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Human Mortality and Rate of Noodling Catfish in Oklahoma

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By

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THESIS ABSTRACT

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ABSTRACT: Noodling is a legal method of catching certain species of fish in the state of Oklahoma and in other states in the South and Midwest. Unlike other forms of angling, noodling requires that the angler be in the same physical aquatic environment as the targeted animal without the aid of equipment such as rods, reels, and nets. The peril of this method of fishing is apparent in the numerous injuries reported annually in Oklahoma. In addition, anglers are sometimes killed while noodling. Other forms of fishing, both sport and commercial, are much more common and have better documentation and regulations pertaining to their dangers. For example, commercial fishing in the Pacific Northwest carries great risk associated with the occupation; long hours at sea, hazardous environments, sleep deprivation, and heavy equipment account for the lives of commercial fisherman each season. Prior research has shown that some commercial fishing occupations are, per capita, among the deadliest jobs in the world (Davis, 2012). Through statistical analysis and case studies of noodling deaths, this research sought to determine if, in comparison to the well-documented deadly occupation

of commercial fishing, noodling ranks as one of the most hazardous types of fishing on the planet. While far fewer people participate in hand-fishing, the data indicate that, per capita, it is extremely dangerous when compared to other types of fishing. Thus, the regulating authorities should educate participants of the risks, and perhaps formulate additional policies to prevent the further unnecessary loss of life.

KEYWORDS*: noodling, fishing, commercial fishing, catfish, drowning, deaths, mortality, Oklahoma*

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CHAPTER I

Introduction

Background

Noodling is a legal method of catching certain species of fish in the state of Oklahoma and in other states in the South and Midwest. Unlike other forms of angling, noodling requires that the angler be in the same physical aquatic environment as the targeted animal without the aid of equipment such as rods, reels, and nets. The peril of this method of fishing is apparent in the numerous injuries reported annually in Oklahoma. In addition, anglers are sometimes killed while noodling. Other forms of fishing, both sport and commercial, are much more common and have better documentation and regulations pertaining to their dangers. While far fewer people participate in hand-fishing, the data indicate that, per capita, it is extremely dangerous when compared to other types of fishing. Thus, the regulating authorities should educate participants of the risks, and perhaps formulate additional policies to prevent the further unnecessary loss of life.

Problem Statement

Sport fishing regulating authorities no doubt understand the risks associated with handfishing but may not totally understand just how dangerous this sport is per capita. If this danger could be shown or given a numeric value, policies and regulations could be adjusted to compensate for this high-risk activity. An actual numeric value may be difficult to obtain, for reasons later to be discussed. The dangers of noodling may be well

known to some, but they are either ignored or disregarded by most who participate in the sport. The hazards are so great in fact, that "despite a paucity of scientific work assessing the true environmental impacts of the technique, many states have outlawed noodling for… concern for the safety of the fishing men…" (Salazar, 2002). In his section devoted to noodling, expert fisherman and author Keith Sutton (1998) cautions "One should also consider the many dangers inherent in this unusual sport…Crippling injuries can result… If an arm or hand gets stuck, or if an exceptionally large cat(fish) is tackled, the noodler can drown. Risks are high, and participants should be aware that death or serious injury can result from carelessness" (The Freshwater Angler; Fishing for Catfish 1998, page #97).

Significance of the Study

This research provides an assessment of the risks associated with the sport of noodling and the factors related to mortality, thereby assisting regulating authorities in managing wildlife policy and in educating the public to practice safety measures when engaging in the sport. While the activity is open to all, it seems that only a small percentage of the participants from specific demographical groups appear to be the key players. If those persons are not already aware of the dangers that exist, perhaps come quantitative data could allow them to further proceed with caution.

Here in Oklahoma in regards to the death/drowning of noodlers, the majority of the cases found involved Caucasian males in their early 30's with the eldest angler fatality being 68 and the youngest being 17. The average over-all age of drowning noodler fatalities was 33.7. While a male in his 20's is more apt to make poor judgement and safety decisions than a man in his 30's, it is possible that the anglers in their 30's

have been involved in the activity for several years, which could likely lead to a higher confidence level in the sport. The higher confidence level would then likely lead to higher moments of success and additional risk-taking behaviors from a grown confidence of literally surviving the activity for so long. There is no doubt that the adrenaline rush received by these men is what fuels the sport and keep them coming back for more action and additional challenges.

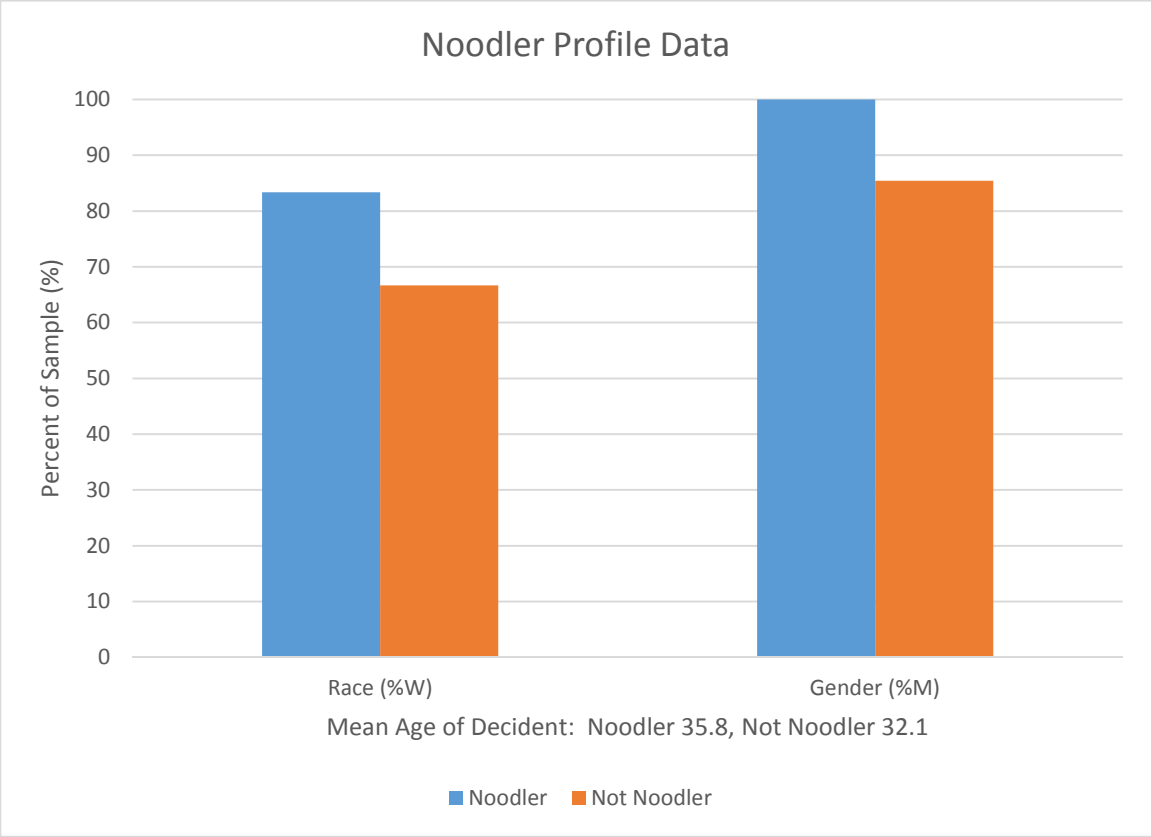

Figure 1: Comparison graph of gender and ethnicity of fatality drowning of noodlers vs other "recreational (not noodle)" drownings

CHAPTER II

Review of the Literature

Noodling: The sport and the problems associated with the activity

According to the U.S. Fish & Wildlife Service, through a "2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation," 729,000 residents and nonresidents 16 years old and older fished in Oklahoma that particular year. According to Salazar, less than 1% of them handfish (Salazar 2002). By those numbers, by inference around 7,000 people participate in the sport here in Oklahoma annually.

Current policy/regulations pertain mainly to the legality of the sport and how it affects the wild population of the fish. The sport of hand-fishing (aka "noodling" or "grappling") is a popular legal method of obtaining nongame species of fish in Oklahoma. As defined by the Oklahoma Department of Wildlife Conservation (ODWC); "Noodling is the taking of nongame fish and catfish by use of hands only." The angler is allowed to use a stringer to secure a fish after it is caught, but the actual act of noodling allows for nothing to be used besides the angler's body. Poles, hooks, ropes, gaffs, and other means of latching the catfish while it is still in the hole are strictly forbidden. If the angler is using a boat to get from location to location on a particular body of water, these items are not even allowed to be on the vessel. Common gear seen in this sport is limited to footwear, swim trunks, and a lot of courage.

The regulations are very specific on what species can be targeted, and what must be returned to the water if an unlawful fish is obtained. While nongame species such as

the common carp and buffalo carp are legal, far and away the most desired species is the flathead catfish. The flathead catfish (*Pylodictis olivaris*) can reach weights of over 100 pounds and grow to more than 5 feet in length, with the world record caught out of the state of Kansas tipping the scales at a whopping 123 pounds (Salazar 2002).

The reputation of the flathead is both praised and scorned by freshwater fishermen. Anglers who prefer to target other species of carnivorous fish seem to belittle the competition of the flathead, which grows significantly larger than most predatory freshwater fish. In a study of consumption and growth patterns in flatheads, they are given credit to their ferocity by the statement; "In several areas where flathead catfish have been introduced, they quickly establish themselves as an apex predator and declines in abundance of native fish species have concurrently been observed in these locations" (Tetzlaff, Flowers, & Pine III, 2010). Perhaps due to jealousy of their ability to consume so much prey, the flathead is also regarded as a bottom-feeder or "trash fish" by a great majority of black bass anglers (who seem to make up the predominantly well known world of the sportfishermen). Those who adore them though, defend them very tenaciously. Long time South Carolina catfish and striped bass charter guide John Sellers boldly claims "You don't need rotten, smelly offering to attract big cats… They're used to feeding on other fish, usually live ones. They're a clean, strong sport fish. They're not garbage eaters (Almy 1989)." Outside of the close family of noodlers, the participants of the sport are not usually held in the highest regard either in respect to their counterparts in the fishing world. "Noodlers are like carp or drum. They're the bottom-feeders, they're trash, they're the scum-suckers… They're the lowest on the totem pole as far as the bass fishermen, your tournament trout fishermen… (Tobias 2011)." It is indeed a muddy,

sweaty, “blue-collar” method of catching fish. This practice of angling in regards to fishing, much like NASCAR fans in the sporting world, brings strong bonds to those who participate and distance from those who do not.

Methods vary based on the type of water being fished, but the general principle is the same. The fisherman wades out into the water and randomly probes his/her arm into crevasses in the rocks, mud, beaver dams, blown-down trees, brush piles, submerged roadbeds, concrete, or other structure in search of waiting catfish. The idea is to come in contact with the fish, allow it to bite you (hand and/or foot), and then obtain a firm grasp on the bottom jaw while physically wrestling the fish out of its hole and into submission. While the technique can be used year round, the flatheads are particularly vulnerable to the tactic during the spawning season between early May and late July. During this time of year the practice is especially frowned upon by some. Mary Grigsby, professor of rural sociology at the University of Missouri claims that “noodling is not fair play. Fair play is not going into the hole when the catfish are trying to reproduce, blocking the hole, and grabbing them off their nest (Tobias 2011).” After the actual spawning is complete between the fish, the female is then chased out of the nest after mating with the male, who remains to guard and fan the eggs with his tail. This fanning is thought to improve the oxygenation and health of the eggs (Salazar, 2002). The male is then the most vulnerable to being grappled. At this point, as he will guard the nest with his very life. Short of being eaten by a larger fish, which is highly unlikely in a sexually mature flathead, the male will not leave the nest for any reason. If the angler is particularly fortunate, he may be able to catch both the male and the female if they are still together in

the midst of their romance, a true bonus for the grappler being able to double their catch in one spot, but very anticlimactic for the fish no doubt.

Human fatalities occur while noodling every year in our state, with the most common cause of death being drowning. Many other injuries which may not be life-threatening are also sustained from underwater debris, roadbeds, or abandoned fishing hooks/tackle. Contact with undesired species such as snakes, snapping turtles, and beavers could result in nasty and unexpected bites which can prove both painful and could become infected if left untreated in a timely manner. In Shaun Morey's book, one man tells about an encounter with a startled muskrat that bit him on the hand after he reached into an apparent air pocket under a beaver den. "One of his fingers had been bitten clean through. The bottom teeth must have missed, but the top teeth went all the way through, just missing the bone (Morey 1994)". Including these additional mechanisms for the angler to be injured and/or killed, there is no doubt that this could be one of the most dangerous types of fishing in the world. Not only is this a highly precarious method of catching fish, but it is extremely regarded as a pastime right here in our home state of Oklahoma. Although more conventional fishing methods are more popular in the Sooner state, those who favor noodling seem to be very dedicated. In Deborah Salazar's article "Noodling: An American Folk Fishing Technique," her research showed that some noodlers who were interviewed go handfishing as often as 60 times annually, often 20 times monthly during the active spawning season of the catfish. The majority of other fishermen do not devote nearly as much time to one particular species of interest.

While it certainly may be unlawfully practiced in other locations, the sport is legal only in the states of Alabama, Arkansas, Georgia, Illinois, Kansas, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Wisconsin, and most recently Texas (Wikipedia 2016). The season is year-round while the summer months are obviously the most popular time of year to participate. Recent attention has been given to the sport through a television series on the National Geographic Channel called "Mud Cats." In the show, various pairs of men compete against each other to see who can grapple the biggest fish that particular week. Camera crews follow these men through varied environments and accurately document how the sport is practiced. The catfish are then transported, alive, to a weigh-in check station and compared to the other fish caught that particular day. The results are documented on a leader board and monetary awards are presented to the victors. While the drama may be embellished a bit during the actual fishing scenes, it gives an accurate depiction of the risk involved.

Noodling Participants and Methods Used

One cannot actually get a feel for this sporting activity without first getting to know those who are directly involved with it. It seems as though the proverbial "line in the sand" has been drawn between noodlers and mainstream rod/reel fisherman. Those who do not participate in hand-fishing seem to scowl at those who do. Professor of fisheries management at Mississippi State University, Donald Jackson, points out that the fish don't care how they die, but argues that a fish makes a choice to bite a lure at the end of a line, while the noodlers deprive it of free will (Todras-Whitehill 2006). This philosophy, although more refined than many a mindset of recreational anglers, summarizes how grapplers are often viewed in the fishing world. While the traditional

angler matches whit with a fish by tricking it into consuming food (fake or otherwise), the hand-fisherman simply has to find the fish literally wrestle it into submission.

