. Mills work assures a scientific solution that adheres to the highest of professional standards.

DCM TECHNICAL SERVICES INC
PROVIDING MEASUREMENT & MAPPING SOLUTIONS

Summary Report

Photogrammetric Solution of Historic Muskie Lengths – Johnson 1949 Muskie

Report by :

Dan Mills
DCM Technical Services Inc.

Date of Report :
January 18, 2008

Submitted to:

World Record Muskie Alliance
11607 Lucas Road
Woodstock, IL
60098

69 Gilmour Avenue, Toronto, ON M6P 3A8
Phone: 416-618-7683 Fax: 416-766-0260 Email: dmills@dcmtechservices.com

BACKGROUND

This report summarizes DCM Technical Services Inc.'s photogrammetric evaluation of historic photographs of one muskellunge (muskie) fish caught by Cal Johnson in 1949. A total of three photographs (Figures 1a – 1c) were provided of the historic muskie, referred to as the "fresh muskie" for the remainder of the report. The height of the angler was unknown and could not be used in the analysis of the muskie length. Also provided to DCM Technical Services Inc. were photographs of what was reported to be the same fish, mounted in a display box, referred to as the "mounted muskie" for the remainder of the report. DCM Technical Services Inc. did not attend the restaurant/bar that the muskie was display at but provided direction to the photographer to ensure that photographs were taken in a manner that would allow photogrammetric measurement. Using the results of the mounted muskie measurements, scale measurements were taken from the mounted muskie to transfer onto the fresh muskie for direct scaling. With the calculation methods used in the fresh muskie length, any perspective that was present in the photographs between the film plane and the fresh muskie would have resulted in an overestimation in the calculated length of the fresh muskie.

Figure 1a – photograph of fresh muskie.

Figure 1b – photograph of fresh muskie.


Figure 1c – photograph of fresh muskie.

Photographs provided and used in the photogrammetric analysis of the mounted muskie were included as Figures 2a – 2c.

Figure 2a – photograph of mounted muskie.

Figure 2b – photograph of mounted muskie.

Figure 2c – photograph of mounted muskie.

PHOTOGRAMMETRIC ANALYSIS

After reviewing the photographs of the fresh muskie, it was determined that there was insufficient information present in the photographs to complete a 3 dimensional photogrammetric analysis of the fresh muskie. The effective camera settings at the time of exposure were not able to be determined due to insufficient control points present in the photographs. The position of the fish and how it was suspended in each of the fresh muskie photos changed in each of the photographs making a 3 dimensional photogrammetric solution not possible. It was determined that there were sufficient visible points to complete a direct scaling of the fresh muskie from dimensions of the mounted muskie.

To complete this direct scale analysis, dimensions from the mounted muskie needed to be determined. The mounted muskie existed in a boxed display at a restaurant/bar but was not available to measure directly. Photographs were taken of the mounted muskie using a calibrated camera. Using these photographs and the known camera information, an analysis of the dimensions of the mounted muskie was completed using commercially available photogrammetry software, PhotoModeler v6. The points that were marked and measured on the fresh muskie were shown in Figures 3a and 3b. A scale measurement was used from the existing frame around the display. The interior width of the frame at the bottom measurement was provide as 65-11/16” and used for scaling purposes in the photogrammetric analysis.

Figure 3a – Photograph of mounted muskie with PhotoModeler solved points shown, scale reference points shown in red.

Figure 3b – Photograph of mounted muskie with PhotoModeler solved points shown, overall length points shown in red.

The tip of the snout to the eye (points 42 – 41 and highlighted in red in Figure 3a) was measured to be 5.669 inches on the mounted muskie. The tip of the snout to the top of the gill flap where it met the body (points 42 – 51 and highlighted in red in Figure 3a) was measured to be 10.209 inches. Both of these measurements were completed photogrammetrically using PhotoModeler 6. Following the assumption that the head dimensions cannot be changed any appreciable amount during the mounting process, these were considered to be the most accurate dimensions for use in scaling the fresh muskie. The top of the jaw (snout) was measured rather than the bottom of the jaw since it was more suitable for the direct scaling. It could be seen in the mounted fish that the bottom jaw would extend slightly further than the top of the jaw if the muskie's mouth was closed. A closed mouth would have resulted in the bottom jaw extending beyond the top jaw much less than 1 inch. Also during the photogrammetric mapping of the mounted muskie, the overall length of the mounted muskie was determined. Using the points

highlighted in red in Figure 3b, the overall calculated length of the muskie was found to be 58.9” with an accuracy of +/- ¼”. These points were chosen to best compensate for the curvature in the mounted muskie but the length might be slightly longer since an intermediate point could not be determined along the body so a straight line distance was taken between points 32 – 51. A two point measurement was also taken from the highlighted point on the snout (point 42) to the highlighted point on the top of the tail (point 18) and found to be 54.8” with an accuracy of +/- ¼”.

As stated earlier in this report, the fresh muskie photographs were not suitable for use in a full 3 dimensional photogrammetric solution so a simplified method of direct scaling was utilized to determine the length of the fresh muskie. Direct scaling has very limited applications and an overall reduction the accuracy of the resulting measurements. The base concept of direct scaling from photographs is that one real world dimension is known and using that dimension and the corresponding length on the photograph, other dimensions on that same photograph can be determined using proportions. For this to be valid there needs to be minimal perspective present between the photograph plane and the plane of the object that is to be scaled directly. The known dimension that is being used for scale measurement also needs to be in the same plane as the section that is being direct scaled. While almost every photograph contains some amount of perspective, the effect will be that the length that is direct scaled will always be AT MOST, the length that is calculated. This means that if a photograph has no perspective present then the dimension (in this case the length of the fresh muskie) would be determined relatively accurately. If perspective were present then the length would be overestimated and would represent the upper bound of the possible length. In the case of the available photographs of the Johnson fresh muskie, all three of the photographs appeared to have minimal perspective present between the fresh muskie (which was hanging vertically) and the camera film plane. A total of six length calculations were completed on the three available photographs to ensure that the calculated lengths were consistent between the photographs. The three photographs with six measurement configurations were included as Figures 4a – 4f and the pixel lengths marked. The red lines represent the approximate location of the start and end of each measurement. Actual measurement were completed in PhotoShop and the red lines with the measured pixel distance inserted after the fact.

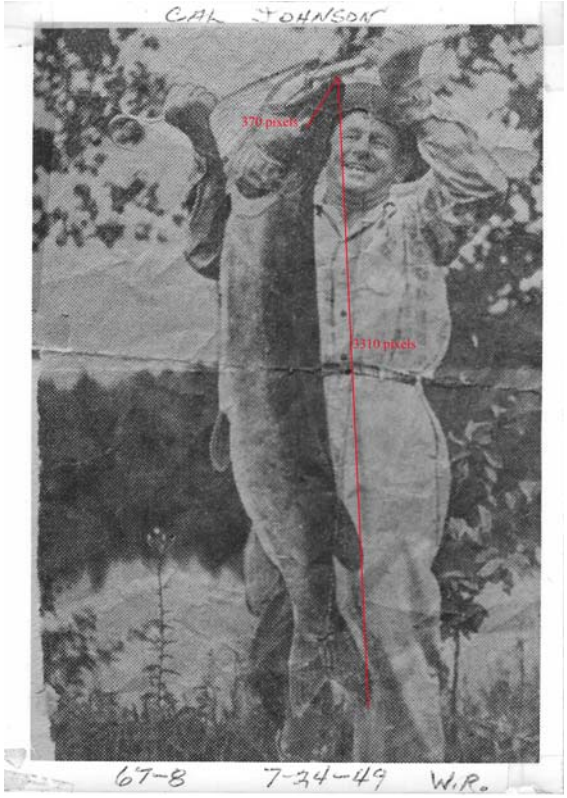


Figure 4a - fresh muskie photograph with eye measurement shown.

