



AGENDA - *revised*

Game, Fish and Parks Commission

November 5-6, 2020
Zoom and Conference Call (see below)
Livestream link <https://www.sd.net/remote1/>

Due to concerns regarding COVID, this meeting will be held via zoom/conference call and livestream. To listen to the entire meeting beginning at 11:30 a.m. CT via livestream at <https://www.sd.net/>. **The public is encouraged to participate remotely to limit our number of in person attendees and ensure social distancing.**

The open forum will begin at 2:00 p.m. CT on November 5th. To provide comments join the meeting via zoom or conference call per the info below. To conduct the public hearing and open forum as efficiently as possible we ask those wishing to testify to **register by 1:00 pm CT by email to Rachel.comes@state.sd.us**. **Testifiers should provide their full names, whom they are representing, city of residence, and which proposed topic they will be addressing.**

Written comments can be submitted at <https://gfp.sd.gov/forms/positions/>. To be included in the public record comments must include full name and city of residence and meet the submission deadline of seventy-two hours before the meeting (not including the day of the meeting)

Click on the link below to join Zoom Meeting. Depending on the application you use you may be required to enter the meeting ID and password. Remember to **enter your display name and mute your microphone**. To help keep background noise and distractions to a minimum, make sure you **mute your microphone and turn off your video** when you are not speaking.

THURSDAY

Zoom Meeting Link <https://state-sd.zoom.us/j/95150139818?pwd=UHg5TThPY0szU05OS2NSUIMvVWhFdz09>
or join via conference call Dial 1 669 900 9128 Meeting ID: 951 5013 9818 Password: 361749

Call to order 11:30 AM CT/ 10:30 AM MT

Division of Administration

Action Items:

1. Conflict of Interest Disclosure
2. Approve Minutes of the October 2020 Meeting
<https://gfp.sd.gov/commission/archives/>
3. Additional Commissioner Salary Days

Information Items:

4. Budget
5. Wildlife Damage Management Strategic Plan
6. Pheasant Hunting Marketing Update
7. License Sales Update
8. Centralized E-Commerce System and RFP
9. Awards Acknowledgement

Petitions

10. Low Plains South Zone Duck Season
11. Big Game Ammo Minimum Size and Type
12. PSP Bird Release Requirements

Open Forum 2:00 PM CT/ 1:00 PM MT

Portion of the meeting designated for public comment on other items of interest. *(Typically limited to 3 minutes per person)*

Proposals

13. Nonmeandered Waters Navigation Lane Process

Division of Parks and Recreation

Information Items:

14. Palisades Update
15. Adams Visitor Center Plan
16. Sheps Canyon Road Update
17. Revenue, Camping and Visitation Report

Division of Wildlife

Information Items:

20. HuntSAFE Update
21. Fish SD Update
22. Wild Turkey Plan
23. EHD Update
24. Elk Management and Depredation Update
25. AIS inspection in MN

Solicitation of Agenda Items from Commissioners

Adjourn

Next meeting information: December 3-4, 2020 – Amerclnn 3112 Island Drive, Fort Pierre, SD

Donations can be made to honor former GFP Commissioner, Cathy Peterson, by visiting the SD Parks & Wildlife Foundation website at <https://parkswildlifefoundation.org/donate.aspx>. Select "Other" as the program you wish to contribute and note "Cathy Peterson" in the explanation box. The SD Parks & Wildlife Foundation and Cathy's family will use the funds to honor her memory for future habitat projects.

**Minutes of the Game, Fish, and Parks Commission
October 1-2, 2020**

Chairman Gary Jensen called the meeting to order at 1:07 p.m. CT via conference call. Commissioners Gary Jensen, Travis Bies, Jon Locken, Russell Olson, Doug Sharp, Charles Spring, Robert Whitmyre. Public and staff were able to listen via SDPB livestream with approximately 125 participants and participate via conference call with approximately 60 total participants via zoom.

DIVISION OF ADMINISTRATION

Conflict of Interest Disclosure

Chair Jensen called for conflicts of interest to be disclosed. None were presented.

Executive Session

Motioned by Olson with second by Whitmyre TO ENTER EXECUTIVE SESSION PURSUANT TO SDCL 1-25-2 (4) TO PREPARE FOR CONTRACT NEGOTIATIONS. Roll Call vote: Bies – yes; Locken – yes; Olson – yes; Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

The Executive Session was held in a private room located at the AmericInn in Fort Pierre, SD. Commissioners G Jensen, Olson, Bies, Locken, Sharp, Spring and Whitmyre participated. Secretary Hepler, Attorney Kotilnek, Kevin Robling, Scott Simpson, Al Nedved, and Rachel Comes were present.

Motioned by Sharp with second by Olson TO CONCLUDE EXECUTIVE SESSION. Roll Call vote: Bies – yes; Locken – yes; Olson – yes; Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

Approval of Minutes

Jensen called for any additions or corrections to the September 2-3, 2020 regular meeting minutes or a motion for approval.

Motion by Locken with second by Sharp TO APPROVE THE MINUTES OF THE SEPTEMBER 2-3, 2020 MEETING. Roll Call vote: Bies – yes; Locken – yes; Olson – yes; Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

Additional Commissioner Salary Days

Spring requested one additional salary day for participation in the Elk Stakeholder work group.

Motion by Whitmyre, second by Sharp TO APPROVE THE REQUESTED SALARY DAY. Roll Call vote: Bies – yes; Locken – yes; Olson – yes; Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

Revised Commissioner Handbook

Jensen noted current efforts to update the Commissioner handbook and requested any additional revisions be submitted so they can be applied prior to finalizing the book for the November meeting.

Commission Communications to the Public

Sharp requested additional details on Commission decisions include details and supporting comments as to why decisions were made to better inform the public. He noted this effort is in addition to the meeting recordings and minutes that are already available for the public

Pheasant Hunting Marketing Update

Jona Ohm, Communication Director and Kirk Hulstein, Tourism, provided information on Pheasant hunting marketing efforts in partnership with Tourism are moving along nicely. The plan's Key Performance Indicators (KPIs), which include license sales, traffic to the GFP website, email subscribers and social media followers are all showing increases. Signage is now in place in Scheels stores advertising the giveaway of a South Dakota pheasant hunt and gear.

The team has October video shoot dates planned for the Pierre area and is focused on bringing more diversity to our photo and video assets. We are also working with Huntstand on a long form video project that will focus on public land and small-town community involvement. Upon completion, it will be distributed across all channels. In addition, the tourism team was also able to secure time with Fox Outdoor Nation at the buffalo roundup. The outstanding experience led to filming a pheasant hunt with Governor Noem hunt at Paul Nelson Farms. It was a great opportunity for photo shoot and additional PR.

License Sales Update

Heather Villa, wildlife administration chief, explained the License Sales Update format has changed to include a 3-year average to compare current year numbers to. In comparison with the 3-year average, 2020 fishing license sales are up 14% and 2020 small game hunting license sales are up 9%. We have now collected over \$1 million in Habitat Stamp Funds. Comparing revenues of 2020 to the 3-year average, we are up in revenue \$900,000, not including Habitat Stamp sales.

Parks and Wildlife Foundation and 2nd Century Habitat Fund Updates

Lisa Weyer, executive director of the Parks & Wildlife Foundation and Second Century Habitat provided updates to the Commission.

Parks & Wildlife Foundation- Holding strategic planning session virtually October 7-8 to plan for the next 3 years. Board meeting to be held October 9 with future projects a topic on the agenda. Several department staff members will present projects to the Board.

Second Century Habitat Fund - Developing organizational website SDHabitatFund.org Hosted Habitat Day at the State Fair on Friday, September 4. Partnered with the Department and conducted two panel discussions: (1) Impact of Pheasant Hunting on the State of SD, (2) Why is habitat development important in SD. Received our first signed contract in the Every Acre Counts Program. We have reached our goal of

enrolling 5000 acres into the Working Lands Habitat Program. Currently have 5100 acres enrolled and have paid out \$765,000 in incentive payments.

Shikar Award Presentation

Secretary Hepler presented Tim McCurdy, district conservation officer, with the Shikar-Safari Club International Wildlife Officer of the Year. The award honors wildlife officers for their performances in wildlife protection, wildlife law enforcement, and in the implementation of wildlife conservation programs.

Act of Valor Awards Commission 2021 Meeting Schedule

Arden Petersen presented the following four men with Act of Valor awards from Game, Fish and Parks, as well as Awards of Commendation from the National Association of State Boating Law Administrators (NASBLA) for their role in a life-saving event last spring.

- Pat Thompson - SDGFP Regional Park Supervisor
- Pat Redden - SDGFP Maintenance Technician
- Austin Schmitz - SDHP Sergeant
- Mark Schaefer - Good Samaritan from Pierre

The four men teamed up to rescue a 66-year old man from frigid Lake Sharpe waters after he capsized his kayak on April 17th. The man had been in the water for 20-25 minutes and was not wearing a life jacket. Had it not been for the quick actions of these four individuals, the outcome undoubtedly would have been much different.

PETITIONS

Tom Kirschenmann, wildlife division director, provided information on the petition process and options available for commission action.

Elk Landowner Tags

Steve Cherkas, petitioner explained he is hoping for an option for you to hunt elk on your own land opposed to your own land within the unit.

Olson noted it is historical for the stakeholder groups to not make changes such as these until the plan has been finalized by the stakeholder group.

Locken there are not many quarters that are 160 acres they may be a few more or less. Need to look in the future if someone is the only owner of a quarter of land, we may want to consider it the full number of acres

Spring if we consider the elk deal and knocked it down to some units it would be a huge change.

Jensen and Kirschenmann noted this discuss has happened many times over the years. And what the minimum change in acreage would mean to the limited number of resources and tags.

Sharp noted nonresident landowners should also be part of the discussion explaining that some landowners just live across the border.

Motioned by Bies, second by Spring TO DENY THE PETITION. Roll Call vote: Bies – yes; Locken – yes; Olson – yes; Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

Motion by Locken, second by Sharp TO APPROVE RESOLUTION 20-20 (appendix A) Denying the petition. Roll Call vote: Bies – yes; Locken – yes; Olson – yes; Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

Bobcat Harvest Reporting

Steve Cherkas, petitioner explained that presentation of the entire carcass is unnecessary as they are only using the lower jaw that gets submitted to age the cat by teeth. It would be simpler to either submit the skull or just the lower jaw. Currently they are returning the entire carcass for hunter or trapper to dispose of. Currently the number of days for tagging is 5 days and would prefer to see it be like other days up to 10 days. It would be a lot more simple and efficient if this could be done less often.

Olson asked how necessary is it to obtain the lower jaw as some many want a European mount?

Kirschenmann we extract the teeth for aging but will need to discuss alternative ways with staff.

Spring it is sometimes difficult to get time scheduled with staff within 5 days

Motioned by Sharp, second by Bies TO DENY THE PETITION. Roll Call vote: Bies – yes; Locken – yes; Olson – yes; Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

Motion by Whitmyre, second by Sharp TO APPROVE RESOLUTION 20-21 (appendix B) Denying the petition. Roll Call vote: Bies – yes; Locken – yes; Olson – yes; Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

Nonmeandered Waters Transportation Lanes

Tom Marquardt presented his petition to the Commission. He noted 70 percent of pepper slough is public land. By closing off the 80 acres it eliminates the access. Would like to see pass through access to public waters through closed areas.

Kirschenmann explained the GFP will begin the process to promulgate new rules to create transportation/navigation lanes as allowed in statute. Staff have also had conversations with the petitioner explaining this process has not began but will be initiated.

Motioned by Olson, second by Whitmyre TO DENY THE PETITION. Roll Call vote: Bies – yes; Locken – yes; Olson – yes; Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

Motion by Sharp, second by Olson TO APPROVE RESOLUTION 20-22 (appendix C) Denying the petition. Roll Call vote: Bies – yes; Locken – yes; Olson – yes; Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

PUBLIC HEARING

The Public Hearing began at 2:04 p.m. and closed at 2:05 p.m. on October 1, 2020. The minutes follow these Commission meeting minutes.

OPEN FORUM

Jensen opened the floor for discussion from those in attendance on matters of importance to them that may not be on the agenda.

Chris Hesla, Pierre, SD – SD Wildlife Federation shared information on fruit bearing trees which he explained are good for everything in the living world. Hopefully this will be something fun and noncontroversial that both the Commission and Department will agree with. These are great for wildlife feeding and cover. A variety of animal depend on these from game species to birds and insects for food, nesting and winter cover. Supports and challenges the wildlife staff to make us proud with the use of the new habitat funds to expand on current efforts and plant more fruit bearing trees. Commended parks staff for the great work they have done to maintain the trees in the campground but noted the shelterbelts along the river and in public hunting areas need some work.

Zach Hunke, Watertown, SD – SD Wildlife Federation spoke in support of the comments made by Chris Hesla regarding additional plantings of fruit bearing trees.

Robin Lecy, Hot Springs, SD - Representing residents and users of GFP facilities in Sheps Canyon on the west side of Angostura Lake – has spent many years in the area and said GFP has done a fantastic job developing the area. Now with the hill ranch the west side of the lake has so much potential. A large number of people are using the camping and water access. With this opportunity there is more use for the road.

Nancy Hilding, Black Hawk, SD – Prairie Hills Audubon Society. Spoke in support of the establishment of transportation lanes for nonmeandered waters and complained it had not been done already. Opposed the petition submitted to only require the lower jaw for bobcats. Wants the commission to have a presentation from Chad Neiman on abundance and wants a bobcat management plan. Complaint that review for threatened and endangered species status review has not been done. Wants a comment period with deadline with the link to comment easy to find like all other management plans. Concerned that additional species have not been listed.

Mark Posthumus, Hot Springs, SD said he would like to discuss maintenance on the connector road from HWY 71 to Sheps Canyon. Spoke in favor of the amenities at the Angostura Reservoir area, but the connector road is adequate for the traffic to this popular area. Would like state highway funds devoted to Shep's Canyon. Wife worked for park front gate and tells stories of people who had concerns with hauling their recreational equipment on the road on the west side of the lake.

FINALIZATIONS

State Park Modern Cabin Fees and Cancellation Policy

Scott Simpson, parks and recreation director, presented the recommended changes to the parks cabin fees and cancellation policy. He explained Parks currently has only two categories for assessing fees on overnight rental facilities; \$55 for a camping cabin and \$150 for a modern cabin. With the acquisition of facilities at Spring Creek and Roy Lake, there are now many different variations of cabins and suites that do not fit into either of these categories. Many of the units have full kitchens and include one bedroom, two-bedroom and three-bedroom options. Several comments have been received indicating the current rental fee of \$150 may be too low for some facilities and too high for others, requiring a review of the current pricing structure to reflect what each facility offers.

Rather than identifying each of the 16 variations of facilities and an associated fee in rule, the Department is suggesting a range of pricing from \$85-\$205 to cover all types of facilities. A fee schedule would be provided to the commission each year identifying the fee for each type of facility. In addition, the Department is asking for the ability to reduce the price of modern cabins and suites by up to 25% to align rental facilities fees with the local market, occupancy rates and create marketing packages that will promote increased use.

