2007 Compound Hunting Bow Face-Off

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&
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www.ArcheryEvolution.com
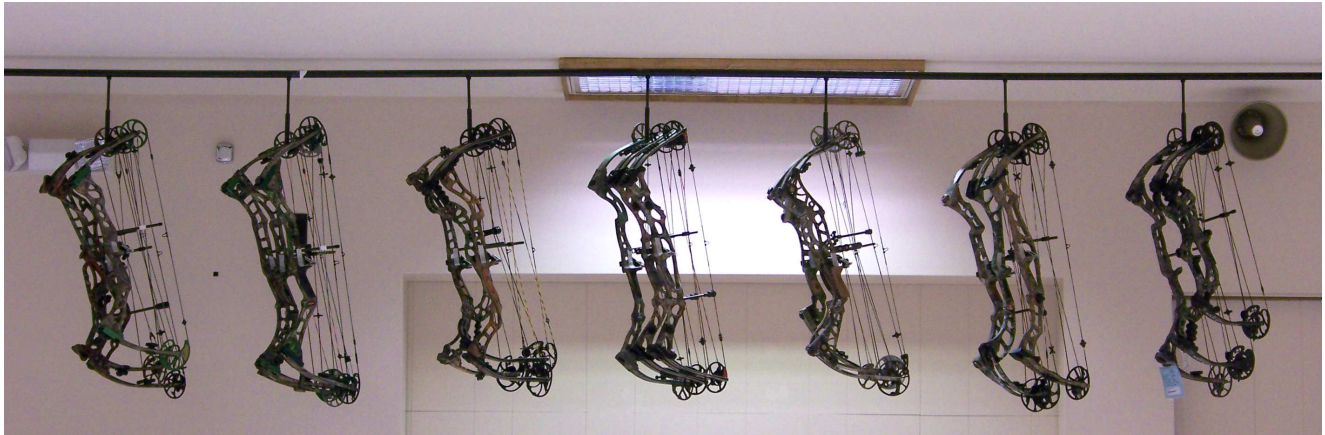
Introduction:

Welcome to the 2007 Compound Hunting Bow Face-Off. The focus of this event is **hunting** style Compound Bows that highlight the cutting edge of those products currently available in the archery marketplace. The goal is to provide those archers who enjoy hunting with appropriate objective information for aiding in the purchasing process. That being said, this evaluation is by no means conclusive; some tests could not be performed due to limitations in resources, time, or budget. Each archer should assess what is important to him or her and interpret the results accordingly. We hope that we have been able to address the objective issues concerning most "demanding" archers with regards to Compound Hunting Bows.

The test consists of **23** different compound hunting bows from **18** different companies for this evaluation. The goal of this evaluation is to provide information on bows throughout the price spectrum. We hope you enjoy the results and find the information provided to be both useful and helpful in your quest to find the best compound hunting bow for you!

Evaluators:

The individuals involved in this assessment have no affiliation with any of the participating companies. We do everything possible to remain objective throughout the testing process through the use of a Hooter Shooter shooting machine and other test equipment. We hope that this is reflected in the presentation of the results.

Participants:

The archery companies whose product was used during the Face-Off testing conduct are as follows:

- Alpine
- APA Innovations
- Bear
- Bowtech
- Darton
- Diamond
- Elite
- High Country
- Hoyt
- Lakota
- Martin
- Mathews
- Pearson
- PSE
- RedHead
- Reflex
- Ross
- Whisper Creek

Initial Conditions & Guidelines

Initial Conditions and Test Categories:

Each company was asked to provide the compound hunting bow that they felt best represented their company and would best suit the following categories:

- **Adaptability / Adjustability**
- **Efficiency**
- **Noise Output**
- **Mechanical Properties**
- **Vibration**

Note: The criteria outlined in this evaluation were deemed to be the important factors to consider for a compound bow. This evaluation in no way represents all areas that are important to archers. Personal experience and preference were used to derive these criteria. Also note that no subjective testing was performed. The evaluators recommend that anyone who is in the market for a compound bow shoot as many different makes / models as possible to determine what best suits their individual needs and desires.

Upon receiving each bow, a string loop of Brownell's .083" String Loop material is installed, after which the bow is set to precisely 29 inches in AMO draw length. An Easton Bow Force Mapper hand-held digital scale, adapted for use on a Hooter Shooter, is then used to set the peak draw weight to 60 pounds (averaged over 5 consecutive measurements). This draw weight is checked with Coffey Marketing Digital Game Scale to ensure consistency in the draw weight readings. Each bow is then fitted with a Spot-Hogg Premier arrow rest, after which paper tuning commences. For consistency, the Hooter Shooter is used during the draw-length, draw-weight and paper tuning process to reduce human induced errors. After completion of the paper tuning process, performance testing based on the test categories can begin.

For the performance tests, 300 grain Speed Pro Max Ultra Lite 5.5 GPI carbon arrows, Carbon Express Maxima Hunter 250 360 grain carbon arrows, Victory Archery VForce 400 420 grain carbon arrows, and 540 grain Easton XX75 2514 aluminum arrows are utilized. All weights are verified an Easton Advanced Grain Scale and confirmed with a Coffey Marketing US Reloader Digital Pocket Scale. The Speed Pro arrows are outfitted with three 1.8 inch Duravanes, with the Carbon Express Arrows utilizing three 2 inch QuickSpin Speed Hunters. The Victory and Easton arrows are outfitted with three 4 inch Duravanes. A Hooter Shooter is used throughout the performance testing to minimize human induced errors. The Easton Bow Force Mapper Professional Chronograph was used for all speed measurements in conjunction with the Model 35 Proof Chronograph from Oehler Research for confirmation. For further details on testing procedures and equipment, please see the individual sections for each test category.

Note: The Easton Professional Chronograph was used primarily for its ability to display speeds down to the tenth of a foot per second. Both chronographs consistently provided speed measurement within 1 fps of one another.

Each bow is evaluated on the 5 objective criteria outlined below. With the exception of Adaptability / Adjustability which is excluded from the overall test result calculations and presented for informational purposes only, each test category is equally weighted for providing the overall results of the Face-Off. A separate spreadsheet is provided to allow the individual to customize the weighting of each category to what he or she feels is important in a compound hunting bow.

Test Category	Assessment
Adaptability / Adjustability	Provides an indication of how "customizable" a bow is through the range of draw weights, lengths, etc. as well as finish options and other available configurations (**Note:** Not included in Overall Performance / Bang for the buck Best Picks)
Dynamic Efficiency	Provides an indication of the amount of energy output by a bow relative to the energy expended through drawing the bow back. An assessment is made with 300, 360, 420 and 540 grain arrows
Speed per inch of Power Stroke	Provides an indication of the amount of speed output by the bow over the distance from the valley to the static brace height position. An assessment is made with 300, 360, 420 and 540 grain arrows
Noise Output	Provides an indication of the noise output characteristics of a bow at the "point blank" range utilizing a series of shots with 300, 360, 420 and 540 grain arrows
Vibration	Provides an indication of the vibration characteristics of a bow during and after shot execution utilizing a series of shots with 300, 360, 420 and 540 grain arrows

2007 Compound Hunting Bow
Face-Off Sponsors

Special Thanks to each of our sponsors. Without them, none of this would have been possible.

Brownell Archery: Provided the .083" Nylon Rope for string loops, which helped to maintain consistency for each bow and allowed for use of the Hooter Shooter.

Lancaster Archery Supply: Special thanks to Rob Kaufhold and Chad "Moose" Whitmoyer for providing unlimited use of facilities and equipment; you couldn't ask for better people to work with!

Bass Pro Shops: Special thanks to Mike Hacker at the Auburn Bass Pro Shops who provided use of two RedHead bows for use in testing.

Rinehart: Provided the 18-1 Rinehart Block for use throughout performance testing. These targets hold up so well that, although 4 targets were provided, only one was needed throughout the whole test!

Carbon Express: Provided Maxima 250 arrows weighing 360 grains for use throughout performance testing. The weight forward design of these arrows provided a unique setup for this test.

Spot-Hogg: Special thanks to Kris Christensen who provided Premier arrow rests for each bow. The use of these arrow rests allowed for easy adjustment during initial setup and paper-tuning and helped to maintain consistency in bow setup.

Victory Archery: Special thanks to Bart Lawhorn who acquired and built VForce 400 arrows in 420 grains weights. The weight tolerance on these arrows was very tight and the arrows themselves are great!

Bows Tested

Alpine Silverado
Contact Info: **Alpine Archery**
      www.alpinearchery.com

MSRP:	$689.00	**Draw Length:**	27" - 30"
Cams:	Velocitec Cam	**Draw Weight:**	60, 70
Limbs:	Bi-Flex Composite	**Brace Height:**	7 1/4"
Grip:	One piece rose wood	**Axle to Axle:**	32"
Let-off:	80%, 65%	**Mass Weight:**	4.98
String:	Stone Mountain Bow Strings D75		
Damping:	Rimflex Dampeners		
Finish:	Realtree Hardwoods Green HD		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	309.1	63.6	13.2
360 Gns.:	286.5	65.6	14.7
420 Gns.:	268.3	67.1	16.1
540 Gns.:	239.9	69.0	18.5
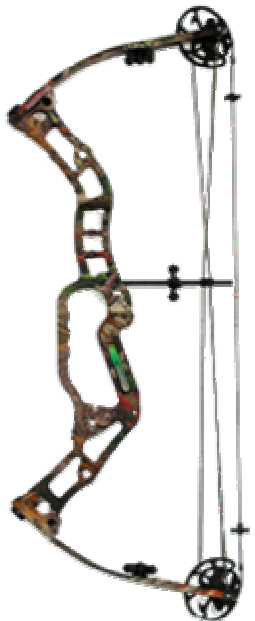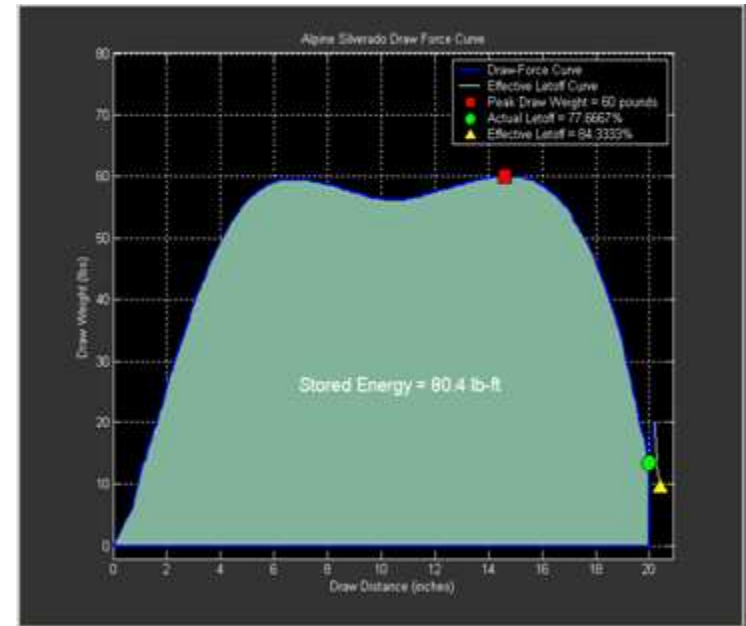
APA Black Mamba X2
Contact Info: **APA Innovations**
      www.apaarchery.com

MSRP:	$824.00	**Draw Length:**	25" - 31"
Cams:	Venom Twin Cam	**Draw Weight:**	50 - 80
Limbs:	Composite	**Brace Height:**	7 1/16"
Grip:	2 piece laminated wood	**Axle to Axle:**	33 7/8"
Let-off:	70%	**Mass Weight:**	4.82
String:	VaporTrail		
Damping:	BowJax dampeners, optional string suppressor		
Finish:	Skyline Camo		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	311.2	64.5	13.3
360 Gns.:	288.1	66.3	14.8
420 Gns.:	268.4	67.2	16.1
540 Gns.:	240.3	69.2	18.5
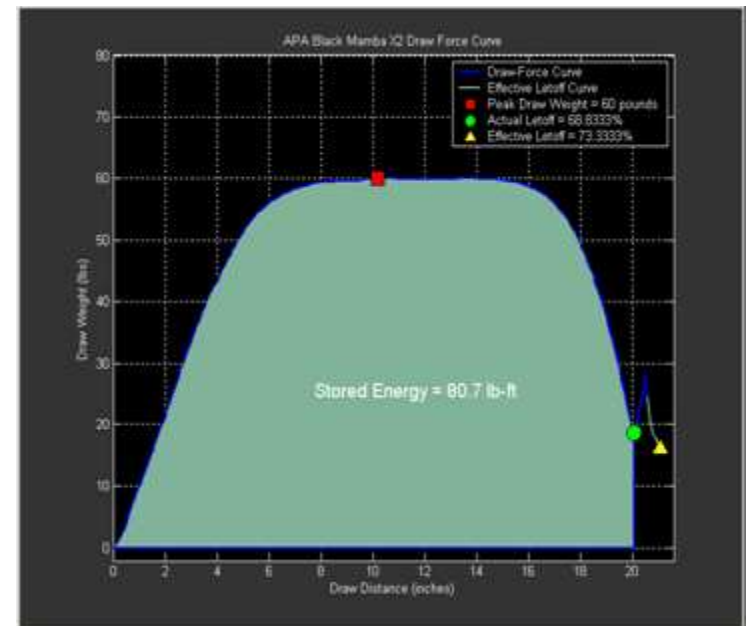
Bows Tested

Bear Instinct

Contact Info: Bear Archery

www.beararcheryproducts.com

MSRP:	$399.99	**Draw Length:**	23"-30"
Cams:	Per. Weight. Single Cam	**Draw Weight:**	50,60,70
Limbs:	Composite	**Brace Height:**	7 1/16"
Grip:	2 piece laminated wood	**Axle to Axle:**	30"
Let-off:	75%	**Mass Weight:**	4.6
String:	Tech Twist Green and Brown BCY Dynaflight 97		
Damping:	Sims® Dampening and Leeches		
Finish:	Realtree HardwoodsGreen® HD™		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	270.4	48.7	11.6
360 Gns.:	251.7	50.6	12.9
420 Gns.:	236.4	52.1	14.2
540 Gns.:	213.6	54.7	16.5
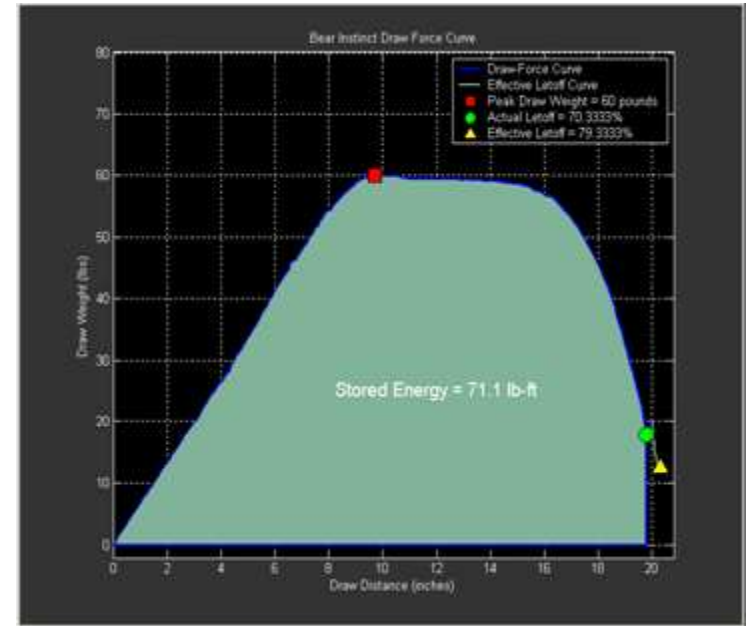
Bear Truth

Contact Info: Bear Archery

www.beararcheryproducts.com

MSRP:	$549.99	**Draw Length:**	23"-30"
Cams:	Ellipt./Per. Weighted	**Draw Weight:**	50,60,70
Limbs:	Compression Molded	**Brace Height:**	7"
Grip:	2 piece wood laminate	**Axle to Axle:**	30"
Let-off:	75%	**Mass Weight:**	4.6
String:	Tech Twist Green and Orange BCY 8125/452X		
Damping:	Sims® Dampening and Leeches		
Finish:	New Mossy Oak® Break-up		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	292.5	57.0	12.5
360 Gns.:	270.7	58.6	13.9
420 Gns.:	252.5	59.4	15.2
540 Gns.:	225.4	60.9	17.4
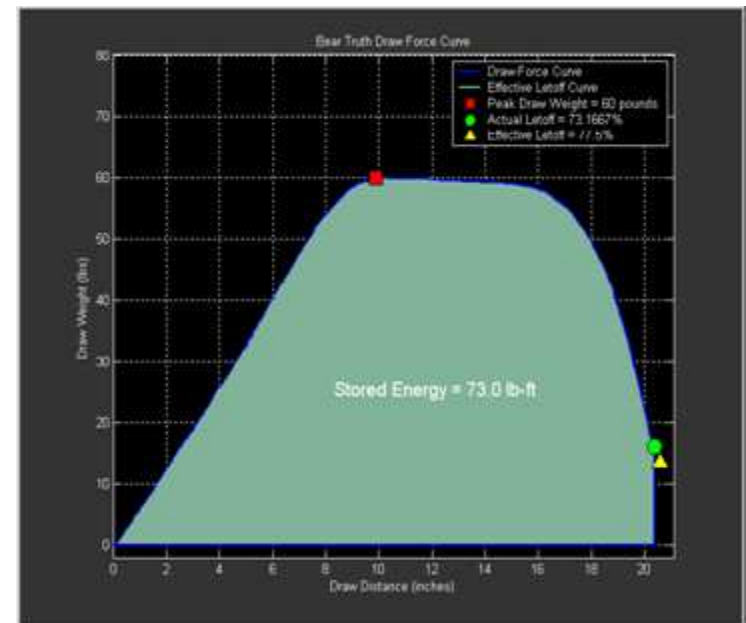
Bows Tested