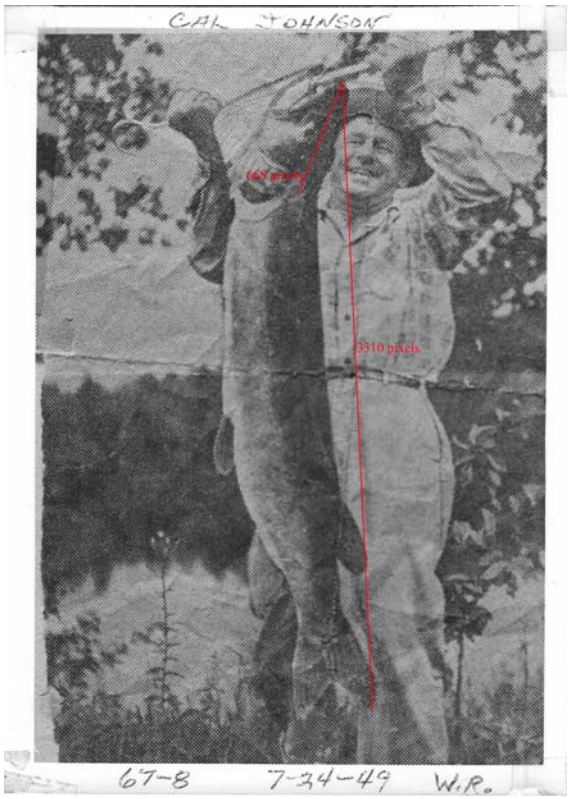


Figure 4b - fresh muskie photograph with gill flap measurement shown.

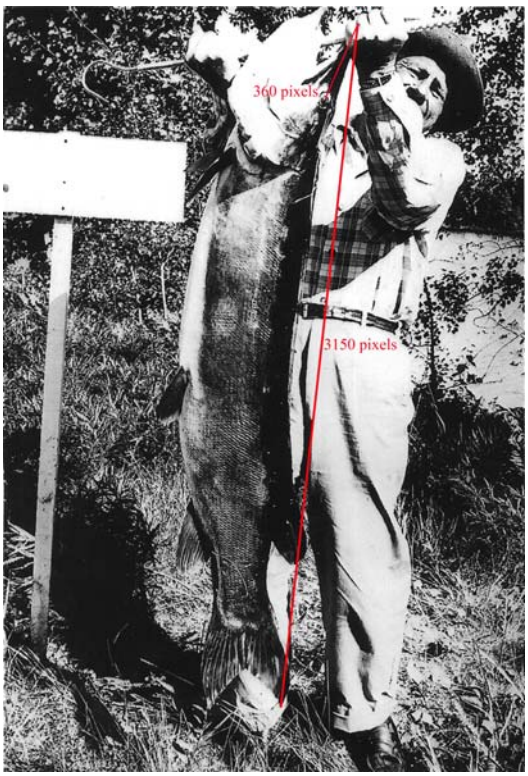


Figure 4c - fresh muskie photograph with eye measurement shown.

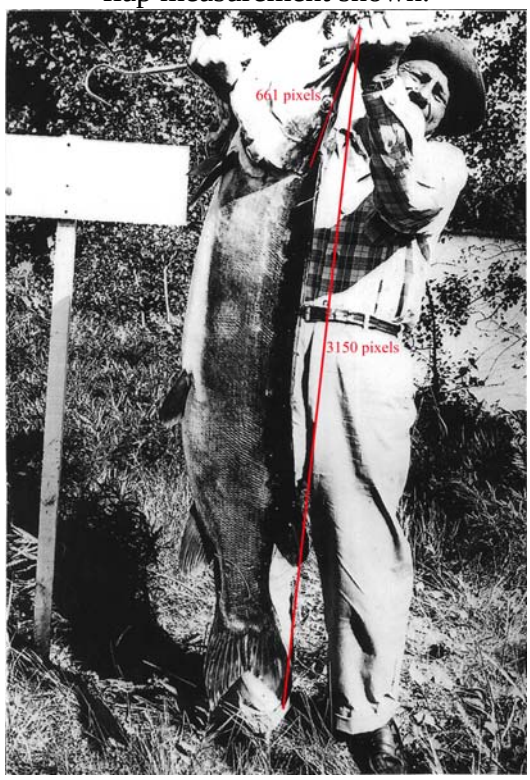


Figure 4d - fresh muskie photograph with gill flap measurement shown.

Figure 4e - fresh muskie photograph with eye measurement shown.

Figure 4f - fresh muskie photograph with gill flap measurement shown.

In each instance of the photographs, the measurements were scaled on the left side of the fish and the eye and gill flap measurements taken from the mounted muskie were derived from the right side. Considering that a fish is symmetric and the consistency of the final calculated results, the effect of the change in right to left side for scaling was deemed negligible. The head of the fresh muskie also had a slight bend from being suspended from a gaff in Figures 4a – 4d. This would have an effect on the overall scaling but the consistency of the calculated results using three photographs and 2 different scaling points (the eye and gill flap) would also suggest that the effect was negligible. The slight effect can be seen in the resulting length calculations from Figure 4c and Figure 4d but the overall results show the fish to consistently be scaled between each photograph. Using the pixel counts shown in Figures 4a – 4f and the snout tip to eye and snout tip to gill flap measurement derived off of the fresh muskie, the following length calculations were derived.

$$\text{Fish length}_{\text{inches}} = (\text{Fish length}_{\text{pixels}} \times \text{Mounted muskie scale length}_{\text{inches}}) / \text{Mounted muskie scale length}_{\text{pixels}}$$

Using the pixel dimensions from Figure 4a and the calculated snout tip to eye length of 5.669 inches the following length was calculated

Fish $length_{inches}$ = (3310_{pixels} x 5.669_{inches}) / 370_{pixels}

Fish $length_{inches}$ = 50.7 inches

Following the same calculation through with all of the measurements shown in Figures 4a – 4f the following overall lengths were determined

	Fish $length_{pixels}$	**Scale $measurement_{inches}$**	**Scale $length_{pixels}$**	**Calculated $length_{inches}$**
Fig. 4a	3310	5.669	370	50.7
Fig. 4b	3310	10.209	668	50.6
Fig. 4c	3150	5.669	360	49.6
Fig. 4d	3150	10.209	667	48.2
Fig. 4e	3504	5.669	403	49.3
Fig. 4f	3504	10.209	699	51.2

The overall length of the fish was calculated to range from 48.2 inches to 51.2 inches. These lengths represent the longest possible length of the fresh muskie seen in the photographs. Any perspective present in the photographs would result in the calculated lengths being an overestimation of the true length. The three photographs did not appear to have appreciable perspective present between the fish and the film plane so the resulting length calculations were considered to be true representations of the fresh muskie length and not overestimations of the length. The accuracy of the resulting length calculations was within +/- 2 inches. Using this upper and lower accuracy, the length of the fish could have ranged between 46 inches to 53.2 inches with the true length likely being approximately 50 to 51 inches.