He also noted that in that in 2019 a definition for modern cabin lodging was created for lodging in parks such as Oahe Downstream, Mina Lake and a new proposed modern cabin at Newton Hills. The acquisition of facilities at Spring Creek and Roy Lake has further diversified the options to include one bedroom, two-bedroom, three-bedroom and four-bedroom units contained in one structure similar to a motel/hotel type of experience. By adding the suite definition our customers will have much clearer understanding of this new facility type.

Motioned by Olson, second by Sharp TO APPROVE THE RECOMMENDED CHANGES TO THE STATE PARK CAMPING FEES AND CANCELLATION POLICY AS PRESENTED. Roll Call vote: Bies – yes; Olson – yes; Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

DIVISION OF PARKS AND RECREATION

Lewis and Clark Dock Replacement and Lease Extension

Simpson presented a lease extension and dock replacement plan for Lewis and Clark Resort and Marina. The concessionaire agrees to replace the entire dock system and create 100 additional slips and the contract would be extended from 2024 to 2044 and with contract extension franchise fees would be 11 percent on gross receipts and 5.5 percent for restaurant franchise fees.

Motioned by Sharp, second by Olson TO APPROVE THE LEASE EXTENSION. Roll Call vote: Bies – yes; Olson – yes; Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

CSP Private Cabin Transfer

Simpson asked the Commission to approve a resolution authorizing the department to execute a Consent to a transfer and assignment of a private cabin permit in Custer State

Park from Estate of Franklyn H. Craft to Berlyn A. Clear and Gary F. Craft. Then transferred and assigned partial interest from Berlyn A. Clear and Gary F. Craft to Brian T. Craft and Roger C. Craft.

Motioned by Peterson with second by B. Jensen TO ADOPT RESOLUTION 20-17 (Appendix D) and RESOLUTION 20-18 (Appendix E) as presented

Fort Sisseton Mobile App

Ali Tonsfeldt, park manager, presented a powerpoint explaining the Fort Sisseton Mobile App to the Commission.

CSP Bison Center

Simpson provided an update on the CSP Bison Center

Revenue, Camping and Visitation Report

Al Nedved, Deputy Director for the Division of Parks and Recreation provided the September revenue, visitation and camping report. September saw continued high use at state parks and recreation areas as the summer season winds down. Dry and warm weather provided ideal conditions for extended season use such as camping, trail use, fishing, and boating. Revenue was up 55% for the month and 40% year to date. Statewide, visitation for September was up 35% from last year, and up 33% over the prior 4-year average. Year-to-date, visitation is up over 1.7 million visitors from last year (30%) or 27% higher than the four-year average. Total visitation from January 1 through September 30 is 9,538,228. Camping also was strong in September with 56,356 camping units which is 55% higher than last year, and 35% better than the prior 4-year average. For the year, camping units are at 358,157 which is a 22% increase from last year, or a 15% increase over the four-year average. October is expected to see more use but is heavily dependent on weather and the availability of services such as comfort stations and water. Staff will begin to winterize these facilities as freezing temperatures approach. Department staff will also begin analyzing the data from the 2020 season to identify factors such as first-time users or other shifts that contributed to this season's usage.

DIVISION OF WILDLIFE

Land Donation – Pheasants Forever Property in Day County

GFP Commission adopted RESOLUTION 20–19 accepting the donation of 440 acres from Pheasants Forever near Pickerel Lake State Park in Day County to be managed as the Tim Kessler Game Production Area. Pheasants Forever, Nestle Purina PetCare, and Pickerel Lake Conservancy are contributing matching funds towards a North American Wetlands Conservation Act Grant to help acquire this parcel through Pheasants Forever's Build a Wildlife Area program. The parcel is comprised of native prairie, wetlands, and cropland, and is in some of the best waterfowl breeding areas in the state, while providing habitat for pheasants, sharp-tail grouse, white tailed deer, and many wetland and upland non-game species.

Motion by Olson, second by Locken TO ADOPT RESOLUTION 20-19 (appendix F) ACCEPTING THE LAND DONATION OF 440 ACRES FROM PHEASANTS FOREVER IN DAY COUNTY. Roll Call vote: Bies – yes; Locken – yes; Olson – yes;

Sharp – yes; Spring – yes; Whitmyre – yes; Jensen – yes. Motion carried 7 yes and 0 no votes.

Purchase of DOT railroad ROW in Lincoln County

Paul Coughlin, wildlife program administrator, provided info on this project explaining it involves a proposal to purchase a 4.016 acre in-holding to the Rollings GPA in Lincoln County. The parcel is a surplus railroad right-of-way property offered exclusively to GFP. This project is in early development stages and will be brought to the GFP Commission early next year for final action.

Hell's Canyon Water Project

John Kanta, wildlife regional supervisor, explained the Forest Service is currently working with livestock permittees to develop water to better distribute livestock grazing on the National Forest in the Hells Canyon area of the Black Hills. Commissioner Bies commented that these types of projects were a worthwhile effort and that GFP should partner to assist with these projects. John Kanta advised that GFP has been discussing the Hells Canyon water project with the Forest Service and that GFP will be contributing to this project.

Lake Pactola release and flow in Rapid Creek

Jake Davis, senior fisheries biologist, provided the Commission long-term GFP trend data that indicated that the trout population in the catch and release area of Rapid Creek below Pactola Dam is highly impacted by discharge from Pactola Reservoir, primarily in the winter. Recent work completed by GFP and SDSMT has recommended that a minimum winter release of 40 cfs would provide the needed trout habitat to sustain a Class 1 fishery. Additionally, recent work has identified alternative dam release operating scenarios that would provide for both increased winter discharge and better use of the water within the Rapid Creek system.

Mule Deer Harvest and Discussion

Andy Lindbloom, senior wildlife biologist, explained that in 2019, total deer harvest was 50,700 across the state of South Dakota; of that, 6,600 mule deer were harvested. Many regulation changes were made from about 2000-2010 in order to increase deer harvest and decrease deer populations. Following record harvest levels and 3-4 severe winters, and several other factors, deer populations fell below desired objectives and from 2010-2020 several regulation changes have subsequently been made to decrease harvest and increase deer populations. Current mule deer populations still remain below objectives, although in some areas deer densities have been slowly increasing closer to objectives. Over the past 4 years during very conservative harvest regulations, antlerless mule deer harvest has averaged approximately 1600 with the majority of harvest occurring from youth/mentor/apprentice (50%), firearm (20%), landowner-on-own land (19%), and archery (9%) deer seasons.

AIS 2020 summary and 2021 approach

John Lott, fisheries chief, provided the Commission information explaining in association with new authorities granted to the department and the commission to manage aquatic invasive species (AIS), the watercraft inspection and decontamination program was expanded to nine crews in 2020. New authorities included making inspections mandatory when stations are in operation and the ability for law

enforcement to stop vehicles transporting boats that bypass inspection stations. Crews operated from early June through Labor Day weekend, conducting over 9,300 watercraft inspections and over 200 decontaminations. Initial plans for the 2021 inspection program include focusing effort in western South Dakota and the Black Hills, where zebra mussels are not known to be present, and conducting a lower level of inspection effort for the Missouri River corridor and eastern SD waters.

While zebra mussels were documented in three eastern South Dakota waters in 2020. Getting boaters to adopt best practices to minimize transport of water and adult mussels to new waters will slow the spread of zebra mussels to new waters. Inspection station are an effective tool for engaging boaters and help them adopt best practices.

Bighorn Sheep Projects from Auction Funds

Switzer and Kanta provide an update on completed and future bighorn sheep projects made possible by auction license funds.

GPA Disposal and Process

Kirschenmann and Coughlin described an evaluation process used by regions 3 and 4 habitat to identify GPAs for potential disposal. Using both the previous GPA assessment, and looking further into other aspects of individual GPAs, such as adequacy of public access, habitat management opportunities, wildlife use, and marketability, a list of GPAs was developed to investigate further the feasibility of their disposal. Through this effort to identify and ultimately dispose of certain GPAs no longer providing for our purposes, GFP hopes to utilize funds derived from their sale for acquisition of additional GPA acres that provide higher levels of public use and wildlife habitat development and management opportunities.

CWD Updates

Switzer provided the Commission an update on CWD.

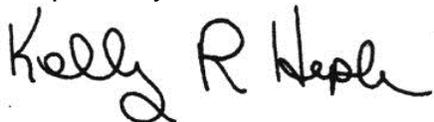
EHD Updates

Switzer provided the Commission an update on EHD.

Adjourn

Meeting adjourned at 11:20 p.m.

Respectfully Submitted,



Kelly R. Hepler, Department Secretary

Appendix A
RESOLUTION 20-21

WHEREAS, Steve Cherkas of Edgemont, South Dakota, submitted a Petition to the Game, Fish and Parks Commission (Commission) dated September 3, 2020, requesting that the Game, Fish and Parks Commission amend ARSD § 41:06:01:15 (Elk application requirements) to decrease the minimum acreage requirement to receive a landowner-operator elk license for the reasons more fully set out in the petition (hereinafter referred to as “the Petition”); and

WHEREAS, all members of the Commission have been furnished with and have reviewed a copy of the Petition; and

WHEREAS, the Commission has been advised that a copy of the Petition has been served on all members of the Interim Rules Review Committee and Director of the Legislative Research Council as required by SDCL § 1-26-13; and

WHEREAS, the Commission has been advised that SDCL § 1-26-13 requires that within thirty (30) days of submission of a Petition, the Commission shall either “deny the petition in writing (stating its reasons for the denials) or shall initiate rule-making proceedings in accordance with SDCL 1-26-4.”; and

WHEREAS, the Commission has been advised and is of the opinion that a hearing on the Petition is neither statutorily required nor necessary; and

WHEREAS, the Commission has reviewed and carefully considered the requirements and procedures set out in SDCL §1-26-13 and the contents of the Petition, including the reasons advanced by Petitioner in support of reducing the acreage requirement for landowner-operator elk license; and

WHEREAS, elk are a limited resource in SD and many South Dakotans have a desire to hunt elk in SD; and

WHEREAS, the Department is currently discussing alternatives to the landowner elk preference rule and a potential landowner own land elk license for public comment in the future; and

WHEREAS, the Department is currently working on revising the existing elk management plan and these topics will be reviewed and discussed during this effort and should go through this process prior to making requested changes.

NOW, THEREFORE, BE IT RESOLVED, that the Commission does hereby deny the Petition for the reasons hereinabove stated in this Resolution, which said Resolution as adopted by the Commission shall constitute the Commission’s written denial of the Petition and its reasons therefore.

BE IT FURTHER RESOLVED that the Petition, a record of the Commission’s discussions concerning same, and this Resolution be made a part of the Minutes of the Commission meeting at which this Resolution is adopted, and further, that the Department be and it is hereby authorized and directed in compliance with SDCL §1-26-13 to serve a copy of an extract of that portion of the Commission minutes which pertain to the Commission’s discussion of the Petition and its adoption of this Resolution, including a copy of the Resolution, on all members of the Interim Rules Review Committee and Director of the Legislative Research Council with copies also to be provided to the Petitioner, Steve Cherkas of Edgemont, South Dakota.

Appendix B
RESOLUTION 20-20

WHEREAS, Steve Cherkas of Edgemont, South Dakota, submitted a Petition to the Game, Fish and Parks Commission (Commission) dated September 3, 2020, requesting that the Game, Fish and Parks Commission amend ARSD § 41:08:01:08.01 (Bobcat trapping and hunting season established – Tagging Requirements) to remove or extend the five-day reporting requirement for the reasons more fully set out in the petition (hereinafter referred to as “the Petition”); and

WHEREAS, all members of the Commission have been furnished with and have reviewed a copy of the Petition; and

WHEREAS, the Commission has been advised that a copy of the Petition has been served on all members of the Interim Rules Review Committee and Director of the Legislative Research Council as required by SDCL § 1-26-13; and

WHEREAS, the Commission has been advised that SDCL § 1-26-13 requires that within thirty (30) days of submission of a Petition, the Commission shall either “deny the petition in writing (stating its reasons for the denials) or shall initiate rule-making proceedings in accordance with SDCL 1-26-4.”; and

WHEREAS, the Commission has been advised and is of the opinion that a hearing on the Petition is neither statutorily required nor necessary; and

WHEREAS, the Commission has reviewed and carefully considered the requirements and procedures set out in SDCL §1-26-13 and the contents of the Petition, including the reasons advanced by Petitioner in support of change to the reporting requirement for bobcat harvest; and

WHEREAS, the carcass collection is needed to collect biological information and should the 5-day check-in period be extended or removed, already poor shape carcasses may come in as not viable/useable; and

WHEREAS, the 5-day timeframe ensures that GFP has timely and accurate data to manage this species. If a person held multiple carcasses throughout the season, the accuracy of the harvest information (sex, harvest location, number of days spent trapping, etc.) could be lost; and

WHEREAS, GFP allows bobcats to be checked-in by a variety of staff, not just Conservation Officers, to allow greater flexibility for the public with the 5-day requirement.

NOW, THEREFORE, BE IT RESOLVED, that the Commission does hereby deny the Petition for the reasons hereinabove stated in this Resolution, which said Resolution as adopted by the Commission shall constitute the Commission’s written denial of the Petition and its reasons therefore.

BE IT FURTHER RESOLVED that the Petition, a record of the Commission’s discussions concerning same, and this Resolution be made a part of the Minutes of the Commission meeting at which this Resolution is adopted, and further, that the Department be and it is hereby authorized and directed in compliance with SDCL §1-26-13 to serve a copy of an extract of that portion of the Commission minutes which pertain to the Commission’s discussion of the Petition and its adoption of this Resolution, including a copy of the Resolution, on all members of the Interim Rules Review Committee and Director of the Legislative Research Council with copies also to be provided to the Petitioner, Steve Cherkas of Edgemont, South Dakota.

Appendix C
RESOLUTION 20-22

WHEREAS, Tom Marquardt of Watertown, South Dakota, submitted a Petition to the Game, Fish and Parks Commission (Commission) dated September 13, 2020 requesting that the Game, Fish and Parks Commission to establish a navigation lane on a closed nonmeandered waters for the reasons more fully set out in the petition (hereinafter referred to as “the Petition”); and

WHEREAS, all members of the Commission have been furnished with and have reviewed a copy of the Petition; and

WHEREAS, the Commission has been advised that a copy of the Petition has been served on all members of the Interim Rules Review Committee and Director of the Legislative Research Council as required by SDCL § 1-26-13; and

WHEREAS, the Commission has been advised that SDCL § 1-26-13 requires that within thirty (30) days of submission of a Petition, the Commission shall either “deny the petition in writing (stating its reasons for the denials) or shall initiate rule-making proceedings in accordance with SDCL 1-26-4.”; and

WHEREAS, the Commission has been advised and is of the opinion that a hearing on the Petition is neither statutorily required nor necessary; and

WHEREAS, the Commission has reviewed and carefully considered the requirements and procedures set out in SDCL §1-26-13 and the contents of the Petition, including the reasons advanced by Petitioner in support of establishing a navigation lane; and

WHEREAS, the Commission has the authority to create navigation lanes on closed nonmeandered bodies of water; and

WHEREAS, there is currently no process established in rule to petition the Commission to create a navigation lane; and

WHEREAS, the Commission deems it necessary to create a process in which the public can petition the Commission; and

WHEREAS, the Department will propose rules to establish a process by which a member of the public can petition the Commission to establish a navigation lane on a closed nonmeandered body of water.