Bowtech Guardiam

Contact Info: Bowtech Archery
                    www.bowtecharchery.com

MSRP:	$799	**Draw Length:**	25"-30½"
Cams:	Center Trac Binary Cam	**Draw Weight:**	50,60,70
Limbs:	Composite Center Pivot	**Brace Height:**	7 1/8"
Grip:	Laminate two piece	**Axle to Axle:**	33 3/4"
Let-off:	65%-80%	**Mass Weight:**	5.00
String:	BCY 452X		
Damping:	Hush Kit		
Finish:	Realtree Hardwoods Green® HD™		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	300.9	60.3	12.9
360 Gns.:	278.7	62.1	14.3
420 Gns.:	260.4	63.2	15.6
540 Gns.:	233.4	65.3	18.0
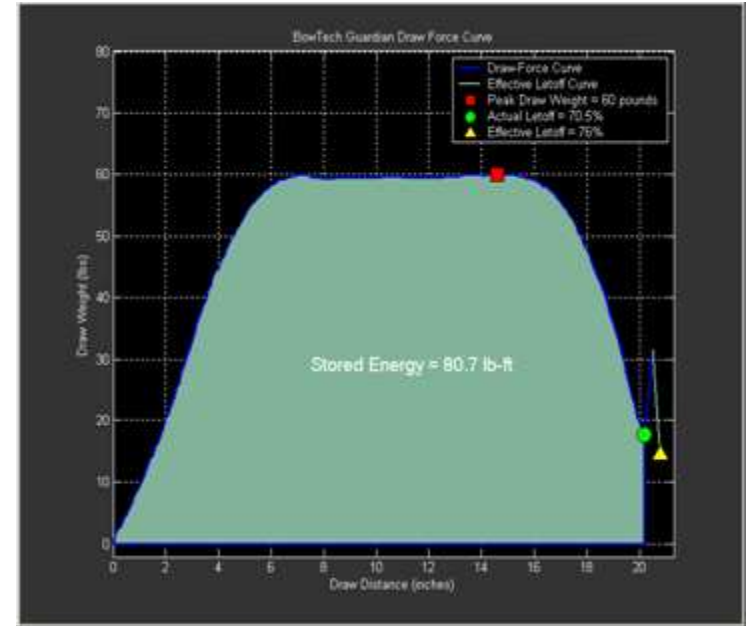
Darton Pro3000

Contact Info: Darton Archery
                    www.dartonarchery.com

MSRP:	$825	**Draw Length:**	25"-30"
Cams:	2 1/2 Cam	**Draw Weight:**	50,60,70
Limbs:	Gordon PowerTuff	**Brace Height:**	6 1/4"
Grip:	Vibra-grip	**Axle to Axle:**	34 1/2"
Let-off:	80%	**Mass Weight:**	4.94
String:	452X		
Damping:	Limbsavers		
Finish:	Realtree Hardwoods Green®		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	309.7	63.9	13.3
360 Gns.:	285.7	65.3	14.7
420 Gns.:	267.0	66.5	16.0
540 Gns.:	238.4	68.1	18.4
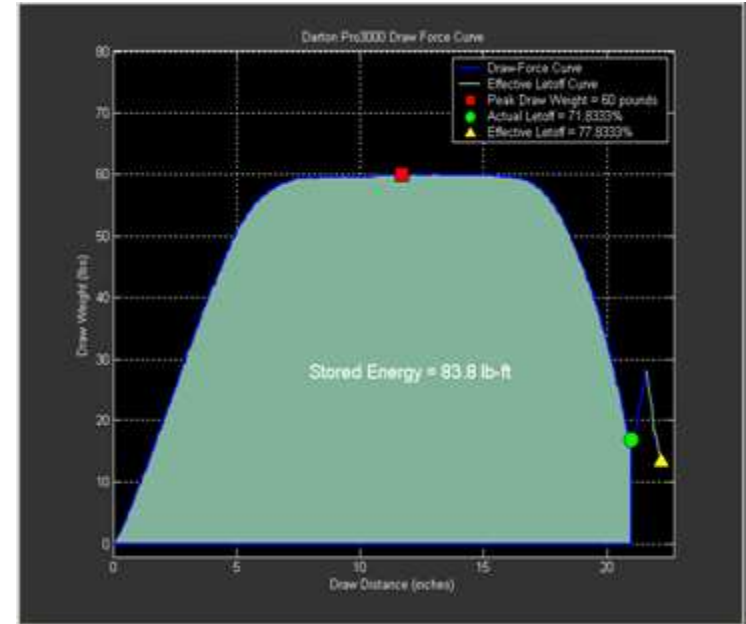
Bows Tested

Diamond Black Ice
Contact Info: Diamond Archery
www.diamondaarchery.com

MSRP:	$699	**Draw Length:**	26"-30"
Cams:	Pinnacle Cam	**Draw Weight:**	50,60,70
Limbs:	Composite	**Brace Height:**	7 1/2"
Grip:	2 piece wood grip	**Axle to Axle:**	31 3/4"
Let-off:	65%-80%	**Mass Weight:**	4.26
String:	BCY 452X		
Damping:	Hush Kit		
Finish:	Mossy Oak NEW Break Up™		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	291.6	56.6	12.5
360 Gns.:	269.1	57.9	13.8
420 Gns.:	251.2	58.8	15.1
540 Gns.:	224.1	60.2	17.3
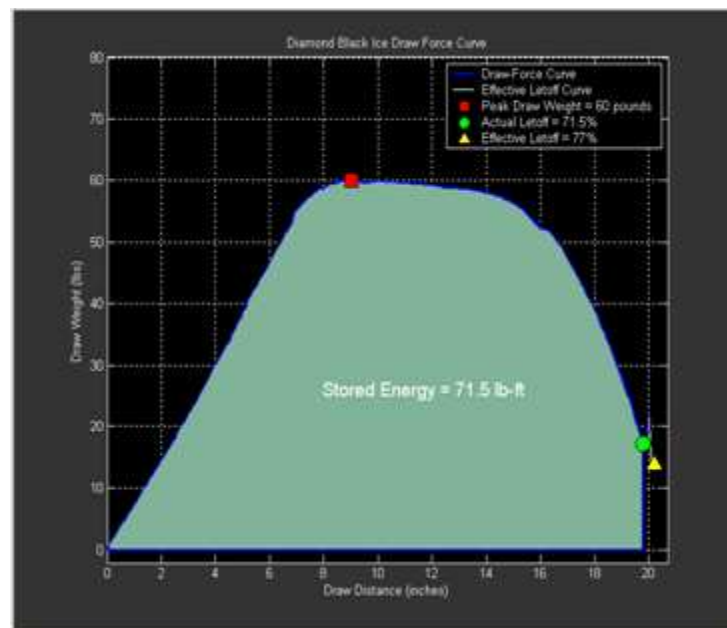
Doc's Sweet Demise by Whisper Creek
Contact Info: Whisper Creek Archery
www.whispercreekarchery.com

MSRP:	$549, $539 in black	**Draw Length:**	25" - 30"
Cams:	HyperFORCE One-Cam	**Draw Weight:**	50,60,70
Limbs:	Gordon Glass	**Brace Height:**	7"
Grip:	5 different options	**Axle to Axle:**	31"
Let-off:	65% or 80%	**Mass Weight:**	4.56
String:	Stone Mountain Custom Bow Strings		
Damping:	String Leeches		
Finish:	Realtree™ HD Green		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	286.1	54.5	12.3
360 Gns.:	264.5	55.9	13.6
420 Gns.:	248.3	57.5	14.9
540 Gns.:	222.7	59.5	17.2
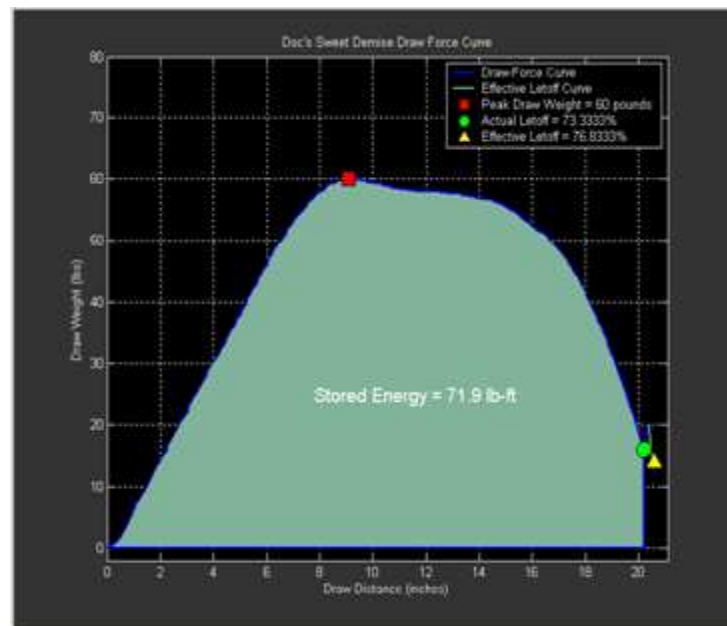
Bows Tested
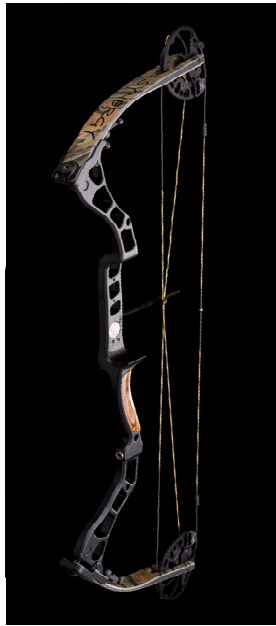
Elite Synergy

Contact Info: Elite Archery

www.elitearchery.com

MSRP:	$659	**Draw Length:**	27" - 30"
Cams:	K8 Cams	**Draw Weight:**	60-90
Limbs:	13" Barnsdale 5 Layer	**Brace Height:**	7"
Grip:	Minimal torque grip	**Axle to Axle:**	33 1/4"
Let-off:	60%-80%	**Mass Weight:**	4.62
String:	Vapor Trail, 452x		
Damping:	Bow Jax MonsterJax on pockets		
Finish:	E-leaf camo		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	311.0	64.4	13.3
360 Gns.:	287.4	66.0	14.8
420 Gns.:	267.9	66.9	16.1
540 Gns.:	238.7	68.3	18.4

Elite Synergy Draw Force Curve

- Draw-Force Curve
- Effective Letoff Curve
- Peak Draw Weight = 60 pounds
- Actual Letoff = 74.8333%
- Effective Letoff = 80.3333%

Stored Energy = 81.5 lb-ft
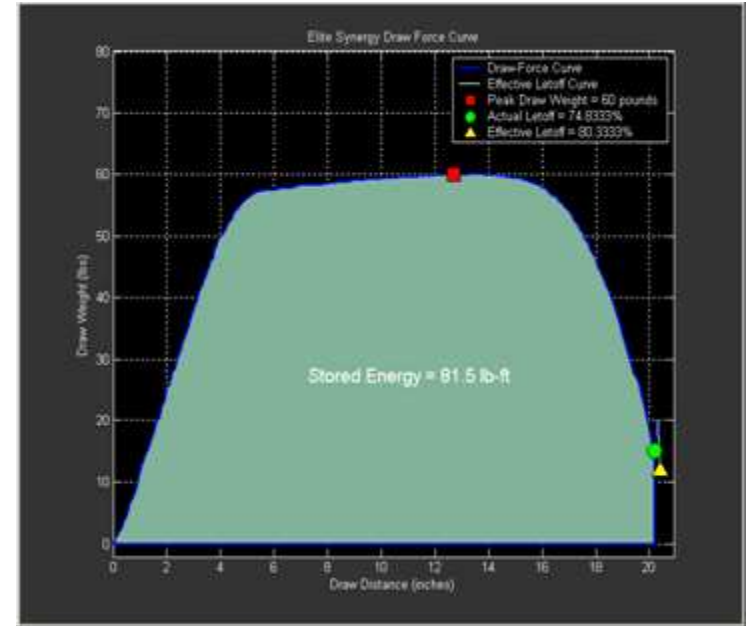
High Country Iron Mace

Contact Info: High Country Archery

www.highcountryarchery.com

MSRP:	$699	**Draw Length:**	27"-31"
Cams:	Trinary Cam	**Draw Weight:**	60-70
Limbs:	13" Barnsdale Laminate	**Brace Height:**	7 3/8"
Grip:	One Piece, Black Walnut	**Axle to Axle:**	33 1/2"
Let-off:	60%-85%	**Mass Weight:**	4.3
String:	Winner's Choice		
Damping:	Bowjax Limb & String Dampening System		
Finish:	Realtree Hardwood , Green HD		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	309.4	63.7	13.3
360 Gns.:	286.4	65.5	14.7
420 Gns.:	267.6	66.8	16.1
540 Gns.:	238.2	68.0	18.4

High Country Iron Mace Draw Force Curve

- Draw-Force Curve
- Effective Letoff Curve
- Peak Draw Weight = 60 pounds
- Actual Letoff = 62%
- Effective Letoff = 70.6667%

Stored Energy = 78.2 lb-ft
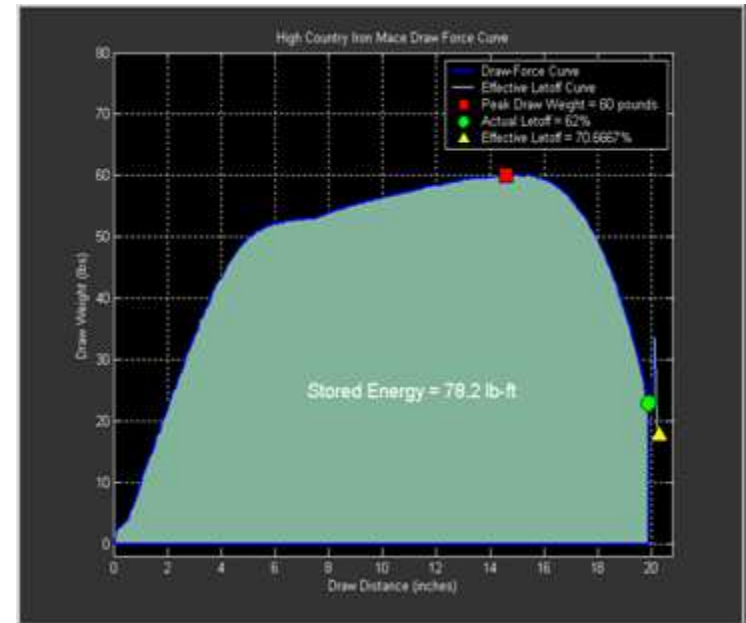
Bows Tested

Hoyt Vectrix

Contact Info: Hoyt
www.hoyt.com

MSRP:	$749	**Draw Length:**	25"-31"
Cams:	Vector Cam 1/2	**Draw Weight:**	40-80
Limbs:	Laminate Split Limbs	**Brace Height:**	7"
Grip:	Pro-fit Custom Grip	**Axle to Axle:**	33"
Let-off:	65%, 75%	**Mass Weight:**	5.28
String:	Fuse strings & cables		
Damping:	Alpha,Riser, and string shox, stealth shot		
Finish:	Realtree Hardwoods Green HD		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	303.1	61.2	13.0
360 Gns.:	280.3	62.8	14.4
420 Gns.:	262.4	64.2	15.7
540 Gns.:	234.3	65.8	18.1
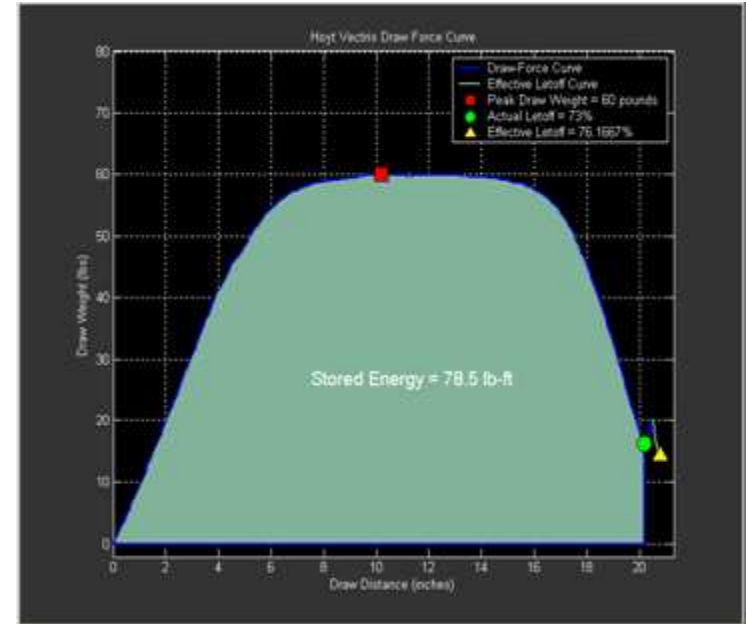
Hoyt Vulcan