The lifestyle and habits that go along with the sport do seem to differ than other anglers who choose to pursue more "admirable" species such as bass, crappie, or trout. One such grapler, Tell Judkins, was more than proud to show off various animal heads and body parts that he has found while searching below the surface for flatheads. "I noodled this raccoon head the other day," he told a NewsOK reporter Adam Kemp, "Bet nobody can say that…" (Kemp 2011). It is stereotypes such as those that set the noodler aside from the more refuted trout angler. Perhaps the lack of required expensive equipment is also part of the reason. Regardless, you will likely not find a flyfisherman boasting at the local tavern after a day of casting hand-tied caddis midges to rising rainbows about the decomposing mammal part(s) he found in the river that day.

As timeless as noodling is to the people of Oklahoma, not much has actually changed with the methods of obtaining these fish and the people who pursue them. It is a blue-collar version of angling that is unique to this state and only a few others in the country (legally). While practiced in other locations, the focal point of this study will be the participants here in the state of Oklahoma.

In a random sample of 12 Noodler fatality drownings and all other recreational drownings that also occurred during the same months as those handfishermen, the data was not too surprising. It appears as though alcohol is a major contributing factor to all drownings (recreational or otherwise). All Noodling fatalities were male, with Caucasian being the highest likelihood of a probability (83.3%). While the recreational drownings were also predominantly male (87.5%), there was some variance to the gender with

victims seemed to be less biased with a 2/3 of the sample being Caucasian, leaving 33.3% being from other races. Men still seemed to have dominated the majority of all drowning cases, regardless of what activity the participant was involved in doing on the water during the particular outing when the fateful event took place. Interestingly enough, age was strikingly similar as well, averaging in their mid-30's for both noodlers and non-noodler deaths.

	noodlers	non-noodlers	test	
	mean(s.d.) or *n*(%)	mean(s.d.) or *n*(%)	statistic	*p*-value
Sex (male)	12 (100%)	42 (87.5%)	$\chi^2 = 1.67$	0.333
Race (Caucasian)	10 (83.3%)	32 (66.7%)	$\chi^2 = 1.27$	0.317
Age (in years)	32.1 (14.8)	35.8 (16.8)	$t = -0.75$	0.461
BAC	0.12 (0.12)	0.11 (0.12)	$t = 0.41$	0.687

Table 1. Summary statistics (*n* = 60)

Many of the risks associated with this sport are well known by those involved. How they choose to avoid or take on those risks is unique to the individual. Getting to know the person techniques, stories, and experiences will be the focal point of this chapter. While online and literature searches can obtain a multitude of information about the sport, it pales in comparison to the actual accounts of actively participating grapplers. First- and second-hand accounts were obtained to support the mission of what this document is.

Regardless of what methods and locations are used, it is quite clear that this is a macho-sport with a high percentage of blue-collar professions who participate. Those who choose to take on fish in this manner do so for prize money at the occasional tournament, fillets for the freezer, but mostly just for the adrenalin rush involved and macho social status among their peers. Lee McFarlin gives the over-all sentiment when he was quoted in the New York Times stating; "Whenever you get in there and get hold of one of them fish, one-on-one against Mother Nature… you beat Mother Nature. You have conquered it all (Todras-Whitehill 2006)."

The lifestyle choices of those involved are usually not limiting their risk-taking behavior to the sport of hand-fishing. Many of the men and women had multiple encounters with cheating death in their everyday lives. Twenty-five-year-old Chris Pulchny recalled a time when he was in a coma for three months after being thrown from a pickup and smashing his head on a curb. When he woke up, his main reason for being upset was that he missed deer season (Kemp 2011). While that certainly would upset anyone who enjoys time in the woods each fall pursing whitetails, the foremost thought for most would likely be time missed from family, work, or other obligations. Not so the noodler! For he is of the mind-set that if he is not in the environment pursuing nature in its most pure and barbaric form, then he has wasted a day on this planet.

Risk Factors Associated with Noodling

Environmental Factors. Water current is common factor in noodling drownings. Often underestimated or not given its due respect, moving water can quickly over-power even the strongest of sportmen. A gallon of water weighs 8.34 pounds. Multiple hundreds of gallons of water that are moving at any speed at all could then create quite a

bit of force. The speed at which water is moving can be very misleading, especially in a wide, muddy, otherwise calm looking river or stream that a confident angler has waded out into. Flatheads will often hole up on oxbows, wingdams, blow-downs, beaver dens, and other things that break up the current, making them a popular spot to try. While the angler is busy exploring these hides on the calm side of a flow, they reach an edge and suddenly get swept away. Undertow currents can also be a problem if not foreseen. If they become entangled or compromised, they are unable to get back to shore and can subsequently drown.

Calm water, while perceived to be not as perilous, still has several risk factors. In tranquil conditions, such as lakes, the concept is the same as in the rivers but not without other hazards. The majority of lakes in Oklahoma are man-made, most of which occurred by damming a river to flood adjacent valleys. When the state was facing the challenges of the Great Depression and the Dust Bowl in the 1930s, Congress passed the Soil Conservation Act. This utilized the states natural resources in a way to both create jobs and better utilize the waterways. Construction of dams and lakes, including Lake Carl Blackwell and Lake Murray in 1937, marked the beginning of a four-decade long period of lake construction in Oklahoma (Whitley & Vance 2007). Many of these flooded areas were formerly used by automobiles and have old roadbeds, now hidden below the surface of the water. Holes and cracks in the surface of the roadbed are a favorite spot for a catfish to reside in wait of its next meal and/or to spawn. The unfortunate occurrence that takes place is when the noodler reaches deep into these holes and gets their arm or foot stuck, not allowing escape. The physical weight of the anglers body against the concrete crack is sometimes enough to pinch the area, making the crack

just small enough to prevent the retrieval of the appendage that was only moments ago looking for a fish. With concrete and roadbeds also comes rebar, which was used to solidify the structure during the construction. Nasty cuts and lacerations are common when hand-fishing these areas as a result. Often after a fish is located, there are several dives by the grappler to position the fish prior to attempting capture. Multiple dives and intense focus, in the excitement of the moment, can cause an inadvertent shift in a rock, roadbed, or other sizeable structure. This can result in the grappler being pinned under the surface (Salazar 2002). To add even more significance to the risk, it should be noted that noodling is not allowed after legal sundown (ODWC – Fishing Regulations 2016-1017, page 9). The sport is clearly dangerous enough without the added element of not being able to see what you are doing.

The catfish themselves are also a potential risk. A large flathead could easily overwhelm an unsuspecting angler who was not prepared for the struggle back to the surface with a weighty opponent who has no problem breathing under water. In a collection of fishing stories, noodler John Pidcock describes his encounter with a forty-eight pound flathead that he grappled out of a beaver den in the Deep Fork River near Luther, Oklahoma; "…it's bottom jaw was as big around as a piece of luggage. When it clamped down on my hand it broke one of my fingers." Fortunately, Mr. Pidcock had two friends with him that day who were able to pull him and the fish from the hole after they got hooked up. "There's nothing more gratifying than getting bit by a big catfish (Morey 1994)." Like many other noodlers, there are tales of fishermen who were not so lucky with encounters with big fish. Pidcock tells the tale of a well-known noodler on Chicken Creek in Lake Tenkiller who had to have an arm amputated after an estimated

90 plus pound fish "raked all the meat off his forearm (Morey 1994)." In addition to the ferocious fight they are known for, catfish have the ability to "lock" their pectoral fins in an outward position when they are threatened. The pectoral fin is accompanied by a stout spine on the lateral aspect of each fin, which are located on the sides of the fish just behind the gill plates. This locking technique is used from the time the catfish is a small fry to prevent them from being swallowed by a bigger predator such as another larger fish or a bird. While physically wrestling a larger catfish, the noodler needs to take care not to be "spined," especially through the chest wall and into a hollow organ such as a lung (Salazar 2002). With the spines on a large catfish exceeding eight inches in some cases, they would have no problem puncturing a chest wall of a human and doing serious damage to an organ behind the rib cage or in the abdomen.

Human Factors. Trotlining is another means of legal catfishing where multiple hooks are secured to a high tensile strength main line via smaller lines (aka "trots"), which are then baited, and left under the water. Often frequenting the same locations due to targeting the same species, noodlers may get tangled, impaled, and otherwise compromised by these lines which are left in the environment. The law requires that trotlines are checked by an angler every twenty-four hours (ODWC – Fishing Regulations 2016-1017, page 8). However, this is of little or no consequence to a noodler who becomes entangled. Often, it only unfortunately results in the decedent being found in a timely manner long after the actual death of the handfisherman has taken place. It is fairly common for trotlines to be left unattended for significant amounts of time, making them even more dangerous in remote locations, which encompasses the majority of Oklahoma waterways.

The most significant human factor would be the consumption of alcohol during the noodling process. While the stereotypical public perception of the noodler is not held in the highest regard as far as social status goes, it certainly does not help the reputation of the sport when so many participants seem to do so while intoxicated and/or impaired. As defined by the Oxford English dictionary, the term "noodling" relates to a "silly or stupid action or idea" (Simpson & Weinder 507). As the case reviews will show, inebriated parties were the common denominator in the majority of all known deaths. Many studies have shown that consumption of alcohol delays reaction time, decision making ability, and over-all control of the human body. All these factors are assumed to be extremely important when undertaking an activity such as trying to catch large fish underwater with your bare hands. If you add to that, a sense of competition or desire to "one-up" a fellow noodler in regards to the size of the catch, it could spell a recipe for disaster.

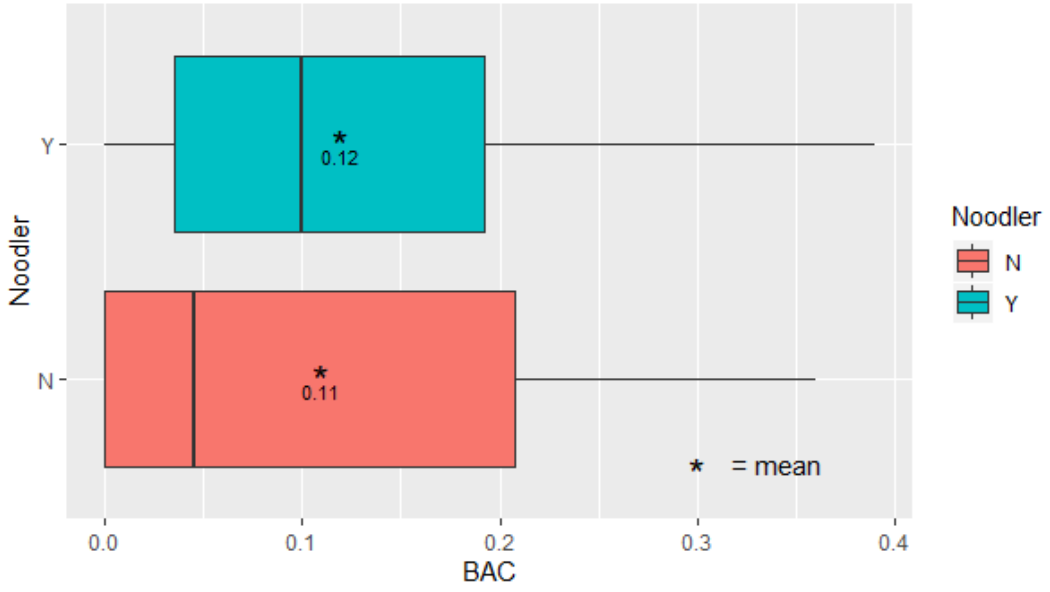

Figure 2: Comparison of Blood Alcohol Content Between Noodlers & "Recreational" Drownings (Not Noodler) occurring the same month

The above figure notes that the significance of alcohol may not be significant to noodling fatalities as much as it is to fatalities involving alcohol consumption and bodies of water. While the average blood alcohol content is similar, the variance is that there some of the "recreational" drownings involved little or no alcohol, while the noodling deaths seemed to all have that as a common denominator. While the dangers associated with alcohol and certain activities are well known, we wanted to see just how dangerous it was specifically to the sport of handfishing. By utilizing the database of the Office of the Chief Medical Examiner, we pulled at random, twelve cases of fatalities involving noodlers. To see what significance specifically the alcohol played in the role of the death, we looked at all other "recreational" drownings that occurred during the given month of the twelve noodle fatalities. Forty-eight "recreational" drownings occurred during the same months as those twelve noodlers. It was interesting to see that the blood alcohol level was similar in both handfishermen and other recreational water enthusiasts. The over-all average for the twelve noodlers was 0.12 % BAC where the forty-eight "recreational" drownings was 0.11% BAC. Perhaps the lesson learned there is not that alcohol is dangerous autonomously to noodling, but to participants in water recreation in general.

The sport of grappling flathead catfish with your bare hands is certainly not for the faint of heart. It is for an outdoorsman willing to risk their longevity simply to put some fillets in the freezer, when there are other methods just as productive. Regardless, it

appears as though this sport/pastime is here to stay for generations to come and the regulating authorities should consider its risks when managing wildlife policy.