I trust this answers the questions that you had about the length of the fresh muskie shown in the three photographs.

Dan Mills
DCM Technical Services Inc.

Imaging Forensics, Inc.
18627 Brookhurst St. PMB 324
Fountain Valley, CA 92708

Peer Review of:

Photogrammetric Solution of Historic Muskie Lengths - Johnson 1949 Muskie
By DCM Technical Services, Inc.
Dated January 18, 2008

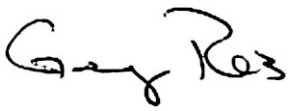
I have reviewed the above-mentioned report for methodology, inclusion of valid variables and margin of error.

In this report, the methodology used was appropriate for the content of the photographs, the mounted Muskie, and the information available about the objects in the images.

In my opinion all relevant variables were considered, and referenced, in the analysis.

The report includes a margin of error that appears to be consistent with the available data and the methods employed in making the measurements.

In my review of this report I find that the methodology, inclusion of valid variables and stated margin of error were all appropriate for the images analyzed based on their content and the information known about the objects in the photographs.



George Reis
Imaging Forensics, Inc.
March 24, 2008

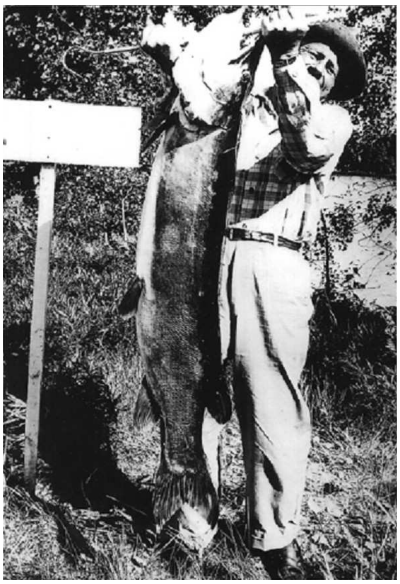
Introduction To Muskellunge Girth Comparison Study

This section of the WRMA Johnson summary report will compare a photograph said to represent the IGFA all tackle world record muskellunge with a photograph of another large, impeccably verified fish.

Part 1 - Visual Comparison

The first part of our Girth Comparison Study will visually compare the 33.5" recorded girth of Mr. Johnson's muskellunge to the aforementioned control fish. The primary focus of this exercise will be to compare the recorded measurements to the photographs in a girth to length ratio.

(A)



(B)

Fish / Angler Identification

(A) Mr. Thomas Gelb 11-30-06 WI - G 28.50" L 53.00" W 51.125 lbs.

(B) Mr. Calmer Johnson 7-24-49 WI - G 33.50" L 60.25" W 67.50 lbs. (IGFA record)

Taxonomic Description

We will start this study by pointing out that all muskellunge are proportional. This includes a direct correlation between the overall girth and side width measurements for muskellunge with a similar girth to length ratio. This will be further explained later in this section.

"Taxonomic Description of Muskellunge," *"Esox Masquinongy (muskellunge): body long and oval*..." quote from Rod Ramsell, fisheries biologist, Minnesota DNR. (A Compendium of Muskie Angling History 3rd edition volume 2, pp. 645. 2007. Larry Ramsell).

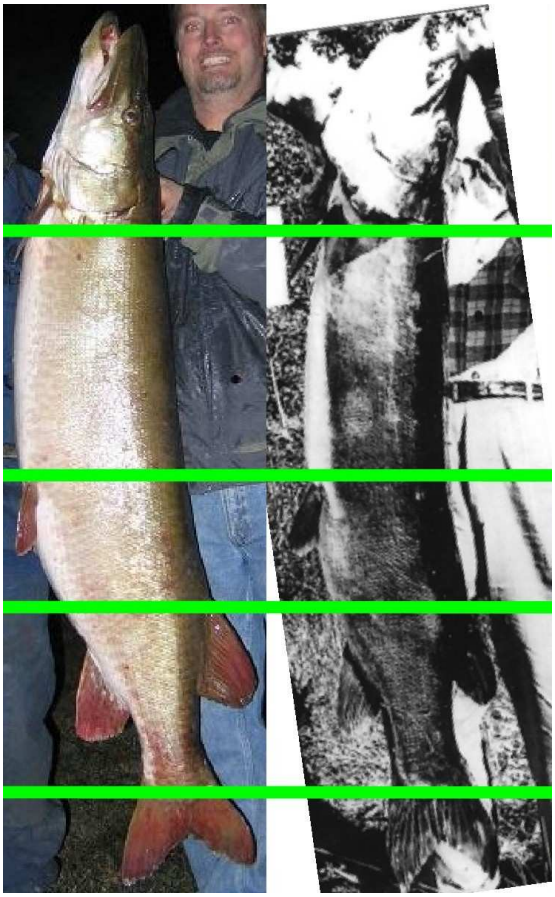
Taxonomy is defined as the scientific classification method by which biologists categorize species of organisms in an ordered system that indicates natural relationships. It is the science, laws, or principles of biological classification.

Under no circumstances is a muskellunge body shape round, or even close to it. This is a biological truism that encompasses all muskellunge, particularly larger specimens that will always have a laterally compressed oval shape. This is a very consistent characteristic with muskellunge that have an exceptional girth.

In basic terms, in order for the fish that Mr. Johnson is holding to be classified as *Esox Masquinongy*, biology mandates that it must have a laterally compressed oval shaped body. In short, the photographic side width of a muskellunge with an exceptional girth must be the predominant feature.

For additional information on muskellunge taxonomy written in 1978 by the late Mr. Ed Crossman;

http://books.google.com/books?id=uP149RJA2IAC&pg=PA1&lpg=PA1&dq=%22Crossman%22+%22Taxonomy+and+distribution.%22&source=web&ots=QpGXLfQDB-&sig=QkAGLpB59yUQIRZhDw5knOhG28I#PPA3,M1