Contact Info: Hoyt
www.hoyt.com

MSRP:	$789	**Draw Length:**	24"-30"
Cams:	Vector Cam 1/2	**Draw Weight:**	40-80
Limbs:	Laminate Split Limbs	**Brace Height:**	6"
Grip:	Pro-fit Custom Grip	**Axle to Axle:**	33"
Let-off:	65%, 75%	**Mass Weight:**	5.08
String:	Fuse strings & cables		
Damping:	Alpha Shox,Riser Shox,String Shox, Stealth Shot		
Finish:	Realtree Hardwoods Green HD		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	311.4	64.6	13.3
360 Gns.:	289.7	67.1	14.9
420 Gns.:	270.7	68.3	16.2
540 Gns.:	242.2	70.3	18.7
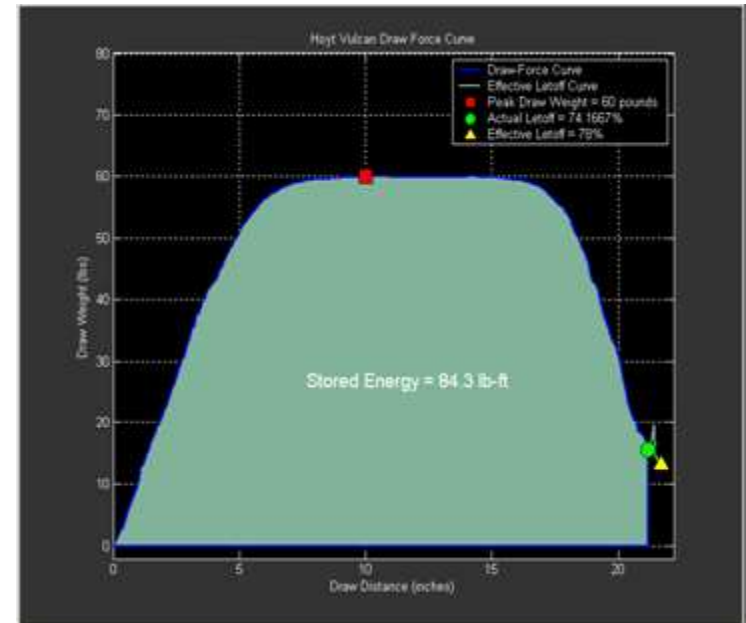
Bows Tested

Lakota Thunder

Contact Info: Lakota Industries
                         www.lakotaarchery.com

MSRP:	$495	**Draw Length:**	27" - 30"
Cams:	Dual Cams	**Draw Weight:**	50-70
Limbs:	Barnsdale laminate	**Brace Height:**	6"
Grip:	2 piece wood grip	**Axle to Axle:**	32"
Let-off:	65% - 70%	**Mass Weight:**	3.96
String:	ProString by Shel Rosberg, 8125 BCY		
Damping:	BowJax & LimbJax		
Finish:	Montana Camo		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	307.4	62.9	13.2
360 Gns.:	285.4	65.1	14.7
420 Gns.:	267.5	66.7	16.1
540 Gns.:	240.6	69.4	18.6

Lakota Thunder Draw Force Curve

Draw-Force Curve
Effective Letoff Curve
Peak Draw Weight = 60 pounds
Actual Letoff = 58.3333%
Effective Letoff = 67.3333%

Stored Energy = 85.7 lb-ft
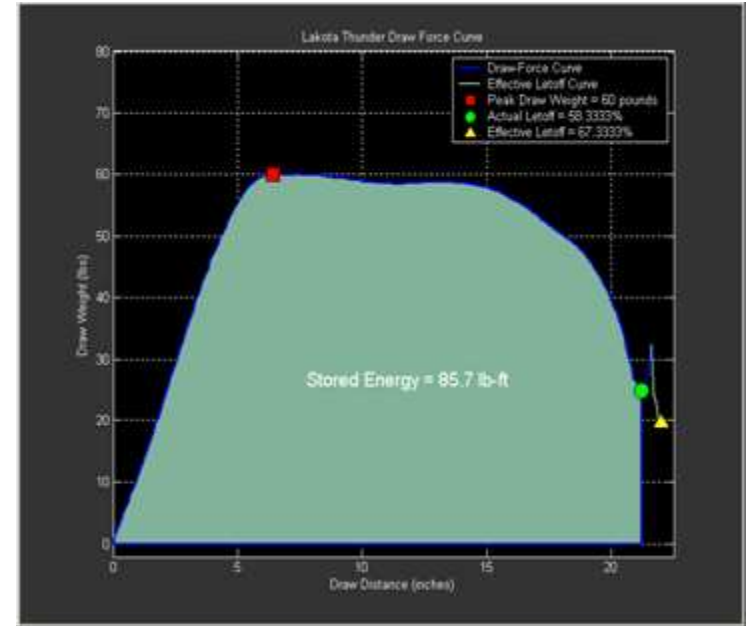
Martin Bengal

Contact Info: Martin Archery
                         www.martinarchery.com

MSRP:	$399	**Draw Length:**	25"-30"
Cams:	M-Pro Single Cam	**Draw Weight:**	50,60,70
Limbs:	Core Flex Tri Laminate	**Brace Height:**	7"
Grip:	Thermal & II, and Elite	**Axle to Axle:**	32"
Let-off:	65%, 80%	**Mass Weight:**	4.84
String:	Double Helix String, Proprietary BCY Blend		
Damping:	Omega V.E.M.		
Finish:	Realtree AP		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	285.4	54.2	12.2
360 Gns.:	264.8	56.0	13.6
420 Gns.:	248.9	57.8	14.9
540 Gns.:	223.6	59.9	17.2

Martin Bengal Draw Force Curve

Draw-Force Curve
Effective Letoff Curve
Peak Draw Weight = 60 pounds
Actual Letoff = 71.1667%
Effective Letoff = 76.1667%

Stored Energy = 72.2 lb-ft
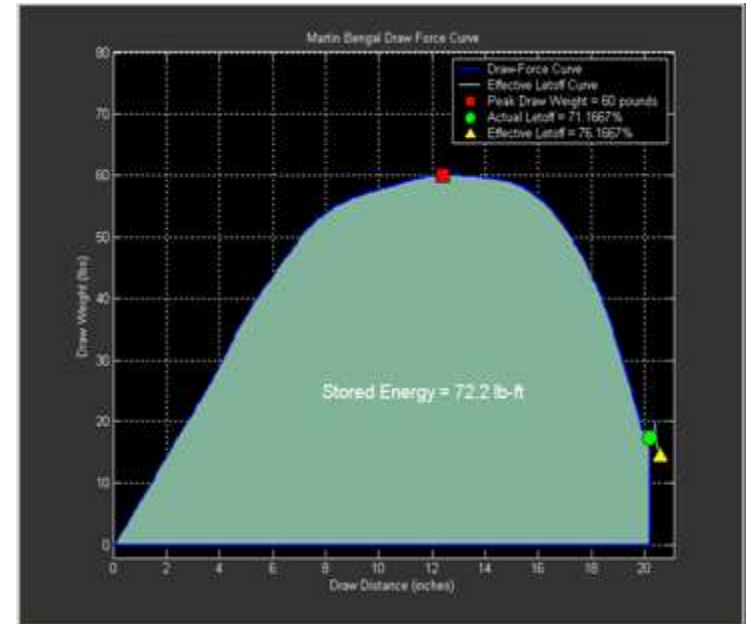
Bows Tested

Mathews Drenalin

Contact Info: Mathews Inc.

www.mathewsinc.com.com

MSRP:	$849	**Draw Length:**	27.5-31.5"
Cams:	Drenalin Cam	**Draw Weight:**	40-70
Limbs:	SE3 Composite	**Brace Height:**	7"
Grip:	Inline 1 piece grip	**Axle to Axle:**	33"
Let-off:	65%, 80%	**Mass Weight:**	3.84
String:	Zebra Barracuda String		
Damping:	Harmonic Dampeners, String Suppressors		
Finish:	Realtree All Purpose Repeat		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	305.1	62.1	13.1
360 Gns.:	282.1	63.6	14.5
420 Gns.:	263.1	64.5	15.8
540 Gns.:	233.3	65.2	18.0
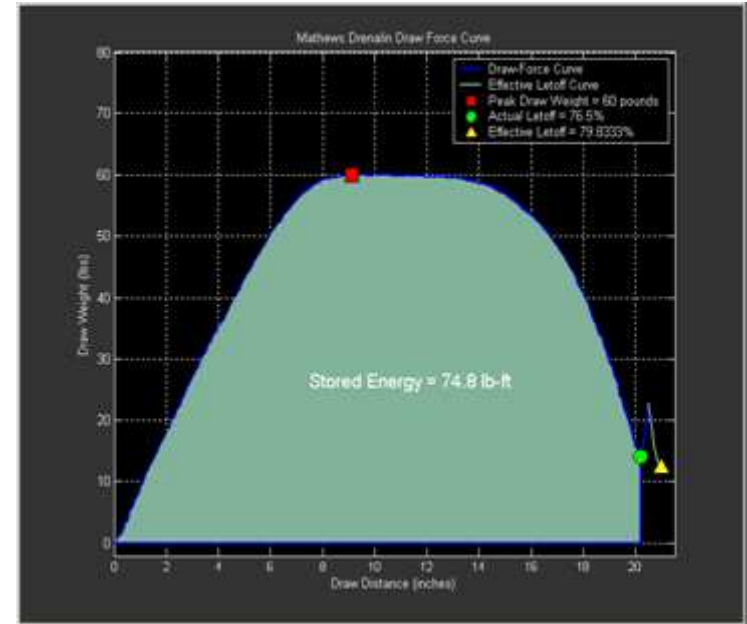
Pearson Z-34

Contact Info: Pearson Archery

www.benpearsonarchery.com

MSRP:	$599	**Draw Length:**	27.5-31.5"
Cams:	PTFE Z-7 Cam	**Draw Weight:**	50,60,70
Limbs:	Barnsdale laminated	**Brace Height:**	7 1/4"
Grip:	Angel wing	**Axle to Axle:**	34 1/4"
Let-off:	75%	**Mass Weight:**	4.64
String:	Stone Mountain Dakota Bow Strings		
Damping:	Bowjax, LimJax		
Finish:	Realtree APG-HD		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	279.9	52.2	12.0
360 Gns.:	258.5	53.4	13.3
420 Gns.:	241.7	54.5	14.5
540 Gns.:	216.9	56.4	16.7
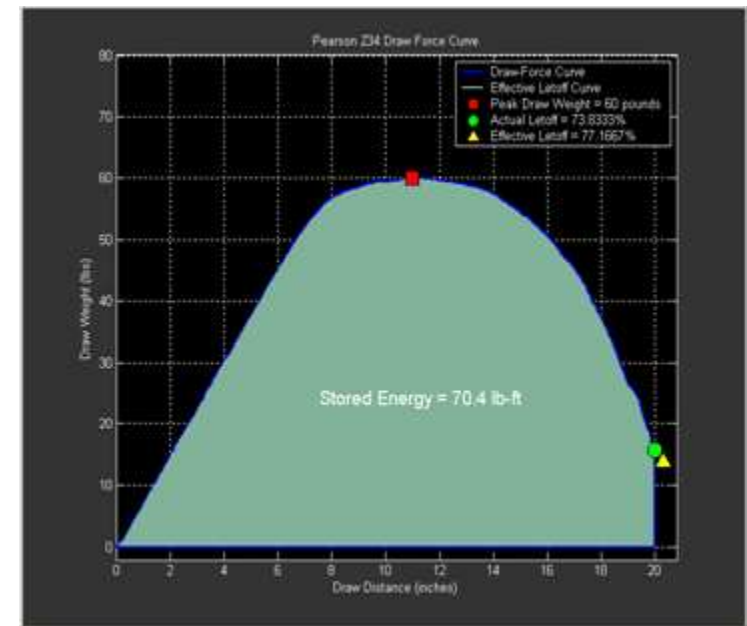
Bows Tested

PSE X-Force
Contact Info: **PSE Archery**
www.pse-archery.com

MSRP:	$799.99	**Draw Length:**	26" - 30"
Cams:	Hybrid Fast Cam	**Draw Weight:**	50-80
Limbs:	12" split limbs	**Brace Height:**	6"
Grip:	B.E.S.T. Grip	**Axle to Axle:**	33"
Let-off:	60%, 70%	**Mass Weight:**	4.38
String:	BCY 8125		
Damping:	Factory installed vibration dampeners		
Finish:	Mossy Oak Breakup		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	321.5	68.8	13.8
360 Gns.:	296.3	70.2	15.2
420 Gns.:	277.2	71.6	16.6
540 Gns.:	246.8	73.0	19.0
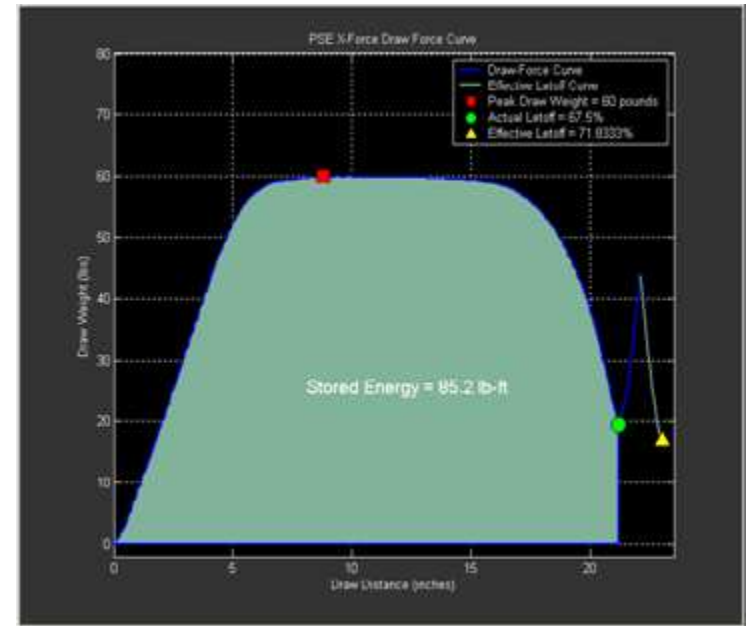
RedHead XP32
Contact Info: **Bass Pro Shops**
www.bassproshops.com

Retail:	$499.99	**Draw Length:**	27"- 30"
Cams:	Slam & 1/2	**Draw Weight:**	60,70
Limbs:	Parallel Split Limbs	**Brace Height:**	7 1/4"
Grip:	Full Wood grip	**Axle to Axle:**	31.5''
Let-off:	75%	**Mass Weight:**	4.26
String:	Unknown		
Damping:	Alpha Shox, Riser Shox, String Shox		
Finish:	Realtree Hardwoods		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	282.3	53.1	12.1
360 Gns.:	261.5	54.7	13.4
420 Gns.:	245.2	56.1	14.7
540 Gns.:	219.9	58.0	17.0
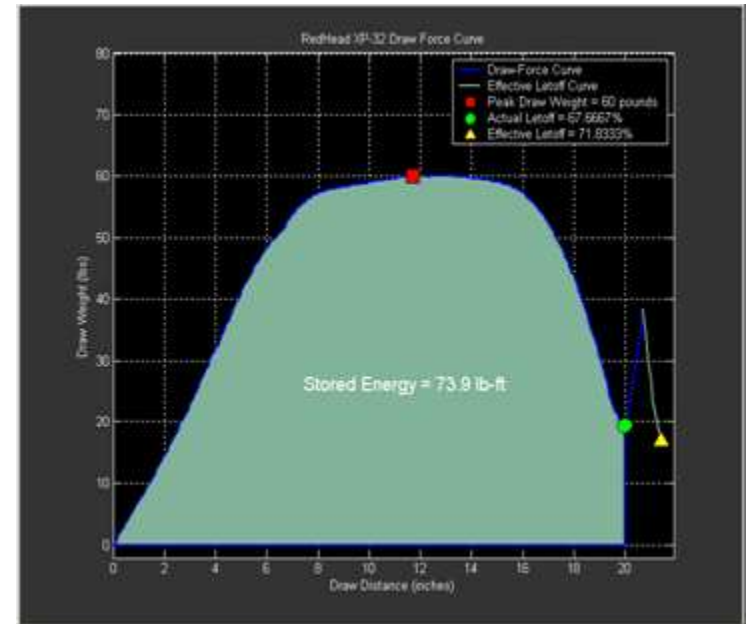
Bows Tested