Mortality Rate Associated with Commercial Fishing

Commercial fishing has the highest occupational fatality rate in the country. Per capita, the commercial fishing fatality rate is three times higher than the second most dangerous occupation listed by the Bureau of Labor Statistics, which is logging (Davis 2012). Even with a Congressional law passed in 1988 requiring all commercial fishing boats to carry life rafts, survival suits, and emergency beacons (Markels 2005), there are still a great number of fatalities associated with it. In a U.S. News & World Report compiled by Alex Markels entitled "Dangers of the Deep," 115 deaths occur out of 100,000 workers who fish commercially. That would account for 1.15 fatalities out of 1,000 fishermen in the industry. For a comparison to other perceived dangerous occupations by the U.S. Department of Labor (and some not, such as working in an office), the following graph is of note:

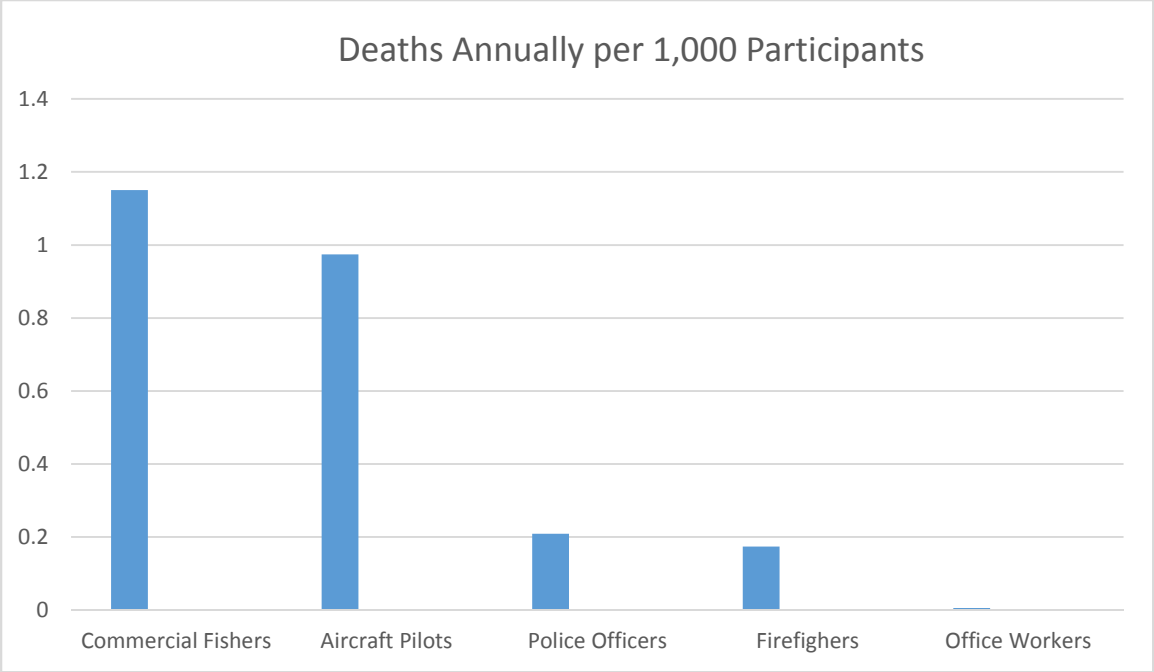

Figure 3: Mortality rates of commercial fishing and other occupations

While the industry of commercial fishing has made some progress in safety techniques over the past several decades, Alaska still has the highest worker-related fatality rate of any state in the entire country (Lincoln, J., O'Connor, M., Retzer, K., Hill, R., Teske, T., Woodward, C., Lucas, D., Somervell, P., Burton, J., Mode, N., Husberg, B., & Conway, G., 2013). Many of their fatalities are associated with, but not limited to their extreme environment conditions and remote locations. Including the high number of fixed-wing aircraft crashes, the Alaskan worker fatality rate is annually 34.8 per 100,000. By comparison, the worker mortality rate for the rest of the United States is 5 per 100,000 (Lincoln J.M. et al. 2013). The noodling fatality rate, per capita, would be comparable in the fact that it seems to be right around 1 in 1,000 per year more or less. While these numbers aren't a hard statistic, most summers having roughly half a dozen or more noodlers die while participating in the sport and only having about 7,000 actually

participate in the activity (per literature review), this would put it close if not directly akin.

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CHAPTER III

Research Purpose

Purpose Statement

The purpose of this study is to bring awareness to the danger level of noodling, highlighted through comparison to the already well-known and well-documented world of commercial fishing. By obtaining both demographical and statistical data in regards to both the fatality cases and otherwise, the goal would be to correlate a statistical value to the mortality rate as accurately as possible in a quantitative value to the already known dangers and mortality rate associated with commercial fishing. Being that commercial fishing is, per capita, the most deadly type of angling in the world, this could demonstrate just how dangerous the sport of noodling actually is. What is it that makes noodling so dangerous? What are the aquatic, man-made, and over-all risk factors that are associated with this sport that could show these values and thus prove how deadly the activity is?

Methods

Participants & Data Collection

The methods used to accomplish this research include interviews with those who are active participants in noodling, data collection from state and national resources, and case studies to bring focus to the actual mechanisms which cause the death.

According to a survey conducted by the Oklahoma Department of Wildlife Conservation (ODWC) in 2007, only 0.03% of anglers in the state participate in noodling (Godfrey 2007). This is a very small percentage of the folks who actually recreate on the

lakes, rivers, ponds, and other waterways of Oklahoma. To better understand the dangers/risks associated with the sport by those involved, I conducted a survey (both telephone and in person). I interviewed approximately fifty grapplers between the dates of May 16, 2018 and November 2020 in various settings both in person and by telephone.

Basic demographical information of the anglers was obtained in order to gather statistical data. In addition, I asked them about the preference in location for targeting the catfish (stagnant or moving waters). I also discussed other animals that they have encountered while grappling, including reptiles, mammals, or other species. Injury documentation was then gathered to include trauma to their own body or to other anglers with whom they were participating. They were also asked what the largest catfish was that they had ever encountered or dealt with. These data were based upon the recollection and self-report of the interviews and lacked independent validation.

In order to get a better idea of how the number of noodling fatalities compares to other drownings, I compared similar demographic information to those deaths that occurred during the same months. Random cases of noodling deaths were selected from the database of the Office of the Chief Medical Examiner, and all other "recreational" deaths occurring on bodies of water (not to include man-made structures like bathtubs, swimming pools, etc) were compiled from those same months that the noodling deaths occurred. I then compared the age of the decedents, blood alcohol levels (if available), ethnicity, and sex. This was all done without violating any privacy or privileged information of the decedents. While these cases are available to the public through inquiry, the personal information neither benefitted the study nor was necessary in any form.

Limitations

The exact number of participants in the sport of noodling was impossible to calculate since there is no license specific to that type of fishing. Also, caught fish/animals are not required to be registered or checked-in with the Oklahoma Department of Wildlife Conservation. The exact number of fatalities was also difficult to ascertain due to the possibility that some decedents were never recovered and their cause of death or disappearance remains undetermined.

Due to the secrecy of the sport and the high-risk lifestyle of those who participate in the activity, there is a high probability that lost noodlers sometimes remain "missing persons" with local and/or national law enforcement and are never found or recovered after a death has taken place. If the angler has a drug or alcohol history or even a criminal history with local law enforcement, it is possible that it would be assumed that they simply skipped town or left under some other suspicious circumstances. Another consideration is a high percentage of those who die while participating in the sport are likely to be fishing alone. Fishermen are often very protective of their fishing spots, not even sharing the locations of previous successful outings with family who could then share with other potential noodlers. If their location was not disclosed to another party, the decedent could go unrecovered for months/years or indefinitely. Water currents, blowdowns, and scavenging animals such as turtles and other catfish can quickly accelerate the decomposition rate of a decedent left in that aquatic anaerobic environment.

CHAPTER IV

Mortality Rate and Risk Factors Associated with Hand-fishing for *Pylodictis olivaris* in Oklahoma *

** Prepared and formatted for submission to the Journal of Forensic Sciences*

Mortality Rate and Risk Factors Associated with Hand-fishing for *Pylodictis olivaris* in Oklahoma

Noodling is a legal method of catching certain species of fish in the state of Oklahoma and in other states in the South and Midwest. Unlike other forms of angling, noodling requires that the angler be in the same physical aquatic environment as the targeted animal without the aid of equipment such as rods, reels, and nets. The peril of this method of fishing is apparent in the numerous injuries reported annually in Oklahoma. In addition, anglers are sometimes killed while noodling. Other forms of fishing, both sport and commercial, are much more common and have better documentation and regulations pertaining to their dangers. For example, commercial fishing in the Pacific Northwest carries great risk associated with the occupation, long hours at sea, hazardous environments, sleep deprivation, and heavy equipment account for the lives of commercial fisherman each season. Prior research has shown that some commercial fishing occupations are, per capita, among the deadliest jobs in the world (Davis, 2012). Through statistical analysis and case studies of noodling deaths, I sought to determine if, in

comparison to the well-documented deadly occupation of commercial fishing, noodling ranks as one of the most hazardous types of fishing on the planet. While far fewer people participate in hand-fishing, data may indicate that, per capita, it is extremely dangerous when compared to other types of fishing. Thus, the regulating authorities should more thoroughly educate participants of the risks, and perhaps formulate additional policies to prevent the further unnecessary loss of life.

KEYWORDS*: noodling, fishing, commercial fishing, catfish, drowning, deaths, mortality, Oklahoma*

METHODS

This study was conducted through interviews with anglers in the field, literature review, and statistical accounts of fatality cases via the Oklahoma Office of the Chief Medical Examiner database. The goal of the research was to examine the risks that are associated with the sport of noodling and confirm the suspicion that the fatality rate is comparable to the well documented high risk occupation of commercial fishing. Thus, the regulating authorities could then educate participants of the risks, and perhaps formulate additional policies to minimize future loss of life, while still allowing this traditional pastime to continue.

Face-to-face interviews with anglers at various locations in the field and at tournament venues such as the "Okie Noodling Contest" held annually in Pauls Valley, Oklahoma, facilitated analysis of demographical information of the angler as well as desired geographic aquatic locations frequented, largest flathead encountered, other undesired species encountered in the water, and personal injuries incurred during the participation in the sport. Additional interviews were conducted via telephone.

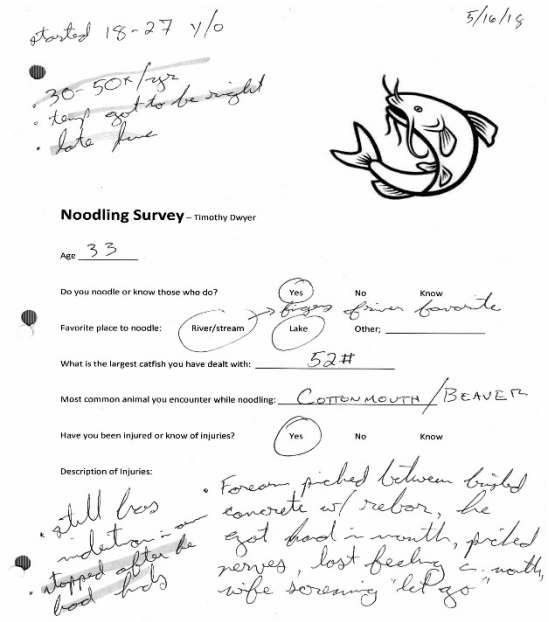

Figure 5: Example of form used to survey noodlers via telephone or in person for acquiring data from participants in the field

In order to document the number and nature of fatalities that occur during the participation in this sport in Oklahoma, I sought and obtained decedent and the data documented the details of the events took place on that particular day. Death records searching fatality cases that occurred in Oklahoma was the only accurate way to obtain this information. Unfortunately reports generated by medicolegal death investigators (MDI's), forensic pathologists, and "county" physicians (prior to 2004), were all written/coded differently. Prior to the year 2000, a digital database was not in place and I was therefore unable to recover cases accurately, as they were literally filed away in archive, in paper form only to be accessed if the decedent's name and date of death were known.

The database was queried post 2000 at the Office of the Chief Medical Examiner to look at cases that occurred in the past nineteen years by medicolegal death investigators who are either no-longer employed by the OCME, deceased themselves, or

otherwise moved on in their professional careers. These reports, while open-record to the requesting public, were reported only indirectly in this article. Only support data of locations, methods, blood ethanol levels, and other basic demographics were analyzed and reported. Names, dates, specific locations, and otherwise will be omitted in order to protect the privacy of those involved and the family/friends that were adversely affected by those tragic events. Compliance with Office of the Chief Medical Examiner policies and procedures were maintained at all times.

The topic of acquisition of actual loss of life statistics during this activity in the state of Oklahoma was handled in the manner of a query of a state database in addition to other methods. As employed by the Office of the Chief Medical Examiner (OCME) as a Medicolegal Death Investigator (MDI) for the past seventeen years, I have person experience in investigating the scenes of noodlers who have met their demise during this activity. In addition, an email/phone survey to my colleagues who are employed in the same manner throughout the state of Oklahoma was also performed. Case studies by both myself and fellow MDI's were used to support the research.

There have been several different changes to information caches in the electronic OCME database reports since 2000. The portion of the field report as filled out by the MDI is known as the "CME-1." There are different ways to query specific statistical data such as cause, manner, and other things specific to the types of death one would be looking for (such as a specific natural disaster like a tornado event). Unfortunately, there is no way of specifically filtering out "noodling" deaths, as the terminology and authors (MDI's) all write reports specific to their own style. For example, if the MDI only listed

that the individual was “fishing,” and not specifically “hand-fishing, noodling,” or “grappling,” then the case could be over-looked.

The actual cause of death in the majority of noodling cases can be attributed to drowning. That being said, how the pathologist words the actual cause of death can make finding specific cases more difficult as well. The field filled out as required by the Oklahoma State Department of Health for the Death Certificate requires listing a “probable cause of death” which is then supported by between one and four “contributing factors.” For example, if the individual died as a result of drowning, given what preference that particular pathologist has for wording in their report, it could be listed a multitude of different ways. The following examples are just of few of the many ways the actual cause of death was listed by pathologist;

1) Drowning
2) Drowning due to water submersion
3) Asphyxia due to drowning
4) Asphyxiation secondary to water submersion
5) Water submersion sequela

Other problems with obtaining reports were that some of the (presumed) decedents were simply never found and became missing persons cases. Especially in flowing river systems with deep cut banks and blow-downs in oxbows, the likelihood of a submerged body surfacing before postmortem activity (both anthropophagic and environmental) was highly unlikely. These cases would often start as missing persons cases and continue to be so even if the known activity was noodling on that fateful day.

Regardless, the information obtained was only done so by painstakingly going through the database in an effort to get as accurate a measure as possible.