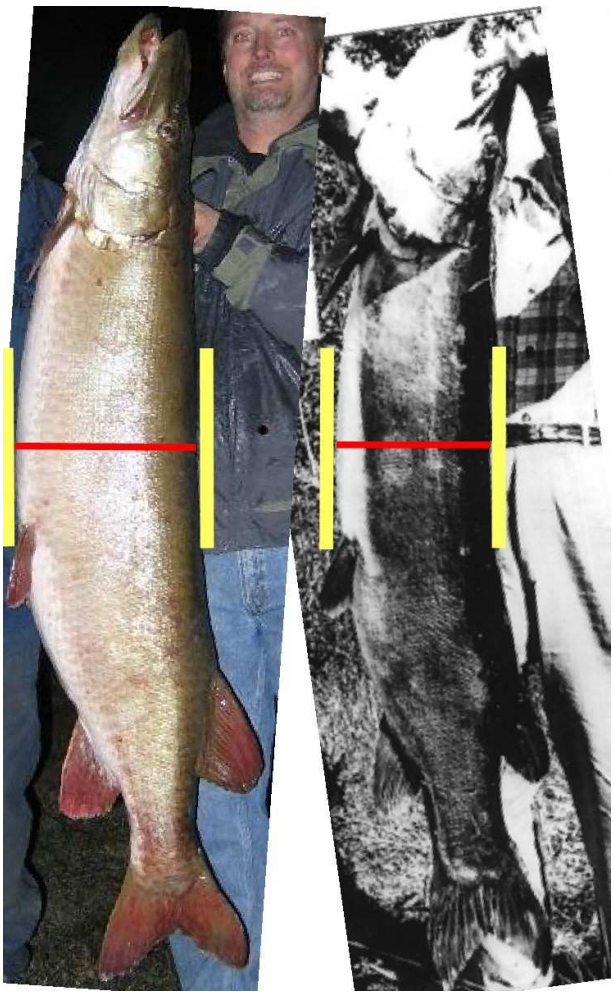
(A) (B)

Note: The reason the tail of Mr. Johnson's muskellunge has been slightly lowered is to compensate for it being compressed.

<u>Proportional Correlation</u>

The two fish above demonstrate how closely the bony anatomical features of adult muskellunge can correlate to one another by the use of the green lines denoting similar fin and gill location. The green lines confirm the fish are lined up and proportioned correctly to one another and can be rightfully used for this study.

Although these fish are not in perfect alignment, the photographs are still very well centered on the fish as illustrated with the anatomical features closely lined up in this comparison. With that said, the vast majority of photographs are not suitable for this application due to differences in camera tilt, angle, and other variables.



(A) (B)

Note: A small but equal space was purposefully left between the fish and the yellow lines above for viewer comparison purposes.

What is a Girth to Length Ratio?

The given dimensions of any fish can be broken down and expressed mathematically into a girth to length ratio. This is defined as the number of times the girth can be divided into the length, expressed here as G/L. In this report, the G/L number will be converted into a percentage of length value, expressed as G/L%.

The girth of a muskellunge is generally considered the greatest measured circumference point of the body that is located between the pectoral and ventral fins (the two sets of paired fins).

The overall length is measured from the tip of the lower jaw to the end of the longest lobe on the caudal (tail) fin.

The only requirement to visually compare the recorded dimensions is to have a good full-length, same-plane, undistorted vertical side view photo as we have in (A) and (B).

To calculate the G/L% of a muskellunge, divide the girth into the length and multiply by 100. For this study we will only be working with the recorded measurements to calculate the G/L% for a visual assessment.

(Recorded girth/recorded length) x 100 = girth to length ratio (G/L) converted into a percentage value G/L%. Reduced formula: *G/L x 100 = G/L%.*

(A) 28.5"/53.00" = .5377 G/L x 100 = 53.77 G/L%

(B) 33.5"/60.25" = .5560 G/L x 100 = 55.60 G/L%

What these percentage figures represent are girth measurements that equal over one half of the overall length of the fish, or more than 50 G/L%.

It should be noted that because a hypothetical 30"x 60", 25"x 50", or 20"x 40" all have identical 50 G/L percentages, a line up of these examples comparatively sized in length would appear strikingly similar despite the overall difference in dimensions.

Similarly, grown muskellunge with the same G/L% of ***any*** length will look proportional in a fish line up, provided the recorded measurements are accurate and the camera placement, tilt, and angles are reasonably consistent.

It is equally as important that the image be a direct side view of the fish without rotation that reveals either the belly or back. The other known photographs of Mr. Johnson's muskellunge cannot rightfully be applied to this type of scrutiny due to this rotation.

It must also be completely understood that because the girth to length ratio is comparing the girth to any given length, different length fish can only be compared properly by showing the images at the same length as with (A) and (B).

Moving on, the recorded measurements of Mr. Johnson's muskellunge have been expressed in a 100% mathematically accurate G/L% that can now be visually compared to the control specimen, and the fish itself. Obviously, the reported 55.60 G/L% of the IGFA record in (B) should visually appear wider than (A).

The 55.60% for Mr. Johnson's muskellunge is a hard black and white number based on the measurements provided by the affidavits themselves.

(A) 53.77 G/L% (B) 55.60 G/L%

Please be reminded that because the girth to length ratio is comparing the girth to any given length, different length fish can only be compared properly by showing the images at the same length.

Girth to Length Ratio Visual Comparison

The above images are the original photographs lined up with the G/L% listed below to provide a powerful visual aid to make direct comparisons between the recorded and visual girth of Mr. Johnson's muskellunge and the control specimen.

This simple, yet compelling exercise is the most accurate way to visually assess the recorded 33.5" girth of Mr. Johnson's muskellunge when compared to the control fish that supposedly has a smaller recorded girth and just as importantly, a smaller calculated G/L%.

Part 1 - Conclusion

Now that we have visually assessed Mr. Johnson's muskellunge as it relates to the control fish and it's own-recorded G/L%, there is obviously a problem with either the recorded dimensions, or photograph (B) said to support these dimensions because the fish is noticeably thinner than (A). Obviously the IGFA record does not visually coincide with it's own recorded dimensions expressed as 55.60% either. This is strong visual evidence that the photograph and/or recorded dimensions submitted to the IGFA simply cannot be that of a 60.25" muskellunge with a 33.5" girth.

A special thank you is extended to Mr. Thomas Gelb for participating in this study as well as WRMA chief researcher, Mr. George Will for his groundbreaking research.

Part 2 - Weight Formula Comparison

In this short exercise we will apply the standard 800-weight formula on the same two fish (A) and (B) to determine the calculated formula weight and then compare it to the recorded weight.

girth x girth x length / 800 = estimated weight

Formula weight	Recorded weight	Difference
(A) 53.81 lbs.	(A) 51.125	(A) +2.685 lbs.
(B) 84.52 lbs.	(B) 67.5 lbs.	(B) +17 lbs.

The percentage difference between the estimated formula weight calculations and the recorded weight respectively are:

(A) - 5.25% (B) - 25.185%

Part 2 - Conclusion

Please consider that the IGFA record muskellunge has an enormous 25.185% discrepancy between the formula weight and the recorded weight, while the control specimen has a more acceptable variance of 5.25%.

The 25.185% discrepancy with Mr. Johnson's fish identifies either a pronounced problem with the 800 formula, or a problem with the recorded dimensions set forth on the affidavits

This formula has been used by both fresh and saltwater anglers alike for years and is considered a reliable method for approximating the correct weight for all types of cylindrical shaped fish using only accurately recorded measurements.

Of course, the standard 800-weight formula is not intended to be regarded as science like photogrammetry. We included this exercise only to assess the general accuracy of the recorded measurements of the IGFA record.