Redhead XSC33

Contact Info: **Bass Pro Shops**
www.bassproshops.com

Retail:	$549.99	**Draw Length:**	28"-30"
Cams:	Extreme One-Cam	**Draw Weight:**	60, 70
Limbs:	Power-Tuff Parallel	**Brace Height:**	7 5/8"
Grip:	Low-Profile Walnut Grip	**Axle to Axle:**	32 1/4"
Let-off:	80%	**Mass Weight:**	4.04
String:	Premier ''Dakota'' String/Cable		
Damping:	Sims Limb Savers® and String Leeches		
Finish:	Realtree Hardwoods Green HD		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	278.2	51.6	11.9
360 Gns.:	257.0	52.8	13.2
420 Gns.:	241.8	54.5	14.5
540 Gns.:	216.5	56.2	16.7
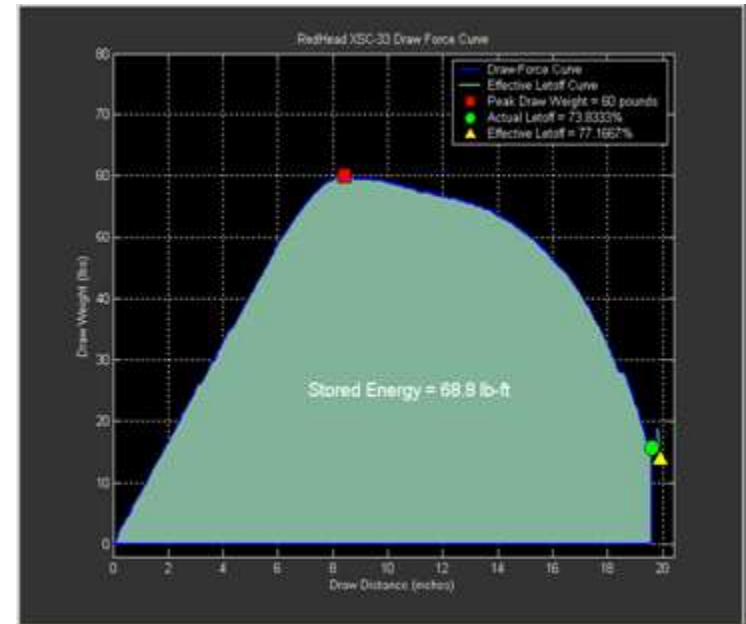
Reflex Ridgeline 34

Contact Info: **Reflex Archery**
www.reflexbow.com

MSRP:	$599	**Draw Length:**	27"-30"
Cams:	FX Cam 1/2	**Draw Weight:**	50,60,70
Limbs:	Parallel Split Limbs	**Brace Height:**	7 1/4"
Grip:	Custom wood grip	**Axle to Axle:**	34"
Let-off:	65%, 75%	**Mass Weight:**	5.24
String:	Fuse strings & cables		
Damping:	Alpha Shox, Riser Shox, String Shox		
Finish:	Realtree APG-HD		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	298.8	59.4	12.8
360 Gns.:	276.7	61.2	14.2
420 Gns.:	259.3	62.7	15.6
540 Gns.:	231.6	64.3	17.9
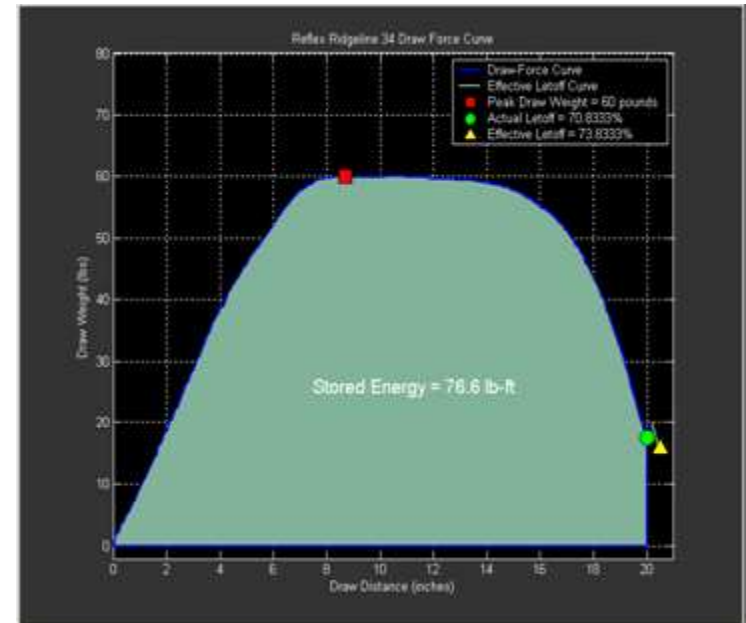
Bows Tested

Ross Cardiac
Contact Info: **Ross Archery**
  www.rossarchery.com

MSRP:	$729.99	**Draw Length:**	27" - 30"
Cams:	Cardiac Cam	**Draw Weight:**	50 – 80
Limbs:	Gordon Glass	**Brace Height:**	7"
Grip:	Two piece wood grip	**Axle to Axle:**	33"
Let-off:	80%	**Mass Weight:**	4.50
String:	Winner's Choice		
Damping:	Flatline		
Finish:	Realtree AP		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	285.8	54.4	12.2
360 Gns.:	254.2	55.8	13.6
420 Gns.:	247.3	57.0	14.8
540 Gns.:	221.4	58.8	17.1
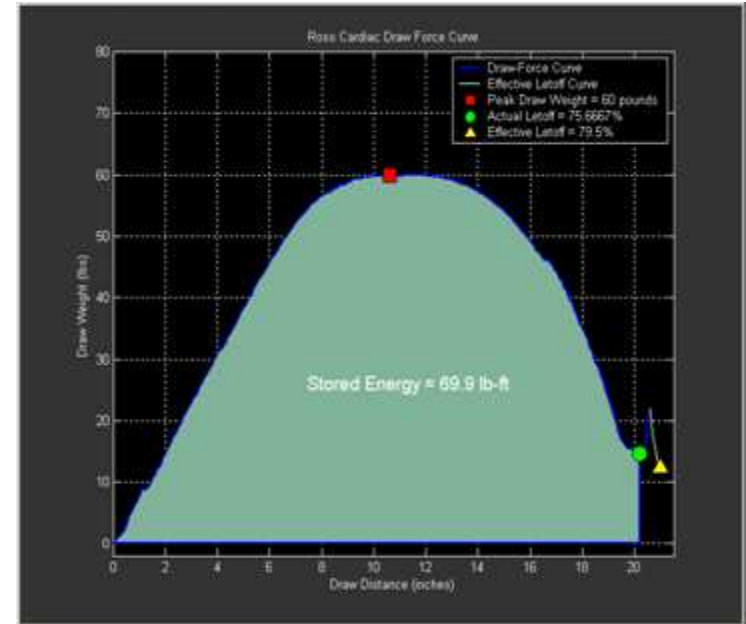
Whisper Creek Innovator Pro
Contact Info: **Whisper Creek Archery**
  www.whispercreekarchery.com

MSRP:	$819	**Draw Length:**	25" - 30"
Cams:	HyperFORCE One-Cam	**Draw Weight:**	50 – 70
Limbs:	Gordon Glass	**Brace Height:**	7"
Grip:	5 grip options	**Axle to Axle:**	31"
Let-off:	65%, 80%	**Mass Weight:**	5.00
String:	Stone Mountain Custom Bow Strings		
Damping:	Sims String Leeches		
Finish:	Realtree HD Green		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	286.2	54.6	12.3
360 Gns.:	264.1	55.7	13.6
420 Gns.:	247.9	57.3	14.9
540 Gns.:	222.0	59.1	17.1
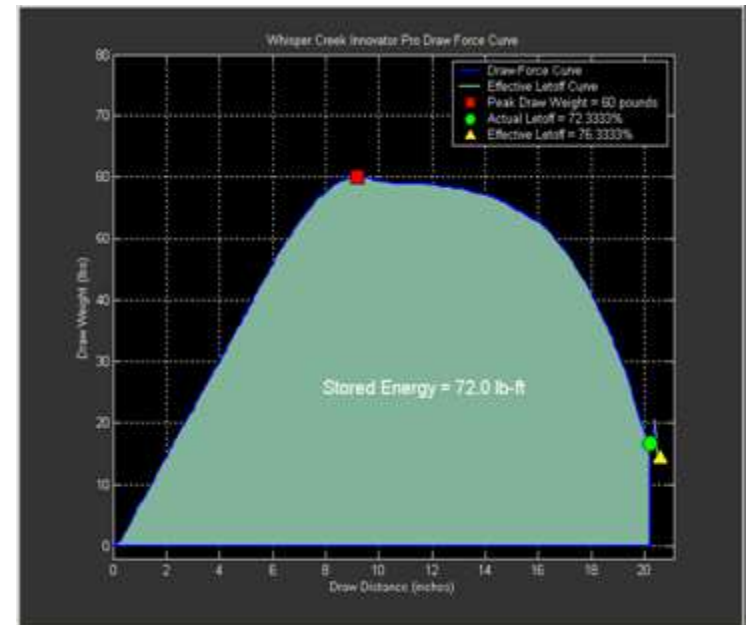
Whisper Creek Stealth LX

Contact Info: **Whisper Creek Archery**
www.whispercreekarchery.com

MSRP:	$449	**Draw Length:**	24" - 29"
Cams:	HyperFORCE One-Cam	**Draw Weight:**	40 - 70
Limbs:	Gordon Glass	**Brace Height:**	8"
Grip:	5 grip options	**Axle to Axle:**	25 5/8"
Let-off:	65%, 80%	**Mass Weight:**	4.00
String:	Stone Mountain Custom Bow Strings		
Damping:	Sims String Leeches		
Finish:	Realtree HD Green		

As Tested Performance (60 lbs, 29"):

	Speed	K.E.	Momentum
300 Gns.:	268.7	48.1	11.5
360 Gns.:	249.3	49.7	12.8
420 Gns.:	234.7	51.4	14.1
540 Gns.:	210.8	53.3	16.3

Whisper Creek Stealth LX Draw Force Curve

- Draw-Force Curve
- Effective Letoff Curve
- Peak Draw Weight = 60 pounds
- Actual Letoff = 75.5%
- Effective Letoff = 80%

Stored Energy = 66.4 lb-ft
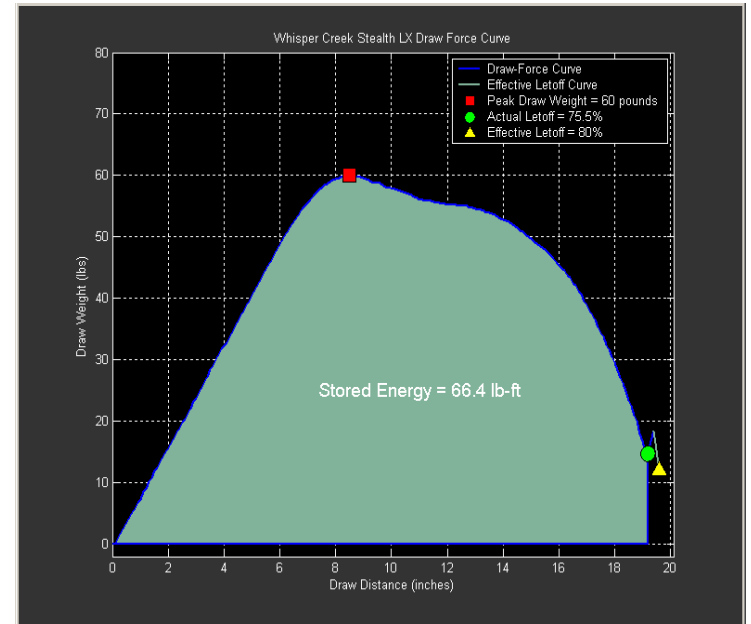
Force-Draw Curve Figures