RESULTS

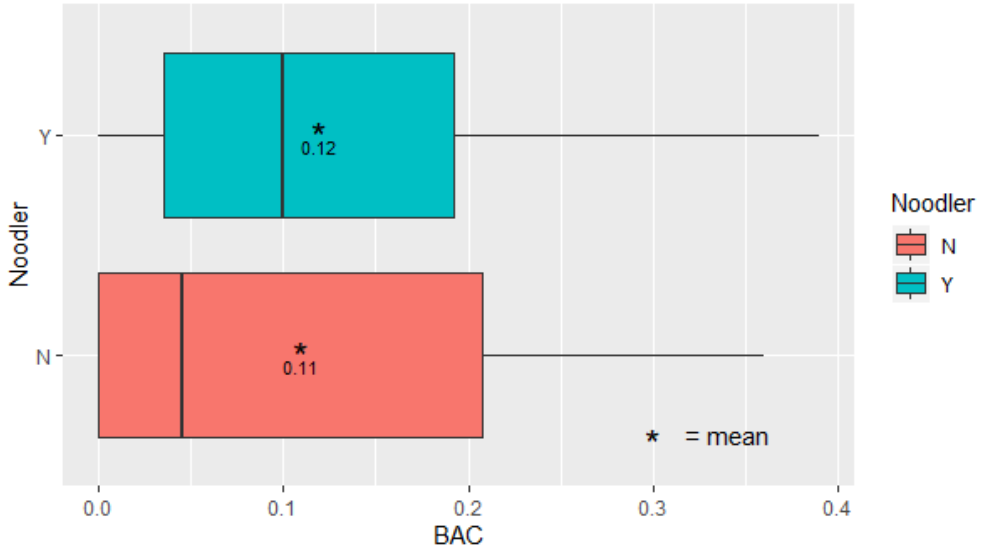

Figure 2: Comparison of Blood Alcohol Content Between Noodlers & "Recreational" Drownings (Not Noodler) occurring the same month

It appears as though alcohol is a major contributing factor to all drownings (recreational or otherwise). All Noodling fatalities were male, with Caucasian being the highest likelihood of probability (83.3%). While the recreational drownings were also predominantly male (87.5%), there was some variance in the gender with 2/3 of victims in the sample being Caucasian, leaving 33.3% being from other races. Men still seemed to have dominated the majority of all drowning cases, regardless of what activity the participant was involved in doing on the water during the particular outing when the fateful event took place. Interestingly enough, age was strikingly similar as well, averaging in the mid-30's for both noodlers and non-noodler deaths.

	noodlers	non-noodlers	test	
	mean(s.d.) or *n*(%)	mean(s.d.) or *n*(%)	statistic	*p*-value
Sex (male)	12 (100%)	42 (87.5%)	$\chi^2 = 1.67$	0.333
Race (Caucasian)	10 (83.3%)	32 (66.7%)	$\chi^2 = 1.27$	0.317
Age (in years)	32.1 (14.8)	35.8 (16.8)	$t = -0.75$	0.461
BAC	0.12 (0.12)	0.11 (0.12)	$t = 0.41$	0.687

Table 1. Summary statistics (*n* = 60)

Between January of 2000 and March 18, 2018, we were able to isolate 846 cases in Oklahoma that included "accidental drowning" in the report. Of these, multiple cases were eliminated before accurate information could be obtained from the narrative to determine if the decedent was in the act of hand-fishing when the death occurred. We were able to further isolate cases by filtering with the word "recreational" in the drowning report.

Each case also has the "injured or became ill at (IBIA)" address/location required to be filled out for such statistical purposes. This is primarily used for civil/criminal court cases where the death actually occurs in another location (such as a medical institution like a hospital), but the scene itself was elsewhere where the actual incident took place. Each of the 846 cases was examined for key-words that would eliminate the possibility of the case being related to noodling in this section. Examples of IBIA keywords used to filter out cases included "water park, pool, hot tub, health club,

residence, fountain, bath tub, motel, nursing home," and other locations where the drowned decedent obviously would not be noodling for catfish. The keyword "pond" or "farm pond" was also used as an eliminator, as large flatheads are not known to be targeted in small bodies of water where they could grow to the desired impressive size that most grapplers are after.

The demographical information was also used to eliminate participants. For example, if the decedent was under the age of 16, the case was not looked at, regardless of where the drowning occurred. Statistically, all fatalities studied previously were Caucasian males. This stereotype was yet again supported during the survey portion of this research. While all cases were examined, of the 846 queried, it was found that only three of the fatalities were not white males. The three included a 52 year-old Black male, a 29 year-old Hispanic male, and a 20 year-old American Indian male. The over-all average age of noodling fatalities was 32.08 while the average age of "recreational" drownings was similar at 35.77. Perhaps persons who have been around water recreationally and/or consuming alcohol while doing so seem to gain confidence in their ability and lose respect for the aquatic environment in their mid-30's after they have some experience spanning over a decade.

Another key component examined was time of year. While there may indeed be some hard-core participants who noodle year-round, it appears that the vast majority do it primarily when the flatheads are in the act of spawning, pre-spawning, or when males are guarding a nest of eggs after the spawn has been completed. Water temperature appeared to be a key factor in this, giving the angler the greatest opportunity during the early summer months of May and June. Many of those interviewed claimed to be all but done

by the 4th of July for that reason. The exception was an older individual participant that liked to go later in the summer waiting until the oxygen level got low so he wouldn't have to "fight them as much." He was the exception though, rather than the rule. Many of the lake and river fatality cases could be eliminated if they occurred during the fall and winter months. No cases involved a noodling fatality between the months of October and March.

Figure 8: Oklahoma noodler Britches Ryerson with an impressive flathead grappled from Lake Eufaula.

DISCUSSION

Drowning is obviously not restricted exclusively to the act of hand-fishing. Drownings occur year-round all over the world. Per the Center for Disease Control (CDC), an estimated 372,000 people die annually from water submersion (3). This is obviously a global problem being "the 3rd leading cause of unintentional injury-related death, and accounting for seven percent of all injury-related death (3)." While a great number of drowning cases skewing these statistics involve children under the age of 14, there is no doubt that drowning affects people of all ages, races, and socioeconomic backgrounds.

Of all the documented drownings in the United States between 1999 and 2010, 47.2 % occurred in natural water (4). In other words, almost half of all drowning fatalities occur in lakes, rivers, or pond water. The other half are attributed to swimming pools, bathtubs, and the more common waters that we as humans encounter in our everyday lives.

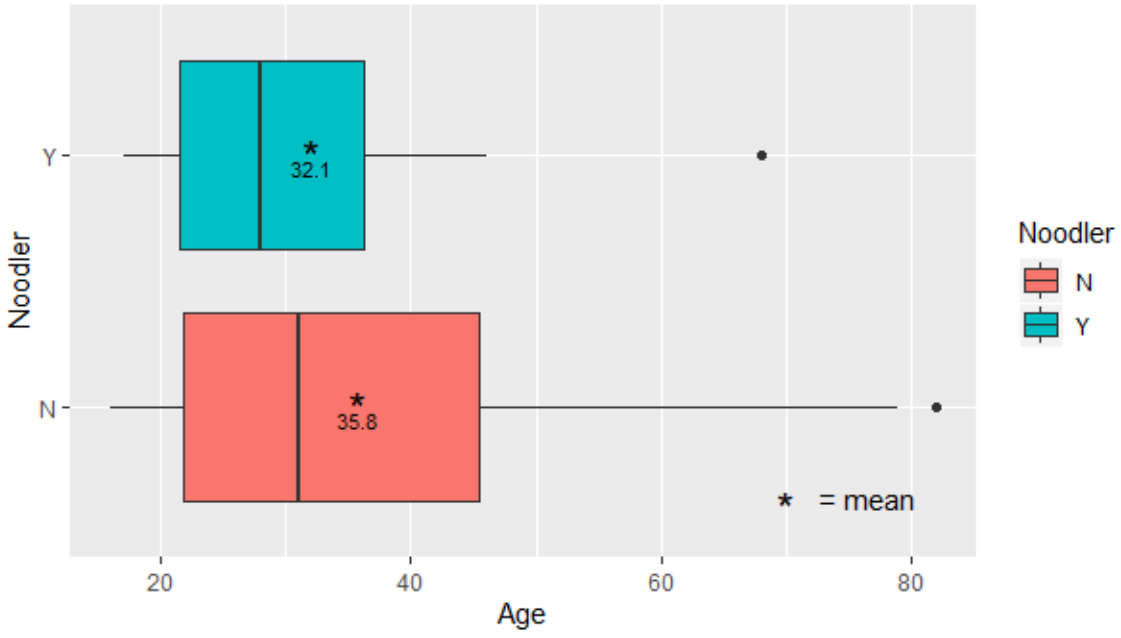

Figure 4: Age comparison to noodling fatalities vs other non-noodler fatalites

Here in Oklahoma, in regards to the death/drowning of noodlers, the majority of the cases involved Caucasian males in their early 30's with the eldest angler fatality being 68 and the youngest being 17. The average over-all age of drowning fatalities was 33.7. While a male in his 20's is more apt to make poor judgement and safety decisions than a man in his 30's, it is possible that the anglers in their 30's have been involved in the activity for several years, which could likely lead to a higher confidence level in the sport. The higher confidence level may then lead to higher moments of success and additional risk-taking behaviors from a grown confidence of literally surviving the activity for so long. There is no doubt that the adrenaline rush received by these men is what fuels the sport and keeps them coming back for more and additional challenges.

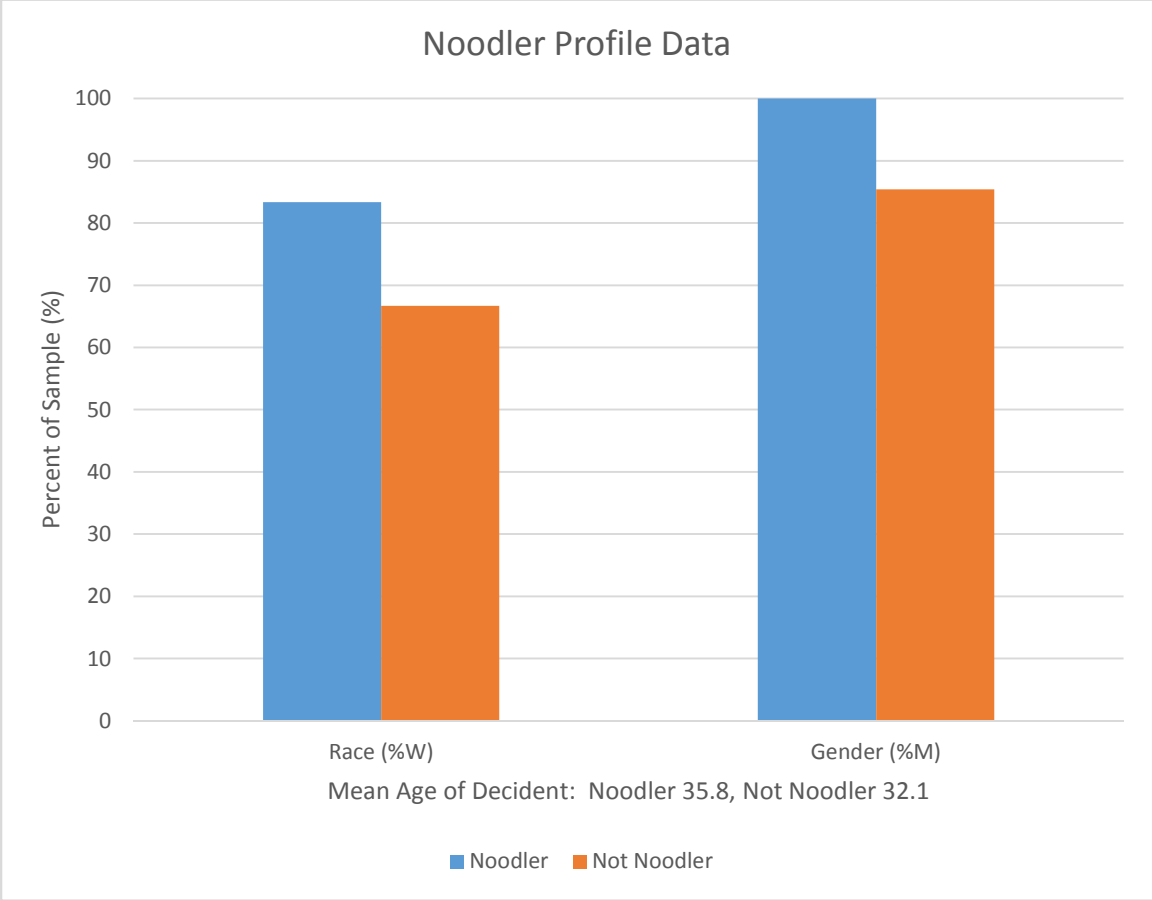

Figure 1: Comparison graph of gender and ethnicity of fatality drowning of noodlers vs other "recreational (not noodle)" drownings

While there are many factors to consider in fatality situations, the statistics do not lie. The presence of alcohol in the system of the noodler has to be taken into consideration. Bold and risky decision making spelled trouble for many of the unfortunate souls as well. That being said, some of them simply encountered what they were after all along; a big dangerous fish. Terry Ivey, a 39 year old man from Hinton, Oklahoma recalls a close scrape with an estimated 80+ pound fish in the North Canadian River where he had to dive to get to a hole under a bolder. He was six feet below the

surface when the monster fish clamped down on his wrist (which was the idea at the time). His jersey glove got caught in the behemoth's teeth and he began to get drug back down into the hole! His frantic kicking brought attention to his friend that he was in trouble, and the two of them were able to free Mr. Ivey from the deadly grasp and get him back to the surface (5).

Situations such as Mr. Ivey's support one important safety factor; noodling in groups or pairs. The sport seems far more dangerous when taken on solo. The unavoidable current when dealing with moving water seemed not as particular in whom it chose to swallow. 42% of deaths came as the result of unanticipated excessive water flow, even in the presence of multiple anglers. Once a person became victim to the flowing water, it seems that there was little others could do for them. In situations where others attempted to save their fellow anglers, multiple fatalities often result, such as the unfortunate situation in the Arkansas River in Tulsa on August 1st of 2013 when three men died (6).

Sport fishing regulating authorities no doubt understand the risks associated with handfishing, but may not totally understand just how dangerous this sport actually is per capita. If this danger could be shown or given a numeric value, policies and regulations could be adjusted to compensate for this high risk activity. An actual numeric value may be difficult if not impossible to obtain, for reasons already discussed. The dangers of noodling may be well known to some, but they are either ignored or disregarded by most who participate in the sport. The hazards are so great in fact, that "despite a paucity of scientific work assessing the true environmental impacts of the technique, many states have outlawed noodling for… concern for the safety of the fishing men…" (7). In his

section devoted to noodling, expert fisherman and author Keith Sutton cautions "One should also consider the many dangers inherent in this unusual sport…Crippling injuries can result… If an arm or hand gets stuck, or if an exceptionally large cat(fish) is tackled, the noodler can drown. Risks are high, and participants should be aware that death or serious injury can result from carelessness" (8).