However, the 25.185% gap between the formula weight and recorded weight is yet another separate variable that reinforces other results that pervade this report. Without question, this problematic theme becomes increasingly difficult to reconcile without simply doubting the recorded dimensions of the IGFA record

Of Further Interest

The outdoor publication "Sports Afield" published a formula that was devised to calculate the weight of "pike shaped fish" during the 1940's (and beyond) while Mr. Johnson was working as a prominent staff writer. The formula would later be proven to be inaccurate and subsequently replaced with the currently accepted 800 formula. The officially listed Sports Afield formula in place when Mr. Johnson registered his fish in the Field & Stream contest in 1949 was:

Girth x girth x length / 1000 = estimated weight

33.5" x 33.5" x 60.25" / 1000 = 67.61 pounds

(The above calculations are for the IGFA world record of 67.5 pounds)

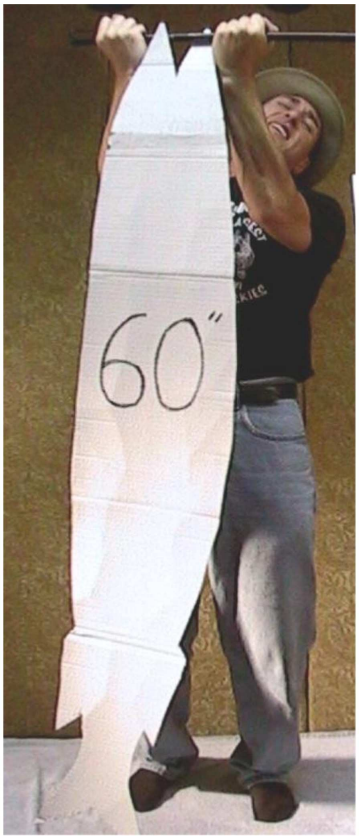
Considering Mr. Johnson was one of Sports Afield magazines long time top writers throughout the 1940's, he would have certainly been aware of the existence of this formula. Most coincidentally, the 1000 formula gives Mr. Johnson's fish a weight of 67.61 lbs, which is only fractionally different than the recorded weight of 67.5 lbs.

Please be reminded the 800 formula weight for Mr. Johnson's muskellunge is 84.52 pounds, a 25.185% discrepancy from the dimensions sworn to on the affidavits.

Reference source: (A Compendium of Muskie Angling History 3rd edition volume 1, p. 634, 2007. Larry Ramsell). (Circa 1940's Sports Afield magazines).

Photo And Silhouette Comparisons

The following visualization experiment compares a photograph of the IGFA All Tackle World Record Muskellunge to artificially constructed muskellunge silhouettes. This procedure will hold Mr. Johnson's muskellunge to a consistent standard of measure first employed in 1992 with Mr. Arthur Lawton and in 2005 with Mr. Louis Spray.



(A)

(B)

(C)

Note: above unaltered images have not been scaled against each other.

Subjects

In photos (A) and (C) stands the subject (WRMA researcher, Mr. Scott Hayes) who is 5’9” tall holding 60” and 54 ½” cardboard mockups. In photo (B) stands Mr. Cal Johnson who is approximately 5’7” to 5’9” holding a muskellunge reported to be 60 ¼” in length and 33 ½” in girth.

It should be noted that the 5’7” to 5’9” range used for Mr. Johnson’s height owes to varying statements on the subject made by Mr. John Dettloff (a Cal Johnson researcher) to WRMA chief researcher, Mr. George Will, at the 2006 and 2007 Minnesota Muskie Expos.

In the 2006 conversation between Mr. Dettloff and Mr. Will, Mr. Dettloff stated unequivocally, *“Cal was 5’ 7”*. Later in this same conversation Mr. Dettloff said, *"I'm the only one that knows and has that information and if anybody else tells you anything different, they don't know what they are talking about."*

After being confronted with some preliminary WRMA photo comparisons the next year at the 2007 Expo by Mr. Will, Mr. Dettloff made the following statement: *"He may have been 5' 8" or maybe even 5' 9”. Photos are deceptive”*.

To extend every benefit of the doubt to the IGFA record, a subject height of 5’9” was used in this comparison. It is important to note however that this figure should be considered a generous maximum for Mr. Johnson. Any reduction in the 5'9" subject height would increase the perceived size of the silhouettes accordingly, and by way of extension decrease the perceived size of the muskellunge Mr. Johnson is holding in photo (B).

Silhouettes / IGFA Record

Photo (A) is a cardboard mock-up measure 60” at its longest vertical point, and 11 ¼” across at its widest horizontal point.

Photo (B) is a photographs of Mr. Johnson with the IGFA All Tackle World Record, recorded as having dimensions of 60 ¼” X 33 ½”.

Photo (C) is a cardboard mock-up, 54 ½” at its longest vertical point, and 10” across at its widest horizontal point.

Silhouettes / Distance

We reproduced the camera height and distance in photo (B) with a camera height of 45” between the floor and camera lens for images (A) and (C). This 45” measurement was reasonably assumed by judging the approximate angle of the camera and photographer in comparison to the image in (B). The distance used from the subject to the camera in both (A) and (C) is approximately 7’.

Silhouettes / Girth

We contacted James McGregor of Advanced Taxidermy in Toronto Canada in April of 2004 to calibrate the side to side "width" (thickness) of some very large carefully measured muskellunge molds to assist in determining correct measurements to use with similar silhouettes during our 2005 Spray visualization experiment.

The two largest girth molds available to him at that time were 27" and 28", which had a calibrated side-to-side width of 7 ½" and 7 5/8" respectively. Many lesser girth fish were calibrated as well, revealing a proportional decrease in width (thickness) that equaled a proportionate decrease in girth.

We formed a cloth tape measure into an oval 33 ½" muskellunge shaped girth to help determine back to belly "depth" measurement for use with these silhouettes. Using the 8" width as a guide in the formed 33 ½" tape measure we arrived at a back-to-belly depth measurement of between 11 ¾" to 12".

If a 33 ½" girth muskellunge would have a width greater than 8", a reduction in depth would obviously occur. This possibility is accounted for by the ½" reduction to 11 ¼". Certainly the 8" width is a fair and realistic value for what a 33 ½" girth muskellunge should be, however none are known to exist for verification purposes.

Based on this exercise, a conservative 11 ¼" depth measurement for the widest point in the 60" silhouette (C), and an even more conservative 10" depth measurement for the 54 ½" silhouette (A) was used.