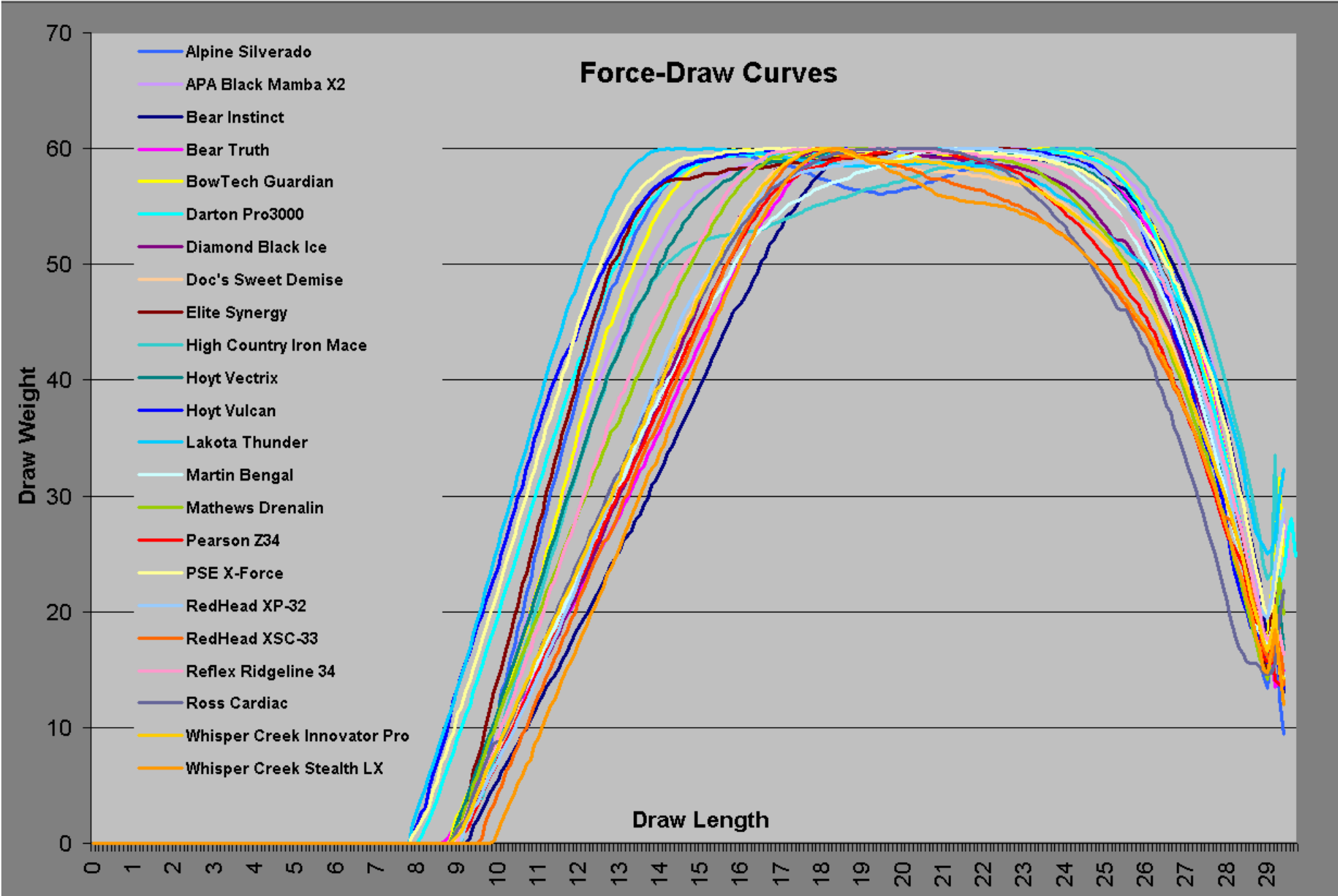**Figure 1 Force-Draw Curves, All Bows**

Force-Draw Curve Figures

Figure 2 Force-Draw Curves, Brace Height < 7"
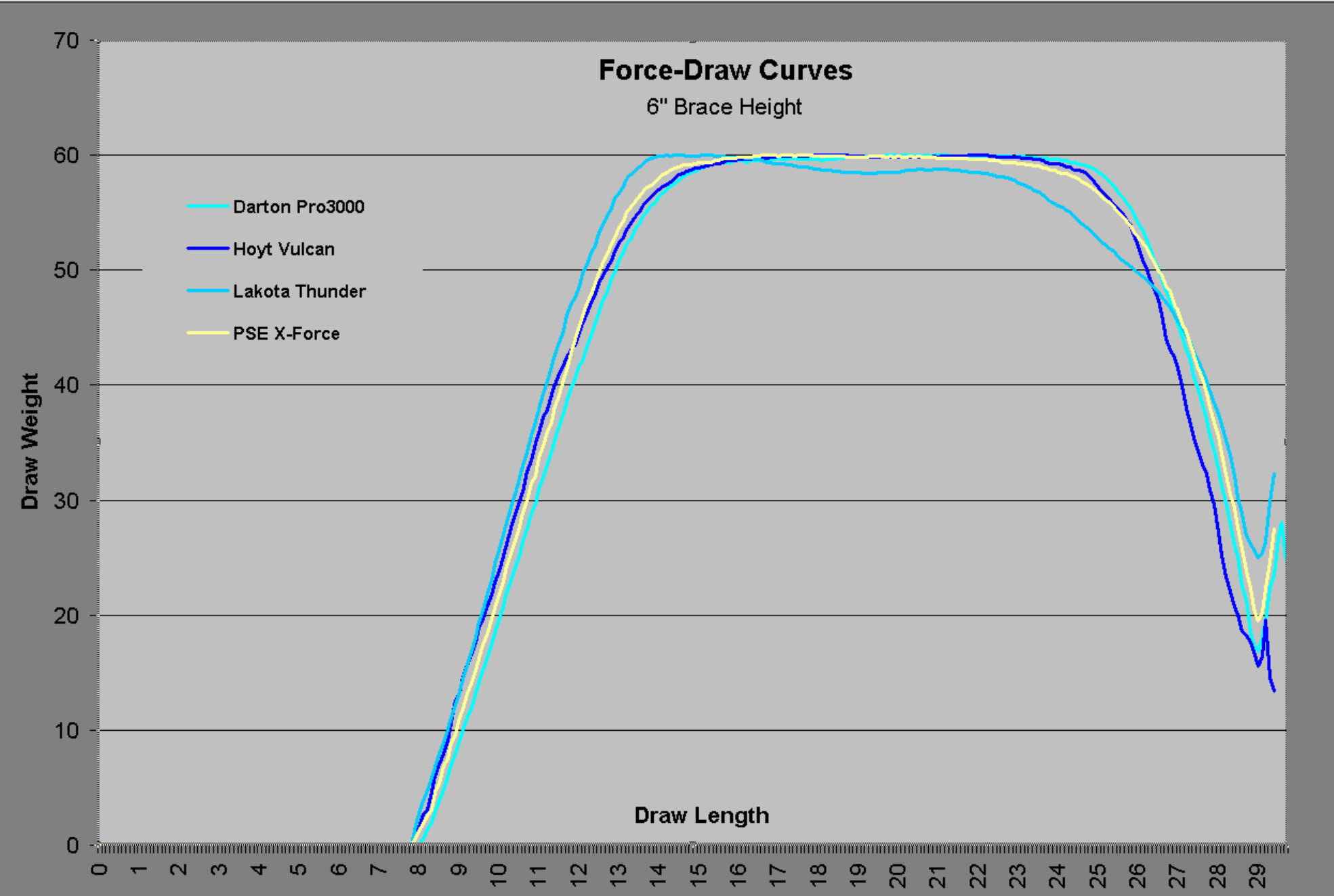
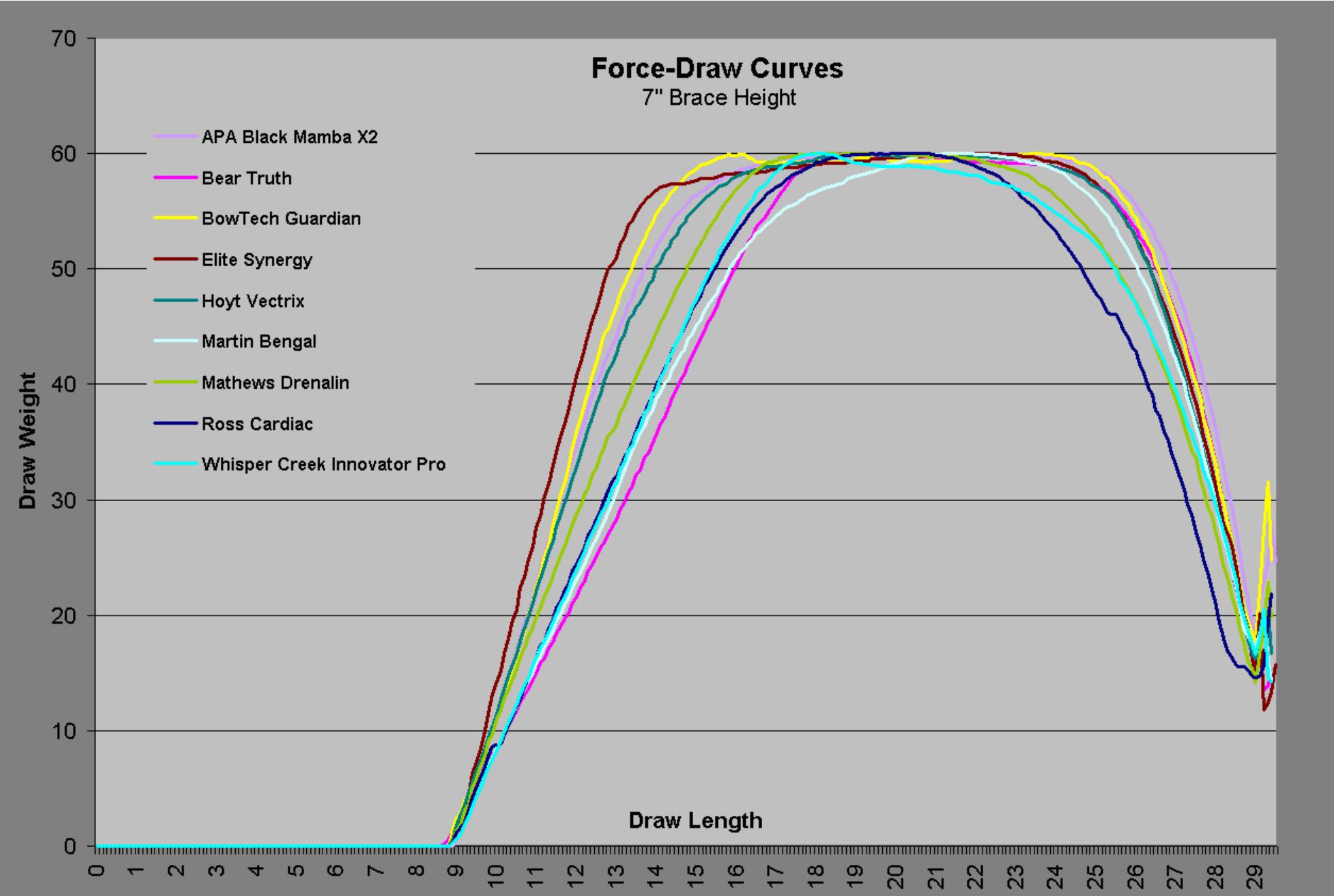# Force-Draw Curve Figures

Figure 3 Force-Draw Curves, Brace Height = 7"
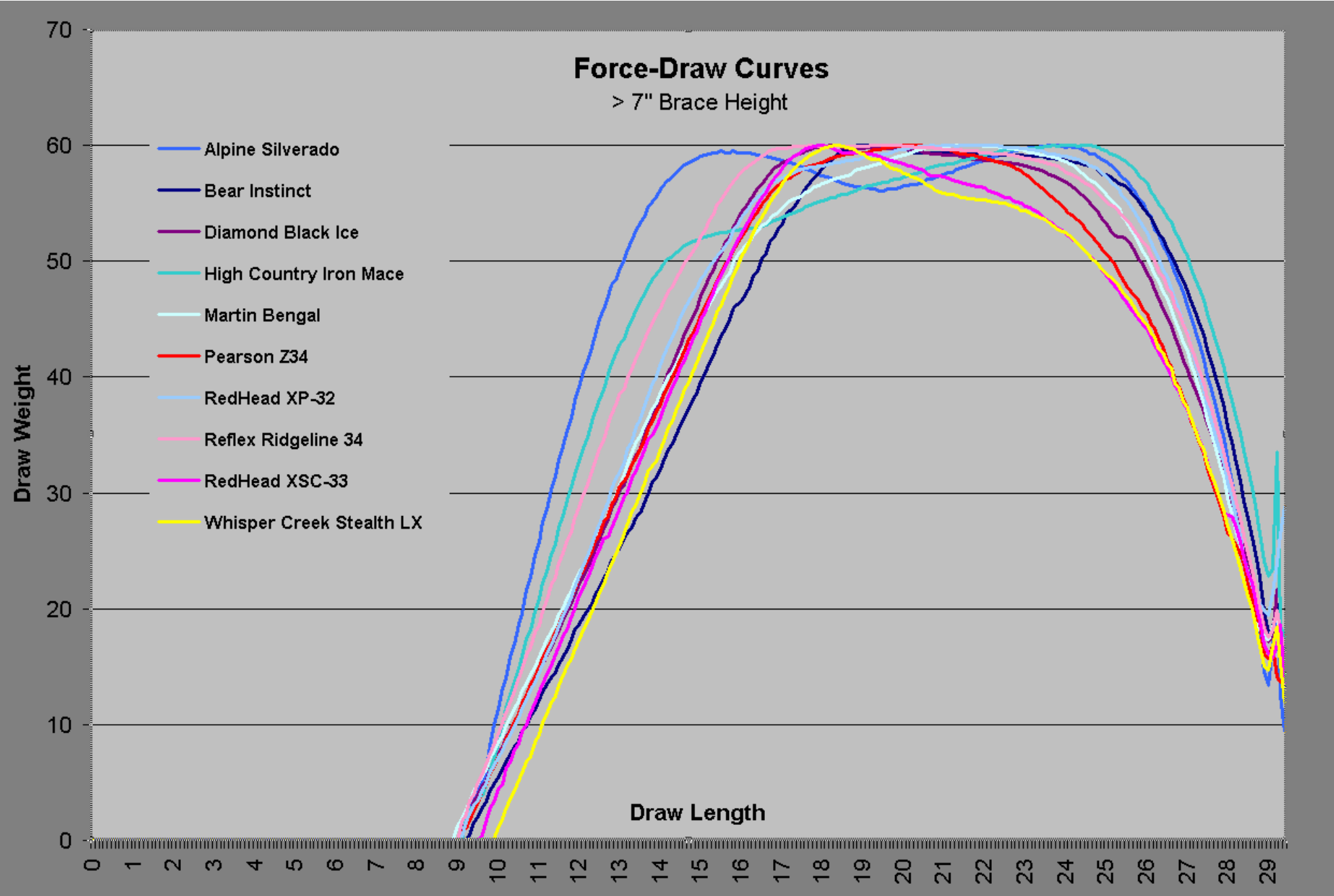
Force-Draw Curve Figures

Figure 4 Force-Draw Curves, Brace Height > 7"

Results at a Glance

Test Section	Adapt.	Dynamic Efficiency					Speed per inch of power stroke					Average Vibration					Noise Output				
Parameter	Adjust.	300 Grains	360 Grains	420 Grains	540 Grains	Average	300 Grains	360 Grains	420 Grains	540 Grains	Average	300 Grains	360 Grains	420 Grains	540 Grains	Average	300 Grains	360 Grains	420 Grains	540 Grains	Average
Bow	Points	%	%	%	%	%	fps/in	fps/in	fps/in	fps/in	fps/in	G	G	G	G	G	dBa	dBa	dBa	dBa	dBa
Alpine Silverado		6	5	4	3	5	2	2	2	1	2										
APA Black Mamba X2		4	4	5	3	4	3	2	3	3	3										
Bear Instinct												9		9			5	1	3	3	3
Bear Truth		8	8			9												5	5	5	4
Bowtech Guardian	4						7	7	9	6	8	1	1	1	1	1	1	3	2	1	1
Darton Pro3000													9	5	8	9	9	7	7	4	5
Diamond Black Ice	8	5	7	6	6	6						2	2	2	2	2	2	2	1	1	1
Doc's Sweet Demise	2											6									
Elite Synergy		6	6	7	9	7	3	4	4	4	4					6					
High Country Iron Mace		2	2	2	2	2	1	1	1	1	1										
Hoyt Vectrix	9	9	9	9	9	8	7	7	6	6	8					9					
Hoyt Vulcan	9												8	8	4	8					
Lakota Thunder																					
Martin Bengal	6																				
Mathews Drenalin		1	1	1	1	1	6	6	6	6	6	3	6			6					
Pearson Z-34																	8	8	9		
PSE X-Force	5	3	3	3	5	3	5	5	4	4	4	7	4	4	7	5	7	6	7	8	8
RedHead XP-32																					
RedHead XSC-33																	6	4	3		7
Reflex Ridgeline 34	7			8	8	9	9	7	5	9	8	4	3	6		4		9			
Ross Cardiac				7		9						5	5	3	3	3	4		6	6	6
Whisper Creek Innovator Pro	3											8		7	5	7	2			7	9
Whisper Creek Stealth LX	1												7							9	

Adaptability / Adjustability:

Objective: The objective of the Adaptability / Adjustability test is to provide information about possible upgrades, modifications, finishes or other customization options available as well as the range of adjustments that is standard for each bow tested. This help to assess the versatility of a given bow.

Rationale: The number of configurations, adaptations, or upgrades a given bow provides equates to the number of different applications a bow can be used for.

Procedure: Literature and information provided by each manufacturer, along with on-line research, were used to assess this category.

Assumptions: The more adjustable / adaptable a bow is to different configurations and setups, the more versatile and customizable, which can potentially increase marketability for future resale.

Note: This section of the report is provided for informational purposes only. It is not included in the overall results as each of the remaining test categories are objectively measured using test equipment. Adaptability / Adjustability is unable to be measured using automated or mechanical test equipment. The ability to include the test results from this section is provided in the Hunting Bow Results spreadsheet.

Results:

Bow	Adaptability / Adjustability(pts)	Rank
Whisper Creek Stealth LX	6.73	1
Doc's Sweet Demise	6.58	2
Whisper Creek Innovator Pro	6.48	3
Bowtech Guardian	6.05	3
PSE X-Force	6.04	5
Martin Bengal	5.91	6
Reflex Ridgeline 34	5.48	7
Diamond Black Ice	5.34	8
Hoyt Vectrix	5.32	9
Hoyt Vulcan	5.32	9

Dynamic Efficiency

Dynamic Efficiency:

Objective: The objective of the Dynamic Efficiency test is to provide an assessment of the amount of energy output by a bow relative to the amount of energy expended by drawing the bow back.

Rationale: The purpose of the compound bow is to transfer the energy expended in drawing the bow back (Potential or Stored Energy) into the energy propelling the arrow downrange (Kinetic Energy). Unfortunately, not all of the Potential Energy is turned into Kinetic Energy. This could be due to various reasons, but regardless of the cause you are not getting all the energy out of the bow that you have put into it. The reason for testing dynamic efficiency is to determine which bows perform the best in transferring the energy that is "stored" into the energy in motion that is released through the arrow.

Procedure: The Easton Bow Force Mapper system is used to create Force – Draw curves for each bow. The plot information obtained from the Mapper is then analyzed to obtain the amount of energy expended in drawing the bow back (See Figure 5 below). This value in pound-feet (lb-ft), considered "potential energy" (or stored energy) for this assessment, is then compared with the Kinetic Energy output by the bow during shot execution with 300 grain, 360 grain, 420 grain and 540 grain arrows. The Kinetic Energy is calculated with the following formula:

$$KE = \frac{ArrowWeight * Speed^2}{450240}$$

Where "KE" is in pound-feet, "Arrow Weight" is in grains, "Speed" is in feet per second (fps) and 450240 is a conversion factor that accounts for unit changes between arrow weight (grains) and velocity (fps). The ratio of the Kinetic Energy to the Potential Energy for all four (4) arrow weights is assessed.

Example: The speed of a 300 grain arrow out of the Mathews Drenalin used in this evaluation was measured to be 305.4 feet per second (fps). The speed of a 540 grain arrow out of the same bow was measured to be 233.3 fps. Using the formula for KE above, we can show that the Kinetic Energy of the 300 grain arrow is 62.1 lb-ft, while the Kinetic Energy of the 540 grain arrow is 65.2 lb-ft. Dividing these two KE values by the Potential Energy (74.8 lb-ft), a dynamic efficiency of 83.0% and 87.2% is achieved, respectively.
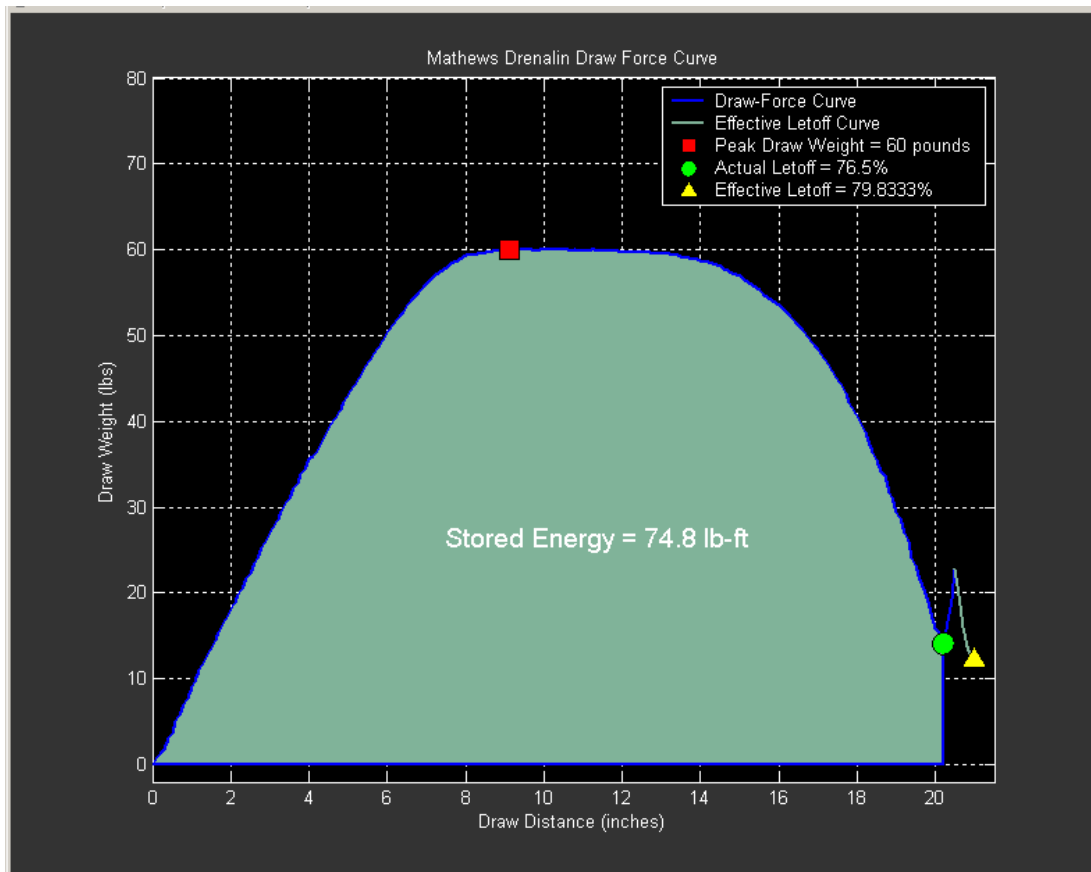