Current policy/regulations pertain mainly to the legality of the sport and how it affects the wild population of the fish. The sport of hand-fishing (aka "noodling" or "grappling") is a popular legal method of obtaining nongame species of fish in Oklahoma. As defined by the Oklahoma Department of Wildlife Conservation (ODWC); "Noodling is the taking of nongame fish and catfish by use of hands only." The angler is allowed to use a stringer to secure a fish after it is caught, but the actual act of noodling allows for nothing to be used besides the angler's body. Poles, hooks, ropes, gaffs, and other means of latching the catfish while it is still in the hole are strictly forbidden (1). If the angler is using a boat to get from location to location on a particular body of water, these items are not even allowed to be on the vessel. Common gear seen in this sport is limited to footwear, swim trunks, and a lot of courage.

The regulations are very specific on what species can be targeted, and what must be returned to the water if an unlawful fish is obtained. While common carp and buffalo carp are legal, far and away the most desired species is the flathead catfish. The flathead catfish (*Pylodictis olivaris*) can reach weights of over 100 pounds and grow to more than 5 feet in length, with the world record caught out of the state of Kansas tipping the scales at a whopping 123 pounds (7). Less common than the more popular channel catfish or

blue catfish by rod/reel anglers, the flathead is well named as he has a large shovel-like head.

The reputation of the flathead is both praised and scorned by freshwater fishermen. Anglers who prefer to target other species of carnivorous fish seem to belittle the competition of the flathead, which grows significantly larger than most predatory freshwater fish. In a study of consumption and growth patterns in flatheads, they are given credit to their ferocity by the statement; "In several areas where flathead catfish have been introduced, they quickly establish themselves as an apex predator and declines in abundance of native fish species have concurrently been observed in these locations" (13). Perhaps due to jealousy of their ability to consume so much prey, the flathead is also regarded as a bottom-feeder or "trash fish" by a great majority of black bass anglers (who seem to make up the predominantly well known world of the sportfishermen in Oklahoma as well as most of North America). Those who adore them though, defend them very tenaciously. Long time South Carolina catfish and striped bass charter guide John Sellers boldly claims "You don't need rotten, smelly offering to attract big cats… They're used to feeding on other fish, usually live ones. They're a clean, strong sport fish. They're not garbage eaters (14)." Outside of the close family of noodlers, the participants of the sport are not usually held in the highest regard either in respect to their counterparts in the fishing world. "Noodlers are like carp or drum. They're the bottom-feeders, they're trash, they're the scum-suckers… They're the lowest on the totem pole as far as the bass fishermen, your tournament trout fishermen… (15)." It is indeed a muddy, sweaty, "blue-collar" method of catching fish. This practice of angling in regards

to fishing, much like NASCAR fans in the sporting world, brings strong bonds to those who participate and distance from those who do not.

Figure 6: Flathead being checked in at the "Okie Noodling Contest" held annually in Pauls Valley, OK

Methods of catching flatheads in this manor vary based on the type of water being fished, but the general principle is the same. The fisherman wades out into the water and randomly probes his/her arm into crevasses in the rocks, mud, beaver dams, blown-down trees, brush piles, submerged roadbeds, concrete, or other structure in search of waiting catfish. The idea is to come in contact with the fish, allow it to bite you (hand and/or foot), and then obtain a firm grasp on the bottom jaw while physically wrestling the fish out of its hole and into submission. While the technique can be used year round, the flatheads are particularly vulnerable to the tactic during the spawning season between early May and late July. During this time of year the practice is especially frowned upon

by some. Mary Grigsby, professor of rural sociology at the University of Missouri claims that "noodling is not fair play. Fair play is not going into the hole when the catfish are trying to reproduce, blocking the hole, and grabbing them off their nest (15)." After the actual spawning is complete between the fish, the female is then chased out of the nest after mating with the male, who remains to guard and fan the eggs with his tail. This fanning is thought to improve the oxygenation and health of the eggs (7). The male is then the most vulnerable to being grappled. At this point, as he will guard the nest with his very life. Short of being eaten by a larger fish, which is highly unlikely in a sexually mature flathead catfish, the male will not leave the nest for any reason. If the angler is particularly fortunate, he may be able to catch both the male and the female if they are still together in the midst of their romance, a true bonus for the grappler being able to double their catch in one spot, but very anticlimactic for the fish no doubt.

Human fatalities occur while noodling every year in our state, with the most common cause of death being drowning. Many other injuries which may not be life-threatening are also sustained from underwater debris, roadbeds, or abandoned fishing hooks/tackle. Contact with undesired species such as snakes, snapping turtles, and beavers could result in nasty and unexpected bites which can prove both painful and could become infected if left untreated in a timely manner. In Shaun Morey's book, one man tells about an encounter with a startled muskrat that bit him on the hand after he reached into an apparent air pocket under a beaver den. "One of his fingers had been bitten clean through. The bottom teeth must have missed, but the top teeth went all the way through, just missing the bone (16)". Including these additional mechanisms for the angler to be injured and/or killed, there is no doubt that this could be one of the most

dangerous types of fishing in the world. Not only is this a highly precarious method of catching fish, but it is extremely regarded as a pastime right here in our home state of Oklahoma. Although more conventional fishing methods are more popular in the Sooner state, those who favor noodling seem to be very dedicated. In Deborah Salazar's article "Noodling: An American Folk Fishing Technique," her research showed that some noodlers who were interviewed go handfishing as often as 60 times annually, often 20 times monthly during the active spawning season of the catfish (7). The majority of other fishermen do not devote nearly as much time to one particular species of interest.

While it certainly may be unlawfully practiced in other locations, the sport is legal only in the states of Alabama, Arkansas, Georgia, Illinois, Kansas, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Wisconsin, and most recently Texas (17). The season is year-round while the summer months are obviously the most popular time of year to participate. Recent attention has been given to the sport through a television series on the National Geographic Channel called "Mud Cats." In the show, various pairs of men compete against each other to see who can grapple the biggest fish that particular week. Camera crews follow these men through varied environments and accurately document how the sport is practiced. The catfish are then transported, alive, to a weigh-in check station and compared to the other fish caught that particular day. The results are documented on a leader board and monetary awards are presented to the victors. While the drama may be embellished a bit during the actual fishing scenes, it gives an accurate depiction of the risk involved. Actual risk factors from this research project can be subdivided into environmental and human.

Environmental Factors. Water current is common factor in noodling drownings. Often underestimated or not given its due respect, moving water can quickly over-power even the strongest of noodlers. A gallon of water weighs 8.34 pounds. Multiple hundreds (or thousands) of gallons of water that are moving at any speed at all can easily create quite a bit of force. The speed at which water is moving can be very misleading, especially in a wide, muddy, otherwise calm looking river or stream that a confident angler has waded out into. Flatheads will often hole up on oxbows, wingdams, blow-downs, beaver dens, and other things that break up the current, making them a popular spot to try. While the angler is busy exploring these hides on the calm side of a flow, they reach an edge and suddenly get swept away. Undertow currents can also be a problem if not foreseen. If they become entangled or compromised, they are unable to get back to shore and can subsequently drown. One particularly tragic case involved an older gentleman who tied a rope to his wrist, which was tied off to a tree on the bank to prevent him from being swept away in the current. In actuality, he was swept away and unable to get to the bank when the line became taunt. Had he been able to drift downstream, perhaps he may have been able to get himself on the shore at the next oxbow.

Calm water, while perceived to be not as perilous, still has several risk factors. In tranquil conditions, such as lakes, the concept is the same as in the rivers but not without other hazards. The majority of lakes in Oklahoma are man-made, most of which occurred by damming a river to flood adjacent valleys. When the state was facing the challenges of the Great Depression and the Dust Bowl in the 1930's, Congress passed the Soil Conservation Act. This utilized the states natural resources in a way to both create

jobs and better utilize the waterways. Construction of dams and lakes starting in 1937, marked the beginning of a four-decade long period of lake construction in Oklahoma (18). Many of these flooded areas were formerly used by automobiles and have old roadbeds and other man-made structures, now hidden below the surface of the water. Holes and cracks in the surface of the roadbed are a favorite spot for a catfish to reside in wait of its next meal and/or to spawn. The unfortunate occurrence that takes place is when the noodler reaches deep into these holes and gets their arm or foot stuck, not allowing escape. The physical weight of the anglers body against the concrete crack is sometimes enough to pinch the area, making the crack just small enough to prevent the retrieval of the appendage that was only moments ago looking for a fish. With concrete and roadbeds also comes rebar, which was used to solidify the structure during the construction. Nasty cuts and lacerations are common when hand-fishing these areas as a result. Often after a fish is located, there are several dives by the grappler to position the fish prior to attempting capture. Multiple dives and intense focus, in the excitement of the moment, can cause an inadvertent shift in a rock, roadbed, or other sizeable structure. This can result in the grappler being pinned under the surface (7). To add even more significance to the risk, it should be noted that noodling is not allowed after legal sundown (1). The sport is clearly dangerous enough without the added element of not being able to see what you are doing.

The catfish themselves are also a potential risk. A large flathead could easily overwhelm an unsuspecting angler who was not prepared for the struggle back to the surface with a weighty opponent who has no problem breathing under water. In a collection of fishing stories, noodler John Pidcock describes his encounter with a forty-

eight pound flathead that he grappled out of a beaver den in the Deep Fork River near Luther, Oklahoma; "…it's bottom jaw was as big around as a piece of luggage. When it clamped down on my hand it broke one of my fingers." Fortunately, Mr. Pidcock had two friends with him that day who were able to pull him and the fish from the hole after they got hooked up. "There's nothing more gratifying than getting bit by a big catfish (16)." Like many other noodlers, there are tales of fishermen who were not so lucky with encounters with big fish. Pidcock tells the tale of a well-known noodler on Chicken Creek in Lake TenKiller who had to have an arm amputated after an estimated 90 plus pound fish "raked all the meat off his forearm (16)." In addition to the ferocious fight they are known for, catfish have the ability to "lock" their pectoral fins in an outward position when they are threatened. The pectoral fin is accompanied by a stout spine on the lateral aspect of each fin, which are located on the sides of the fish just behind the gill plates. This locking technique is used from the time the catfish is a small fry to prevent them from being swallowed by a bigger predator such as another larger fish or a bird. While physically wrestling a larger catfish, the noodler needs to take care not to be "spined," especially through the chest wall and into a hollow organ such as a lung (7). With the spines on a large catfish exceeding eight inches in some cases, they would have no problem penetrating through the pleural space of a human and doing serious damage to an organ behind the rib cage.

Human Factors. Trotlining is another means of legal catfishing where multiple hooks are secured to a high tensile strength main line via smaller lines (aka "trots"), which are then baited, and left under the water. Often frequenting the same locations due to targeting the same species, noodlers may get tangled, impaled, and otherwise

compromised by these lines which are left in the environment. The law requires that trotlines are checked by an angler every twenty-four hours (1). However, this is of little or no consequence to a noodler who becomes entangled and/or impaled. Often, it only unfortunately results in the decedent being found in a timely manner long after the actual death of the handfisherman has taken place. It is fairly common for trotlines to be left unattended for significant amounts of time, making them even more dangerous in remote locations, which encompasses the majority of Oklahoma waterways.

Figure 7: Angler running a trotline for catfish (left). Unfortunate circumstance of noodler who was drown as the result of being impaled on a trotline hook under the surface (right).

The thought most significant human factor would be the consumption of alcohol during the noodling process. While the stereotypical public perception of the noodler is not held in the highest regard as far as social status goes, it certainly does not help the reputation of the sport when so many participants seem to do so while intoxicated and/or impaired. As defined by the Oxford English dictionary, the term "noodling" relates to a "silly or stupid action or idea" (19). As the case reviews have shown, inebriated parties were the common denominator in the majority of all known deaths. As it turned out, this

was not specific only to the handfishermen though. Many studies have shown that consumption of alcohol delays reaction time, decision making ability, and over-all control of the human body. All these factors would assumed to be extremely important when undertaking an activity such as trying to catch large fish underwater with your bare hands. If you add to that, a sense of competition or desire to "one-up" a fellow noodler in regards to the size of the catch, it could spell a recipe for disaster.

While the dangers associated with alcohol and certain activities are well known, we wanted to see just how dangerous it was specifically to the sport of handfishing. By utilizing the database of the Office of the Chief Medical Examiner, we pulled at random, twelve cases of fatalities involving noodlers. To see what significance specifically the alcohol played in the role of the death, we looked at all other "recreational" drownings that occurred during the given month of the twelve noodle fatalities. Forty-eight "recreational" drownings occurred during the same months as those twelve noodlers. It was interesting to see that the blood alcohol level was similar in both handfishermen and other recreational water enthusiasts. The over-all average for the twelve noodlers was 0.12 % BAC where the forty-eight "recreational" drownings was 0.11% BAC. Perhaps the lesson learned there is not that alcohol is dangerous autonomously to noodling, but to participants in water recreation in general.

CONCLUSION

The main purpose of this study was to bring awareness to the danger level of noodling, one way of doing so being through comparison to the already well-known and well-documented dangers in the world of commercial fishing. According to the U.S. Fish & Wildlife Service, through a "2011 National Survey of Fishing, Hunting, and Wildlife-

Associated Recreation," 729,000 residents and nonresidents 16 years old and older fish in Oklahoma on an annual basis (9). According to Salazar, less than 1% of anglers participate in the sport of handfishing (7). By inference around 7,000 people annually participate in the sport of noodling here in Oklahoma. The exact number of participants would be impossible to calculate since there isn't any specific license for that type of fishing. Also, caught fish/animals are not required to be registered or checked-in with the ODWC. The exact number of fatalities of humans would also be difficult to ascertain due to the possibility that some decedents are never recovered and their cause of death or disappearance remains undetermined.

Fatality rates vary from year to year, but it would seem the number of noodlers killed and recovered each summer seems to be around half a dozen (more or less). This would mean that approximately 0.857 deaths occur out of 1,000 grapplers annually. One particular summer surveyed for this research project through the Office of the Chief Medical Examiner had seven fatalities that year, which would be a death of 1 out of approximately 1,000 noodlers. This is taking into account that the actual number of participants is around 7,000 (7).