NOW, THEREFORE, BE IT RESOLVED, that the Commission does hereby deny the Petition for the reasons hereinabove stated in this Resolution, which said Resolution as adopted by the Commission shall constitute the Commission’s written denial of the Petition and its reasons therefore.

BE IT FURTHER RESOLVED that the Petition, a record of the Commission’s discussions concerning same, and this Resolution be made a part of the Minutes of the Commission meeting at which this Resolution is adopted, and further, that the Department be and it is hereby authorized and directed in compliance with SDCL §1-26-13 to serve a copy of an extract of that portion of the Commission minutes which pertain to the Commission’s discussion of the Petition and its adoption of this Resolution, including a copy of the Resolution, on all members of the Interim Rules Review Committee and Director of the Legislative Research Council with copies also to be provided to the Petitioner, Tom Marquardt of Watertown, South Dakota.

Appendix D
RESOLUTION 20-17

WHEREAS, the South Dakota Game, Fish and Parks Commission has been advised that the Estate of Franklyn H. Craft owner of a cabin located in Custer State Park (Custer County) on property described as:

Lot Four (4) of Pine Crest Group, Northwest Quarter of the Southwest Quarter (NW1/4SW1/4), Section Twelve (12), Township Four (4) South, Range Five (5), East of the Black Hills Meridian, Custer State Park, Custer County, South Dakota.

WHEREAS, the property upon which the cabin is located is owned by the South Dakota Department of Game, Fish and Parks and has been leased to the Estate of Franklyn H. Craft by permit by reason of a Stipulation of Settlement and Dismissal entered in Craft v. Wipf, Civil Action No. 85-5092, U.S. District Court for the District of South Dakota, Western Division, and subsequent agreements and permits executed thereafter based on said Stipulation and Dismissal; and

WHEREAS, the Commission has been advised that the Estate of Franklyn H. Craft desires to and have transferred and assigned his interest in said cabin and cabin site permit to Berlyn A. Clear and Gary F. Craft; and

WHEREAS, the Commission has been requested to approve said Transfer and Assignment.

NOW, therefore, be it resolved that in the event the Department receives an executed Agreement and Assignment of the cabin site permit and cabin and appurtenances located thereon and which further provides that said Assignees agree to abide by all of the terms and conditions of the aforementioned Stipulation of Settlement and Dismissal and all subsequent agreements relative thereto, including but not limited to Cabin Site Permits, Addendums, and all agreements relative to establishing the lease or rental payments due the Department, then in that event, the Department is authorized to execute a Consent to the requested Assignment.

Appendix E
RESOLUTION 20-18

WHEREAS, the South Dakota Game, Fish and Parks Commission has been advised that the Berlyn A. Clear and Gary F. Craft owners of a cabin located in Custer State Park (Custer County) on property described as:

Lot Four (4) of Pine Crest Group, Northwest Quarter of the Southwest Quarter (NW1/4SW1/4), Section Twelve (12), Township Four (4) South, Range Five (5), East of the Black Hills Meridian, Custer State Park, Custer County, South Dakota.

WHEREAS, the property upon which the cabin is located is owned by the South Dakota Department of Game, Fish and Parks and has been leased to the Berlyn A. Craft and Gary F. Craft by permit by reason of a Stipulation of Settlement and Dismissal entered in Craft v. Wipf, Civil Action No. 85-5092, U.S. District Court for the District of South Dakota, Western Division, and subsequent agreements and permits executed thereafter based on said Stipulation and Dismissal; and

WHEREAS, the Commission has been advised that the Berlyn A. Clear and Gary F. Craft desire to and have transferred and assigned partial interest in said cabin and cabin site permit to Brian T. Craft and Roger C. Craft; and

WHEREAS, the Commission has been requested to approve said Transfer and Assignment.

NOW, therefore, be it resolved that in the event the Department receives an executed Agreement and Assignment of the cabin site permit and cabin and appurtenances located thereon and which further provides that said Assignees agree to abide by all of the terms and conditions of the aforementioned Stipulation of Settlement and Dismissal and all subsequent agreements relative thereto, including but not limited to Cabin Site Permits, Addendums, and all agreements relative to establishing the lease or rental payments due the Department, then in that event, the Department is authorized to execute a Consent to the requested Assignment.

Appendix F
RESOLUTION 20 - 19

WHEREAS, Pheasants Forever, Inc. owns real property (Property) described as:

The NW $\frac{1}{4}$ NE $\frac{1}{4}$, S $\frac{1}{2}$ NW $\frac{1}{4}$, NE $\frac{1}{4}$ NW $\frac{1}{4}$, S $\frac{1}{2}$ SW $\frac{1}{4}$, NE $\frac{1}{4}$ SW $\frac{1}{4}$, and S $\frac{1}{2}$ S $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 25; the SE $\frac{1}{4}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SE $\frac{1}{4}$, SE $\frac{1}{4}$ SE $\frac{1}{4}$ less portion deeded in Warranty Deed recorded in Book B79 page 663, and except lots H1, H2, and H5 of Section 35; and the NE $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 36; all in Township 124 North, Range 53 West of the 5th P.M., Day County, South Dakota., subject to any easements, restrictions, covenants, and reservations of record; and

WHEREAS, pursuant to its wishes, Pheasants Forever, Inc. desires to gift and transfer title to the Property to the South Dakota Department of Game, Fish and Parks (Department) for use as a Game Production Area; and

WHEREAS, the Department has evaluated and determined that the Property would serve very well as a Game Production Area, offering wildlife habitat, public hunting, and other wildlife related outdoor recreational opportunities; and

WHEREAS, the Department is authorized to accept gifts of property for Game Production Area as per SDCL 41-2-19 and desires to accept the gift of the Property upon confirmation of the gift by the Game, Fish and Parks Commission; and

WHEREAS, the Game, Fish and Parks Commission desires to acknowledge the Department's acceptance of this gift of property from Pheasants Forever, Inc. for use as a Game Production Area, and further acknowledge the extreme generosity of Pheasants Forever, Inc.

NOW, THEREFORE, BE IT RESOLVED, that the Game, Fish and Parks Commission does hereby confirm the decision by the Department to accept the transfer and gift of the Property from Pheasants Forever, Inc. to be used as a Game Production Area.

BE IT FURTHER RESOLVED that the Game, Fish and Parks Commission, on behalf of the citizens and sportspersons of South Dakota, does hereby acknowledge and express its deepest appreciation and gratitude to Pheasants Forever, Inc. for its generosity, and further acknowledge the outdoor recreation opportunities this gift will provide to South Dakotans for many years to come.

**Public Hearing Minutes of the Game, Fish and Parks Commission
October 1-2, 2020**

The Commission Chair Gary Jensen began the public hearing at 2:04 p.m. CT via conference call. Commissioners Gary Jensen, Travis Bies, Jon Locken, Russell Olson, Doug Sharp, Charles Spring, and Robert Whitmyre were present. Kotilnek indicated written comments were provided to the Commissioners prior to this time and will be reflected in the Public Hearing Minutes. Kotilnek then invited the public to come forward with oral testimony.

State Park Modern Cabin Fees and Cancellation Policy

No verbal comments

See attached written public comments submitted prior to the public hearing

The public Hearing concluded at 2:05 p.m.

Respectfully Submitted,

A handwritten signature in black ink that reads "Kelly R Hepler". The signature is written in a cursive, slightly slanted style.

Kelly R. Hepler, Department Secretary

**Rolling Budget Summary Report
FY2022**

Center 0610 Wildlife - Info

	Actual FY19	Actual FY20	Budgeted FY21	Inflation FY22	Exp/Red FY22	Request FY22	Recommended FY22	Rec. Inc/Dec FY22
Personal Services								
EMPLOYEE SALARIES	14,741,029	14,660,599	15,788,822	-	-	15,788,822	15,788,822	-
EMPLOYEE BENEFITS	4,782,864	5,736,675	5,392,759	-	-	5,392,759	5,392,759	-
FTE	296.5	290.7	296.0			296.0	296.0	-
Funding Types								
GENERAL	-	-	-	-	-	-	-	-
FEDERAL	4,409,912	4,902,051	4,937,656	-	-	4,937,656	4,937,656	-
OTHER	15,113,981	15,495,225	16,243,925	-	-	16,243,925	16,243,925	-
Total PS	19,523,893	20,397,276	21,181,581	-	-	21,181,581	21,181,581	-
Operating Expenses								
TRAVEL	762,202	1,537,477	1,351,866		1,581,052	2,932,918	2,932,918	1,581,052
CONTRACTUAL SERVICES	19,004,837	18,682,672	20,654,710	-	5,686,564	26,341,274	26,341,274	5,686,564
SUPPLIES & MATERIALS	4,647,028	4,586,380	4,286,046	-	18,500	4,304,546	4,304,546	18,500
GRANTS AND SUBSIDIES	1,662,501	1,677,219	2,120,873	-	1,155	2,122,028	2,122,028	1,155
CAPITAL OUTLAY	1,873,321	3,410,995	2,268,752	-	155,700	2,424,452	2,424,452	155,700
OTHER	61,866	84,406	-	-	-	-	-	-
Funding Types								
GENERAL	-	-	-	-	-	-	-	-
FEDERAL	12,386,024	12,333,680	14,012,052	-	485,531	14,497,583	14,497,583	485,531
OTHER	15,625,730	17,645,470	16,670,195	-	6,957,440	23,627,635	23,627,635	6,957,440
Total OE	28,011,755	29,979,150	30,682,247	-	7,442,971	38,125,218	38,125,218	7,442,97
TOTAL FOR 0610								
Funding Types								
GENERAL	-	-	-	-	-	-	-	-
FEDERAL	16,795,936	17,235,731	18,949,708	-	485,531	19,435,239	19,435,239	485,531
OTHER	30,739,711	33,140,695	32,914,120	-	6,957,440	39,871,560	39,871,560	6,957,440
Total	47,535,647	50,376,426	51,863,828	-	7,442,971	59,306,799	59,306,799	7,442,971

**Rolling Budget Summary Report
FY2022**

Center 0612 Wildlife -Development/Improvement - Info

	Actual FY19	Actual FY20	Budgeted FY21	Inflation FY22	Exp/Red FY22	Request FY22	Recommended FY22	Rec. Inc/Dec FY22
Operating Expenses								
CONTRACTUAL SERVICES	15,145	-	-	-	-	-	-	-
CAPITAL OUTLAY	3,665,199	2,028,000	2,562,500	-	(10,000)	2,552,500	2,552,500	(10,000)
Funding Types								
GENERAL	-	-	-	-	-	-	-	-
FEDERAL	2,775,570	1,427,250	1,957,750	-	(242,500)	1,715,250	1,715,250	(242,500)
OTHER	904,775	600,750	604,750	-	232,500	837,250	837,250	232,500
Total OE	3,680,344	2,028,000	2,562,500	-	(10,000)	2,552,500	2,552,500	(10,000)

TOTAL FOR 0610

Funding Types								
GENERAL	-	-	-	-	-	-	-	-
FEDERAL	2,775,570	1,427,250	1,957,750	-	(242,500)	1,715,250	1,715,250	(242,500)
OTHER	904,775	600,750	604,750	-	232,500	837,250	837,250	232,500
Total	3,680,344	2,028,000	2,562,500	-	(10,000)	2,552,500	2,552,500	(10,000)

Rolling Budget Summary Report FY2022

Center 0622 Snowmobile Trails - Info

	Actual FY19	Actual FY20	Budgeted FY21	Inflation FY22	Exp/Red FY22	Request FY22	Recommended FY22	Rec. Inc/Dec FY22
Personal Services								
EMPLOYEE SALARIES	159,903	236,452	341,576	-	-	341,576	341,576	-
EMPLOYEE BENEFITS	57,306	78,586	84,977	-	-	84,977	84,977	-
FTE	4.0	3.8	9.1	-	-	9.1	9.1	-
Funding Types								
GENERAL	-	-	-	-	-	-	-	-
FEDERAL	-	-	-	-	-	-	-	-
OTHER	217,209	315,039	426,553	-	-	426,553	426,553	-
Total PS	217,209	315,039	426,553	-	-	426,553	426,553	-
Operating Expenses								
TRAVEL	5,803	35,103	54,754	-	7,000	61,754	61,754	7,000
CONTRACTUAL SERVICES	120,133	94,304	143,794	-	(7,000)	136,794	136,794	(7,000)
SUPPLIES & MATERIALS	213,963	181,019	184,750	-	-	184,750	184,750	-
GRANTS AND SUBSIDIES	179,518	124,080	312,500	-	-	312,500	312,500	-
CAPITAL OUTLAY	162,317	195,253	264,000	-	-	264,000	264,000	-
OTHER	392	-	-	-	-	-	-	-
Total OE	682,125	629,759	959,798	-	-	959,798	959,798	-
TOTAL FOR 0610								
Funding Types								
GENERAL	-	-	-	-	-	-	-	-
FEDERAL	-	-	-	-	-	-	-	-
OTHER	899,335	944,797	1,386,351	-	-	1,386,351	1,386,351	-
Total	899,335	944,797	1,386,351	-	-	1,386,351	1,386,351	21 -

**Rolling Budget Summary Report
FY2022**

Center 0601 Administration								
	Actual FY19	Actual FY20	Budgeted FY21	Inflation FY22	Exp/Red FY22	Request FY22	Recommended FY22	Rec. Inc/Dec FY22
Personal Services								
EMPLOYEE SALARIES	1,611,704	1,539,652	1,876,549	-	(50,000)	1,826,549	1,826,549	(50,000)
EMPLOYEE BENEFITS	470,852	534,135	678,211	-	(25,000)	653,211	653,211	(25,000)
FTE	25.8	23.6	28.6	-	-	28.6	28.6	-
Funding Types								
GENERAL	140,191	158,995	156,944	-	-	156,944	156,944	-
FEDERAL	-	-	-	-	-	-	-	-
OTHER	1,942,365	1,914,791	2,397,816	-	(75,000)	2,322,816	2,322,816	(75,000)
Total PS	2,082,556	2,073,786	2,554,760	-	(75,000)	2,479,760	2,479,760	(75,000)
Operating Expenses								
TRAVEL	99,588	119,239	210,764	-	-	210,764	210,764	-
CONTRACTUAL SERVICES	1,495,610	1,582,378	1,549,838	-	76,014	1,625,852	1,625,852	76,014
SUPPLIES & MATERIALS	239,327	430,000	330,765	-	-	330,765	330,765	-
GRANTS AND SUBSIDIES	-	-	-	-	-	-	-	-
CAPITAL OUTLAY	64,892	65,827	16,715	-	-	16,715	16,715	-
OTHER	-	-	2,000	-	-	2,000	2,000	-
Funding Types								
GENERAL	824,951	823,205	822,471	-	1,014	823,485	823,485	1,014
FEDERAL	-	104,465	-	-	-	-	-	-
OTHER	1,074,466	1,269,774	1,287,611	-	75,000	1,362,611	1,362,611	75,000
Total OE	1,899,417	2,197,444	2,110,082	-	76,014	2,186,096	2,186,096	76,014
TOTAL FOR 0610								
Funding Types								
GENERAL	965,142	982,200	979,415	-	1,014	980,429	980,429	1,014
FEDERAL	-	104,465	-	-	-	-	-	-
OTHER	3,016,831	3,184,565	3,685,427	-	-	3,685,427	3,685,427	-
Total	3,981,973	4,271,230	4,664,842	-	1,014	4,665,856	4,665,856	1,014