Figure 5 Force-Draw Curve and Calculated Potential Energy

Dynamic Efficiency

Results:

Compound Bow	300 Grain Arrow Dynamic Efficiency	Rank
Mathews Drenalin	83.0%	1
High Country Iron Mace	81.5%	2
PSE X-Force	80.8%	3
APA Black MambaX2	80.0%	4
Diamond Black Ice	79.2%	5
Alpine Silverado	79.1%	6
Elite Synergy	79.1%	6
Bear Truth	78.1%	8
Hoyt Vectrix	77.9%	9

Compound Bow	360 Grain Arrow Dynamic Efficiency	Rank
Mathews Drenalin	85.1%	1
High Country Iron Mace	83.8%	2
PSE X-Force	82.4%	3
APA Black MambaX2	82.2%	4
Alpine Silverado	81.6%	5
Elite Synergy	81.0%	6
Diamond Black Ice	80.9%	7
Bear Truth	80.2%	8
Hoyt Vectrix	80.0%	9

Compound Bow	420 Grain Arrow Dynamic Efficiency	Rank
Mathews Drenalin	86.3%	1
High Country Iron Mace	85.4%	2
PSE X-Force	84.1%	3
Alpine Silverado	83.5%	4
APA Black MambaX2	83.2%	5
Diamond Black Ice	82.3%	6
Elite Synergy	82.1%	7
Reflex Ridgeline 34	81.9%	8
Hoyt Vectrix	81.8%	9

Compound Bow	540 Grain Arrow Dynamic Efficiency	Rank
Mathews Drenalin	87.2%	1
High Country Iron Mace	87.0%	2
Alpine Silverado	85.8%	3
APA Black MambaX2	85.8%	3
PSE X-Force	85.7%	5
Diamond Black Ice	84.2%	6
Ross Cardiac	84.1%	7
Reflex Ridgeline 34	83.9%	8
Elite Synergy	83.8%	9
Hoyt Vectrix	83.8%	9

Dynamic Efficiency

Results Chart: Average scores ranged from 72.5% to 85.4%

Dynamic Efficiency - Average

	Bear Truth	Reflex Ridgeline 34	Ross Cardiac	Hoyt Vectrix	Elite Synergy	Diamond Black Ice	Alpine Silverado	APA Black MambaX2	PSE X-Force	High Country Iron Mace	Mathews Drenalin
▪ Average	80.8%	80.8%	80.8%	80.9%	81.5%	81.7%	82.5%	82.8%	83.2%	84.4%	85.4%

23
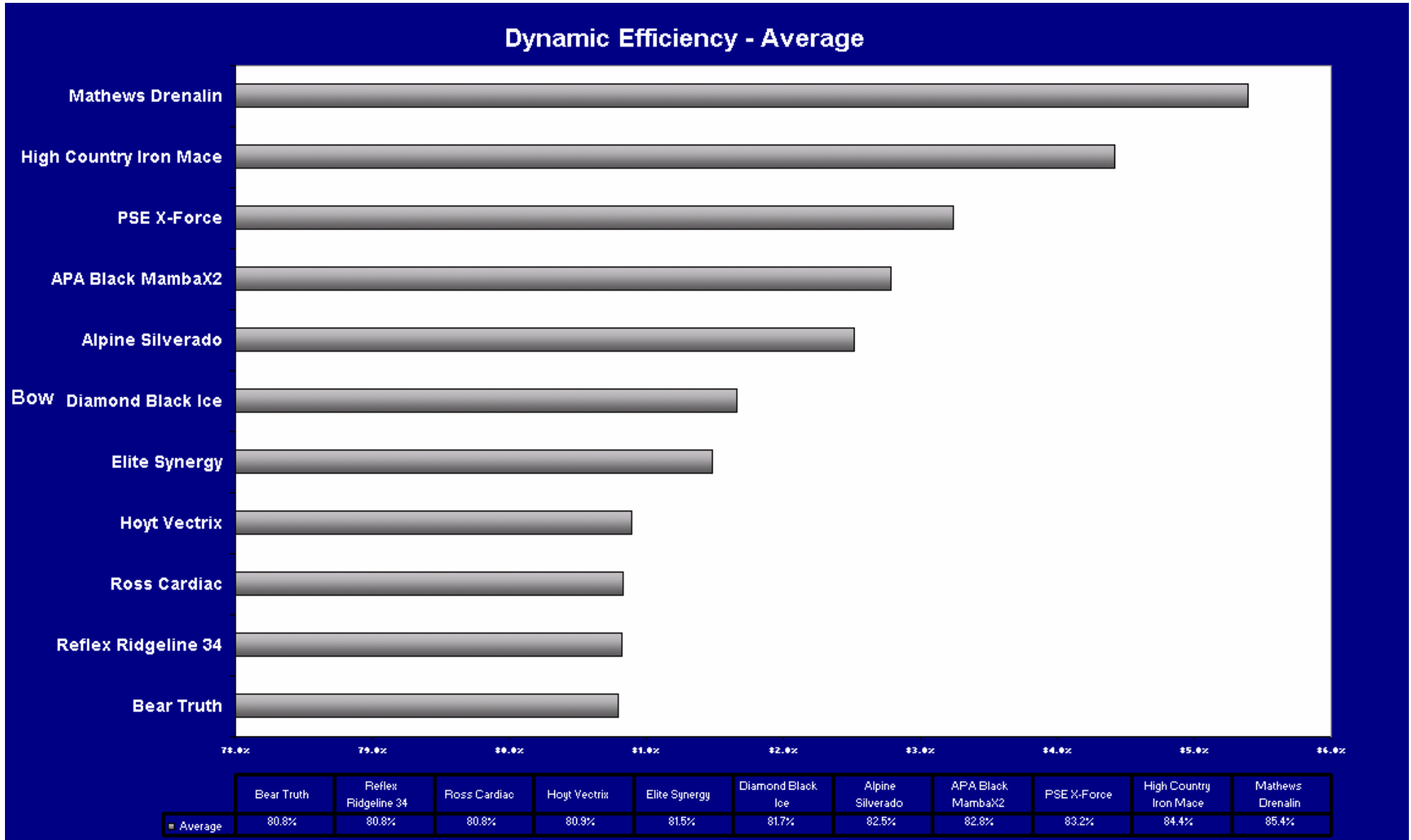
Speed per Inch of Power Stroke:

Objective: The objective of this section is to determine the speed properties of a bow based on power stroke at point blank range with varying arrow weights.

Rationale: Because there are so many varying configurations in today's compound bows (e.g. low or high brace height, reflex / deflex riser geometry), the amount of speed output by each bow per the inch of its power stroke is a reasonable way to put each bow on more of an equal playing field.

Procedure: Each bow is mounted to the Hooter Shooter. A series of 3 speed measurements are taken with an Easton Professional Chronograph at a distance of three (3) feet from the bow with 300, 360, 420, and 540 grain arrows. These measurements are confirmed with an Oehler Research M35 Chronograph and then averaged per arrow weight. The brace height of each bow is then measured and 1.75 inches is added to this measurement. This value is subtracted from 29" (all bows setup to 29" AMO draw-length) to determine the length of the power stroke. The power stroke value is then divided into the average speed for each of the arrow weights. The average speed per inch of power stroke over all arrow weights is then calculated and for use in the overall results.

Assumptions: An assumption is made that the speed per inch of power stroke more accurately characterizes the speed performance of a given bow. Another assumption is made that the string travel past the brace position during shot execution does not impart any energy on the arrow.
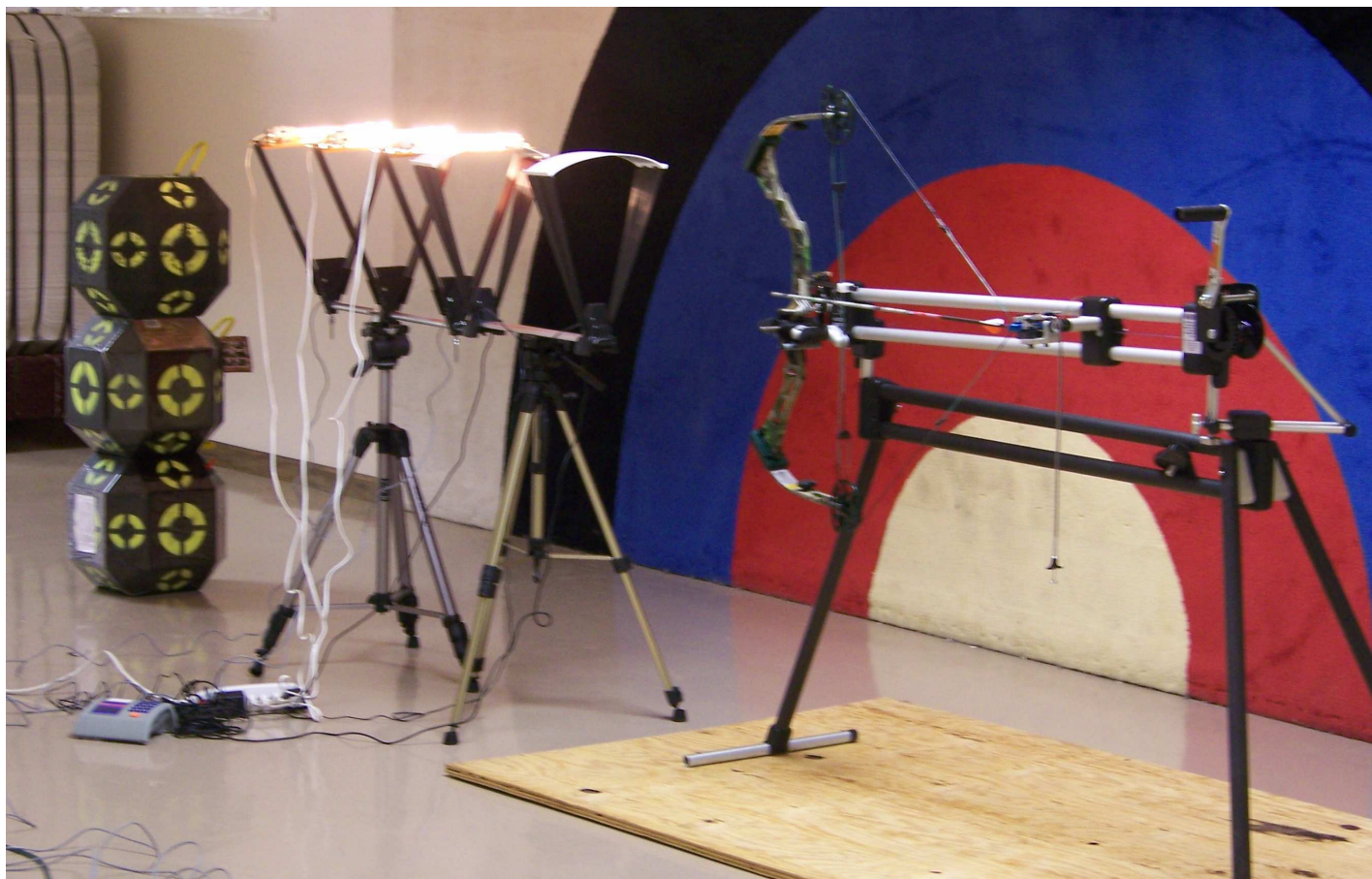

Figure 6 Speed Measurements taken at 3 feet

Speed per Inch of Power Stroke

Results:

Compound Bow	Power Stroke (in.)	300 Grain Arrow (fps / in)	Rank
High Country Iron Mace	19 7/8	15.6	1
Alpine Silverado	20	15.5	2
APA Black MambaX2	20 3/16	15.4	3
Elite Synergy	20 1/4	15.4	3
PSE X-Force	21 1/4	15.3	5
Mathews Drenalin	20 1/4	15.1	6
Bowtech Guardian	20 1/8	15.0	7
Hoyt Vectrix	20 1/4	15.0	7
Reflex Ridgeline 34	20	14.9	9

Compound Bow	Power Stroke (in.)	360 Grain Arrow (fps / in)	Rank
High Country Iron Mace	19 7/8	14.4	1
Alpine Silverado	20	14.3	2
APA Black MambaX2	20 3/16	14.3	2
Elite Synergy	20 1/4	14.2	4
PSE X-Force	21 1/4	14.1	5
Mathews Drenalin	20 1/4	13.9	6
Bowtech Guardian	20 1/8	13.8	7
Hoyt Vectrix	20 1/4	13.8	7
Reflex Ridgeline 34	20	13.8	7

Compound Bow	Power Stroke (in.)	420 Grain Arrow (fps / in)	Rank
High Country Iron Mace	19 7/8	13.5	1
Alpine Silverado	20	13.4	2
APA Black MambaX2	20 3/16	13.3	3
Elite Synergy	21 1/2	13.2	4
PSE X-Force	21 1/4	13.2	4
Hoyt Vectrix	20 1/4	13.0	6
Mathews Drenalin	20 1/4	13.0	6
Reflex Ridgeline 34	20	13.0	6
Bowtech Guardian	20 1/8	12.9	9

Compound Bow	Power Stroke (in.)	540 Grain Arrow (fps / in)	Rank
Alpine Silverado	20	12.0	1
High Country Iron Mace	19 7/8	12.0	1
APA Black MambaX2	20 3/16	11.9	3
Elite Synergy	21 1/2	11.8	4
PSE X-Force	21 1/4	11.8	4
Bowtech Guardian	20 1/8	11.6	6
Hoyt Vectrix	20 1/4	11.6	6
Mathews Drenalin	20 1/4	11.6	6
Reflex Ridgeline 34	20	11.5	9

Speed per Inch of Power Stroke

Results Chart: Average scores ranged from 12.3 to 13.9 fps/inch power stroke

Speed per Inch of Power Stroke - Average

	Reflex Ridgeline 34	Bowtech Guardian	Hoyt Vectrix	Mathews Drenalin	PSE X-Force	Elite Synergy	APA Black MambaX2	Alpine Silverado	High Country Iron Mace
■ Average	13.3	13.3	13.3	13.4	13.6	13.6	13.7	13.8	13.9
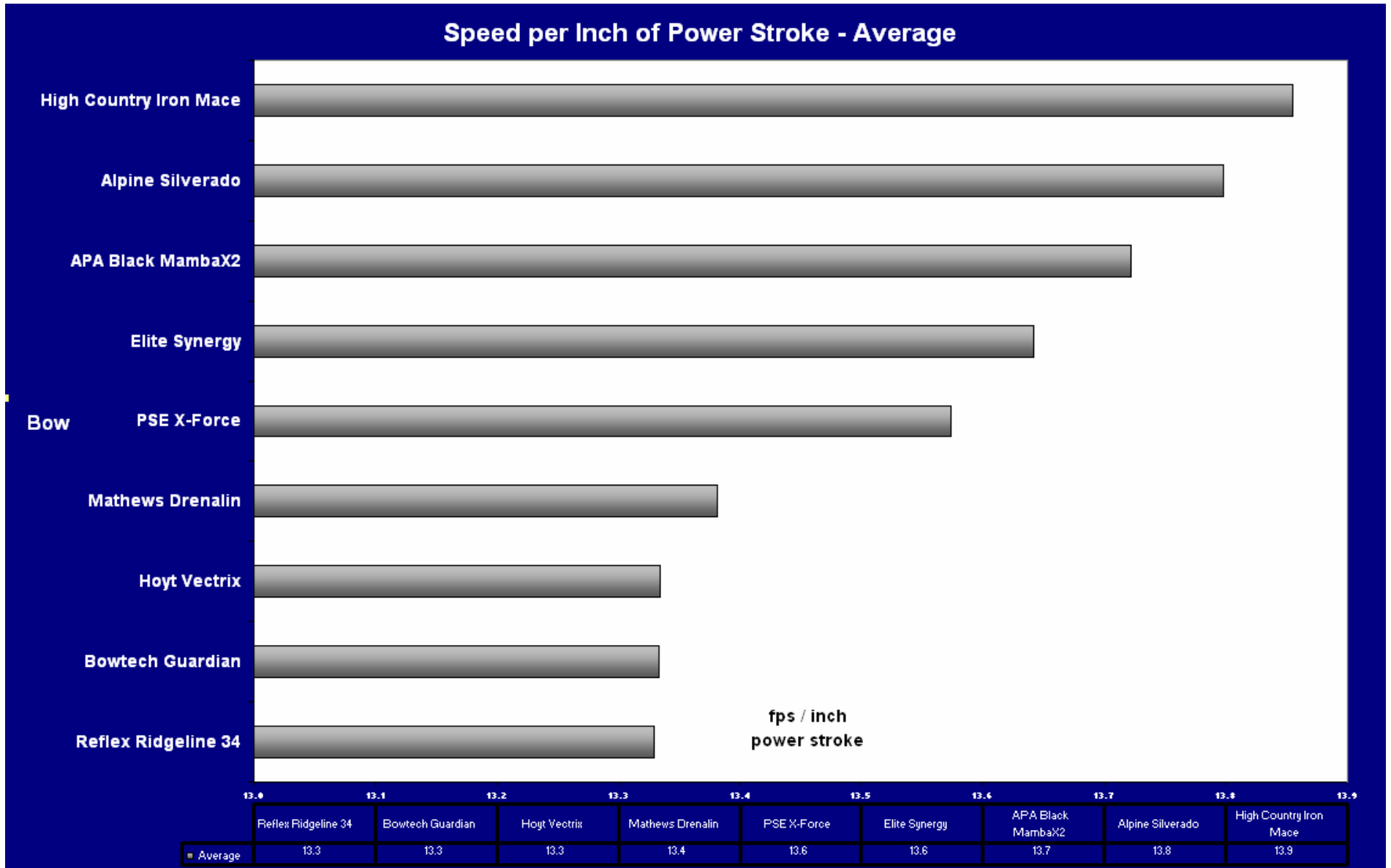
Noise Output:

Objective: The objective of this section is to determine the noise output properties for each bow at point blank range.

