

CITIZEN-PROPOSED ISSUE PAPER

Date: 8/29/2019

ISSUE:	Allowing stone broadheads for archery hunting
DISCUSSION (FACTS AND FIGURES, EXPLANATION OF ISSUE):	
<p>Colorado is one of only 9 states in the U.S. that require using metal broadheads for archery hunting (see attached addendum of 2019 broadhead specifications for archery hunting in each state). Four states in the U.S. specifically allow the use of stone broadheads for archery hunting. The other 37 states do not specify, or restrict, what broadheads are made of. None of the 6 states surrounding Colorado require broadheads to be metal.</p> <p>Comparisons have shown that broadheads made of stone are as sharp, penetrate as well, are as lethal, and survive impacts as well as metal: https://www.wideopenspaces.com/stone-arrowheads-match-modern-steel-video/ https://www.youtube.com/watch?v=UmuHWEY2P9M https://www.youtube.com/watch?v=7qiqmzZk0j0</p> <p>There does not seem to be any information that claims that steel broadheads are superior to stone broadheads of similar size, so there does not seem to be a justification for specifying that broadheads used for archery hunting need to be metal. Stone broadheads have been used successfully for tens of thousands of years, enabling the survival of our species.</p> <p>For these reasons, it is requested that stone points not be prohibited for archery hunting in the State of Colorado.</p> <p>This can be easily accomplished by removing the word "steel" from the archery regulations, so that they read: "...a minimum of two steel cutting edges." Many states specify "sharpened" or "sharp" cutting edges, and the 4 that specifically allow stone broadheads state: "flint-, chert- or obsidian-knapped"; "napped flint, chert or obsidian"; "naturally occurring stone"; or "stone arrow heads may be used." Unless Colorado has a reason to specify specific materials, it seems the clearest and easiest to understand is simply to specify: "two sharp cutting edges having a minimum of 7/8-inch outside diameter in the same plane..."</p>	
WHO MIGHT BE INTERESTED IN THIS ISSUE? HAVE YOU COMMUNICATED WITH ANY OTHER INTERESTED PARTIES? WHAT INPUT HAVE YOU RECEIVED?	
<p>I assume other traditional archery hunters would be interested in changing this regulation, but I have not communicated with anyone about this and have not received any input.</p>	
ALTERNATIVES: PLEASE INDICATE THE PROBABLE OUTCOME IF THIS PETITION IS ACCEPTED, AS WELL AS THE IMPACT OF ALTERNATIVES TO THIS PETITION:	
<p>Probable outcome will be the enhancement of recreational hunting experiences for those who want to use more traditional, authentic weapons in the primitive hunting season. The alternative is to continue to prohibit the use of stone broadheads by requiring only metal broadheads, without reliable justification.</p>	
PETITION PROPOSED BY:	Lee O'Brien
PETITION WRITTEN BY:	Lee O'Brien
DATE SENT TO THE COMMISSION:	August 29, 2019

Addendum to (O'Brien) Citizen-Proposed Issue (8/29/2019)

<u>State</u>	<u>2019 State Regulations on Broadheads for Archery Hunting:</u>	<u>Edge Type</u>	<u>Stone Allowed</u>	<u>Number of States</u>
Arizona	broadheads no less than 7/8 inch in width with metal, ceramic-coated metal, or ceramic cutting edges and capable of firing a minimum of 250 feet per second	specified	no	9
Colorado	broadhead having a minimum of 7/8-inch outside diameter (width) and a minimum of two steel cutting edges . Each cutting edge must be in same plane for entire length of cutting surface.	specified	no	
Maryland	arrows or bolts used for deer hunting must have a sharpened broadhead with metal points and a minimum width of 7/8 of an inch	specified	no	
Massachusetts	arrows must have a well sharpened steel broadhead blade not less than 7/8 inches in width	specified	no	
Minnesota	arrowheads used for taking big game must have a minimum of two metal cutting edges , be of barbless broadhead design, with a diameter of at least 7/8 inch	specified	no	
New Jersey	arrows used for hunting deer, bear, turkey, coyote, fox or woodchuck must be fitted with an edged head of well-sharpened metal and a minimum width of 3/4 inches	specified	no	
North Dakota	arrows must be at least 24 inches long, tipped with a metal broadhead , with at least two sharp cutting edges, and have a cutting diameter of at least 3/4 inch	specified	no	
Rhode Island	broadhead tipped arrows with at least two (2) metal cutting edges	specified	no	
South Dakota	broadhead (fixed or mechanical) that has at least two metal cutting edges	specified	no	