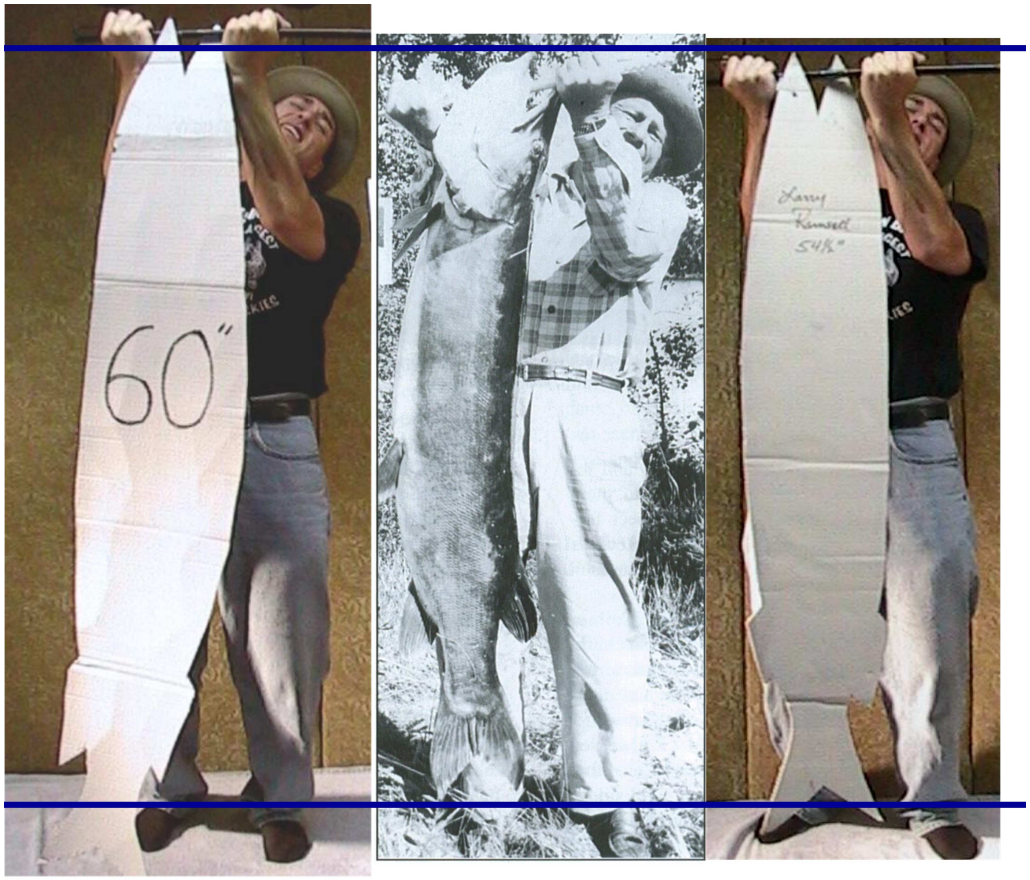
Silhouettes / Distance

We held both silhouettes 8" from the front of the subject to the front of the silhouette in a similar pose to that of Mr. Johnson.

Please consider both silhouettes were held 8" away from the subject for the absolute minimum viewer distortion perspective. In reality, this is the equivalent of the subject holding a real 33 ½" girth fish tight against his body.

For photographic distortion perspective, it would normally be required to add the distance between the back side of the fish and the front of Mr. Johnson's body with the 8" fish width (thickness) together to form a correct viewer distortion perspective. This distortion perspective would undoubtedly increase the perceived size if the silhouette was held further away from the subject, and therefore closer to the camera. Because this distance between the fish and the subject was an unknown, the absolute minimum 8"width distortion measurement was used.

Photo/Silhouette Comparison Results



(A) (B) (C)

Silhouette Results / Length

Blue lines from the muskellunge Mr. Johnson is holding (B) are extended through the mockups in (A) and (C) to act as a visual aid. The subject in (A) and (C) is accurately scaled to the same height as Mr. Johnson (B). Please notice subject (A) is scaled accurately. However, the 60” mockup (A) was necessarily held higher than the fish depicted in the image with Mr. Johnson (B) in order to keep the silhouette tail section off of the floor.

This visualization experiment leaves little doubt that a large discrepancy exists between the muskellunge Mr. Johnson is holding and the 60” silhouette. Though not as obvious, the difference between Mr. Johnson's muskellunge and the 54 ½” silhouette is still apparent.

Based on this silhouette work, even while employing conservative numbers that benefit the size of the muskellunge in the photograph with a 5'9" subject, the fish pictured in (B) falls well short of the reported IGFA record length of 60 ¼”. In sum, we determined it a physical impossibility for a 5’9” subject to hold a 60” silhouette and not utterly dwarf the muskellunge Mr. Johnson is holding.

Of particular interest is how the smaller 54 ½” mock-up compares to the upper end of the DCM Technical calculated maximum length range of 53.2”, or 54” when the lower jaw measurement is factored in. The result of this visualization experiment coincides with the DCM results and accurately represents what a 5'9" subject would look like holding a real 60” muskellunge in that pose.

Silhouette Results / Girth

Please be reminded that although at first glance the (A) and (C) silhouettes may appear to have been constructed too wide when compared to fish (B), these silhouettes were constructed based on the recorded dimensions of Mr. Johnson's muskellunge in conjunction with the gradual taper of the muskellunge Mr. Johnson is holding in image (B).

Though the length discrepancies were indeed obvious, we ask that the reader please direct his or her attention once again to the 33 ½” stated girth for the muskellunge depicted in this photo. In photographs of muskellunge with extreme girth to length ratios the WRMA researched, there is always a very pronounced wide midsection or “belly” visible in the photographs when the girth measurement is over one half of the overall length of the fish. (Please see G/L section that supports this statement).

The readily apparent gradual “taper” of the IGFA record muskellunge is certainly more consistent with what one would expect on a muskellunge displaying a more common or average girth, and offers some explanation why the gradual taper of the silhouettes is so overwhelming. The obvious visual discrepancy of a “tapered” versus “belly” of the 33 ½” girth IGFA record is as noteworthy as the conflict in length.

Visualization Experiment Summary

There is little doubt this visualization experiment yielded conclusive results that coincides with the results that pervade this report. The photograph of the muskellunge Mr. Johnson is holding could not have the recorded measurements of 60 ¼” by 33 ½” while using a 5'9" subject based on this study.

It is readily apparent that if this visualization experiment had incorporated a slightly shorter subject, the visual results would have favored a muskellunge shorter than 54”. With that said, the results are still in line with the DCM Technical solution. The only reasonable conclusion we can draw is that the muskellunge Mr. Johnson is holding was of average build, and slightly less than 54” in length.

In sum, although the muskellunge Mr. Johnson is holding is surely a fine specimen, this simple yet compelling experiment shows it to have been no larger than any number of other large muskellunge captured from this same time period and geographic area.

Affidavit Review

Two affidavits appear to support the recorded length and weight of the IGFA all tackle world record muskellunge. In this section we will examine these affidavits and corresponding supporting documents in order to provide insight into the weigh-in of the IGFA all tackle world record. In preface, it is noteworthy that Mr. Johnson's muskellunge did not receive world record scrutiny by either Field & Stream or the American Museum of Natural History due to its finishing second in the annual contest that year.

Weigh-In

Weigh-in details are taken from an October, 1949 *Outdoor Magazine* article written by the angler himself, Mr. Cal Johnson, in addition to an April/May 1995 *Musky Hunter* interview with Mr. Phillip Johnson, the angler's son, written by Mr. John Dettloff. Each article mentions that the muskellunge weigh-in included the weight of boards and a gunnysack that were taken off the scale and weighed separately to ascertain the weight. Cal Johnson noted the initial weight at 75 pounds while Phillip recalled the initial weight at 87 pounds.

Interestingly, Cal Johnson's article also mentions that the fish was taken to a taxidermy shop where it was again weighed and measured. There is very little detail provided with regard to the type of scale or methods used to determine the exact same weight reading, minus boards and gunny sack, of 67 lb. 8 oz. Importantly, documentation of scale inspection and certification for either scale used to weigh Mr. Johnson's fish is not known to exist.