Rationale: A great deal of emphasis is placed on the amount of noise output by compound bows. Today's hunting bows have different noise output characteristics with varying arrow weights. Many hunters use heavier arrows for increased down range kinetic energy, while others use lighter arrows for increased speed. Because of these issues, noise output readings are measured at point blank range for 300, 360, 420 and 540 grain arrows.

Procedure: Each bow is mounted to the Hooter Shooter inside an Anechoic Chamber. A Larson Davis model 831 digital sound level meter (SLM) is mounted on a tripod and positioned 8 inches in front of a standard measuring point on the Hooter Shooter with the microphone set at a height of 36 inches. The digital sound meter frequency weighting is set to 'A' (which allows the meter to respond as the human ear would) with the maximum sound output measurements taken from shot to shot. A series of three (3) shots is executed for 300, 360, 420 and 540 grain arrows from each bow, during which the peak sound measurements (dBa) are recorded. From these measurements, the average noise output is calculated for each bow.

Assumptions: An assumption associated with this test is that the sample size of three firings per arrow weight is sufficient to correctly characterize the noise output of the bow at point blank range.
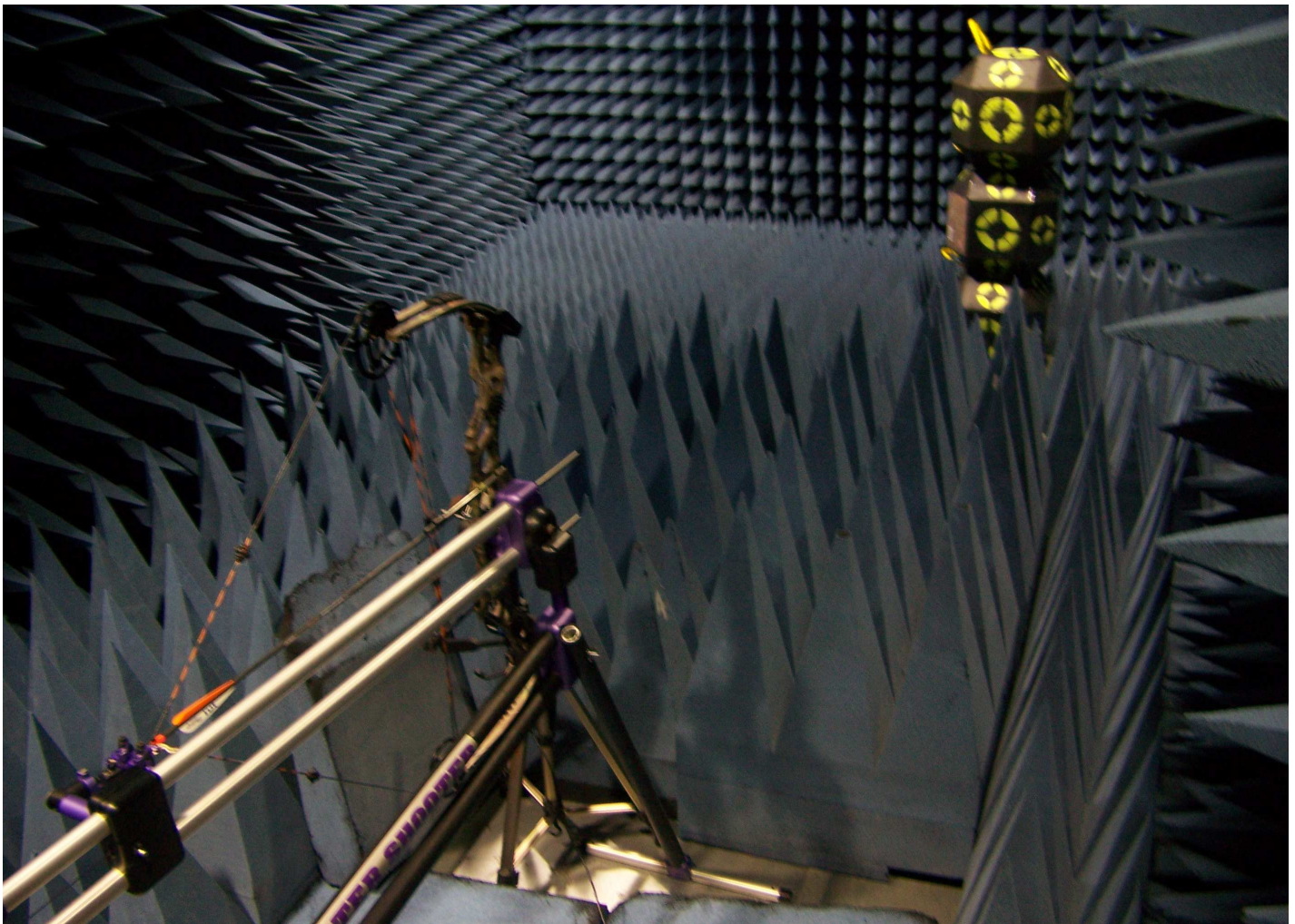

Figure 7 Noise Output Measurements taken in Anechoic Chamber

Figure 4 Noise Output Measurements taken at Point Blank range

Noise Output

Results:

Compound Bow	300 Grain Arrow Point Blank (dBa)	Rank
Bowtech Guardian	84.8	1
Diamond Black Ice	86.4	2
Whisper Creek Innovator Pro	86.4	2
Ross Cardiac	86.6	4
Bear Instinct	87.3	5
RedHead XSC-33	87.5	6
PSE X-Force	88.0	7
Pearson Z-34	88.4	8
Darton Pro3000	88.5	9

Compound Bow	360 Grain Arrow Point Blank (dBa)	Rank
Bear Instinct	85.0	1
Diamond Black Ice	85.1	2
Bowtech Guardian	85.7	3
RedHead XSC-33	86.3	4
Bear Truth	86.6	5
PSE X-Force	87.0	6
Darton Pro3000	87.3	7
Pearson Z-34	87.4	8
Reflex Ridgeline 34	87.9	9

Compound Bow	420 Grain Arrow Point Blank (dBa)	Rank
Diamond Black Ice	83.6	1
Bowtech Guardian	84.3	2
Bear Instinct	84.5	3
RedHead XSC-33	84.5	3
Bear Truth	84.8	5
Ross Cardiac	85.5	6
Darton Pro3000	85.8	7
PSE X-Force	85.8	7
Pearson Z-34	86.0	9

Compound Bow	540 Grain Arrow Point Blank (dBa)	Rank
Bowtech Guardian	81.8	1
Diamond Black Ice	81.8	2
Bear Instinct	83.0	3
Darton Pro3000	83.6	4
Bear Truth	84.2	5
Ross Cardiac	84.5	6
Whisper Creek Innovator Pro	85.2	7
PSE X-Force	86.0	8
Whisper Creek Stealth LX	86.4	9

Noise Output

Results Chart: Average scores ranged from 90.9 to 84.2 dBA.

Noise Output - Average

	Whisper Creek Innovator Pro	PSE X-Force	RedHead XSC-33	Ross Cardiac	Darton Pro3000	Bear Truth	Bear Instinct	Diamond Black Ice	Bowtech Guardian
■ Average	86.8	86.7	86.6	86.4	86.3	86.1	85.0	84.2	84.2
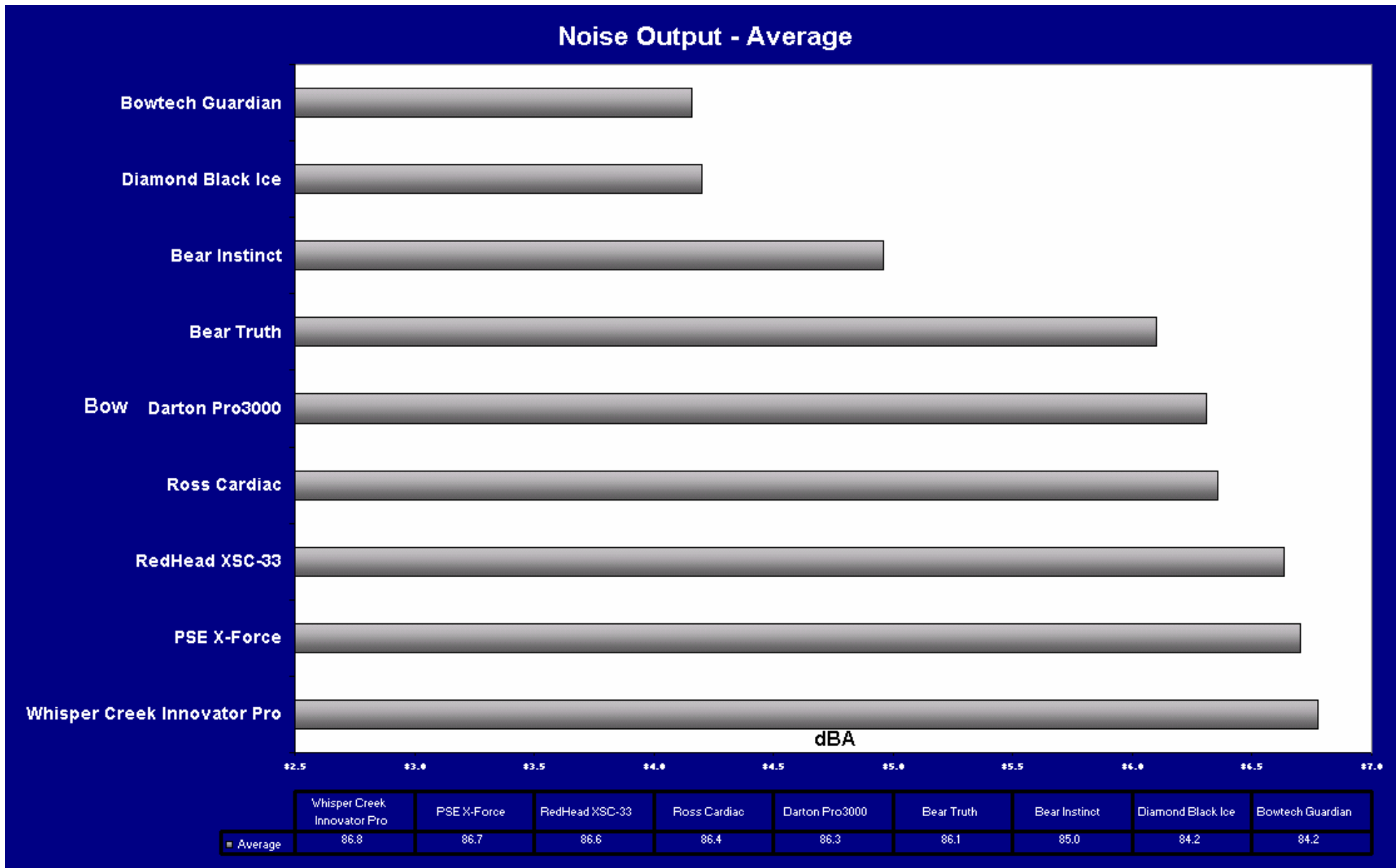
Vibration:

Objective: The objective of the Vibration Test is to provide an indication of the amount of hand shock each bow produces under shot execution with four different arrow weights. For consistency, the vibration data is collected at the stabilizer bushing on each bow.

Rationale: The less vibration output by a bow and felt by the archer during and after shot execution, the more enjoyable a bow is to shoot, especially during long practice sessions. Our test equipment is highly sensitive; an archer may not be able to distinguish between some of the calculated vibration outputs of given bows.

Procedure: An accelerometer (Dytran, model 3030A4) is attached to each at the stabilizer bushing. A series of 3 shots is taken with 300, 360, 420 and 540 grain arrows, during which vibration data is collected (see "Equipment Used" section for equipment details). After data collection is completed, each raw data set is analyzed to determine the average maximum vibration amplitude of the three shots for each arrow weight.

Assumptions: An assumption is made that the stabilizer bushing area of each bow is an area that is representative of the amount of vibration an archer can expect to experience.
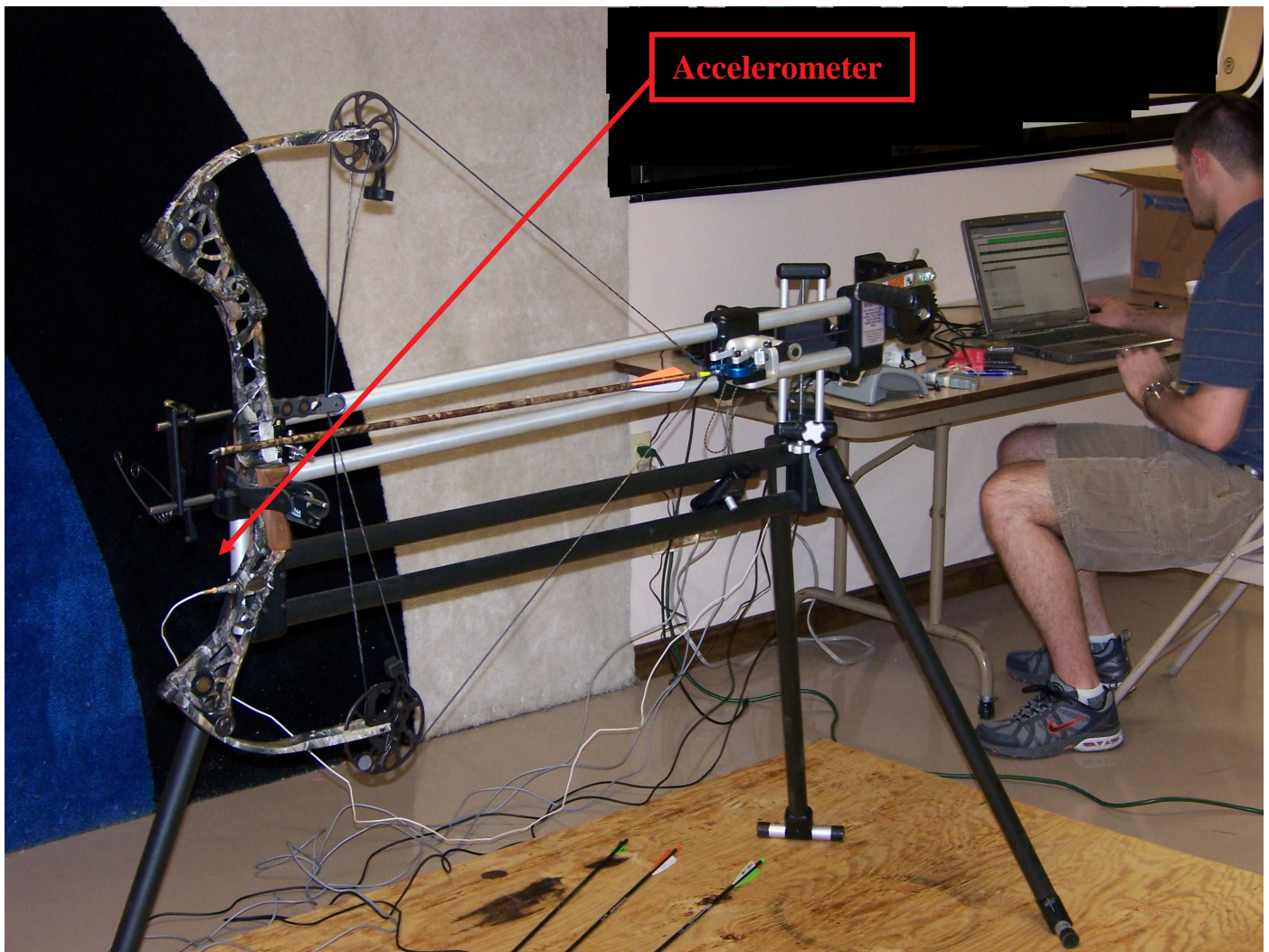

Figure 8 Vibration Data Collection Setup

Vibration

Results:

Compound Bow	300 Grain Arrow Vibration (G)	Rank
Bowtech Guardian	33.193	1
Diamond Black Ice	58.844	2
Mathews Drenalin	64.570	3
Reflex Ridgeline 34	65.191	4
Ross Cardiac	68.712	5
Doc's Sweet Demise	75.497	6
PSE X-Force	76.383	7
Whisper Creek Innovator Pro	88.448	8
Bear Instinct	90.372	9

Compound Bow	360 Grain Arrow Vibration (G)	Rank
Bowtech Guardian	30.523	1
Diamond Black Ice	43.872	2
Reflex Ridgeline 34	59.376	3
PSE X-Force	67.968	4
Ross Cardiac	71.876	5
Mathews Drenalin	75.282	6
Whisper Creek Stealth LX	79.058	7
Hoyt Vulcan	79.687	8
Darton Pro3000	81.610	9