Alabama	arrows shall be equipped with a broadhead which has a minimum cutting diameter of 7/8 inch and 2 sharpened edges	specified	yes
Alaska	a fixed, replaceable, or mechanical/retractable blade-type arrowhead that is not barbed with two or more sharp cutting edges having a minimum cutting diameter of seven-eighths inch (7/8")	specified	yes
Arkansas	arrowheads at least 7/8-inches wide (mechanicals OK)	not specified	yes
California	broad head type blade which will not pass through a hole seven-eighths inch in diameter shall be used. Mechanical/retractable broad heads shall be measured in the open position	not specified	yes
Connecticut	arrowheads for hunting deer and turkey must have at least two blades and be at least 7/8 inch wide at its widest point	not specified	yes
Delaware	sharpened broadhead arrows (min. width 7/8")	specified	yes
Florida	broadheads having at least two sharpened edges with minimum widths of 7/8 inch	specified	yes
Georgia	arrows for hunting deer, bear or feral hog must be broadhead type	not specified	yes
Hawaii	no specifications	not specified	yes
Idaho	can't use: broadheads measuring less than 7/8 inch in width and having a primary cutting edge less than 0.015 inch thick	specified	yes
Illinois	broadheads must be used and may have fixed (must be metal or flint-, chert- or obsidian-knapped) or expandable (must be metal) cutting surfaces, must have a minimum 7/8 inch diameter when fully opened	specified	yes
Indiana	arrows must be tipped with broadheads that are metal, metal-edged, or napped flint, chert or obsidian	specified	yes

<u>State</u>	<u>2019 State Regulations on Broadheads for Archery Hunting:</u>	<u>Edge Type</u>	<u>Stone Allowed</u>	<u>Number of States</u>
Iowa	no minimum draw weights for bows or minimum diameter for broadheads	not specified	yes	
Kansas	broadhead points that when fully expanded cannot pass through a ring 3/4-inch in diameter	not specified	yes	
Kentucky	fixed blade or mechanical broadheads at least 7/8" wide (when blades extended)	not specified	yes	
Louisiana	no specifications	not specified	yes	
Maine	arrow heads (including expandable mechanical broadheads) must be at least 7/8 inch in width	not specified	yes	
Michigan	broadhead point at least 7/8 inches wide	not specified	yes	
Mississippi	no specifications	not specified	yes	
Missouri	no specifications, atlatl are allowed	not specified	yes	
Montana	arrows must have broadheads with at least two cutting edges and be at least 7/8 inches at the widest point	specified	yes	
Nebraska	a sharpened hunting head with a blade of at least 7/16 inch radius from the center of the arrow or spear shaft, spears allowed	specified	yes	
Nevada	fixed broadheads must be at least 7/8 inch wide at the widest point	not specified	yes	
New Hampshire	fixed blade broadheads cannot be less than 7/8 inches wide and not more than 1 1/2 inches wide	not specified	yes	
New Mexico	arrows and bolts must have broadheads (fixed or mechanical) with cutting edges	specified	yes	
New York	can't use: arrows with barbed broadheads; arrowheads less than 7/8 inches at the widest point or with less than 2 sharp cutting edges	specified	yes	
North Carolina	arrows and bolts with a fixed minimum broadhead width of seven-eighths of an inch shall be used	not specified	yes	
Ohio	arrow tip needs a minimum of two cutting edges , which may be exposed or unexposed and a minimum 3/4-inch width	specified	yes	
Oklahoma	arrows and/or bolts must be fitted with hunting type points not less than 7/8 inches wide	not specified	yes	
Oregon	broadheads must be unbarbed and at least 7/8" wide	not specified	yes	
Pennsylvania	broadhead must have a fixed or mechanical tip having sharpened cutting edges consisting of metal or naturally occurring stone , outside diameter or width of at least 7/8 inch	specified	yes	
South Carolina	no restrictions on draw weight/length, arrow weight/length, or broad head weight, width, or style	not specified	yes	
Tennessee	hunting arrows and bolts must be equipped with sharpened broadheads	specified	yes	
Texas	no restrictions on arrow or bolt lengths, arrow material, arrow weight, lighted nocks, broadhead lengths or diameter, number of cutting edges , broadhead material , or mechanical broadheads	specified	yes	
Utah	arrowheads must have two or more sharp-cutting edges that cannot pass through a 7/8 inch ring	specified	yes	
Vermont	arrowhead of at least 7/8 of an inch wide and at least two cutting sides	specified	yes	
Virginia	broadhead widths/expandables that open to 7/8-inch	not specified	yes	
Washington	can't use: arrow or bolt that does not have a sharp broadhead, and the broadhead blade or blades are less than seven-eighths inch wide	not specified	yes	
West Virginia	can't use: broadheads having less than two sharp-cutting edges measuring less than 3/4 of an inch in width	specified	yes	