By comparison, commercial fishing has the highest occupational fatality rate in the country. Per capita, their fatality rate is three times higher than the second most dangerous occupation on the Bureau of Labor Statistics, which is logging (10). Even with a Congressional law passed in 1988 requiring all commercial fishing boats to carry life rafts, survival suits, and emergency beacons, there are still a great number of fatalities associated with it. In a U.S. News & World Report entitled "Dangers of the Deep," 115 deaths occur out of 100,000 workers who fish commercially (11). That would account

for 1.15 fatalities out of 1,000 fishermen in the industry. For a comparison to other perceived dangerous occupations by the U.S. Department of Labor (and some not, such as working in an office), the following graph is of note:

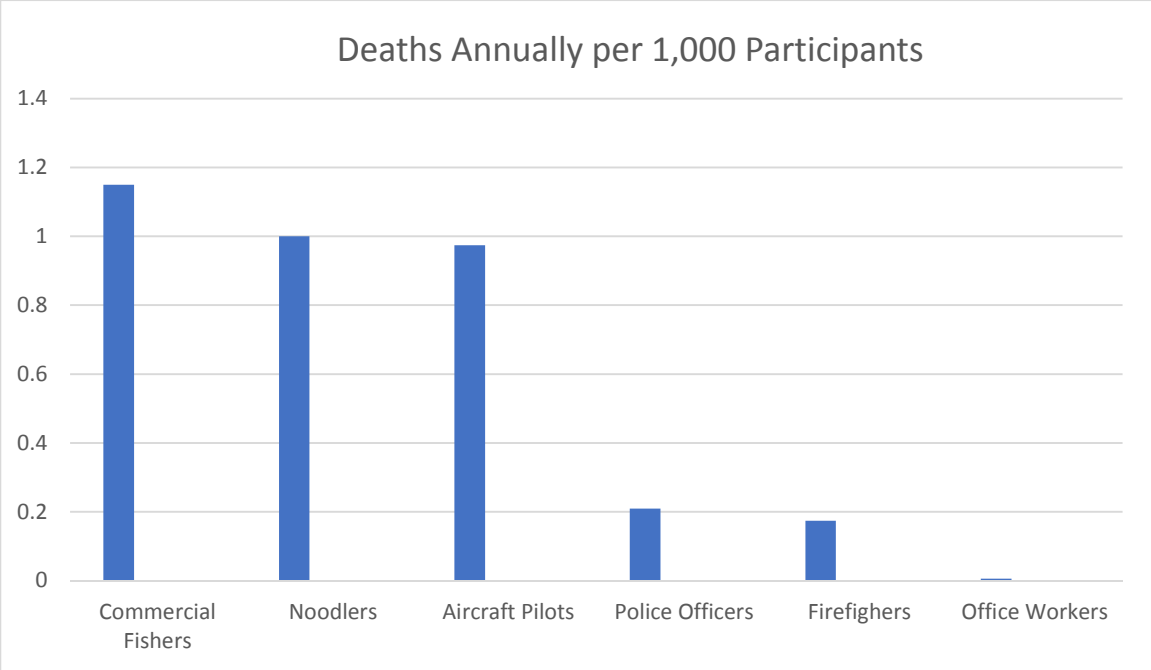

Figure 3: Graph comparison compiled with approximate numbers of noodling participants on an annual basis in Oklahoma (7, 9) versus annual mortality rate of commercial fisherman (11).

While the industry of commercial fishing has made some progress in safety techniques over the past several decades, Alaska still has the highest worker-related fatality rate of any state in the entire country (12). Many of their fatalities are associated with, but not limited to their extreme environment conditions and remote locations. Including the high number of fixed-wing aircraft crashes, the Alaskan worker fatality rate is annually 34.8 per 100,000. By comparison, the worker mortality rate for the rest of the United States is 5 per 100,000 (12). What does that mean to Oklahoma and the mortality rate per capita for noodling catfish? It means that a person is three times more likely to die while noodling for catfish here than they would be working in Alaska! 0.348 Alaskan

workers die annually on the job out of 1,000 versus 1 out of 1,000 noodlers here in Oklahoma.

Other literature reviewed showed that noodling may have more participants in other states where there are literally more people than Oklahoma. For example, according to Professor Mark Morgan at the University of Missouri, their state has roughly 2,000 participants. He does admit that those are not "hard figures," but he has spent a great deal of time studying hand-fishermen and their habits (Todras-Whitehill, 2006). With the population of Missouri being roughly two million higher than here in Oklahoma, this would certainly make sense. Future research could be conducted to compare noodling mortality rates between the two states.

In addition, it may be beneficial to implement some type of a training or licensing program to this particular sport autonomously. In other parts of the world, there are specific training licenses and programs required prior to unique and common forms of outdoor recreation. For example, if one was wishing to pursue game with a bow and arrow in Europe, they would need documentation that shows you have permission to hunt in that form in your home country. You also have to past a written exam and demonstrate your proficiency prior to being allowed to do so and then apply for the privilege (Nordic Hunters Alliance; Denmark 2020).

While hand-fishing for catfish in America is different in nature than bowhunting game in another continent, it still could both benefit those who participate in the sport by making them more aware of the dangers and also provide some safety training. Not much different than the formerly required Concealed Carry handgun training classes prior to the law being changed, it would allow a participant, regardless of experience and

intent, to be aware of both the dangers and risks associated with the sport of which they have chosen to partake.

Regardless of what other state or states are compared to Oklahoma or the training requirements that may be implemented, the information derived from such a study will likely be similar. The demographics, alcohol consumption, and otherwise hazards that go along with this sport just cannot have that much variance. This study may have shown what was already know, all be it putting some quantative data to go along with the known associated risks of the occupation. Both fascinating, compelling, and often leaving one simply scratching their head in amazement, this sport is around to stay and will no doubt continue to produce both injuries and fatalities.

The sport of grappling flathead catfish with your bare hands is certainly not for the faint of heart. It is for an outdoorsman willing to risk their longevity simply to put some fillets in the freezer, when there are other methods just as productive. Regardless, it appears as though this sport/pastime is here to stay for generations to come and the regulating authorities should consider its risks when managing wildlife policy. The participation in noodling, legally or otherwise, is not going anywhere. It is a time honored traditional that is here to stay so long as flathead catfish inhabit the lakes, creeks, and rivers of this great state.

Acknowledgements

We are grateful to all the Oklahoma noodlers who participated in being interviewed both via telephone and in person. Through a “telephone game” contact list, we were able to reach further and gather many otherwise unknown angler incite. Special consideration must be given to Britches Ryerson, dedicated noodler, who was able to

provide many of the contacts and share his personal knowledge with some big flatheads. We also appreciate all the hard work and dedication of the numerous pathologists, autopsy technicians, and medicolegal death investigators (former, current, and deceased) of Oklahoma who provided reports and put in the hours on the job at the expense of the tax-payer. Their public service, while often unnoticed, is critical to the regulations and laws that govern daily activities of citizens of this great state. Dr. Clay Nichols, retired, in particular helped with editing and insight. We also appreciate the guidance and direction of fellow grad student, Amber Fortney, without whom I wouldn't have been able to compile the material. The insight and counsel of Dr. Wayne Lord was also invaluable in obtaining the material to complete the project. Lastly, none of this would have come to fruition without the support of my parents, whom encouraged me to pursue a master's degree as a non-traditional student well into an already rewarding career and busy family life.

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CHAPTER V

Noodling Catfish in Oklahoma: The Most Dangerous Angling in the World?*

*Prepared and formatted for submission to Outdoor Oklahoma (Sportsman) Magazine

Noodling Catfish in Oklahoma: The Most Dangerous Angling in the World?

The distressed thump of bone and flesh against the rock echoed out into the water. The dull rhythmic thud repeated over and over until there was once again silence. "She is ready again" stated my fellow angler Bruce, who was blocking the hole in the rock below the surface with his feet. Both of us were in chin-deep water still catching our breath from the previous encounter. The grappled catfish Bruce had noodled only minutes earlier was on the bank where it had landed after being hurled from its aquatic environment by the tattooed arms of my partner. Now caked in dirt and mud, the flathead flailed and fought against an invisible adversary, gill plates flared and tail sweeping from side to side on the shore. It was a modest specimen by flathead standards, likely barely over ten pounds in weight. The true bonus was when it was discovered that a second fish, likely the breeding female, was still in the hole where it the other had just been wrestled from.

Taking a deep breath, I gathered my wits for yet another attempt at the remaining submerged beast. Before I could dive again, a longnose gar lazily slurped the surface twenty yards to my left. Being equipped with a modified swim bladder to help adjust their buoyancy by taking air from the surface, it was a common occurrence seen in southern waters. Being an avid bowfisherman of gar, it did not concern me for my

safety, but it did remind me of where I was in relation to this particular outing on this day. I was in their environment. I was on their terms. Parked in a chair on the bank with a rod in hand or standing on the deck of a boat steering a trolling motor was an entirely different set of circumstances. What other creatures were in the red-clay-choked water where we stood? After all, you could not see your own hand if your arm were submerged to the elbow! Sure, I had heard of all the dangers associated with this sport. I knew this lake was home to snapping turtles, beavers, snakes, and a multitude of other water creatures that could bite, sting, cut, or otherwise injure me. This time was different though, I told myself. This time I KNEW it was a catfish in that hole. I knew it was a catfish because Bruce had already caught the other one in there. I knew this time it was "safe."

Inhaling a lung full of precious oxygen, I dropped below the surface in the murky water and everything slowed down. I could hear my heartbeat through my chest, no doubt the modification of being submerged. I could feel the leg of my partner blocking the hole in the rock and followed it to the bottom of the lake. Reaching past his shoe and into the crevasse, I slid my right arm into the hide. Soft sticky muddy bottom turned smooth once my appendage was in the hole. Having been told that a fanned out hole would feel like this, I was again convinced myself that it was "only" a catfish in there. Then I felt it… The massive head was hard and flat. Barbles tickled my wrist as the fish no doubt was also attempting to decipher what I was and what I was doing down there. I slowly worked my free hand to the mouth of the fish while Bruce moved aside, allowing me to get past him and deeper into the hole.

Noodling, also known as “grappling,” “hogging,” “dogging,” “tickling,” or hand-fishing, is a method of legally catching certain species of fish in the state of Oklahoma as well as other states in the South and Midwest. The regulations as outlined by the Oklahoma Department of Wildlife & Conservation are very specific as to methods that are allowed and species that can be targeted. Unlike other forms of angling, noodling requires that the angler be in the same physical aquatic environment as the targeted animal. Without the aid of equipment such as rods, reels, and nets, the fisherman has only the use of his or her own body to land the fish. In Oklahoma, anglers are sometimes severely injured or even killed due to the risks associated with this type of sport. Despite these well-known inherent dangers, Oklahomans take to the water each summer in pursuit of flathead catfish *(Pylodictis olivaris)* in this time-honored tradition that has gone on for generations.

Other forms of fishing, both sport and commercial, are much more common on a national scale, as well as globally. These more commonly known types of angling have better documentation and regulations pertaining to their dangers. Certain forms of commercial fishing in the Pacific Northwest, for example, carry great risk associated with the occupation. Long hours at sea, hazardous environments, sleep deprivation, and heavy equipment account for the lives of commercial fisherman each season. Statistics have shown that some of these commercial fishing occupations are, per capita, some of the most deadly jobs on the planet. Having worked in the capacity of a medicolegal death investigator for the Office of the Chief Medical Examiner in Oklahoma and seeing the untimely demise of noodlers, it is my belief that, in comparison to the well-known documented deadly occupation of commercial fishing, noodling may rank as one of the

most hazardous types of fishing on earth. I set out to prove this statistically as best I could while conducting research on a thesis for a master of science degree at the University of Central Oklahoma in Edmond.

Methods of catching flatheads in this manner vary based on the type of water being fished, but the general principle is the same. The fisherman wades out into the water and randomly probes his/her arm into crevasses in the rocks, mud, beaver dams, blown-down trees, brush piles, submerged roadbeds, concrete, or other structure in search of waiting catfish. The idea is to come in contact with the fish, allow it to bite you (hand and/or foot), and then obtain a firm grasp on the bottom jaw while physically wrestling the fish out of its hole and into submission. While the technique can be used year round, the flatheads are particularly vulnerable to the tactic during the spawning season between early May and late July. After the act of spawning is complete between the fish, the female is then chased out of the nest while the male remains to guard and fan the eggs with his tail. This fanning is thought to improve the oxygenation and health of the eggs. In so doing this, it allows the angler to feel a smoothness to the inside of the hole which would otherwise be soft and muddy, giving away the location of the fish to the observant grappler. Short of being eaten by a larger fish, which is highly unlikely in a sexually mature flathead catfish, the male will not leave the nest for any reason during this time and is thus more vulnerable to being caught.

Human fatalities occur while noodling annually in Oklahoma, with the most common cause of death being drowning. Many other injuries which may not be life-threatening are also sustained from underwater debris, roadbeds, or abandoned fishing hooks/tackle. Contact with undesired species such as snakes, snapping turtles, and

beavers could result in nasty bites, which are painful and become quickly infected if left untreated in a timely manner.

My research showed water current to be the most common factor in noodling drownings. Often underestimated or not given its due respect, moving water can quickly over-power even the strongest of noodlers. A gallon of water weighs 8.34 pounds. Multiple thousands of gallons of water that are moving at any speed at all can easily create quite a bit of force. The speed at which water is moving can be very misleading, especially in a wide, muddy, deceptively calm-looking river or stream that we are all familiar with here in the Sooner state. Flatheads will often hole up on oxbows, wingdams, blow-downs, beaver dens, and other things that break up the current, making them a popular spot to try. While the angler is busy exploring these hides on the calm side of a flow, they reach an edge and suddenly get swept away. Undertow currents can also be a problem if not foreseen. If they become entangled or compromised, they are unable to get back to shore and can subsequently drown.

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and other man-made structures, now hidden below the surface of the water. Holes and cracks in the surface of the roadbed are a favorite spot for a catfish to reside in wait of its next meal and/or to spawn. An unfortunate occurrence that takes place is when the noodler reaches deep into these holes and gets an arm or foot stuck, preventing escape. The physical weight of the anglers body against the concrete crack is sometimes enough to pinch the area, making the crack just small enough to prevent the retrieval of the appendage that was only moments ago looking for a fish. With concrete and roadbeds also comes rebar, which was used to solidify the structure during the construction. Nasty cuts and lacerations are common when hand-fishing these areas as a result. Often after a fish is located, there are several dives by the grappler to position the fish prior to attempting capture. Multiple dives and intense focus, in the excitement of the moment, can cause an inadvertent shift in a rock, roadbed, or other sizeable structure. This can result in the grappler being pinned under the surface.

The catfish themselves are also a potential risk. A large flathead could easily overwhelm an unsuspecting angler who was not prepared for the struggle back to the surface with a weighty opponent who has no problem breathing under water. In addition to the ferocious fight they are known for, catfish have the ability to "lock" their pectoral fins in an outward position when they are threatened. The pectoral fin is accompanied by a stout spine on the lateral aspect of each fin, which are located on the sides of the fish just behind the gill plates. This locking technique is used from the time the catfish are small fry to prevent them from being swallowed by larger predators such as a bigger fish or a bird. While physically wrestling a large flathead, the noodler needs to take care not to be "spined," especially through the chest wall and into a hollow organ such as a lung.