**Rolling Budget Summary Report
FY2022**

Center 0620 State Parks and Recreation								
	Actual FY19	Actual FY20	Budgeted FY21	Inflation FY22	Exp/Red FY22	Request FY22	Recommended FY22	Rec. Inc/Dec FY22
Personal Services								
EMPLOYEE SALARIES	8,971,000	8,868,342	9,481,361	-	-	9,481,361	9,481,361	-
EMPLOYEE BENEFITS	2,349,520	2,916,489	2,787,805	-	-	2,787,805	2,787,805	-
FTE	243.8	237.7	250.2	-	-	250.2	250.2	-
Funding Types								
GENERAL	2,775,127	2,970,117	2,992,450	-	-	2,992,450	2,992,450	-
FEDERAL	546,040	571,498	1,052,316	-	-	1,052,316	1,052,316	-
OTHER	7,999,353	8,243,216	8,224,400	-	-	8,224,400	8,224,400	-
Total PS	11,320,520	11,784,831	12,269,166	-	-	12,269,166	12,269,166	-
Operating Expenses								
TRAVEL	148,158	547,910	330,424	-	671,765	1,002,189	1,002,189	671,765
CONTRACTUAL SERVICES	9,104,528	9,781,926	9,749,581	-	(381,433)	9,368,148	9,368,148	(381,433)
SUPPLIES & MATERIALS	2,466,499	2,544,803	2,562,989	-	151,530	2,714,519	2,714,519	151,530
GRANTS AND SUBSIDIES	472,579	590,391	1,100,000	-	-	1,100,000	1,100,000	-
CAPITAL OUTLAY	1,454,305	757,145	853,942	-	400,000	1,253,942	1,253,942	400,000
OTHER	476,097	579,499	532,909	-	-	532,909	532,909	-
Funding Types								
GENERAL	2,465,822	2,466,447	2,463,346	-	(1,604)	2,461,742	2,461,742	(1,604)
FEDERAL	1,985,584	1,967,516	2,985,682	-	(7,730)	2,977,952	2,977,952	(7,730)
OTHER	9,670,759	10,367,711	9,680,817	-	851,196	10,532,013	10,532,013	851,196
Total OE	14,122,165	14,801,673	15,129,845	-	841,862	15,971,707	15,971,707	841,862
TOTAL FOR 0620								
Funding Types								
GENERAL	5,240,949	5,436,564	5,455,796	-	(1,604)	5,454,192	5,454,192	(1,604)
FEDERAL	2,531,624	2,539,014	4,037,998	-	(7,730)	4,030,268	4,030,268	(7,730)
OTHER	17,670,112	18,610,926	17,905,217	-	851,196	18,756,413	18,756,413	851,196
Total	25,442,685	26,586,504	27,399,011	-	841,862	28,240,873	28,240,873	841,862

**Rolling Budget Summary Report
FY2022**

Center 0621 State Parks and Recreation - Dev/Imp								
	Actual FY19	Actual FY20	Budgeted FY21	Inflation FY22	Exp/Red FY22	Request FY22	Recommended FY22	Rec. Inc/Dec FY22
Personal Services								
EMPLOYEE SALARIES	-	-	-	-	-	-	-	-
EMPLOYEE BENEFITS	-	-	-	-	-	-	-	-
Funding Types								
GENERAL	-	-	-	-	-	-	-	-
FEDERAL	-	-	-	-	-	-	-	-
OTHER	-	-	-	-	-	-	-	-
Total PS	-	-	-	-	-	-	-	-
Operating Expenses								
TRAVEL	-	-	-	-	-	-	-	-
CONTRACTUAL SERVICES	596,914	274,727	-	-	-	-	-	-
SUPPLIES & MATERIALS	89,579	-	-	-	-	-	-	-
GRANTS AND SUBSIDIES	-	-	-	-	-	-	-	-
CAPITAL OUTLAY	9,660,359	10,313,148	11,899,820	-	1,401,080	13,300,900	13,300,900	1,401,080
Funding Types								
GENERAL	-	-	-	-	-	-	-	-
FEDERAL	3,185,750	3,747,250	2,064,900	-	283,000	2,347,900	2,347,900	283,000
OTHER	7,161,102	6,840,625	9,834,920	-	1,118,080	10,953,000	10,953,000	1,118,080
Total OE	10,346,852	10,587,875	11,899,820	-	1,401,080	13,300,900	13,300,900	1,401,080
TOTAL FOR 0621								
Funding Types								
GENERAL	-	-	-	-	-	-	-	-
FEDERAL	3,185,750	3,747,250	2,064,900	-	283,000	2,347,900	2,347,900	283,000
OTHER	7,161,102	6,840,625	9,834,920	-	1,118,080	10,953,000	10,953,000	1,118,080
Total	10,346,852	10,587,875	11,899,820	-	1,401,080	13,300,900	13,300,900	1,401,080

Rolling Budget Summary Report FY2022

Center 06 GAME, FISH, AND PARKS

	Actual FY19	Actual FY20	Budgeted FY21	Inflation FY22	Exp/Red FY22	Request FY22	Recommended FY22	Rec. Inc/Dec FY22
Personal Services								
EMPLOYEE SALARIES	25,483,636	25,305,046	27,488,308	-	(50,000)	27,438,308	27,438,308	(50,000)
EMPLOYEE BENEFITS	7,660,542	9,265,885	8,943,752	-	(25,000)	8,918,752	8,918,752	(25,000)
FTE	570.0	555.8	583.9	-	-	583.9	583.9	-
Funding Types								
GENERAL	2,915,318	3,129,113	3,149,394	-	-	3,149,394	3,149,394	-
FEDERAL	4,955,951	5,473,548	5,989,972	-	-	5,989,972	5,989,972	-
OTHER	25,272,909	25,968,270	27,292,694	-	(75,000)	27,217,694	27,217,694	(75,000)
Total PS	33,144,178	34,570,931	36,432,060	-	(75,000)	36,357,060	36,357,060	(75,000)
Operating Expenses								
TRAVEL	1,015,752	2,239,729	1,947,808	-	2,259,817	4,207,625	4,207,625	2,259,817
CONTRACTUAL SERVICES	30,337,167	30,416,006	32,097,923	-	5,374,145	37,472,068	37,472,068	5,374,145
SUPPLIES & MATERIALS	7,656,395	7,742,202	7,364,550	-	170,030	7,534,580	7,534,580	170,030
GRANTS AND SUBSIDIES	2,314,598	2,391,691	3,533,373	-	1,155	3,534,528	3,534,528	1,155
CAPITAL OUTLAY	16,880,393	16,770,367	17,865,729	-	1,946,780	19,812,509	19,812,509	1,946,780
OTHER	538,354	663,905	534,909	-	-	534,909	534,909	-
Funding Types								
GENERAL	3,290,773	3,289,651	3,285,817	-	(590)	3,285,227	3,285,227	(590)
FEDERAL	20,332,928	19,580,161	21,020,384	-	518,301	21,538,685	21,538,685	518,301
OTHER	35,118,958	37,354,089	39,038,091	-	9,234,216	48,272,307	48,272,307	9,234,216
Total OE	58,742,659	60,223,901	63,344,292	-	9,751,927	73,096,219	73,096,219	9,751,927
TOTAL FOR 06								
Funding Types								
GENERAL	6,206,091	6,418,764	6,435,211	-	(590)	6,434,621	6,434,621	(590)
FEDERAL	25,288,879	25,053,709	27,010,356	-	518,301	27,528,657	27,528,657	518,301
OTHER	60,391,867	63,322,358	66,330,785	-	9,159,216	75,490,001	75,490,001	9,159,216
Total	91,886,837	94,794,832	99,776,352	-	9,676,927	109,453,279	109,453,279	9,676,927



SOUTH DAKOTA'S PHEASANT HUNTING MARKETING CAMPAIGN

JULY – OCTOBER 2020 QUARTERLY REPORT

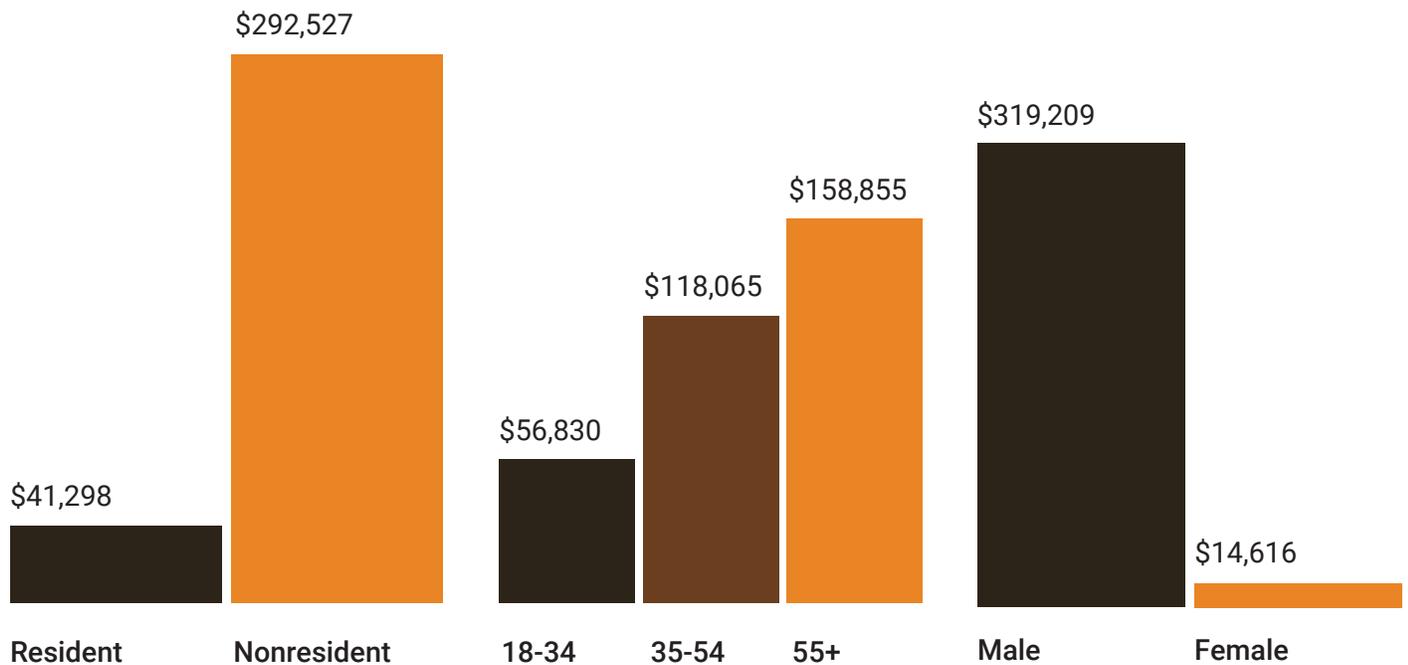


To date, campaign efforts have driven 3,944 hunters to spend \$333,825 in small game license sales.

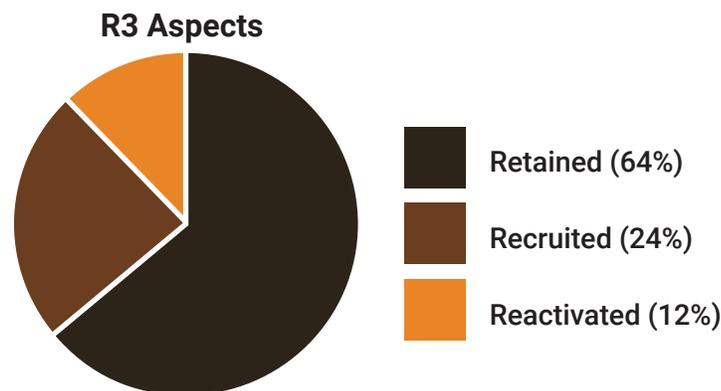
SALES



DEMOGRAPHICS



R3



We have spent \$65,212.73 on paid search digital marketing efforts, which generated \$333,825 in small game license sales. This means for every dollar invested in digital paid search marketing efforts, we achieved a \$5 return on investment.

* Reactivated hunters are individuals who have not purchased a license in the last three years or more.

License Sales Totals

(as of Nov 1)

date updated: 2 Nov 2020

Resident						+/- Licenses		+/- Revenue	
	2017	2018	2019	3-yr Avg	2020	2019 vs 2020	3-yr Avg vs 2020	2019 vs 2020	3-yr Avg vs 2020
Combination	46,452	44,779	42,869	44,700	47,080	4,211	2,380	\$ 231,605	\$ 130,900
Junior Combination	7,569	6,856	6,443	6,956	8,562	2,119	1,606	\$ 57,213	\$ 43,362
Senior Combination	8,920	9,362	9,541	9,274	10,510	969	1,236	\$ 38,760	\$ 49,427
Small Game	13,446	14,108	12,168	13,241	13,159	991	-82	\$ 32,703	\$ (2,695)
Youth Small Game	3,985	3,784	3,335	3,701	3,520	185	-181	\$ 925	\$ (907)
1-Day Small Game	641	634	670	648	715	45	67	\$ 540	\$ 800
Migratory Bird Certificate	25,402	24,869	23,978	24,750	25,022	1,044	272	\$ 5,220	\$ 1,362
Predator/Varmint	1,364	1,428	1,361	1,384	1,488	127	104	\$ 635	\$ 518
Furbearer	2,691	2,983	3,243	2,972	3,305	62	333	\$ 1,860	\$ 9,980
Annual Fishing	61,146	56,723	51,953	56,607	67,195	15,242	10,588	\$ 426,776	\$ 296,455
Senior Fishing	13,167	12,898	12,588	12,884	14,532	1,944	1,648	\$ 23,328	\$ 19,772
1-Day Fishing	6,113	5,485	5,469	5,689	6,970	1,501	1,281	\$ 12,008	\$ 10,248
Gamefish Spearing/Archery	2,906	2,974	0	1,960	0	0	-1,960	\$ -	\$ (9,800)
Habitat Stamp	0	0	0	0	52,950	52,950	52,950	\$ 529,500	\$ 529,500
RESIDENT TOTALS =	193,802	186,883	173,618	184,768	255,008	81,390	70,240	\$ 1,361,073	\$ 1,078,922