<u>State</u>	<u>2019 State Regulations on Broadheads for Archery Hunting:</u>	<u>Edge Type</u>	<u>Stone Allowed</u>	<u>Number of States</u>
Wisconsin	metal broadheads must be at least 7/8 of an inch wide and kept sharp . Stone arrow heads may be used.	specified	yes	41
Wyoming	an arrow equipped with a fixed or expanding point broadhead that when fully expanded cannot pass through a seven-eighths (7/8) inch solid ring	not specified	yes	

States Bordering Colorado

Kansas	broadhead points that when fully expanded cannot pass through a ring 3/4-inch in diameter	not specified	yes	all
Nebraska	a sharpened hunting head with a blade of at least 7/16 inch radius from the center of the arrow or spear shaft, spears allowed	specified	yes	
New Mexico	arrows and bolts must have broadheads (fixed or mechanical) with cutting edges	specified	yes	
Oklahoma	arrows and/or bolts must be fitted with hunting type points not less than 7/8 inches wide	not specified	yes	
Utah	arrowheads must have two or more sharp-cutting edges that cannot pass through a 7/8 inch ring	specified	yes	
Wyoming	an arrow equipped with a fixed or expanding point broadhead that when fully expanded cannot pass through a seven-eighths (7/8) inch solid ring	not specified	yes	

CITIZEN-PROPOSED ISSUE PAPER

Date: August 20, 2019

ISSUE:	Legalization of the Use of Stone Projectile Points for Big Game Hunting during Archery Season
DISCUSSION (FACTS AND FIGURES, EXPLANATION OF ISSUE):	
<p>Knapped stone points have armed the tips of hunting projectiles for at least 500,000 years (Wilkins et al. 2012). In contrast, steel points have armed projectiles for only the last 3,000 years. Once invented, steel tips were not instantly adopted in every circumstance as superior hunting technology (Bamforth 1993). Even after the development of iron smelting, stone projectile points continued to be used in many contexts until recently. Given this lengthy history, it is clear that stone points have been used to harvest far more prey than their steel counterparts.</p> <p>The state of Colorado requires archers to hunt big game with broadheads having a minimum of two steel cutting edges and a 7/8 inch outside diameter. The regulations do not specify length or shape of the blades, or hardness or sharpness of the steel. Without additional specifications, steel is not an objectively better material than stone for hunting points. Very poorly designed steel points can be used legally, while in contrast, a much better designed stone point would be illegal.</p> <p>Projectile experiments on animal carcasses demonstrate that well designed stone points break through bone and cause sufficient hemorrhaging to kill quickly when vitals are encountered (Friis-Hansen 1990; Frison 2004; Pétilion et al. 2011; Pettigrew 2015). Soft steel bends on impact with hard materials and significantly decreases penetration. In contrast, when stone breaks on impact with bone it shatters and flakes, creating more cutting edges.</p> <p>Both steel and stone points can be made more or less effective by accounting for design specifications. The current regulations leave most aspects of design up to the hunter, while specifying only material and width. This places a level of trust in dedicated archery hunters but falls short of sensible regulation. Most other states do not specify material in their regulations, and therefore leave stone as a viable option.</p> <p>Many people hunt partially as a means of connecting with a fundamental human experience that is as old as our species. Stone points have armed the tips of composite projectiles for hundreds of thousands of years longer than steel. Hunters who wish to use knapped stone points should be given the opportunity to do so during big game archery season.</p> <p>References:</p> <p>Bamforth, Douglas B. 1993 Stone Tools, Steel Tools. In <i>Ethnohistory and Archaeology: Approaches to Postcontact Change in the Americas</i>, edited by J. Daniel Rogers and Samuel M. Wilson, pp. 49–72. Interdisciplinary Contributions to Archaeology. Springer US, Boston, MA.</p> <p>Friis-Hansen, Jan 1990 Mesolithic Cutting Arrows: Functional Analysis of Arrows used in the Hunting of Large Game. <i>Antiquity</i> 64(244):494–504.</p> <p>Frison, George C. 2004 <i>Survival by Hunting: Prehistoric Human Predators and Animal Prey</i>. University of California Press, Berkeley.</p> <p>Pétilion, J. M., O. Bignon, P. Bodu, P. Cattelain, G. Debout, M. Langlais, V. Laroulandie, H. Plisson, and B. Valentin</p>	