With the spines on a large catfish exceeding eight inches in some cases, they would have no problem penetrating through the pleural space of a human and doing serious damage to an organ behind the rib cage or in the abdomen.

Trotlining is another means of legal catfishing where multiple hooks are secured to a high-tensile-strength main line via smaller lines (aka "trots"), which are then baited, and left under the water. Often frequenting the same locations due to targeting the same species, noodlers may get compromised by these lines which are left in the environment. The law requires that trotlines are checked by an angler every twenty-four hours, but this is of little or no consequence to a noodler who becomes entangled and/or impaled. Often, it only unfortunately results in the decedent being found in a timely manner long after the actual death of the handfisherman has taken place. It is fairly common for trotlines to be left unattended for significant periods of time, making them even more dangerous in remote locations, which encompasses the majority of Oklahoma waterways.

Drowning is obviously not attributed exclusively to the act of hand-fishing. Drownings occur year-round all over the world. Per the Center for Disease Control (CDC), an estimated 372,000 people die annually from water submersion. It is clearly a global problem being the 3rd leading cause of unintentional injury-related death, accounting for seven percent of all injury-related death.

In Oklahoma, in regards to the drowning of noodlers, the majority of the cases discovered by my research involved Caucasian males in their early 30's with the eldest angler fatality being 68 and the youngest being 17. The average over-all age of drowning fatalities was 33.7. While a male in his 20's is more apt to make poor judgement and safety decisions than a man in his 30's, it is possible that the anglers in their 30's have

been involved in the activity for several years, which could lead to a higher confidence level in the sport. The higher confidence level is then likely to lead to higher moments of success and additional risk-taking behaviors due to an increased confidence from literally surviving the activity for so long. There is no doubt that the adrenaline rush received by these men is what fuels the sport and keep them coming back for more action and additional challenges.

In a random sample of 12 Noodler fatality drownings and all other recreational drownings that also occurred during the same months as those handfishermen, the data was not too surprising. It appears as though alcohol is a major contributing factor to all drownings (recreational or otherwise). All Noodling fatalities were male, with Caucasian being the highest likelihood of a probability (83.3%). While the recreational drownings were also predominantly male (87.5%), there was some variance to the gender with victims seemed to be less biased with a 2/3 of the sample being Caucasian, leaving 33.3% being from other races. Men still seemed to have dominated the majority of all drowning cases, regardless of what activity the participant was involved in doing on the water during the particular outing when the fateful event took place. Interestingly enough, age was strikingly similar as well, averaging in the mid-30's for both noodlers and non-noodler deaths.

	noodlers	non-noodlers	test	
	mean(s.d.) or *n*(%)	mean(s.d.) or *n*(%)	statistic	*p*-value
Sex (male)	12 (100%)	42 (87.5%)	$\chi^2 = 1.67$	0.333
Race (Caucasian)	10 (83.3%)	32 (66.7%)	$\chi^2 = 1.27$	0.317
Age (in years)	32.1 (14.8)	35.8 (16.8)	$t = -0.75$	0.461
BAC	0.12 (0.12)	0.11 (0.12)	$t = 0.41$	0.687

Table 1. Summary statistics (*n* = 60)

According to the U.S. Fish & Wildlife Service, 729,000 residents and nonresidents 16 years old and older fish in Oklahoma on an annual basis. Research published by Deborah Salazar in "Noodling: An American Folk Fishing Tradition," showed less than 1% of anglers participate in the sport of handfishing. By that statistic, approximately 7,000 people annually participate in the sport of noodling in Oklahoma. The exact number of participants would be impossible to calculate since there are not any specific license for this type of fishing. Also, caught fish are not required to be registered or checked-in with the ODWC. Additionally, ascertaining the exact number of human fatalities is hampered by the fact that some decedents are never recovered and their cause of death or disappearance remains undetermined.

Fatality rates vary from year to year, but the data shows the number of noodlers killed and recovered each summer to be around half a dozen. This would mean that approximately 0.857 deaths occur out of 1,000 grapplers annually. One particular summer surveyed had seven fatalities that year, which would be a death of 1 out of

approximately 1,000 noodlers. This is taking into account that the actual number of participants is around 7,000.

By comparison, commercial fishing has the highest occupational fatality rate in the country. Per capita, their fatality rate is three times higher than the second most dangerous occupation on the Bureau of Labor Statistics, which is logging. As reported in a U.S. News & World Report article entitled "Dangers of the Deep," 115 deaths occur out of 100,000 workers who fish commercially. That would account for 1.15 fatalities out of 1,000 fishermen in the industry. While the industry of commercial fishing has made some progress in safety techniques over the past several decades, Alaska still has the highest work-related fatality rate of any state in the nation. Many Alaskan fatalities are associated with, but not limited to extreme environmental conditions and remote jobsites. Including the high number of fixed-wing aircraft crashes, the Alaskan worker fatality rate is 34.8 per 100,000 annually. By comparison, the worker mortality rate for the rest of the United States is 5 per 100,000.

What does that mean to Oklahoma and the mortality rate per capita for noodling catfish? It means that a person is three times more likely to die while noodling for catfish in Oklahoma than they would be working in Alaska! Approximately 0.348 per 1,000 Alaskan workers die annually on the job versus 1 out of 1,000 noodlers in Oklahoma. The noodling fatality rate almost be is comparable to that of commercial fishing, with 1 noodler and 1.15 commercial fishermen drowning per thousand. The sport of grappling flathead catfish with your bare hands is certainly not for the faint of heart. It is for an outdoorsman willing to risk their health and/or longevity simply to put some fillets in the freezer. Regardless, it appears as though this sport/pastime is here to stay for generations

to come. It is a time honored traditional that is here to stay so long as flathead catfish inhabit the lakes, creeks, and rivers of this great state.

I wish I could tell you that my one experience with this sport ended with a well-earned flathead on the bank next to Bruce's that day. As with so many activities in the outdoors though, the adversary won. The catfish did exactly what I wanted it to do; it bit me. Instead of gripping the jaw and wrangling it out of the hole like Bruce had done, my "flight" reaction took hold and I was able to save my hand. I pushed back so hard that my partner moved out of the way and the monster fish blasted past me, out into the depths to live another day. My knuckles looked as though I had given a belt-sander a fist-bump. As blood flowed down my arm, I realized that nothing was really hurt but my pride. Taking a good raz from my buddy for screwing up an "easy" one was the hardest part of the afternoon. It was an experience I will never forget, but also an activity I realize just is not for me. I like my hands. I like my fingers. I am man enough to admit that using tackle to land fish from above the surface of the water is a route I shall continue to pursue and enjoy for (hopefully) years to come.

Results

Fatality rates vary from year to year, but it would seem the number of noodlers killed and recovered each summer seems to be around half a dozen (more or less). This would mean that approximately 0.857 deaths occur out of 1,000 grapplers annually. One particular summer surveyed for this research project through the Office of the Chief Medical Examiner had seven fatalities that year, which would be a death of 1 out of approximately 1,000 noodlers. This is taking into account that the actual number of participants is around 7,000 (7). What does that mean to Oklahoma and the mortality rate per capita for noodling catfish? It means that a person is three times more likely to die

while noodling for catfish here than working in Alaska! 0.348 Alaskan workers die annually on the job out of 1,000 versus 1 out of 1,000 noodlers here in Oklahoma.

By comparison, commercial fishing has the highest occupational fatality rate in the country. Per capita, their fatality rate is three times higher than the second most dangerous occupation on the Bureau of Labor Statistics, which is logging (10). Even with a Congressional law passed in 1988 requiring all commercial fishing boats to carry life rafts, survival suits, and emergency beacons, there are still a great number of fatalities associated with it. In a U.S. News & World Report entitled "Dangers of the Deep," 115 deaths occur out of 100,000 workers who fish commercially (11). That would account for 1.15 fatalities out of 1,000 fishermen in the industry. For a comparison to other perceived dangerous occupations by the U.S. Department of Labor (and some not, such as working in an office), the following graph is of note:

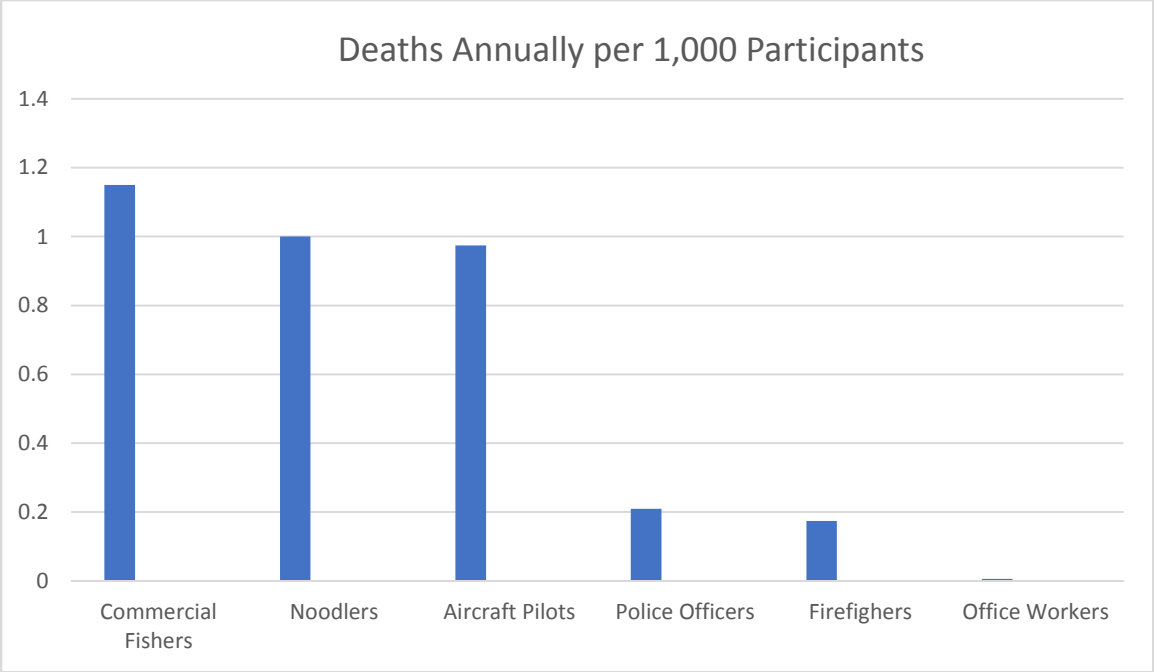

Figure 3: Graph comparison compiled with approximate numbers of noodling participants on an annual basis in Oklahoma (7, 9) versus annual mortality rate of commercial fisherman (11).

In order to get a better idea of the actual fatalities that occur during the participation of this sport in Oklahoma, we had to look to the actual decedents and the data that supported why the events took place on that particular day. Looking into fatality cases that occurred in Oklahoma was the only accurate way to obtain that information. The unfortunate set of circumstances is that all reports generated by medicolegal death investigators (MDI's), forensic pathologists, and "county" physicians (prior to 2004), were all written/coded differently. Prior to 2000 the database was not in place and I was unable to look into those cases accurately, as they were literally filed away in archive only to be pulled if the decedent's name and date of death were known.

The actual cause of death in the majority of noodling cases can be attributed to drowning. That being said, how the pathologist words the actual cause of death can make

finding specific cases more difficult. The field filled out as required by the Oklahoma State Department of Health for the Death Certificate requires listing a "probable cause of death" which is then supported by between one and four "contributing factors." For example, if the individual died as a result of drowning, given what preference that particular pathologist has for wording in their report, it could be listed a multitude of different ways. The following examples are just of few of the many ways the actual cause of death was listed by pathologist;

- Drowning
- Drowning due to water submersion
- Asphyxia due to drowning
- Asphyxiation secondary to water submersion
- Water submersion sequela

Other problems with obtaining reports were that some of the (presumed) decedents were simply never found and became missing persons cases. Especially in river systems with deep cut banks and blow-downs in oxbows, the likelihood of a body surfacing before postmortem activity (both anthropophagic and environmental) was highly likely. These cases would often start as missing persons cases and continue to be so even if the known activity was noodling on that fateful day.

The topic of acquisition of actual loss of life statistics during this activity in the state of Oklahoma was handled in the manner of a query of a state database in addition to other methods. As employed by the Office of the Chief Medical Examiner (OCME) as a Medicolegal Death Investigator (MDI) for the past seventeen years, I have person experience in investigating the scenes of noodlers who have met their demise during this

activity. In addition, an email/phone survey to my colleagues who are employed in the same manner throughout the state of Oklahoma was also performed. Case studies by both myself and fellow MDI's were used to support the data.

The database was also queried at the Office of the Chief Medical Examiner to look at cases that occurred in the past nineteen years by MDI's who are either no-longer employed by the OCME, deceased themselves, or otherwise moved on in their professional careers. These reports, while open-record to the requesting public, will not be used specifically in this thesis. Information taken from them will only support data of locations, methods, blood ethanol levels, and other basic demographics. Names, dates, specific locations, and otherwise will be omitted in order to protect the privacy of those involved and the family/friends that were adversely affected by those tragic events.

Prior to the year 2000, reports were still generated by a "county doctor" system of physicians throughout the state. These reports were literally mailed to the central office and filed on shelves in such a manner that, while hopefully accurate to the individual case, would be next to impossible to comb through looking specifically for information to support this study.

There are several different information caches in the electronic OCME database reports however since 2000. The portion of the field report as filled out by the MDI is known as the "CME-1." There are different ways to query specific statistical data such as cause, manner, and other things specific to the types of death one would be looking for (such as a specific natural disaster like a tornado event). Unfortunately, there is no way of specifically filtering out "noodling" deaths, as the terminology and authors (MDI's) all write reports specific to their own style. For example, if the MDI only listed that the

individual was “fishing,” and not specifically “hand-fishing, noodling,” or “grappling,” then the case could be over-looked.

Between January of 2000 and March 18, 2018, I was able to isolate 846 cases in Oklahoma that included “accidental drowning” in the report. Of these, multiple cases had to be eliminated before accurate information could be obtained from the narrative to see if the decedent was in the act of hand-fishing when the drowning occurred. We were able to further isolate cases by filtering with the word “recreational” in the drowning report.