Compound Bow	420 Grain Arrow Vibration (G)	Rank
Bowtech Guardian	27.370	1
Diamond Black Ice	37.593	2
Reflex Ridgeline 34	69.362	3
PSE X-Force	65.054	4
Ross Cardiac	62.502	5
Mathews Drenalin	78.145	6
Whisper Creek Stealth LX	75.626	7
Hoyt Vulcan	73.912	8
Darton Pro3000	69.330	9

Compound Bow	540 Grain Arrow Vibration (G)	Rank
Bowtech Guardian	24.662	1
Diamond Black Ice	29.443	2
Ross Cardiac	55.583	3
Hoyt Vulcan	57.195	3
Whisper Creek Innovator Pro	57.839	5
Elite Synergy	58.621	6
PSE X-Force	60.326	7
Darton Pro3000	60.375	8
Hoyt Vectrix	61.266	9

Vibration

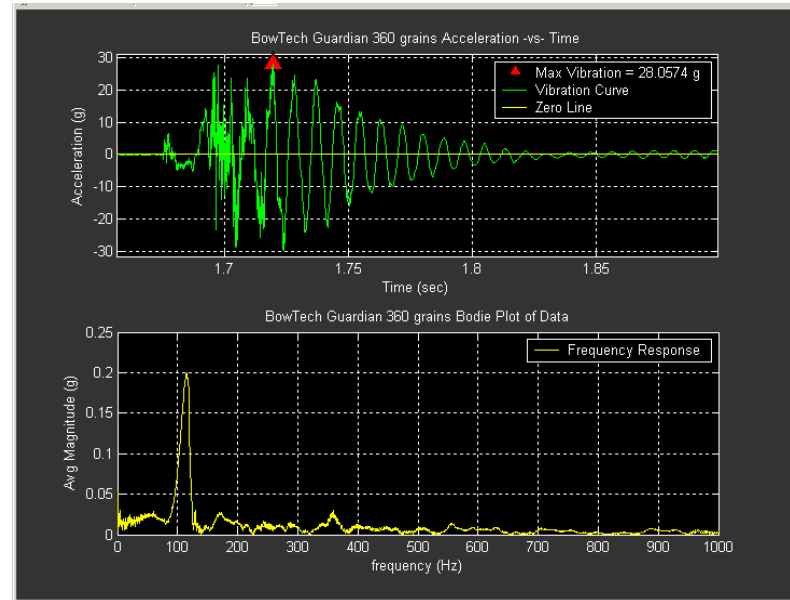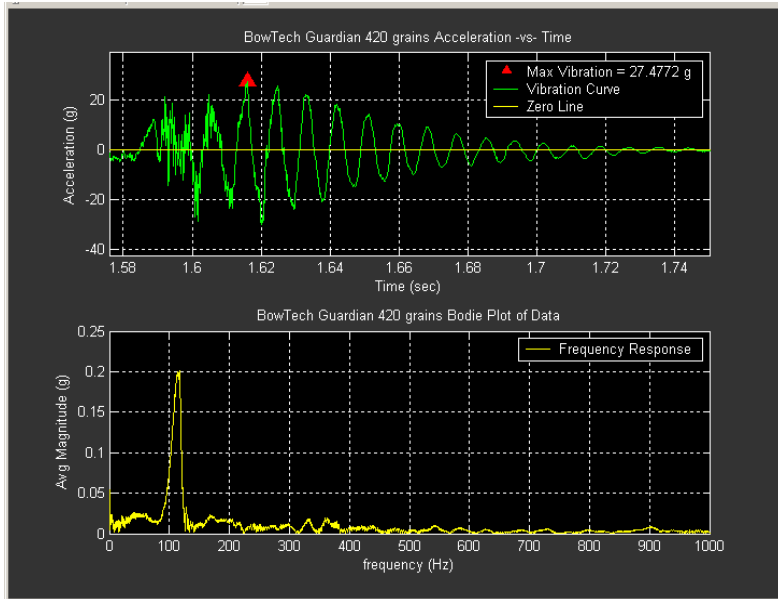**Results chart: Average scores ranged from 190.074 to 28.937 G's**

Vibration - Average

	Darton Pro3000	Hoyt Vulcan	Whisper Creek Innovator Pro	Mathews Drenalin	PSE X-Force	Reflex Ridgeline 34	Ross Cardiac	Diamond Black Ice	Bowtech Guardian
▪ Average	77.564	75.685	75.333	73.160	67.433	65.673	64.668	42.438	28.937
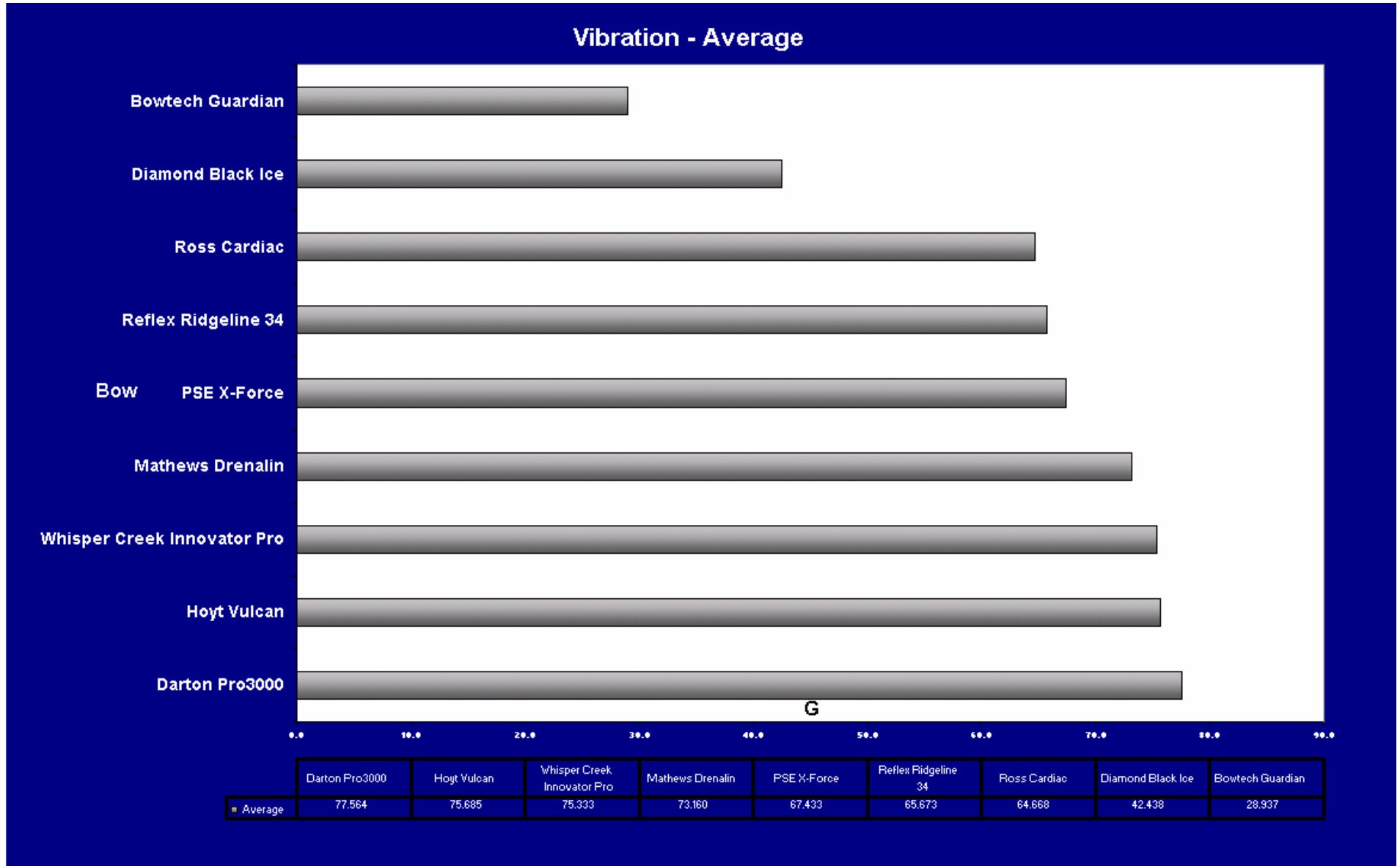
Acceleration Curves

300 Grains

360 Grains

420 Grains

540 Grains

34
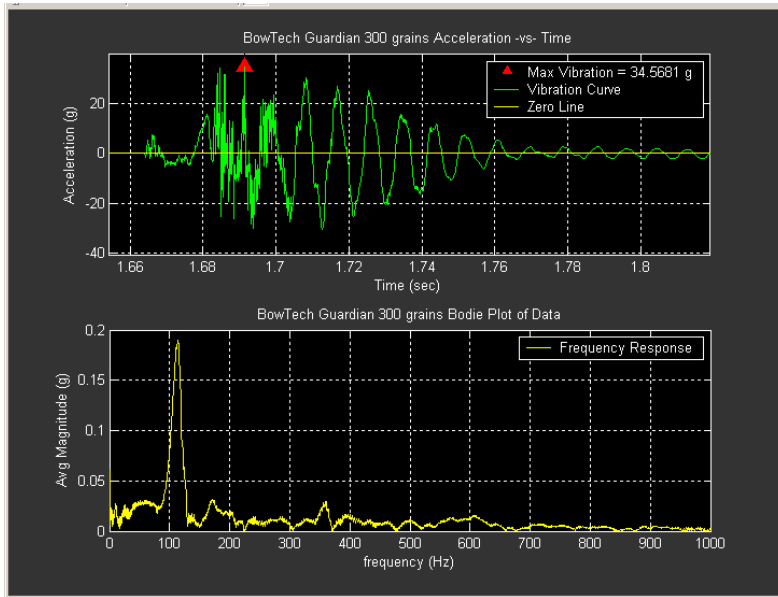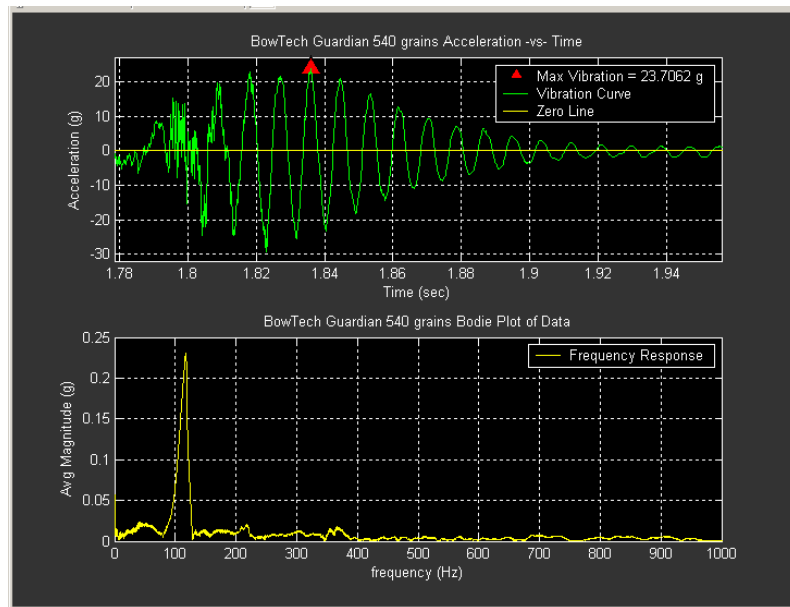
Best Picks

Overall Performance Best Picks:

The "Overall Performance Best Picks" are provided in the following table. The percentage of points each bow received with respect to the highest scoring bow in each of the test categories (excluding adaptability / adjustability) was used to determine the total number of percentage points (highest scoring bow for a test category receives 100 percentage points for that category). This provides a truly comparative analysis of how each bow placed relative to its competitors based solely on the criteria outlined in this test with no additional weighting added. For personalized rankings of each bow, please see the Hunting Bow Results spreadsheet (see **Note** below).

Compound Bow	MSRP	Total Percentage Points	Rank
Bowtech Guardian	$799	387.3%	1
Diamond Black Ice	$699	358.4%	2
PSE X-Force	$799.99	335.4%	3
Mathews Drenalin	$799	331.4%	4
Reflex Ridgeline 34	$599	330.6%	5
Ross Cardiac	$730	327.6%	6
Elite Synergy	$659	322.4%	7
Hoyt Vulcan	$789	322.4%	7
Alpine Silverado	$689	321.8%	8
High Country Iron Mace	$699	321.2%	9

"Bang for the Buck" Best Picks:

The "Bang for the Buck" Best Picks are provided in the following table. The percentage of points each bow received with respect to the highest scoring bow in each of the test categories (excluding Adaptability / Adjustability) was used to determine the total number of percentage points (see "Overall Performance" Best Picks section above). The MSRP for each bow was then divided into the total percentage points, providing a "percentage points per dollar" assessment. This assessment is based solely on the criteria outlined in this test and no additional weighting is added. For personalized rankings of each bow, please see the Hunting Bow Results spreadsheet (see **Note** below).

Compound Bow	MSRP	Total Percentage Points per Dollar	Rank
Martin Bengal	$399	0.78036%	1
Bear Instinct	$399.99	0.77371%	2
Whisper Creek Stealth LX	$449	0.69281%	3
RedHead XP-32	$499.99	0.61310%	4
Lakota Thunder	$495	0.58901%	5
Bear Truth	$549.99	0.56556%	6
Doc's Sweet Demise	$549	0.56217%	7
RedHead XSC-33	$549.99	0.55953%	8
Reflex Ridgeline 34	$599	0.55185%	9

Note: The Hunting Bow Results spreadsheet reflects rankings of the top 9 bows in Performance and "Bang for the Buck" according to the weightings and costs input by the individual archer as well as the results of the Face-Off test categories. It is not intended to lead anyone to a purchase decision as there are important factors for consideration that were not or could not be tested during this evaluation. Rather, this table is for reference only and is provided solely as a convenience to the user.   Rankings should be viewed within this context and do not represent a recommendation by the author(s) of this report.

2007 Compound Hunting Bow
Face-Off Equipment Used / Special Thanks

Equipment Used:

General:
- Hooter Shooter by Spot Hogg
- Easton Bow Force Mapper System & Professional Chronograph
- Oehler Research M35 Chronograph

Instruments for weight measurements:
- Easton Hand-Held digital scale
- Easton Advanced Grain Scale
- Coffey Marketing US Reloader Digital Pocket Scale.
- Coffey Marketing US Game Scale

Instruments used for speed measurements
- Easton Hand-Held digital scale
- Coffey Marketing US Game Scale

Instruments used for Noise Output Test:
- Larson Davis Model 831 Sound Level Meter
- Anechoic Chamber

Instruments used for Vibration Test:
- National Instruments Data Acquisition Pad (NI USB-6251)
- National Instruments Signal Conditioning Connector Block (model SCC-68)
- National Instruments Signal Conditioner Module (model SCC-ACC01)
- Dytran Accelerometer (model 3030A4)

Special Thanks:

We would like to thank all of the manufacturers and sponsors who provided bows and test equipment for this evaluation; without them and their support, this evaluation never would have been possible.
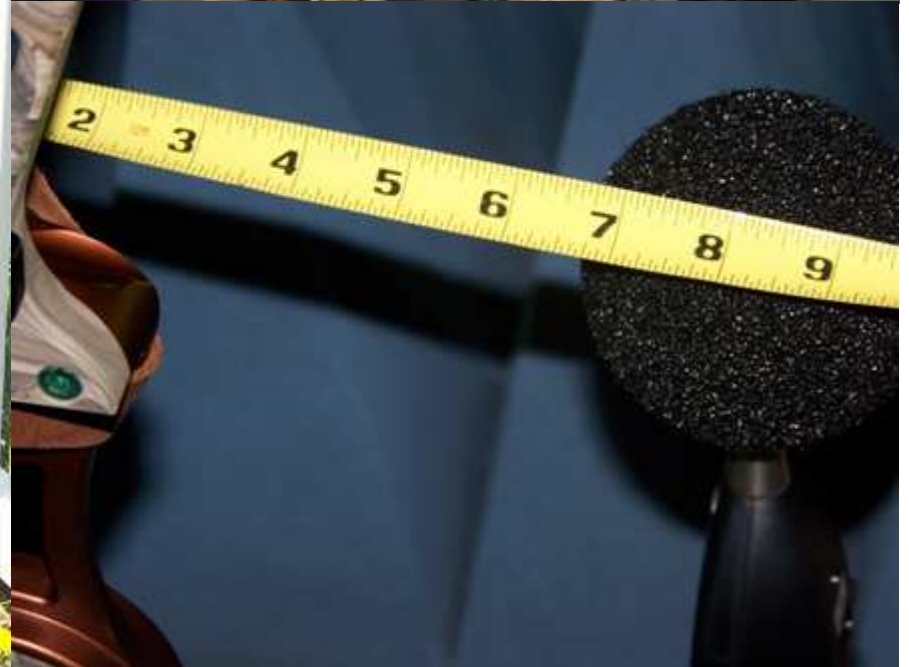
Anthony Barnum   Jonathan Teater

2007 Compound Hunting Bow
Face-Off Miscellaneous Pictures

2007 Compound Hunting Bow
Face-Off Miscellaneous Pictures