2011 Hard Core and Cutting Edge: Experimental Manufacture and Use of Magdalenian Composite Projectile Tips. *Journal of Archaeological Science* 38(6):1266–1283.
DOI:10.1016/j.jas.2011.01.002.

Pettigrew, Devin B.

2015 The Ballistics of Archaic North American Atlatls and Darts. Unpublished Master's thesis, University of Arkansas, Fayetteville.

Wilkins, J., B. J. Schoville, K. S. Brown, and M. Chazan

2012 Evidence for Early Hafted Hunting Technology. *Science* 338(6109):942–946.
DOI:10.1126/science.1227608.

WHO MIGHT BE INTERESTED IN THIS ISSUE? HAVE YOU COMMUNICATED WITH ANY OTHER INTERESTED PARTIES? WHAT INPUT HAVE YOU RECEIVED?

I have communicated the organizers of the Laughing Coyote Project, a primitive skills organization outside of Loveland, who have expressed interest in legalizing stone points. Many states have regulations that specify that a projectile point should have a minimum of two cutting edges with a minimum diameter of 7/8 inches (<https://www.wasparchery.com/blog/broadhead-hunting-regulations-by-state/>). These regulations do not specify material, and thus allow for knapped stone projectile points.

ALTERNATIVES: PLEASE INDICATE THE PROBABLE OUTCOME IF THIS PETITION IS ACCEPTED, AS WELL AS THE IMPACT OF ALTERNATIVES TO THIS PETITION:

Knapped stone points have a deep history of use and remain acceptable hunting armatures in many states. Knappable stone, including chert, obsidian, fine grained quartzite and basalt produce sharp edges when flaked, but flint knapping requires dedication to master. Those who wish to hunt with stone points will include individuals interested in ancient hunting technologies, and hunters who wish to take on new and interesting challenges. It is unlikely that hunters who are not dedicated to the challenge will attempt to hunt with stone points. In the author's experience, most people who do not hunt are surprised to hear that stone points are not legal hunting tips.

PETITION PROPOSED BY:	Devin B. Pettigrew
PETITION WRITTEN BY:	Devin B. Pettigrew
DATE SENT TO THE COMMISSION:	8/20/2019