Nonresident						+/- Licenses		+/- Revenue	
	2017	2018	2019	3-yr Avg	2020	2019 vs 2020	3-yr Avg vs 2020	2019 vs 2020	3-yr Avg vs 2020
Small Game	42,182	44,276	41,955	42,804	41,859	-96	-945	\$ (11,616)	\$ (114,385)
Youth Small Game	1,228	1,216	1,000	1,148	1,189	189	41	\$ 1,890	\$ 410
Annual Shooting Preserve	327	257	250	278	261	11	-17	\$ 1,331	\$ (2,057)
5-day Shooting Preserve	8,090	8,374	8,459	8,308	7,191	-1,268	-1,117	\$ (96,368)	\$ (84,867)
1-day Shooting Preserve	745	830	806	794	705	-101	-89	\$ (4,646)	\$ (4,079)
Spring Light Goose	4,494	4,714	2,810	4,006	2,961	151	-1,045	\$ 7,550	\$ (52,250)
Youth Spring Light Goose	159	179	94	144	122	28	-22	\$ 728	\$ (572)
Migratory Bird Certificate	976	1,358	1,442	1,259	1,921	479	662	\$ 2,395	\$ 3,312
Predator/Varmint	4,705	4,841	4,447	4,664	4,051	-396	-613	\$ (15,840)	\$ (24,533)
Furbearer	10	8	10	9	10	0	1	\$ -	\$ 183
Annual Fishing	26,074	25,875	22,724	24,891	27,418	4,694	2,527	\$ 314,498	\$ 169,309
Family Fishing	9,324	8,726	8,017	8,689	9,887	1,870	1,198	\$ 125,290	\$ 80,266
Youth Annual Fishing	1,332	1,236	1,116	1,228	1,465	349	237	\$ 8,725	\$ 5,925
3-Day Fishing	23,961	23,983	22,091	23,345	21,350	-741	-1,995	\$ (27,417)	\$ (73,815)
1-Day Fishing	21,816	19,688	19,264	20,256	30,109	10,845	9,853	\$ 173,520	\$ 157,648
Gamefish Spearing/Archery	675	731	0	469	0	0	-469	\$ -	\$ (2,343)
Habitat Stamp	0	0	0	0	61,162	61,162	61,162	\$ 1,529,050	\$ 1,529,050
NONRESIDENT TOTALS =	146,098	146,292	134,485	142,292	211,661	77,176	69,369	\$ 2,009,090	\$ 1,587,202
GRAND TOTALS =	339,900	333,175	308,103	327,059	466,669	158,566	139,610	\$ 3,370,163	\$ 2,666,123



TIMELINE | Centralized E-Commerce System

2020 RFP Research, Writing, Editing, and Final Phases

RESEARCH PHASE

January - May

- Brainstorming Sessions with Parks and Wildlife staff
- Complete Prioritization Needs Assessment
- Schedule and Review 4 Vendor Demonstrations
 - Aspira completed on April 1, 2020
 - Brandt completed on April 17, 2020
 - Recreation.Gov completed on April 27, 2020
 - Kalkomey completed on June 19, 2020

WRITING PHASE

June - August

- June will kick off the RFP writing phase
- Internal planning meetings continue
- Large Internal User Group Meeting = Aug. 25
 - Review draft RFP sections
 - Provide feedback by September 1
- Meet with BIT Technology Team = Aug. 27

EDITING PHASE

September - October

- September will kick off the RFP editing phase
- Review efforts will continue with staff
- **Sept. 30**= discuss RFP deliverable with Hepler, Robling and Directors.
- **Oct. 15** = publish RFP

FINAL PHASE

November - December

- Nov. 5 = Deadline for written questions sent via email to GFP
- Nov. 5 and Dec. 3 = Update to GFP Commission
- Nov. 13 = GFP responses due back to vendors
- Nov. 23 = Proposals due
- Dec. 1-8 = Proposal review and virtual interviews conducted
- Dec. 11 = Vendor decision made
- Dec. 14-18 = Contract negotiations
- Dec. 28 = Award and sign contract

OTHER KEY DATES

Construction Begins | Jan – Dec 2021

- Focus Group Sessions
- Development
- Regular Meetings
- Present info to GFP Commission
- Testing and Review Phases

Deliver Systems to GFP | Jan – Dec 2021

- Focus Group Sessions to Beta Test
- Edit System
- Vendor to begin Training Sessions

Launch Date = January 1, 2022

Comes, Rachel

From: info@gfp.sd.us
Sent: Wednesday, October 21, 2020 9:43 AM
To: bcameron1007@yahoo.com
Cc: Comes, Rachel
Subject: Petition for Rule Change Form

Categories: Commission

South Dakota - Game, Fish, and Parks

Petition for Rule Change

A new form was just submitted from the <http://gfp.sd.gov/> website with the following information:

ID: 100

Petitioner Name: Brad Cameron

Address: 40670 303rd Street
Avon, SD 57315

Email: bcameron1007@yahoo.com

Phone: 605-464-1822

Rule Identification: Duck Season Low Plains South Zone

Describe Change: Move the opening date in the South Zone to correspond with Nebraska opening

Reason for Change: Currently our season opens two weeks after the Nebraska season. Most of the duck hunting in the south zone takes place on the Missouri River border waters with Nebraska. The Nebraska residents and the non residents with Nebraska licenses get first chance with all the local ducks before we can even start hunting. The majority of the time most of the ducks are gone by Christmas if you need to shorten the season by two weeks. I would like to have a conversation with the SDGFP on this if given the chance. Thanks for your consideration. Brad Cameron

Comes, Rachel

From: info@gfp.sd.us
Sent: Monday, October 26, 2020 4:16 PM
To:
Cc: Comes, Rachel
Subject: Petition for Rule Change Form

South Dakota - Game, Fish, and Parks

Petition for Rule Change

A new form was just submitted from the <http://gfp.sd.gov/> website with the following information:

ID: 101
Petitioner Name: Jeremy Silko
Address: rapid city, SD 57703

Email:

Phone:

Rule Identification: 41:06:04:11. Minimum size and type of big game ammunition

Describe Change: Soft-point, expanding bullets, and non-toxic fluted copper are permitted.

Reason for Change: There are two reasons for my requested change. (1) Technology has advanced enough to prove that monolithic copper when fluted and used as bullets can provide quick, ethical kills to animals with the same or better effectiveness of copper-jacketed, lead-based hollow points or soft points as currently allowed. The rounds are produced in South Dakota by Lehigh defense and loaded by at least two respected ammunition producers. One of those is Black Hills Ammo, also located in Rapid City, SD. The second is Underwood Ammo in Illinois. Ruger also produces a similar polymer/copper fluted design. I ask that the commission ask these producers for detailed analysis, and to consider these projectiles as options for hunters. The (2) second reason for allowing these rounds would be to allow another option for non-toxic rounds. We should allow hunters every opportunity to preserve our great resources for the next generations, and many to come. The small steps today, just may add up to big steps tomorrow. Respectfully, Jeremy Silko

2016/17
JOINT AGENCY
BALLISTICS TEST FOR
DEFENSIVE HANDGUN
AMMUNITION

FOR AGENCY / LAW ENFORCEMENT
DISSEMINATION ONLY

Sanitized versions available for general use

UNCLASSIFIED

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FORWARD

The 2016/17 Joint Agency Ballistic Test For Defensive Handgun Ammunition was conducted by several Federal, State and Local government agencies as well as security teams, contractors and ballistics experts. It is being hosted by a private training company and includes testers and experts from these multiple agencies. The training company ensured continuity, consistency and accuracy of all tests and generated the final report for all involved.

This report brings together the most credible information regarding wound ballistics. It combines the knowledge and results of previous federal wound ballistics tests, verifies those results and uses medically recommended animal tissue media to create new relevant realistic data. The comparison of effective handgun ammunition for federal, state and local agencies is critical and complex. Representative data of a real target is needed for instruction and selection. The individual shot data produced during this test has all been measured and recorded and is included in the full agency/LE version of the report. A set of compilation data sheets is also included to better compare shot results and averages.

No conclusions or choices have been made and none will be included in this report. The test was conducted only to produce and record raw data and describe rounds in regards to four wound ballistics characteristics. Any agency wishing to use this report and the data to make conclusions must first understand their needs and be able to quantify their requirements using the four characteristics described herein.

Data from rounds failing to function as designed on target were not thrown out as has been done in other familiar tests. Any ammunition failures in the weapon or failure to fire were recorded but are not described in this report. The only failures included were wound ballistics failures to function on target.

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TACTICAL REALITIES

There are four main subjects involved in stopping power. Shot placement (wound placement), amount of shots, bullet capability (wound ballistic profile) and the target being shot.

Proper wound placement is the most important determinant to stopping/incapacitating a human target. However, shot placement is NOT wound placement and where a shot hits the target does not always determine the path of the bullet through the target due to barriers (clothes, bones and outside items) and bullet performance/failures. Many common defensive rounds are easy to defeat or vector away from the original path of the bullet. Barrier performance is extremely important in judging whether a round will continue on its original path or be deflected/defeated.

Amount of hits on target is critical and any agency considering choosing a new weapon, caliber or ammunition should certainly take into account how many rounds the weapon contains, recoil and ease of follow up shots and lastly the weight of the weapon and ammunition to be carried.

Bullet capability, which is the wound ballistic profile of that type of ammunition is what was measured and documented in this test. It quantifies the performance of a single round in regards to four wound ballistics characteristics. Penetration Depth, Reliability/Consistency, Barrier Performance and Permanent Wound Cavity (PWC).

The health and physical condition of the target is extremely important in determining the results of a shooting. Age, sex, size, health and outside influences such as drugs and alcohol greatly affect the targets capability to stay active or be incapacitated.

MECHANICS OF PROJECTILE WOUNDING

There are four components to projectile wounding.

1. Penetration. The overall distance traveled by the bullet through the selected media. All agencies that took part in this test agreed that Penetration is the most important component of projectile wounding.
2. Permanent Wound Cavity (PWC). The volume measured in cubic inches of the space created by the bullet after it goes through the media. This is the destroyed part of the target. It is calculated by multiplying the depth (penetration) of the wound and the area (not diameter) of the hole left by the passage of the bullet. The area is extremely difficult to measure in the case of fragmenting rounds with multiple projectiles, solid copper rounds which create holes larger than their caliber and tumbling bullets that have holes that vary greatly at different depths.
3. Temporary Stretch Cavity. The expansion and temporary displacement of media or tissue due to the transfer of kinetic energy to the target. This stretch cavity only causes wounding in high velocity rounds greater than 2,000 feet per second (fps) and for all rounds that do not exceed that velocity inside of the target does not contribute at all to any wounding effects or incapacitation. The displaced tissue is not destroyed and in most cases is not even damaged. Most human tissue (other than brain and liver tissue) can be stretched as much as 6 times its normal size before overexpansion and tearing occurs. Also, human tissue can expand extremely rapidly and outward force caused by the kinetic energy transfer is typically <15% of the velocity of the projectile causing the displacement. Exceeding roughly 2,000 fps causes an outward force velocity exceeding the maximum rate of expansion for most human tissue which in turn causes a tearing wound. Since none of the rounds tested exceeded 2,000 fps inside of the target by even 10%, temporary stretch cavity caused minimal damage and therefore was not to be considered of any importance. High speed (>3,000 fps) rifle rounds were tested at some events and the animal tissue media was dissected and showed tearing which was never present in any of the handgun rounds <2,000 fps further confirming that Temporary Stretch Cavity has no effect on wounding a target with <2,000 fps projectiles. Unfortunately it is still used by non-experts during assessment.

4. Fragmentation. Projectile pieces or secondary fragments of bone or other barrier. Each fragment path must be included in the calculation of the PWC. Fragmentation occurs either intentionally by the use of frangible or pre-fragmented rounds or accidentally by the breaking apart of the projectile. Frangible rounds tend to create large wound cavity areas but shallow wound penetration. The overall Permanent Wound Cavity (PWC) is generally less than a non-fragmenting round due to the smaller mass of each fragment, larger surface area after fragmentation resulting in greatly increased drag. Since most critical body parts reside deep inside of the thoracic cavity a superficial wound that does not encounter and destroy critical organs/blood vessels and CNS tissue does little in the way of incapacitation. This is why all agencies that took part in this test agreed that Penetration is the most important characteristic of projectile wounding. Given that the FBI and DoD protocols call for a minimum gel penetration of 12 inches with a goal of around 18 inches, low penetrating fragmenting rounds did not qualify by exhibiting any reasonable penetration depths. Accidental fragmentation takes place in a higher percentage of time with hollow point ammunition than with Full Metal Jacket (FMJ) or solid copper rounds. Two distinct characteristics increase accidental fragmentation with hollow points.

- a. Velocity. Rounds traveling at over 1,200 fps had an alarmingly higher rate of accidental fragmentation in this test. Rounds below 1,100 fps had a relatively low fragmentation rate. Between 1,100-1,200 fps the rate was abnormally high but not as catastrophic as over 1,200 fps.
- b. Thickness of the metal of the sidewall of the hollow point projectile. Smaller caliber rounds have less thick walls. This makes them less strong and increased the rate of fragmentation. At the same velocity the smaller the caliber the hollow point the higher the accidental fragmentation rate across the board with no exceptions.

These two characteristics which cause accidental fragmentation greatly reduced the penetration, consistency, reliability, barrier performance and overall Permanent Wound Cavity size. In the cases where accidental fragmentation occurred the pieces were generally very close to the PWC which limited additional wounding effects.

Projectiles incapacitate by destroying or seriously damaging Central Nervous System (CNS) tissue, causing organ failure or causing blood loss. All projectile wounds combine the above four components to a greater or lesser degree.

THE HUMAN TARGET

There are four main kinds of human tissue.

1. Epithelial. Covers the body surface (skin) and forms the lining of most internal cavities and organs. Skin is extremely strong. The resistance of skin to projectile penetration is equal to about 3-4 inches of IWBA calibrated ballistics gelatin.
2. Nervous. Thin nerve tissue which constitutes the smallest percentage of human tissue.
3. Connective. Tissue providing a variety of functions to include support and protection. Bone, cartilage and blood vessels are the most common types of connective tissue. Bone is an excellent protective barrier and is similar but stronger than the plywood that was used in 2 phases of this test as a consistent barrier IAW IWBA standards.
4. Muscular. Made up mostly of muscle tissue and of most internal organs. It is the most common type of human tissue in the thoracic cavity which is the target area or center of mass. In this test during phase 4 and phase 5 we used multiple standard size beef briskets to as closely as possible consistently replicate human muscular tissue.

The average human male is 10" thick. Most human tissue is elastic. Organs, skin, muscle, intestines and blood vessels are capable of substantial stretching with minimal damage. Medical and military studies have shown that the outward velocity of tissue caused by the temporary stretch cavity is between 8-15% of the velocity of the projectile at the depth the stretch is created. Furthermore in these studies it was shown that human muscular tissue (other than brain or liver tissue) can stretch much faster than that velocity. Also, the distance created by the stretch cavity does not exceed the capability of the muscular tissue to stretch without tearing. At greater than around 2,000 fps it was tested, seen and measured that our test tissue did show signs of over-stretching and damage. This was noted on the rounds that were extremely high speed at impact (>2,000 fps). It was difficult to measure but is a contributing factor to overall wounding.