Each case also has the “injured or became ill at (IBIA)” address/location required to be filled out for such statistical purposes. This is primarily used for civil/criminal court cases where the death actually occurs in another location (such as a medical institution like a hospital), but the scene itself was elsewhere where the actual incident took place. The painstaking endeavor was undergone looking through each of the 846 cases for keywords that would eliminate the possibility of the case being related to noodling in this section. Examples of IBIA keywords used to filter out cases would be like “water park, pool, hot tub, health club, residence, fountain, bath tub, motel, nursing home,” and other locations where the decedent obviously would not be noodling for catfish. The keyword “pond” or “farm pond” was also used as an eliminator, as large flatheads are not known to be targeted in small bodies of water where they could grow to the desired impressive size that most grapplers are after.

The demographical information was also used to eliminate participants. For example, if the decedent was under the age of 16, the case was not looked at, regardless of where the drowning occurred. Statistically, all fatalities studied previously were

Caucasian males. This stereotype was yet again supported during the survey portion of this research. While all cases were looked at of the 846 queried, it was found that only three of the fatalities were outside of the ethnicity of the white males. The three included a 52-year-old Black male, a 29 year-old Hispanic male, and a 20 year-old American Indian male.

Another key component was to look at the actual time of year. While there may indeed be some hard-core participants who noodle year-round, it appears that the vast majority do it primarily when the flatheads are in the act of spawning, pre-spawning, or males guarding the nest of eggs after the spawn has been completed. Water temperature appeared to be a key factor in this, giving the angler the greatest opportunity during the early summer months of May and June. Many of those interviewed claimed to be all but done by the 4th of July for that reason. The exception was an older individual who waited until the oxygen level got lower when the temperatures cooled off so he wouldn't have to "fight them as much." Many of the lake and river fatality cases could be eliminated if they occurred during the fall and winter months. Between duck hunters and cold-weather fishermen, it was not noted anywhere that a case involved a noodling fatality between the months of October and March.

Drowning is obviously not accounted exclusively to the act of hand-fishing. Drownings occur year-round all over the world. Per the Center for Disease Control (CDC), an estimated 372,000 people die annually from water submersion (2012). This is obviously a global problem being "the 3rd leading cause of unintentional injury-related death, accounting for seven percent of all injury-related death (CDC Drowning Statistics 2012)." While a great number of drowning cases skewing these statistics involve

children under the age of 14, there is no doubt that drowning affects people of all ages, races, and socioeconomic backgrounds.

Of all the documented drownings in the United States between 1999 and 2010, 47.2 % occurred in natural water (Outdoor Life Editors 2015). In other words, almost half of all drowning fatalities are the result of lake, river, or pond water. The other half could be attributed to swimming pools, bathtubs, and the more common waters that we as humans encounter in our everyday lives.

Here in Oklahoma, the majority of the cases found involved Caucasian males in their early 30's with the eldest angler fatality being 68 and the youngest being 17. The average over-all age of drowning fatalities was 33.7. While a male in his 20's is more apt to make poor judgement and safety decisions than a man in his 30's, it is possible that the anglers in their 30's have been involved in the activity for several years, which could likely lead to a higher confidence level in the sport. The higher confidence level would then likely lead to higher moments of success and additional risk-taking behaviors from a grown confidence of literally surviving the activity for so long. There is no doubt that the adrenaline rush received by these men is what fuels the sport and keep them coming back for more action and additional challenges.

While there are many factors to consider in fatality situations, the statistics do not lie. The presence of alcohol in the system of the noodler has to be taken into consideration. Bold and risky decision making spelled trouble for many of the unfortunate souls as well. That being said, some of them simply encountered what they were after all along; a big dangerous fish. Terry Ivey, a 39-year-old man from Hinton, Oklahoma recalls a close scrape with an estimated 80+ pound fish in the North Canadian

River where he had to dive to get to a hole under a bolder. He was six feet below the surface when the monster fish clamped down on his wrist (which was the idea at the time). His jersey glove got caught in the behemoth's teeth and he began to get drug back down into the hole! His frantic kicking brought attention to his friend that he was in trouble, and the two of them were able to free Mr. Ivey from the deadly grasp and get him back to the surface (Todras-Whitehill 2006).

Situations such as Mr. Ivey's support one important safety factor; noodling in groups or pairs. The sport seems far more dangerous when taken on solo. The unavoidable current when dealing with moving water seemed not as particular in whom it chose to swallow. 42% of deaths came as the result of unanticipated excessive water flow, even in the presence of multiple anglers. Once a person comes victim to the flowing water, it seems that there was little others could do for them. In situations where others attempted to save their fellow anglers, multiple fatalities could be the result such as the unfortunate situation in the Arkansas River in Tulsa on August 1st of 2013 when three men died (Dwyer CME-1 Research). Handfishing in groups or pairs is still very dangerous, although not as so the solo angler. One method of obtaining a catfish deep in a hole involves making a literal human chain where fisherman grab the feet of the legs of the man (or men) going deeper into the hole. A case in 2011 involved three men making said "human chain" going into a concrete pipe that was submerged. The lead angler came in contact with a catfish and the middle-man lost hold of his legs during the encounter. The third angler then pulled the middle-man from the hole (without the lead angler) and the two could not get back to the lead angler in time.

After interviewing dozens of anglers who currently or have recently noodled here in Oklahoma, there was a quite a few similarities seen. Spots where successful past outings have produced fish are kept quite secrete. Exact locations of "holes" are not shared, even with close family members and friends. I was often only given the name of the lake and/or river where large catfish were encountered. When asked specifically about the location of one enormous fish that was boated in Lake Eufaula (a lake with over 600 miles of shoreline and fed by the North Canadian River which runs across the entire state), the angler gave up the exact location of "right here in Oklahoma." When I refocused the question as to where the fish was actual caught, he responded with "right by the bottom jaw (of the catfish)." After that interview I quickly learned that getting more specific than that was simply not going to happen. I would've had a better chance at a consensual night with their spouse than the location of those fishing spots!

One over-whelming similarity was also the common notion of bending the rules a bit to tip the scales in the advantage of the fisherman. Most fishing holes are literally holes in the bank or bottom of a lake in the form of structure. The implementation of artificial holes in an effort to attract/hold catfish is a very common practice. The Oklahoma Department of Wildlife Conservation (ODWC) is very specific to this, stating that "It is unlawful to place into any lake or reservoir any container that will attract, entice or lure fish into an open cavity within that container. Containers include, but are not limited to drums, cans, tubs, boxes, and barrels. It is illegal to noodle within such containers. (ODWC Fishing Regulations, 2018)" A common theme was to locate and/or place such containers, most notably 55-gallon drums. These drums are a common place in the many oil fields across the state and are not all too difficult to come by in rural

areas. One anonymous noodler proclaimed "You got to check up in those barrels with a stick before you reach you hand in there because a turtle will get in and not be able to find their way out and drown. By the time you stick your hand in there, they can be pretty stinky and nasty! (Dwyer 2018)" These barrels are easily located in almost any lake here in Oklahoma when the waters recede due to summer drought or otherwise, exposing them to anyone searching the banks for other species. A common site while bowfishing for carp myself, I simply troll past and evert my gaze with hopes that in the unlikely event that grappler is watching me, I would act as though I had no knowledge of the structure(s).

Turtles seemed to be the most common animal that the anglers came in contact with while in the water. Frequenting the entire state, this did not come as a surprise. Most seemed to be happy with swimming the other way, although a bite from one could prove painful. Dangers associated with the turtle (among other aquatic inhabitants) will be discussed in another chapter of this thesis. The desired specimen, the flathead catfish, can put a powerful bite on the angler as well. According to Chris Pulchny of Stillwater, Oklahoma, "a catfish bite feels like having your hand rubbed between two grill brushes; it's not significant pain, but you remember it! (Kemp 2011)"

Once again, bending of the rules seemed to be a common theme throughout the course of the interviews. While none would out-right admit unlawful activity, there was much suggested as to how one betters their odds in regards to catching fish. The very locations fished are often brought into question as to if permission had been obtained to fish there to being with. When Spencer Hall tagged along during his journey of noodling in pursuit of the grand prize of the Okie Noodling Contest in 2011, his "guides" admitted

during one of their stops along a river that "no one seems to know exactly whose land it is in the end, though everyone waves to a tree-mounted security camera along the fringe of the vegetation bordering the river (Hall 2011)."

The Oklahoma regulations are very specific about the tackle that can be used (or rather not used) in commission of obtaining flatheads in this manner. "Possession of hooks, gaff hooks, spears, poles with hooks attached or ropes with hooks attached while in the act of noodling shall be proof of violation of the "hands only" noodling law (ODWC 2019). That being said, various methods of securing a stubborn fish are often employed. From using a barbed fiberglass fish arrow to secure the eye socket of a fish, to a hook on the end of a pole, to a device involving a radiator clamp and a rope, methods of violating this "hands only" law do indeed happen. These techniques are the reason for careful examination of catfish caught at both noodling tournaments or by game wardens who stop participants. Any fish found to have hook marks or similar injuries would no doubt disqualify the fish from contender status in a tournament or land the fisherman with a hefty fine from the Wildlife Department. In June of 2018 while attending the "Okie Noodling Tournament" in Pauls Valley, a van with a polygraph machine equipped inside was parked by the tank where participants checked in their fish for the day!

The methods used that get anglers into trouble (both legally and safety) often involved attempting to "dig out" a fish hidden deep in the rocks. Moving structure below the surface causes other things to shift and can get the fisherman into distress. By deploying a stick of explosive through conduit pipe, one anonymous noodler claimed to be able to obtain obdurate fish in that manner.

The reputation of a noodler comes as a badge of honor to those who have a hand in the sport. Pun intended… They embrace the redneck stereotype the goes with the activity and at no time did I encounter any of the anglers who were the least bit ashamed or apologetic about their means of catching these catfish. Shunned by other types of angling, this group of men and women form a common bond on a level of comradery and secrecy at the same time. It is almost cult-like with a bit of boasting and one-upmanship in the public eye when discussed outside the circle of actual grapplers. They are proud to tell you how they do it and how big the beasts are that they wrestle from the muddy depths, but you'd have a better chance of not seeing a mustache at an Oklahoma Sheriff's Association meeting then one of them giving away the geographic location of one of their coveted holes.

In SB Nation's "The Amateur" with Spencer Hall, which is a program where he (Mr. Hall) as host goes along on various sporting activities to prove little other than provide entertainment to those who follow the show, he once attempted noodling. When he met his ride at a Shell station off I-40 near Wewoka, Oklahoma, the description of the vehicle picking him up set the stereotype in full swing; "The windshield of this pickup truck has two long cracks forming an unsteady drawn right angle at the lower corner… The plastic on the passenger side dash is split like drying, cakey mud… There are plastic antifreeze jugs and work helmets in the floorboard… I try to put my drink in the cup holder, (but)… is full of small arms ammunition" (Hall 2011). Vehicles in similar repair would be very common along the banks and boat ramps of the Sooner state each summer near locations hunted no doubt.

Thesis Conclusion and Discussion

The purpose of this study was to bring awareness to the danger level of noodling by examining techniques used, methods deployed, and contributing factors (both environmental and human). One way of doing so being through comparison to the already well-known and well-documented dangers in the world of commercial fishing. The exact number of participants would be impossible to calculate since there isn't any specific license for that type of fishing and for other reasons previously discussed. Still, the data acquired seems to give an accurate representation to the fact that this is indeed a dangerous method of angling, if not the most dangerous on the planet.

Fatality rates seem to vary from year to year. The research through the Office of the Chief Medical Examiner database and by other accounts would seem to show a mortality rate of approximately 1 out of 1,000 noodlers on an annual basis. While this may not seem like an overly abundant number of human lives lost to this sport, the key factor is that there just are not that many participants who actually participate in it! By comparison, commercial fishing has the highest occupational fatality rate in the country and has been shown as thus. For noodling to even be remotely in the same capacity should show that it is indeed beyond the realm of only "moderately dangerous."

Environmental factors, given the nature of our aquatic structures, seem to be unavoidable if one were to participate in the sport. A flathead catfish does not get old and big by getting killed or eaten they are young! These old giants have gained their size and abilities by their capability to survive themselves. The locations they reside prove both hazardous to their prey and the humans who pursue them there. Roadbeds, wing-dams, and submerged concrete structures are just some of the many hazards that can

compromise a human who does not have the ability to breathe beneath the surface of the water such as they do.

Overwhelmingly apparent more than any other factor seems to be the consumption of large quantities of alcohol while participating in this sport. It was both surprising and somewhat expected at the same time that alcohol would contribute. We just didn't know how much! So many of the drowning fatalities (both noodling and recreational in general) may have been prevented and/or non-existent all together had the swimmer simply not been impaired. Studies as to the ability of alcohol to inhibit ones "normal" abilities have been shown and well documented for hundreds of years. Another discussion for another day, but it certainly cannot be disputed on any level that alcohol in addition to this type of angling takes the danger element to a whole new level entirely. Results and observations were more qualitative since actual numbers and ratios could not be proven.

Future Research

Other literature reviewed showed that noodling may have more participants in other states where there are literally more people than Oklahoma. For example, according to Professor Mark Morgan at the University of Missouri, their state has roughly 2,000 participants. He does admit that those are not "hard figures," but he has spent a great deal of time studying hand-fishermen and their habits (Todras-Whitehill, 2006). With the population of Missouri being roughly two million higher than here in Oklahoma, this would certainly make sense. Future research could be conducted to compare noodling mortality rates between the two states.

In addition, it may be beneficial to implement some type of a training or licensing program to this particular sport autonomously. In other parts of the world, there are specific training licenses and programs required prior to unique and common forms of outdoor recreation. For example, if one was wishing to pursue game with a bow and arrow in Europe, they would need documentation that shows you have permission to hunt in that form in your home country. You also have to past a written exam and demonstrate your proficiency prior to being allowed to do so and then apply for the privilege (Nordic Hunters Alliance; Denmark 2020).

While hand-fishing for catfish in America is different in nature than bowhunting game in another continent, it still could both benefit those who participate in the sport by making them more aware of the dangers and also provide some safety training. Not much different than the formerly required Concealed Carry handgun training classes prior to the law being changed, it would allow a participant, regardless of experience and intent, to be aware of both the dangers and risks associated with the sport of which they have chosen to partake.

Regardless of what other state or states are compared to Oklahoma or the training requirements that may be implemented, the information derived from such a study will likely be similar. The demographics, alcohol consumption, and otherwise hazards that go along with this sport just cannot have that much variance. This study may have shown what was already know, all be it putting some quantative data to go along with the known associated risks of the occupation. Both fascinating, compelling, and often leaving one simply scratching their head in amazement, this sport is around to stay and will no doubt continue to produce both injuries and fatalities.