CITIZEN-PROPOSED ISSUE PAPER

Date: October 29, 2019

ISSUE:	Legalization of the use of the Atlatl for Big Game Hunting during Archery Season
<p>DISCUSSION (FACTS AND FIGURES, EXPLANATION OF ISSUE):</p> <p>Archaeologists generally agree that when people first migrated into the Americas from Siberia approximately 15,000 years ago they brought with them the atlatl (Hutchings 2015). This weapon remained the primary piercing projectile weapon for hunting and warfare until approximately 2,000 years ago when the bow was first introduced from the North (Walde 2013). After 1,500 years ago the atlatl had been replaced in many, but not all, contexts of use by the bow. The rate of replacement was gradual in many areas, where both weapons were in use simultaneously. Historically the atlatl was used in various parts of North America for fishing, waterfowl hunting, marine mammal hunting and warfare. It was reintroduced to European culture in the 16th century A.D. when conquistadores encountered soldiers armed with atlatls in Mesoamerica and the Mississippi Delta (Swanton 1938). The conquistadores quickly developed a respect for the weapon, which could penetrate heavy fabric armor. Perhaps surprising to some, large populations and social complexity occurred at places like Poverty Point in Louisiana, and in the Gulf of Mexico before the bow was introduced to the Americas.</p> <p>In the past 40 years the atlatl has seen resurgence in popularity in Europe and the US (see for example the World Atlatl Association website: https://worldatlatl.org/). It has now been legalized for hunting in Alabama, Nebraska and Missouri. Due to its uninterrupted indigenous use it was never illegal to hunt with an atlatl in Alaska.</p> <p>The atlatl functions by extending the length of the arm and thus the leverage one has on a light and flexible spear, called a dart. Darts typically travel between 50-60 mph, although fast throws by strong throwers can reach nearly 80 mph (Whittaker et al. 2017). Accuracy is more challenging to study. Within 30 paces native Australians could transfix a hat, and Eskimos demonstrated accuracy with seal darts at 30-50 yards (Whittaker 2010). The bow fires more consistently, and so a higher degree of accuracy is easier to achieve with less training. But with adequate training and concentration, modern users of atlatls demonstrate the ability to hit small targets.</p> <p>To the naked eye, darts travel at impressive speeds, and being much heavier than arrows, they impact hard. Very heavy darts carry enough kinetic energy (KE) and momentum (P) to kill elephants with one shot from 20 yards (Frison 1989). However, lighter and swifter prey is best hunted with smaller darts that can be comfortably carried and thrown at higher velocity (see Whittaker et al. 2017:Table 4 for a comparison between hunting arrow and dart KE and P). In an experiment on a 220 lb hog carcass (Pettigrew 2015), 3.5 ounce darts armed with stone tips consistently punched through ribs and the scapula, and penetrated the full depth of the chest cavity, producing high wound-surface areas.</p>	

Atlatls are effective weapons, but to hunt effectively the hunter must be well-practiced and dedicated. If prey sees the throwing motion it could dodge, and throws for accuracy are best made within 20 yards. As simple lever extensions of the body, atlatls are unlikely to be improved upon by modern contrivances. Compared to the complex pulley mechanisms that many call bows today, atlatls are far more in keeping with the spirit of archery, and with the *primitivism* associated with the development of wilderness conservation in the early 1900s (Nash 2014). All wildernesses were, in fact, places that people once carried out their subsistence using such tools. What is more, countless generations of hunters have used the weapon effectively. Our continued existence as a species is proof of this.

Yet some would consider such ancient technology not efficacious for use by modern hunters, while indigenous people are critiqued for continuing subsistence practices in Alaskan wilderness due to their use of motorized boats and rifles (Nash 2014). This has serious implications in a globalized world where next to war, conservation is the second leading cause of indigenous people losing their lands and livelihoods (Dowie 2006).

This is a problem of efficacy, manifested from a particular cultural perspective. So called “primitive” technology is seen as efficacious for indigenous people because it is associated with fair chase, while “modern” folks should use weapons that kill efficiently. Both arguments are constructed on biased assumptions without adequate background data. Imagine a future weapon that can shoot 5000 yards from a silent mobile air platform with extreme velocity and precision. This weapon requires little skill. It meets the criteria for swift kills, but not fair chase.

Regulations that prohibit certain pre-modern weaponry attempt to control for skill with technology. But fair chase is consequent with hunting skill, and in reality, so are swift kills with modern weaponry. Most hunters have experienced the dire consequences of rifle shots that go astray. The fact is that modern technology does not obviate skill. If it did, it would not meet the criteria for fair chase. Hunting regulators currently rely on hunters to develop adequate skill to make swift kills, while experience and social pressure provides the actual drive to develop and maintain skill. Atlatls require dedicated practice both to launch accurately, and to deploy in a hunting situation. Those who are not dedicated to developing the requisite skill are also less likely to get close enough to game, and therefore less likely to cause wounds that would supersede what already occurs with improper training and mistakes using modern weapons.