Except for penetration into the brain cavity or spinal cord, reliable and consistent immediate incapacitation of the human target by projectile wounding to the torso is extremely unreliable. Even shots to the heart are not immediate as stored oxygen may allow for voluntary action for 5-15 seconds after functional heart destruction. Failure of the Central Nervous System (CNS) and/or massive blood loss sufficient

to drop blood pressure, cause organ failure or deprive the brain of oxygen is the only way to cause reliable incapacitation. Important tissue destruction equals stopping power.

Common “One Shot Stop” and “Knock Down Power” are both myths perpetuated by the uninformed. The actual impact of the projectile onto a target is less than the recoil of the weapon.

Energy transfer is often quoted and is completely immaterial. First, the transfer of energy is represented by the Temporary Stretch Cavity and as stated is insufficient in rounds <2,000 fps to cause any damage except for brain and liver tissue. Secondly, the human body can absorb a great amount of energy without being damaged. Thirdly, a baseball hit in a game, or a hockey puck has approximately half the energy of a 9mm bullet being shot. Lastly, the human body is not one solid mass where energy is easily transferred throughout the body. Changes in tissue density and space between organs nullifies a vast amount of transfer of energy.

We must also discuss Energy vs Momentum. During this test and the 6 other major federal handgun ballistics tests it was conclusively found that the heaviest bullets in each caliber average larger Permanent Wound Cavities (PWC) than lighter bullets in the same caliber. Using hollow points as the example because they were the only type of rounds tested in the aforementioned 6 tests, there were 6, 7, 3, 6, 6, 5 and 5 calibers tested in each of the 7 tests, to include ours. The 9mm and 45 ACP were the most common tested rounds and were tested in each of the 7 tests. The 40S&W was tested in 6 of the tests. In 6 of 7 tests the heaviest 9mm (147 grain) bullets averaged the largest PWC over any other weight 9mm. In 5 of 6 tests the heaviest 40 S&W bullets averaged the largest PWC over any other weight 40. In 7 of 7 tests the heaviest 45 ACP (230 grain) bullets averaged the largest PWC over any other weight 45. In all cases the heavier bullets in any caliber have less energy than the lite weight bullets in that caliber that have the highest energy.

So, does that mean that momentum is more important? Well, the heaviest rounds do have more momentum, but in actuality what it proves is that energy calculations have no bearing or indicators to bullet performance. Otherwise the fastest bullets in any particular weight/caliber would be the best and that simply isn't true.

True bullet performance must be measured in a consistent media. Realistic animal tissue media yields better analysis to real world shootings. Mathematical calculations without shooting are not tests and have no bearing on reality.

AMMUNITION SELECTION CRITERIA

Four types of ammunition were tested.

1. Hollow Point. The most common defensive ammunition used by all the agencies that took part in this test. These rounds are intended to expand to increase the frontal area of the projectile. This will create a larger diameter wound and also increase drag which limits penetration depth as compared to a FMJ.
2. Full Metal Jacket (FMJ). The second most common ammunition used by all the agencies that took part in this test. This is also the most widely used training or practice ammunition. They create deeper wounds of less diameter.
3. Solid Copper. These rounds have the most varied designs. Some performed extremely well, while others were simply gimmicks. Some of them behave similar to hollow points, while others are non-expanding, their designed destructive mechanism varied greatly between bullets.
4. Frangible. These rounds are designed to break apart and fragment upon striking a target either immediately at the surface or after minimal penetration. They are designed to create large diameter wounds that do not penetrate deep. In all cases these rounds did not penetrate the required 12 inches of ballistics gel, except for some cores. If your agency requires minimal penetration or absolute barrier failure than these rounds are designed for that task. Some have an extremely high reliability rate and consistently break apart on contact and should be considered. Other frangible rounds were less consistent and sometimes failed to break apart during barrier and tissue tests and should be avoided. Since this test was concerned with defensive ammunition and all agencies that took part in the test agreed that > 12 inches penetration in IWBA ballistics gel is a requirement and the most important characteristic in determining projectile effectiveness, frangible rounds were superficially tested.

Prior to the beginning of the test all the agencies involved listed what they believed were the most important characteristics in wound ballistics. The unanimous most critical component of projectile wounding is Penetration. After that a combination of reliability, consistency, barrier performance and overall Permanent Wound Cavity were listed and were generally thought to be of equal importance. If your agency

believes in putting these characteristics in particular order and believes that their importance is not equal please use the following test data favoring your requirements. We have tested, measured and reported using these characteristics separately so each agency can use the criteria best suited for their purposes.

A bullet must penetrate deep enough to pass through and destroy vital organ tissue. This must be accomplished from different target body angles and through common barriers such as clothes and bone. Side shots through an arm must penetrate greater than 10 inches to contact the heart and frontal shots must penetrate at least 7 inches to reach the back of the abdominal cavity. These above figures ARE NOT ballistics gel depths, but rather human tissue penetration depths. All of the agencies in this test require a minimum of 12 inches of penetration in ballistics gel. Some of the agencies involved desire 15-18 inches and other agencies desired 18 inches $\pm 10\%$ (16-20 inches) of overall calibrated ballistics gel penetration. With the desired penetration depth, a projectile creating a larger diameter wound will destroy an equally larger amount of tissue. Small increases in diameter cause large amounts of frontal area change (Area = $\pi \times \text{Radius squared}$).

The Over-Penetration Myth:

Fear that a bullet will pass through a target body and damage a bystander are unfounded. First, approximately 40% of all shots fired in the day do not hit any target at all and even less bullets hit the target at night. That's cause for real concern. Secondly, shots passing through the target torso do not have sufficient remaining penetration capabilities. Lastly, there haven't been any cases where this has actually happened. No recorded medical reports or lawsuits come from a bystander wounding resulting from over-penetrating handgun bullets through the torso of a target. For the purposes of this test we used International Wound Ballistics Association (IWBA) 18x6x6 inch calibrated gel blocks with a sideways block backstop providing an overall maximum measured depth of 24 inches. Only Full Metal Jacket rounds and rounds that failed exceeded penetrating that depth.

PREVIOUS TESTS

There have been several large scale reliable Wound Ballistics tests. This is the first large scale multi agency test to accomplish two items.

1. The testing of four different types of defensive ammunition instead of only testing hollow points.
2. The use in two of the five phases of actual animal tissue. This tissue was chosen after consultation with forensic pathologists, internal medicine doctors and finally butchers. The media chosen was found to be the closest tissue to actual human tissue that was readily available and consistent in size and density.

Prior to this test being started analysis of the major previous tests was done. Several of the tests seemed to produce very similar results to other tests while two did not. During further analysis of the data we found that there were specific consistent ratios between all of the tests. We produced a report and Power Point presentation with these findings which was made available to many federal agencies. A term Ballistic Ratio was coined which described wound ballistics test comparisons in an all new way.

BALLISTIC RATIO:

Ballistic Ratio (BR) is a mathematical calculation used to compare results from different tests. BR is calculated separately for each test. All rounds in a test have a PWC calculated in cubic inch volume. All 9mm hollow points are analyzed to determine the largest PWC average by weight (147 grain, 124 grain, and 115 grain). In 6 of the 7 tests the average 147 grain had the largest PWC compared to the other 9mm weights. The average PWC of the best grain of the 9mm in each test is used as the Ballistic Standard. All Ballistic Ratios are calculated as a ratio of PWC in comparison to the 9mm Ballistic Standard in each test.

Largest average PWC 9mm by grain has a BR of 1.0

Raw data comparisons from different tests between rounds or calibers cannot be used do to inconsistencies in media. A Ballistic ratio must be calculated for each test then BRs can be compared between tests.

Example:

Average all the PWCs for each 9mm grains separately (115, 124, 147 grain)

All 115 grain 9mm are tested and have an average PWC of 2.8 cu inches

All 124 grain 9mm are tested and have an average PWC of 2.9 cu inches

All 147 grain 9mm are tested and have an average PWC of 3.0 cu inches

The largest average PWC of those three grains becomes the Ballistic Standard which all rounds are compared to (3.0 in this example).

In this example the 147 grain 9mm with an average PWC of 3.0 cu inches is Ballistic Standard and has a Ballistic Ratio of 1.0. If a round tested had a PWC of 4.5 ci than its BR would be 1.5 ($4.5 \div 3.0$).

Six large scale tests from US Federal Government agencies and independent organizations have been completed prior to this test. Each of the six tests, compared terminal ballistics for pistol hollow points. Permanent Wound Cavities were calculated for every shot in each test. Each test calculated separately PWC and BR.

SIX PRIOR TEST RESULT OBSERVATIONS:

All caliber Ballistic Ratios were fairly consistent across all 6 tests (All within 5%)

The average 147 grain 9mm won 5 of 6 competitions for Best 9mm PWC size

The average 230 grain 45ACP won all 6 competitions for best 45ACP

The 45ACP won all 6 competitions for largest average PWC between all calibers

As stated earlier only the 9mm and 45ACP were in all 6 tests. The Ballistic ratios shown below are the average for that caliber regardless of how many tests that caliber was included in.

CALIBER	6 TEST BALLISTIC RATIO (BR) AVERAGE
45ACP	1.5
10mm	1.3
40SW	1.22
.357SIG	1.1
9mm	1.0
.357 Mag	.98
.38 Spl	.79
.380	.48

NOTE: In three of the six tests, rounds which failed on target due to failure to expand and accidental fragmentation were included. The 10mm, 357 SIG and 357 Mag had an extremely high failure rate due to excessive velocity. This was also verified in our test. That is why the BR for those calibers is so low. In the other three tests failures on target were thrown out and those calibers results showed artificially better. If a test you are referencing shows better than the above results question whether the failures were included.

Our ballistics gel test results were compared to each of the above mentioned tests and the results were all very consistent (within 5%-10% for each caliber in each test). Our duplicated results validated the other tests which in turn validated our testing process.

If any agency would like a copy of our “Federal Tests of Pistol Hollow Points” 6 test comparison report, please let us know and we will provide the Power Point presentation with all of the data.

TEST PROTOCOLS, PHASES AND GRADING CRITERIA

PURPOSE:

The 2016/17 Joint Agency Ballistic test is being conducted to compare defensive handgun ammunition. Six defensive calibers will be included. All four bullet types will be included.

It will be conducted in 5 separate phases.

It will be graded using 4 criteria.

No conclusions or selections shall be made.

Raw data will be averaged and may be used independently depending on the criteria desired by each receiving agency.

AMMUNITION TYPES:

The 2016/17 Ballistic test will compare all types of defensive ammunition

It will include not only Hollow Points (HP) like the preceding federal tests. Round types will include:

Hollow Points

Full Metal Jacket (FMJ)

Solid Copper

Frangible

Six defensive calibers will be included. 9mm, 357 Sig, .40, 10mm, .45 and 5.7mm

PROTOCOLS:

We have several federal, state and local agencies, contractors and weapons instructors involved. All phases and tests were conducted with at least 1 cameraman, one chief tester and one assistant for quality control and multiple measurements. No averages will be provided unless at least 4 rounds fired per phase for all rounds that pass each phase. All failures to function are included in the data with no "flyers" or failures being removed.

At the conclusion of the entire test a report will be available for all agencies. A sanitized civilian report will be made available but with the participant information removed. A PowerPoint brief will also be created for agency use to aid in selection, training and instruction.

A few videos of individual tests are being published by the civilian side of the test, but an overall video will not be made.

ALTERNATE TESTING:

Testing will take place at multiple facilities.

If test team members are present and can certify the authenticity of the media, ammunition, weapons and raw data then it will be included in the overall test report.

If any of the above cannot be validated then that particular test will be used only as a control and verification of results but the raw data will not be included in the test report.

This will take place when individual agencies want to conduct a test to compare their chosen rounds and to validate our test. If test team members are present and verify the test then that data will be included, otherwise the data will only be for the testing agencies use.

5 PHASES:

1. All rounds fired at least 4 times, chronographed and averaged. Testing actual vs advertised velocities, consistency and reliability.
2. All rounds fired at least 4 times into IWBA calibrated FBI 10% ordnance gelatin with a standard 4 layer denim barrier. Recovered rounds inspected for failures, retained weight and overall dimensions.

Measuring Overall Penetration Depth. FBI standard 12” minimum and 18” desired. Rounds not meeting the minimum will be annotated and may not remain in the test for the remaining phases.

Measuring Reliability and Consistency.

Measuring Overall PWC. Measured in cubic inch volume.

3. IWBA Calibrated FBI 10% ordnance gelatin with a single $\frac{3}{4}$ inch thick AA fir plywood panel IAW FBI / DoD protocols and a standard denim barrier. All rounds fired at least 4 times into media. Recovered rounds inspected for failures, retained weight and overall dimensions.

Measuring Overall Penetration Depth

Measuring Reliability, Consistency and Barrier Performance

Measuring Overall PWC. Measured in cubic inch volume.

4. Animal Tissue with a standard denim barrier. All rounds fired at least 4 times into Animal Tissue with a denim barrier. Rounds not recovered.

Measuring Overall Wound dimensions. Exit wound channels from each of the two briskets measured for min and max diameter then averaged. Average diameter converted to area and recorded.

Measuring Reliability and Consistency.

5. Animal Tissue with a single $\frac{3}{4}$ inch thick AA fir plywood panel and a standard denim barrier. All rounds fired at least 4 times. Rounds not recovered.

Measuring Overall Wound dimensions. Exit wound channels from each of the two briskets measured for min and max diameter then averaged. Average diameter converted to area and recorded.

Measuring Reliability, Consistency and Barrier Performance

MEDIA:

IWBA Calibrated FBI 10% ordnance gelatin. Proper recipe, temperature and BB depth calibration immediately prior to shot.

Single ¾ inch thick AA fir plywood panel IAW FBI / DoD protocols

Denim barrier consists of layers of standardized material

Animal Tissue consists of 2 boneless hanging briskets

7-8" thick. (Average human male is 10" thick)

36±2 pounds. Fat side out, back to back. Point side up on one and down on the other to provide equal thickness.

Animal Tissue consisting of 2 boneless cow briskets was chosen after discussions with a forensic pathologist, other MD's and a butcher. There are four main types of human tissue: muscle, epithelial, connective and nervous. Cow brisket closely represents human muscle tissue and organs. It is a compressible realistic consistent media.

Media Problems:

IWBA Calibrated FBI 10% ordnance gelatin- Gel was originally used because it is consistent and easy to use/measure. It allowed a comparative study to take place with replicable results. Never advertised or designed to be a simulation of any human or animal tissue. Gel is a fluid and is non-compressible unlike human material. Temporary Stretch Cavity does not represent any damaged or destroyed material. Although density and resistance is similar to human tissue gels inability to be compressed makes it an extremely poor tissue simulant as hydraulic effects in gel are completely different than in animal tissue or a human target. This required a new more realistic media to be used. Our Phase 4/5 used actual animal tissue to make up for the deficiencies in using only gel and getting artificial results. This was never a problem in hollow point testing as recovered bullet diameter equaled gel wound diameter which is similar to results in actual tissue. With rounds that tumble or cause compression gel results are very artificial and were very different from actual tissue tests or medical reports post shooting.