Affidavits

AFFIDAVIT

I, Philip Johnson, son of the late Cal Johnson, attest that on the 24th of July in 1949 I accompanied my father Cal and was present in the boat with him when he caught his 67-1/2 pound world record muskellunge out of Lac Court Oreilles, near Hayward, Wisconsin. I was 23 years old at the time and remember that this fish was caught early in the morning after a storm. No one else was present in the boat at the time of the catch. It was just the two of us.

I attest that my father hooked, played and landed this muskellunge fairly and by legal means and, once the muskellunge was played out and the boat was worked close enough to shore, I jumped out of the boat, gaffed the fish, and pulled it up onto the beach. Rather than shooting the muskellunge - which was legal and customary at that time - the fish was subdued with the gaff handle.

In addition to witnessing the actual catching of this 67-1/2 pound muskellunge, I was also a witness to the weighing and measuring of this fish. I attest that this muskellunge was weighed in my presence on an accurate, beam-type platform scale at the Moccasin Lodge by its proprietors, Mike Solo and Serge Bagny. This muskellunge measured 60-1/4 inches in length, 33-1/2 inches around its girth and weighed in at 67 pounds eight ounces. The weight and measurements were double checked on taxidermist Karl Kahmann's scale and the two scales gave the same reading and were subsequently state inspected.

I, Philip Johnson, attest that the above mentioned details regarding my father's 67-1/2 pound muskellunge are all true and I was a witness to the catching, weighing and measuring of this fish.

(Signed) Philip Johnson
Philip Johnson

1-25-93

BARBARA L. COMBS
Notary-Public State of Nevada
Appointment Recorded in Washoe County
MY APPOINTMENT EXPIRES APR. 4, 1994

AFFIDAVIT

SPECIES OF FISH ..... MUSKELLUNGE (Esox masquinongy)
WEIGHT ..... SIXTY SEVEN AND ONE HALF POUNDS
LENGTH ..... SIXTY AND ONE QUARTER INCHES
GIRTH ..... THIRTY THREE AND ONE HALF INCHES
DATE CAUGHT ..... JULY 24, 1949
WHERE CAUGHT ..... LAC COURT O'REILLES, HAYWARD, WIS.
QUEST AT ..... MOCCASIN LODGE, HAYWARD, WISCONSIN
TYPE OF ROD .....
REEL .....
LINE .....
BAIT USED .....

I hereby certify that I Personally caught the above-described fish in full accordance with the good ethics of true sportsmanship and while practicing the rules and regulations governing all-tackle sport fishing. The fish was taken on rod, reel and line legally from wate available to the general public. No assistance was rendered during the hooking and playing of this fish.

Signature of person who caught fish Cal Johnson
NAME ..... CAL JOHNSON
ADDRESS ..... HAYWARD, WISCONSIN
Sworn to me before this 25 day of July, 1949
Notary's signature (SEAL)
NOTARY PUBLIC, SARATOGA COUNTY
MY COMMISSION EXPIRES JUNE 1, 1952

We, the undersigned, personally witnessed the weighing and measuring of the above-described fish and do hereby affirm that the weight and measurements given are correct:

Signature of Witness Oscar A. Faust
Address 2135 Bannerman Ave Louisville Ky
Signature of Witness Karl W. Kahmann
Address Route 2 - Hayward Wis.
Signature of Witness Mike Solo & Serge Bagny
Address Moccasin Lodge, Hayward, Wis.

The 1949 affidavit (attached) is unusual because it's a single document that attests to two separate events with multiple witnesses gathered together simultaneously to all sign the same prepared legal document expressing a mutually agreed upon outcome.

It is likewise curious that Mr. Phil Johnson stated in a 1993 affidavit (attached) that he was present when the fish was weighed, yet he did not sign the 1949 affidavit. Of further interest is why Mr. Jack Connor's signature does not appear on the 1949 affidavit as well. These facts become more baffling when the following selections (taken from Mr. Larry Ramsell's 2007 Compendium) are considered:

> "Johnson told how he and his son, Phil, and Jack Connor, an outdoor writer for a Minneapolis paper, got out on the lake just as a thunderstorm was grumbling its way off into the distance. He told this story: " it was still raining a little and there were some lightning flashes in the East and the thunder was still rumbling. But it was a muskie morning, I (Cal) said "you can smell muskies. If we don't connect this morning, we never will. "I took the start position in the boat. Connor went to the bow and Phil, who was guiding, stayed at the oars" (*True* magazine, circa 1949. Mel Ellis author).
>
> "In our party was Jack Connor, outdoor editor of the Minneapolis Star and Sunday Tribune, and dad (Cal Johnson, noted outdoor writer formerly of Ashland) and myself" (Phil Johnson to Ashland Press, 1949).
>
> "By this time dad and Jack were out on the shore, telling me what to do, advice I sorely needed" (Phil Johnson to Ashland Press, 1949).

The above interviewed statements were recorded directly after the catch and subsequent to Mr. Connor's recant of his involvement, which thereby forced the Johnson's to retract first-hand accounts they had jubilantly made to reporters only hours before.

> "Hayward celebrated and almost everybody was dandy about the whole thing until – wham! bang! blooey! – like some of that lightning that had been playing around on the morning of the big catch - Connor suddenly announced he had not been in the boat with Johnson and did not see the fish caught. So another world record lunge' becomes just a little tainted, because both Johnson and Connor stuck by their stories. Later, however, Johnson admitted that Connor had not been in the boat nor did he see the fish landed." (*True* magazine, 1949).

Significantly, the following represents Cal Johnson's revised account to reporters after Mr. Connor recanted:

> "Cal moved out to where Connor could see him and waved him in, both boats arriving a few minutes apart" (Milwaukee Journal – Sentinel, Lew Morrison, 1949).

That Mr. Johnson and Mr. Connor conspired to mislead reporters originally, and that Mr. Connor was an outdoor editor himself, adds significance to the fact that he did not sign the affidavit. There is little question that vouching for the weight of a world record catch should have been an honor he would have been proud to have been associated with.

DCM Technical Services Photogrammetric Solution

Like DNA evidence, photogrammetric solutions of the kind provided by DCM Technical Services are admissible in a court of law. It has been shown conclusively by DCM Technical Services that all of Mr. Johnson's muskellunge photographs said to represent a 60 ¼" length fish were in fact of a muskellunge with a maximum total lower jaw length of 54". If the mount from the 1949 Johnson record currently on display in Hayward, Wisconsin is supposedly the same fish portrayed in the photographs said to weigh 67# 8oz. as claimed, science has proven it was augmented in size to resemble the recorded dimensions set forth on these affidavits.

Affidavit Summary

It is safe to assume that record standards were more relaxed in 1949 than they are today. However, the fact remains that there is no proof that the two scales used to record the identical weight of 67 lbs. 8 oz. for Mr. Johnson's muskellunge were certified or even examined for accuracy.

The weigh-in is further complicated by the guesswork necessary for calculating the fish's weight by subtracting the weight of a gunnysack and boards. Additionally, there is no information available as to how the boards and a gunnysack were used to obtain an initial weight or how much each individual board and the gunnysack weighed.

A final complication is the fact that Mr. Johnson's muskellunge was not subjected to normal year-end world record scrutiny in 1949 because it finished in second place in the annual Field & Stream contest.