In Colorado, atlatls were the primary hunting weapon for most of the human occupation since the Pleistocene. For many, hunting is pursued as a means of reconnecting with a time when human lives and the natural world were less disparate. This seemingly small issue is not without substance; it is intertwined with broader narratives of nature versus culture, and policies concerning how human hunters have and should continue to articulate with their environments. The author requests that the state of Colorado follow on the model of Missouri and other states by reinstating the atlatl, which has a far lengthier history of use than even the bow, as a legal weapon for big game hunting during archery season.

References

Dowie, Mark

2006 Conservation refugees. *Seedling* January 2006.

Frison, George C.

1989 Experimental Use of Clovis Weaponry and Tools on African Elephants. *American Antiquity* 54(4):766–784. DOI:10.2307/280681.

Hutchings, W. Karl

2015 Finding the Paleoindian spearthrower: quantitative evidence for mechanically-assisted propulsion of lithic armatures during the North American Paleoindian Period. *Journal of Archaeological Science* 55:34–41. DOI:10.1016/j.jas.2014.12.019.

Nash, Roderick Frazier

2014 *Wilderness and the American Mind*. Fifth Edition. Yale University Press.

Pettigrew, Devin B.

2015 The Ballistics of Archaic North American Atlatls and Darts. Unpublished Master's thesis, University of Arkansas, Fayetteville.

Swanton, John R.

1938 Historic use of the spear-thrower in southeastern North America. *American Antiquity* 3(4):356–358.

Walde, Dale

2013 The Bow and Cultural Complexity of the Canadian Plains. *Evolutionary Anthropology: Issues, News, and Reviews* 22(3):139–144. DOI:10.1002/evan.21354.

Whittaker, John C.

2010 Weapon Trials: The Atlatl and Experiments in Hunting Technology. In *Designing Experimental Research in Archaeology: Examining Technology through Production and Use*, edited by Jeffrey R. Ferguson. University Press of Colorado, Boulder.

Whittaker, John C., Devin B. Pettigrew, and Ryan J. Grohsmeyer

2017 Atlatl Dart Velocity: Accurate Measurements and Implications for Paleoindian and Archaic Archaeology. *PaleoAmerica* 3(2):161–181.
DOI:10.1080/20555563.2017.1301133.

WHO MIGHT BE INTERESTED IN THIS ISSUE? HAVE YOU COMMUNICATED WITH ANY OTHER INTERESTED PARTIES? WHAT INPUT HAVE YOU RECEIVED?	
<p>Hunters and non-hunters who are interested in ancient hunting technology have worked to legalize atlatl hunting in other states (See the history of the legalization effort in MO and annual reports at the bottom of this page: https://worldatlatl.org/about-atlatls/modern-sport/). In Colorado I have communicated with the organizers the Laughing Coyote Project, a primitive skills organization outside of Loveland, who have expressed keen interest in legalization of atlatls for hunting. Ten members of the World Atlatl Association also reside in Colorado, and the Cheyenne tribe has expressed interest in the atlatl.</p>	
ALTERNATIVES: PLEASE INDICATE THE PROBABLE OUTCOME IF THIS PETITION IS ACCEPTED, AS WELL AS THE IMPACT OF ALTERNATIVES TO THIS PETITION:	
<p>If this petition is accepted the outcome will most likely follow the effects of legalizing atlatl hunting for deer in Missouri. That is, legalization of atlatl hunting would attract both people who have done little hunting but are interested in ancient hunting technology, and experienced hunters who are looking for a new challenge. It therefore has potential to attract new hunters and provide an avenue for current hunters to learn more about ancient hunters. At first very few dedicated and interested hunters will attempt atlatl hunting, and interest will grow gradually.</p>	
PETITION PROPOSED BY:	Devin B. Pettigrew
PETITION WRITTEN BY:	Devin B. Pettigrew
DATE SENT TO THE COMMISSION:	10/29/2019