4 GRADING CRITERIA:

1. Penetration using Phase 2 data for a desired 18” and a minimum of 12”.
2. Reliability and Consistency. Failure to perform as designed (Failure to open/tumble, fragmentation and jacket separation) will be noted and included in the data. Standard Deviation for each shot tested within a Phase.
3. Barrier Performance. Percent of penetration and PWC size lost from non-barrier shots to barrier shots from Phase 2/3 and Phase 4/5.
4. Permanent Wound Cavity. Measured in cubic inches for the Ballistics gel tests of Phase 2/3. Measured as average hole area from Phase 4/5.

RESULTS / REPORTS:

The 2016/17 Joint Agency Ballistic Test will document and report all raw data from each shot in each phase. Averages will be calculated and reported.

Please note data in Phase 2/3 is:

1. Penetration in inches.
2. Diameter of the wound.
3. Permanent Wound Cavity (PWC), which is Penetration x Area (NOT DIAMETER)

Please note data in Phase 4/5 is:

1. Average hole AREA (NOT DIAMETER). Do not confuse the Diameter listed in Phase 2/3 data with Area listed in Phase 4/5 data.

No conclusions, rank ordering or choosing will be accomplished. All data will be graded using the aforementioned 4 grading criteria. Each agency may use the data as they see fit and can calculate any other grades they wish.

A government / manufacturer report will be produced and sent to all participants and requestors. Pictures, videos and Power Point presentation of certain tests are available for any agency upon request.

A condensed report will be made available to the public scrubbed of any test team names and agencies.

Any agency desiring help with their ballistics testing, wishing to recreate any of our tests or wanting information on our rig for tissue testing please make your request and we will help the best we can.

PHASE 1

All rounds fired at least 4 times chronographed and averaged. Testing advertised box velocity vs. actual tested average velocity, consistency and reliability. Table also includes description of which pistols were used for all of the phases.

CALIBER	ROUND	BOX VEL	PISTOL	AV VEL	
9mm	Winchester FMJ 124 gr	1140	Sig P 226 / Glock 17	1140	
	Winchester Ranger T 147 gr	990	Glock 17	1000	
	Remington GS +P 124 gr	1180	Glock 17	1170	
	Remington GS 147 gr	990	Glock 17	980	
	Speer GD +P 124 gr	1220	Glock 17	1200	
	CorBon +P 115 gr	1350	Glock 17	1300	
	Hornady C Duty +P 135 gr	1115	Glock 17	1120	
	Sig Sauer V 124 gr	1165	Sig P 226 / Glock 17	1150	
	Federal HST 147 gr	1000	Sig P 226 / Glock 17	1005	
	Fort Scott 80 gr	1350	Sig P 226 / Glock 17	1405	
	OATH Tango 110 gr	1200	Glock 17	1150	
	Underwood XD 90 gr	1400	Sig P 226 / Glock 17	1480	
	Underwood XD +P 90 gr	1475	Sig P 226 / Glock 17	1505	
	Underwood XD +P+ 90 gr	1550	Sig P 226 / Glock 17	1585	
	Underwood Max Exp 105 gr	1175	Glock 17	1160	
	Glaser Blue +P 80 gr	1500	Glock 17	1465	
	G2 RIP 92 gr	1265	Glock 17	1295	
	357 SIG	Winchester FMJ 125 gr	1350	Glock 22 conv barl	1370
		Speer GD 125 gr	1350	Glock 22 conv barl	1385
Sig Sauer V 125 gr		1356	Glock 22 conv barl	1375	
Federal HST 125 gr		1360	Glock 22 conv barl	1375	
Underwood XD 65 gr		2100	Glock 22 conv barl	2060	
Underwood XD 90 gr		1700	Glock 22 conv barl	1690	
40 S&W	Winchester FMJ 180 gr	1020	Glock 22	1005	
	Winchester Ranger T 180 gr	990	Glock 22	1000	
	Remington GS 165 gr	1150	Glock 22	1145	
	Remington GS 180 gr	1015	Glock 22	1020	
	Speer GD 165 gr	1050	Glock 22	1060	
	Hornady C Duty 175 gr	1010	Glock 22	1020	
	Sig Sauer V 165 gr	1090	Glock 22	1070	
	Federal HST 180 gr	1000	Glock 22	1000	
	Fort Scott 125 g	1320	Glock 22	1290	
	OATH Tango 125 gr	1250	Glock 22	1225	
	Underwood XD 115 gr	1400	Glock 22	1425	
	Underwood Max Exp 140 gr	1050	Glock 22	1060	
	Glaser Blue 115 gr	1400	Glock 22	1355	
	G2 RIP 115 gr	1080	Glock 22	1100	

PHASE 1

CALIBER	ROUND	BOX VEL	PISTOL	AV VEL
10mm	Winchester FMJ 200 gr	1050	Glock 20	1020
	Winchester SX 175 gr	1290	Glock 20	1300
	Hornady C Duty 175 gr	1160	Glock 20	1180
	Sig Sauer 180 gr	1250	Glock 20	1200
	Federal Hydra Shok 180 gr	1030	Glock 20	1005
	Underwood XD 115 gr	1700	Glock 20	1750
45 ACP	Winchester FMJ 230 gr	835	Sig P227E / Glock 21	865
	Winchester Ranger T 230 gr	880	Glock 21	910
	Remington GS 185 gr	1140	Glock 21	1115
	Speer Gold Dot 230 gr	890	Glock 21	810
	Hornady C Duty +P 220 gr	975	Glock 21	960
	Sig Sauer V 230 gr	830	Glock 21	850
	Federal Hydra Shok 230 gr	900	Sig P227E / Glock 21	860
	Federal HST +P 230 gr	950	Sig P227E / Glock 21	950
	Fort Scott 180 gr	989	Glock 21	1000
	OATH Tango 163 gr	1100	Glock 21	1105
	Underwood XD 120 gr	1320	Sig P227E / Glock 21	1400
	Underwood XD +P 120 gr	1420	Sig P227E / Glock 21	1460
	Underwood XD Super 120 gr	1600	Sig P227E / Glock 21	1550
	Underwood Max Exp 174 gr	1050	Glock 21	1035
	Glasr Blue +P 145 gr	1350	Glock 21	1330
	G2 RIP 162 gr	960	Glock 21	995
5.7mm	American Eagle 40 gr	1655	FN 5.7	1575
	SS195LF 28 gr	2000	FN 5.7	1900
	SS197SR 40 gr	1700	FN 5.7	1620
	SS198LF 28gr	2150	FN 5.7	2050
	Elite S4M 28gr	2650	FN 5.7	2410
	Elite T6B 28 gr	2570	FN 5.7	2230
	Elite PenetraTOR 40 gr	1900	FN 5.7	1905
	Elite ProtecTOR 40 gr	2100	FN 5.7	1910
	Elite DevastaTOR 37 gr		FN 5.7	2005
	Vanguard Black Fang 34 gr	2150	FN 5.7	2130
	Vanguard Barnes 50 gr HP	1725	FN 5.7	1590
	Vanguard Comb Tech 50 gr		FN 5.7	1635

PHASE 2

All rounds fired at least 4 times into IWBA calibrated FBI 10% ordnance gelatin with a standard 4 layer denim barrier. Recovered rounds inspected for failures, retained weight and overall dimensions.

CALIBER	ROUND	PENETRAION	DIAMETER	PWC
9mm	Winchester FMJ 124 gr	24+	.37	2.6 ci
	Winchester Ranger T 147 gr	14.5	.63	4.5 ci
	Remington GS +P 124 gr	13	.58	3.5 ci
	Remington GS 147 gr	17	.55	4.0 ci
	Speer GD +P 124 gr	15.3	.51	4.0 ci
	CorBon +P 115 gr	9.5	.57	2.5 ci
	Hornady C Duty +P 135 gr	14.5	.52	3.1 ci
	Sig Sauer V 124 gr	13.8	.55	3.3 ci
	Federal HST 147 gr	15.2	.57	3.9 ci
	Fort Scott 80 gr	19.5	.42	2.7 ci
	OATH Tango 110 gr	5.25	.85	3.0 ci
	Underwood XD 90 gr	16	.76	7.2 ci
	Underwood XD +P 90 gr	16.75	.87	9.9 ci
	Underwood XD +P+ 90 gr	17.5	.95	12.4 ci
	Underwood Max Exp 105 gr	10.25	.8	5.1 ci
	Glaser Blue +P 80 gr	6	Unable to measure	
	G2 RIP 92 gr	4 trocars/14 core	.39 core	2.1 ci
357 SIG	Winchester FMJ 125 gr	24+	.38	2.7 ci
	Speer GD 125 gr	17.6	.57	4.5 ci
	Sig Sauer V 125 gr	17	.6	4.8 ci
	Federal HST 125 gr	17.2	.61	5.0 ci
	Underwood XD 65 gr	17.5	1.0	13.7 ci
	Underwood XD 90 gr	18.3	1.0	14.4 ci
40 S&W	Winchester FMJ 180 gr	24+	.43	3.5 ci
	Winchester Ranger T 180 gr	13.5	.68	4.9 ci
	Remington GS 165 gr	15.5	.46	4.6 ci
	Remington GS 180 gr	17.2	.61	5.0 ci
	Speer GD 165 gr	14.3	.67	5.0 ci
	Hornady C Duty 175 gr	17.9	.61	5.2 ci
	Sig Sauer V 165 gr	16	.64	5.1 ci
	Federal HST 180 gr	18	.6	5.2 ci
	Fort Scott 125 g	22	.48	4.0 ci
	OATH Tango 125 gr	7.75	.85	4.4 ci
	Underwood XD 115 gr	18.5	.9	11.8 ci
	Underwood Max Exp 140 gr	8.5	.95	6.0 ci
	Glaser Blue 115 gr	7	Unable to measure	
G2 RIP 115 gr	5 trocars/11.5 core	.45 core	2.6 ci	

PHASE 2

CALIBER	ROUND	PENETRATION	DIAMETER	PWC
10mm	Winchester FMJ 200 gr	24+	.45	3.8 ci
	Winchester SX 175 gr	14.8	.66	5.2 ci
	Hornady C Duty 175 gr	22	.55	5.2 ci
	Sig Sauer 180 gr	16	.64	5.1 ci
	Federal Hydra Shok 180 gr	16.6	.65	5.5 ci
	Underwood XD 115 gr	19.3	1.02	15.7 ci
45 ACP	Winchester FMJ 230 gr	24+	.47	4.2 ci
	Winchester Ranger T 230 gr	16.5	.66	5.7 ci
	Remington GS 185 gr	15.1	.72	6.1 ci
	Speer Gold Dot 230 gr	17.5	.64	5.6 ci
	Hornady C Duty +P 220 gr	16	.7	.62 ci
	Sig Sauer V 230 gr	15.1	.73	6.3 ci
	Federal Hydra Shok 230 gr	15	.71	6.0 ci
	Federal HST +P 230 gr	15.5	.72	6.3 ci
	Fort Scott 180 gr	24+	.5	4.7 ci
	OATH Tango 163 gr	9	.9	5.7 ci
	Underwood XD 120 gr	18.5	.85	10.5 ci
	Underwood XD +P 120 gr	19	.9	12.0 ci
	Underwood XD Super 120 gr	20	.98	15.1 ci
	Underwood Max Exp 174 gr	9	1.2	10.2 ci
	Glaser Blue +P 145 gr	7.25	Unable to measure	
	G2 RIP 162 gr	4.5 trocars/16 core	.49 core	3.8 ci
5.7mm	American Eagle 40 gr	12.5	Unable to measure accurately due to tumbling, compression and intentional fragmentation in some cases. Reference Phase 4/5 data for wound dimensions.	
	SS195LF 28 gr	8.9		
	SS197SR 40 gr	14		
	SS198LF 28gr	10		
	Elite S4M 28gr	12.3		
	Elite T6B 28 gr	15.2		
	Elite PenetraTOR 40 gr	17.2		
	Elite ProtecTOR 40 gr	16.5		
	Elite DevastaTOR 37 gr	18.5		
	Vanguard Black Fang 34 gr	19		
	Vanguard Barnes 50 gr HP	16.8		
Vanguard Comb Tech 50 gr	17			

PHASE 3

All rounds fired ≥ 4 times into IWBA Calibrated FBI 10% ordnance gelatin with a single $\frac{3}{4}$ inch thick AA fir plywood panel and a standard denim barrier. Recovered rounds inspected for failures, retained weight and overall dimensions.

CALIBER	ROUND	PENETRAION	DIAMETER	PWC
9mm	Winchester FMJ 124 gr	24+	.38	2.7 ci
	Winchester Ranger T 147 gr	16	.4	2.0 ci
	Remington GS +P 124 gr	12	.5	2.4 ci
	Remington GS 147 gr	16	.5	3.1 ci
	Speer GD +P 124 gr	14	.44	2.1 ci
	CorBon +P 115 gr	7	.5	1.4 ci
	Hornady C Duty +P 135 gr	13.5	.5	2.7 ci
	Sig Sauer V 124 gr	16.5	.42	2.3 ci
	Federal HST 147 gr	15.5	.52	3.3 ci
	Fort Scott 80 gr	18.6	.42	2.6 ci
	OATH Tango 110 gr	4.75	.78	2.3 ci
	Underwood XD 90 gr	15.2	.7	5.8 ci
	Underwood XD +P 90 gr	16	.83	8.5 ci
	Underwood XD +P+ 90 gr	16.6	.93	11.3 ci
	Underwood Max Exp 105 gr	11	.72	4.48 ci
	Glaser Blue +P 80 gr	5.5	Unable to measure	
	G2 RIP 92 gr	3.5 trocars/12.5 core	.38	1.8 ci
357 SIG	Winchester FMJ 125 gr	24+	.37	2.6 ci
	Speer GD 125 gr	14.8	.48	2.7 ci
	Sig Sauer V 125 gr	22	.4	2.7 ci
	Federal HST 125 gr	20	.44	3.0 ci
	Underwood XD 65 gr	16.5	.98	12.5 ci
	Underwood XD 90 gr	17.4	1.0	13.7 ci
40 S&W	Winchester FMJ 180 gr	24+	.43	3.5 ci
	Winchester Ranger T 180 gr	12.7	.64	4.1 ci
	Remington GS 165 gr	17.2	.42	2.4 ci
	Remington GS 180 gr	16.4	.55	3.9 ci
	Speer GD 165 gr	16.2	.48	2.9 ci
	Hornady C Duty 175 gr	17.2	.6	4.8 ci
	Sig Sauer V 165 gr	16.5	.58	4.4 ci
	Federal HST 180 gr	17.6	.57	4.5 ci
	Fort Scott 125 g	20.8	.46	3.5 ci
	OATH Tango 125 gr	6.75	.8	4.2 ci
	Underwood XD 115 gr	18.1	.9	11.5 ci
	Underwood Max Exp 140 gr	9.5	.88	5.8 ci
	Glaser Blue 115 gr	6.5	Unable to measure	
G2 RIP 115 gr	5 trocars/11.2 core	.44 core	2.5 ci	