The 60 ¼" measurement set forth on the affidavits has been summarily dismissed by a peer-reviewed photogrammetric solution as being a maximum of 54" in total length. Further, the photograph said to represent a muskellunge with a 33 ½" girth (55.60 G/L%) has been shown not to possess this record-setting dimension.

This affidavit review of Mr. Johnson's muskellunge generated more questions than answers - although one certainty remains - there are no known photographs of Mr. Johnson with a 60 ¼" long muskellunge that might help support the claims made on these affidavits.

In the case of Mr. Johnson's 1949 muskellunge, we can choose to believe modern-day science, or these contradictory affidavits. Clearly, based on all the evidence presented in this case, it is simply impossible to justify a belief in both.

Note: Full copies of referenced material are available upon request.

Taxidermist

The following letter from Mr. Doug Petrousek, of Douglas Taxidermy answers questions posed by the WRMA that could directly relate to the mount of Mr. Johnson's muskellunge currently on display in Hayward, Wisconsin. Mr. Petrousek has been in the taxidermy business full time, mounting fish only, for over 32 years. For further references or information: www.douglastaxidermy.com

Question from the WRMA to Mr. Douglas Petrousek regarding Mr. Cal Johnson's muskellunge.

Question;

Would it have been possible to create a realistic looking skin mount of a 50-53" muskellunge into a mount that would measure approximately 60" long using normal materials available in the 1940s?

Answer;

Yes, this could have been accomplished in a number of different ways. Based on a first hand examination of the Cal Johnson mount and the photos of the fresh fish with Cal Johnson, it is my opinion that the mount could have been easily artificially augmented from the 50-53" range to approximately 60" long with materials in the 1940s.

Submitted Respectfully,

Doug Petrousek
4-24-2008

DOUGLAS TAXIDERMY
Saint Charles, Illinois

Lawyer

The following letter from Mr. Kim Presbury, of Presbrey & Associates is in response to the WRMA's request to review the Johnson Summary Report in its entirety for its legal and technical merit as well as it's admissibility in a court of law for the state of Illinois. For further references or information: presbrey@presbrey.com

Presbrey & Associates
821 West Galena Blvd.
Aurora, IL 60506
(630) 264-7300
Fax (630) 897-8637
presbrey@presbrey.com

Kim Edward Presbrey
Charles E. Petersen
Kurt A. Niermann
Michelle D. Porro

April 29, 2008

To whom it may concern,

I have reviewed the WRMA report regarding the photogrammetric analysis of the size of the Calmer Johnson muskie. The analysis that was performed appears to comply with the scientific standards required by law. It also appears that the findings of this report are both reproducible and admissible in a court of law.

It also appears that the scientific method was rightfully applied in several areas of the general report, and would be reproducible and admissible as well. The standard deviation and scientific findings of the DCM analysis lend compelling support to the overall findings of this report.

Sincerely,

Kim Presbrey
Past President IL Trial Lawyers

WRMA Johnson Summary

From the expert calculations made by DCM Technical Services, it is evident that all of the photographs commonly said to depict Mr. Johnson's IGFA All Tackle World Record muskellunge did not belong to a living fish measuring 60 ¼" in length. In fact, all the known photographs have been scientifically proven by DCM Technical to belong to a muskellunge with an upper jaw to end of tail length of only 53.2".

Another highly credentialed expert firm in the field of photogrammetry, Forensic Imaging, graciously provided a pro bono peer-review that ensures that DCM rigidly adhered to the highest professional standards in photogrammetry. With an overall maximum possible length of 54" (when lower jaw measurement is utilized), the fish in the photographs remains well short of the 60 ¼" set forth in the affidavits.

It has been visually and mathematically shown in the G/L% section that the photograph of Mr. Johnson's muskellunge does not represent a fish possessing a 33.5" girth. Separate scrutiny was applied in the visualization experiment that yielded similar results in both length and girth. Even the time honored 800 formula for calculating weight supports these findings and revealed a 25.185% discrepancy from the recorded weight/dimensions set forth on the affidavits themselves.

A peer-reviewed report conclusively proved that the skin mount of Mr. Johnson's muskellunge is considerably longer than the fresh fish in the photographs said to be the same fish. Further, Douglas Taxidermy, a well recognized expert in his field has attested to a very real possibility that an approximate 50" fresh muskellunge could be made into an approximate 60" mounted mock replica.

There are only two rational conclusions that can be drawn regarding the mount of Mr. Johnson's muskellunge that is still in existence. Either the photographs and mount are two separate fish, or the overall dimensions were enhanced during the taxidermy process to create a mock replica that would coincide with the predetermined dimensions.

Considering the WRMA research provided runs so blatantly counter to the claims made on the affidavits, the affidavits alone cannot provide the type of tangible proof required for any form of legitimate record recognition.

Moving forward

It is of considerable relevance that The Field & Stream contest only recognized the 1st place finisher at the end of 1949 as their champion. In other words, even though the record was broken multiple times during that year, less scrutiny was afforded this lower contest entry due to it not being their official 1949 contest winner. Therefore, the IGFA is the only governing body to sanction Mr. Johnson's muskellunge as an official all tackle world record - and then nearly 50 years following its capture.

The inconsistent board and gunnysack method used by Mr. Johnson and his son coupled with no supporting documentation attesting to the accuracy of the scales leaves considerable doubt regarding the weight claimed on the affidavits.

It is clear that for record keepers, scientific analysis must trump eyewitness testimony whenever the two stand in such opposition. This is not to say that eyewitness testimony lacks value. However, just as in courtrooms of today, it is necessary to recognize that eyewitness testimony has fallen to a position of secondary importance relative to hard scientific fact.

We applaud the IGFA for addressing the difficult reality that today's standards must require a legitimate photograph be submitted to quantify a record. Clearly the IGFA has determined that eyewitness testimony can be inherently problematic and sought proactively to address this issue, as in the case of Mr. Arthur Lawton. We believe that the burden of establishing adequate proof for any angling record to be set aside, retired, or disqualified must fall squarely on the shoulders of the evidence presented. We feel that this burden of proof has been clearly met by the contents of this report.

It is obvious the WRMA has purposefully presented a variety of possible directives the IGFA may elect to pursue; it is also just as obvious which directive the WRMA feels is the correct one. We feel strongly that embracing the truth regarding Mr. Johnson's muskellunge will eventually add to the overall credibility of our beloved sport, and it is in this spirit we humbly submit our findings. North America's fast growing muskellunge community now looks toward the IGFA to establish a legitimate world record so the healing process can begin.

In closing, the preponderance of scientific and circumstantial evidence we have presented all point to the fresh fish photographs said to represent the IGFA All Tackle World Record belonged to a muskellunge well short of 67 lbs. 8 oz. The ramifications of this record lacking photographic proof, trustworthy dimensions, or acceptable scale or weigh-in method is incredibly damaging to the validity of a 67 lb. 8 oz. muskellunge having ever existed in the flesh.

It is therefore our recommendation that Mr. Johnson's records be promptly removed from record status.

Sincerely,

Rich Delaney, President WRMA
Jerry Newman, founder WRMA
George Will, chief researcher WRMA