PHASE 3

CALIBER	ROUND	PENETRATION	DIAMETER	PWC
10mm	Winchester FMJ 200 gr	24+	0.45	3.8 ci
	Winchester SX 175 gr	18.5	0.44	2.8 ci
	Hornady C Duty 175 gr	16	0.58	4.2 ci
	Sig Sauer 180 gr	15	0.6	4.2 ci
	Federal Hydra Shok 180 gr	17.4	0.48	3.2 ci
	Underwood XD 115 gr	18.8	0.97	13.9 ci
45 ACP	Winchester FMJ 230 gr	24+	0.48	4.3 ci
	Winchester Ranger T 230 gr	15.4	0.61	4.5 ci
	Remington GS 185 gr	13.8	0.64	4.4 ci
	Speer Gold Dot 230 gr	16.5	0.62	5.0 ci
	Hornady C Duty +P 220 gr	17.2	0.66	5.9 ci
	Sig Sauer V 230 gr	16.2	0.7	6.2 ci
	Federal Hydra Shok 230 gr	17.2	0.62	5.2 ci
	Federal HST +P 230 gr	16	0.71	6.3 ci
	Fort Scott 180 gr	24+	0.48	4.3 ci
	OATH Tango 163 gr	11.25	0.75	5.0 ci
	Underwood XD 120 gr	17.6	0.8	8.8 ci
	Underwood XD +P 120 gr	18.4	0.88	11.2 ci
	Underwood XD Super 120 gr	19.2	0.95	13.6 ci
	Underwood Max Exp 174 gr	7.5	1.05	6.5 ci
	Glaser Blue +P 145 gr	7	Unable to measure	
G2 RIP 162 gr	8.75 FTE	0.63	2.7 ci	
5.7mm	American Eagle 40 gr	11.5	Unable to measure accurately due to tumbling, compression and intentional fragmentation in some cases. Reference Phase 4/5 data for wound dimensions.	
	SS195LF 28 gr	8.2		
	SS197SR 40 gr	13		
	SS198LF 28gr	9.1		
	Elite S4M 28gr	11.5		
	Elite T6B 28 gr	14.5		
	Elite PenetraTOR 40 gr	15.9		
	Elite ProtecTOR 40 gr	15.3		
	Elite DevastaTOR 37 gr	18.2		
	Vanguard Black Fang 34 gr	18.5		
	Vanguard Barnes 50 gr HP	15		
Vanguard Comb Tech 50 gr	16.2			

PHASE 4/5

Phase 4- Animal Tissue with a standard denim barrier. See pages 16/17.

Phase 5- Animal Tissue with a single ¾ inch thick AA fir plywood panel and a standard denim barrier. Rounds not recovered.

Caliber	Round	P3 Shots	P3 Av Area	P4 Shots	P4 Av Area	
9mm	Winchester FMJ 124 gr	6	.14	6	.12	
	Winchester Ranger T 147 gr	5	.3	4	.25	
	Remington GS +P 124 gr	4	.25	4	.17	
	Remington GS 147 gr	4	.3	4	.25	
	Speer GD +P 124 gr	4	.24	4	.16	
	CorBon +P 115 gr	4	.3	4	.16	
	Hornady C Duty +P 135 gr	4	.35	4	.31	
	Sig Sauer V 124 gr	4	.4	4	.35	
	Federal HST 147 gr	6	.42	4	.35	
	Fort Scott 80 gr	4	.27	4	.25	
	OATH Tango 110 gr	2	DNE	2	DNE	
	Underwood XD 90 gr	5	.6	4	.47	
	Underwood XD +P 90 gr	5	.6	4	.6	
	Underwood XD +P+ 90 gr	8	.62	6	.72	
	Underwood Max Exp 105 gr	2	.5	2	.41	
	Glaser Blue +P 80 gr	2	DNE	2	DNE	
	G2 RIP 92 gr	2	.15	2	.13	
	357 SIG	Winchester FMJ 125 gr	6	.15	6	.15
		Speer GD 125 gr	4	.28	6	.16
		Sig Sauer V 125 gr	4	.44	4	.32
Federal HST 125 gr		6	.5	6	.4	
Underwood XD 65 gr		4	.78	4	.71	
Underwood XD 90 gr		8	.78	6	.68	
40 S&W	Winchester FMJ 180 gr	8	.14	8	.16	
	Winchester Ranger T 180 gr	6	.42	6	.36	
	Remington GS 165 gr	4	.3	4	.2	
	Remington GS 180 gr	6	.44	6	.36	
	Speer GD 165 gr	4	.3	4	.24	
	Hornady C Duty 175 gr	6	.4	4	.4	
	Sig Sauer V 165 gr	4	.45	4	.41	
	Federal HST 180 gr	6	.49	6	.43	
	Fort Scott 125 g	4	.2	4	.28	
	OATH Tango 125 gr	2	DNE	2	DNE	
	Underwood XD 115 gr	8	.635	8	.575	
	Underwood Max Exp 140 gr	2	.69	2	.58	
	Glaser Blue 115 gr	2	DNE	2	DNE	
	G2 RIP 115 gr	2	.2	2	DNE FTE	

PHASE 4/5

Caliber	Round	P3 Shots	P3 Av Area	P4 Shots	P4 Av Area
10mm	Winchester FMJ 200 gr	8	.16	6	.16
	Winchester SX 175 gr	4	.5	4	.4
	Hornady C Duty 175 gr	4	.44	4	.42
	Sig Sauer 180 gr	4	.6	4	.36
	Federal Hydra Shok 180 gr	4	.54	4	.44
	Underwood XD 115 gr	6	.8	6	.74
45 ACP	Winchester FMJ 230 gr	4	.18	4	.22
	Winchester Ranger T 230 gr	4	.48	4	.48
	Remington GS 185 gr	4	.4	4	.36
	Speer Gold Dot 230 gr	4	.5	4	.44
	Hornady C Duty +P 220 gr	4	.52	4	.44
	Sig Sauer V 230 gr	4	.5	4	.42
	Federal Hydra Shok 230 gr	6	.31	4	.32
	Federal HST +P 230 gr	6	.55	6	.45
	Fort Scott 180 gr	4	.2	4	.28
	OATH Tango 163 gr	2	.61	2	.53
	Underwood XD 120 gr	6	.6	6	.345
	Underwood XD +P 120 gr	4	.65	4	.61
	Underwood XD Super 120 gr	8	.825	8	.71
	Underwood Max Exp 174 gr	2	.79	2	.79
	Glaser Blue +P 145 gr	2	DNE	2	DNE
	G2 RIP 162 gr	2	.18	2	.24
5.7mm	American Eagle 40 gr	4	.3	4	.2
	SS195LF 28 gr	4	.3	4	.25
	SS197SR 40 gr	4	.2	4	.2
	SS198LF 28gr	4	.35	4	.35
	Elite S4M 28gr	4	.4	4	.55
	Elite T6B 28 gr	5	.5	7	.49
	Elite PenetraTOR 40 gr	4	.35	4	.1
	Elite ProtecTOR 40 gr	4	.13	3	.12
	Elite DevastaTOR 37 gr	7	.61	5	.56
	Vanguard Black Fang 34 gr	4	.69	4	.46
	Vanguard Barnes 50 gr HP	4	.56	4	.4
	Vanguard Comb Tech 50 gr	6	.59	4	.5

HOLLOW POINT SUMMARY

All hollow points are designed to expand after contact with the target/media. Some are designed to open slowly or less amount to aid in barrier performance and to provide deeper penetration, while others are designed to open more rapidly to cause the largest diameter/area wound.

Results from the six previous tests and this test showed there are four main characteristics to hollow point performance in order.

1. Caliber. The larger the caliber hollow point the deeper the average penetration depth, the more reliable the rounds were with a lower failure to function percentage, better barrier performance and the largest average PWC. In all four grading criteria the largest caliber hollow point rounds did the best when compared to other hollow points.
2. Weight. In each of the 5 calibers that hollow points were tested the heaviest weight in each caliber did the best in all four graded characteristics.
3. Bullet Design. Certain bullet designs outperformed other designs. This was the third most important characteristic after caliber and weight.
4. Velocity. In all hollow points velocities less than 800 fps resulted in larger failure to expand percentages in all 7 tests. Between 800-900 fps the percentage decreased and ceased to be a problem above 900 fps. Velocities over 1,200 fps resulted in extremely high failures due to jacket separation and fragmentation. The reliability rate was slightly better between 1,100-1,200 fps and accidental fragmentation happened far more rarely below 1,100 fps. The sweet spot for hollow point reliability is between 900-1,100 fps. Remember hollow points are designed to expand and function properly with specific impact velocities. Changing barrel lengths or using +P rounds may alter the desired effects in a negative manner. A faster hollow point is not always a better hollow point. For the other three types of ammunition tested increased velocity always produced better results, not true for hollow points.

Overall:

1. Penetration. Most hollow points penetrated at least 12 inches in IWBA gel. None of the hollow points exceeded 24 inches except during failure to expand occurrences. In all cases increasing bullet weight increased penetration. While increasing velocity did a number of factors and none of them reliably.

2. Unfortunately, of all 4 types of rounds tested hollow points recorded the worst reliability and the worst consistency. Hollow point bullets in this test expanded approximately 75% of the time in the Phase 2 gel test. (In the six tests previously mentioned it was recorded that hollow points failed to function properly about 30% of the time which is slightly worse than our data). Reliability and consistency continued to degrade as a barrier was added in Phase 3 and as we shifted testing to tissue in Phase 4 and then finally the worst results in Phase 5 barrier and tissue. Factors in this include the caliber, velocity, target media, barriers and bullet design. This means that at least 1 out of every 4 shots resulted in a failure! In realistic tissue with barriers such as clothes and bone 1 out of every 3 hollow point shots resulted in failure to function. This is extremely poor reliability and consistency.
3. Barriers greatly affected the hollow points tested. Hollow points are neither barrier blind nor barrier fail. Results varied from shot to shot.
 - a. 9mm hollow point rounds recorded an average of a 30% degradation in penetration and PWC due to barriers.
 - b. 357 SIG hollow points recorded an average of a 35% degradation due to barriers. The higher velocity caused more cases of accidental fragmentation as evidenced in both Phase 3 and Phase 5.
 - c. The 40 S&W recorded an average of 15% degradation due to barriers.
 - d. The 10mm hollow points recorded an average of 20-25% degradation in penetration and PWC due to barriers because of accidental fragmentation caused by excessive velocity similar to the 357 SIG.
 - e. The 45 ACP recorded an average of 10% degradation due to barriers.
4. Permanent Wound Cavities were generally larger than almost all types tested with the exception of some of the rounds from the Solid Copper category. Compared to some massive expansion solid copper rounds and frangible rounds hollow points still had the largest PWC due to a good combination of expansion resulting in larger diameter wounds and deep penetration.

FULL METAL JACKET (FMJ) SUMMARY

FMJs are the second most used by all the agencies involved in this test. They are also the most used training ammunition. They are typically not the first choice for defensive ammunition but they do have three very good characteristics.

1. FMJs penetrate very deeply. In 5 of the 6 tested calibers (not the 5.7mm) the FMJs tested all penetrated completely through the 24 inches of gel and all barriers that were used. If you are looking for extremely deep penetration regardless of barriers then FMJs or Solid Copper rounds would be your choice.
2. Excellent Reliability, Consistency and weapons function. Every round did almost exactly what it was supposed to do and did it every time. We had no problems with feeding or function on any of the tested calibers FMJs.
3. Barrier Performance. Almost completely barrier blind like only some of the other ammunition tested they did extremely well and are a great choice if your agency considers barrier performance to be one of the top criteria in ammunition selection. They easily exceeded the capability of all the hollow points and frangibles and some of the solid coppers when it came to barrier performance. Given that hollow points fail 25%-35% of the time and are unreliable versus barriers consider Full Metal Jacket rounds.
4. In each caliber tested the FMJ rounds produced the smallest Permanent Wound Cavity size.

Overall if extremely deep penetration and barrier performance is important while small diameter wounding is acceptable on your agency criteria list as it was for a couple of the involved groups then FMJs are a logical choice. Though, even hollow points that failed to function tended to produce larger PWCs.

SOLID COPPER PROJECTILE SUMMARY

Solid Copper bullets are a non-standard category of projectiles with vastly varying designs. Defining or lumping all of these rounds together is very problematic as they are not similar to each other as is found in the hollow point and FMJ categories. Since the results varied to such a high degree each design needs to be discussed separately. There are two main sub-categories in Solid Copper projectiles; Extreme Expansion and Non-expanding.

1. Extreme Expansion. These rounds could certainly be considered as hollow points and any agency wishing to include them in that category is more than welcome to as the data sheets do not have categories. For the purpose of this summary we have included the Underwood Maximum Expansion and OATH Tango in the Solid Copper category. Another Solid Copper round, the G2 RIP was included in the Frangible category as its main design characteristic is fragmentation.
 - a. Penetration. Neither of these rounds in any caliber met the minimum requirement for penetration for any agency involved in this test. None of the rounds tested exceeded 12 inches in IWBA gel. Some of the rounds tested did not make it through the tissue media used in Phase 4/5.
 - b. Reliability and Consistency. These rounds tended to be reliable and produce fairly consistent results. For the amount of expansion exhibited this is very impressive. We had no failures to expand although some of the expansion was not as designed. Several of the rounds turned sideways greatly reducing the diameter of the wound channel. Only rarely did we see any of the rounds fragment.
 - c. Barrier Performance. The expansion and shape of the recovered round was changed by barriers. These rounds are not stopped by barriers but are not barrier blind. Barriers limited the amount of penetration that was already extremely low. In 9mm and .40 the Underwood ME round had some fragmentation issues which resulted in smaller wound diameters but deeper penetration. These two solid copper extreme expansion rounds behaved exactly like hollow points when it came to barriers.
 - d. Permanent Wound Cavity. The two extreme expansion rounds tout themselves as creating maximum sized wound channels which we found to be true. Some of the largest diameter wounds produced were from these

rounds. Unfortunately, the penetration depth was so shallow that the overall PWC size did not rank among the largest in some calibers.

Overall these rounds performed well. Given that Penetration was judged to be the most important characteristic, these rounds fall short of even the minimum and PWCs can be matched or exceeded by the best hollow points and other solid copper rounds available.

2. Non-expanding. These designs are non-deforming rounds designed to use a specific technology to create a larger than FMJ wound cavity. Tumbling or hydraulic compression tissue redirection are the two mechanisms used to create larger wounds. Because gel is non-compressible and human tissue is compressible results from these rounds are larger in the Phase 2/3 gel tests than in Phase 4/5 tissue tests. Hollow point wound diameters are very similar when comparing gel to tissue with and without barriers. These Solid Copper non-deforming/non-expanding rounds created larger wound channels in gel which was not replicated in tissue. There are 3 types of rounds tested that fall into this sub-category: Fort Scott, Underwood Xtreme Defender (XD) and the 5.7mm rounds. Because of the incredible differences in results between these rounds we will discuss them independently.

The Fort Scott uses tumbling as its destructive mechanism. Unfortunately, this rounds tumbling reliability was low in gel and very low in tissue. If the Fort Scott doesn't tumble then you have in essence an FMJ. The 9mm Fort Scott tumbled 4 out of 8 shots into tissue in Phase 4/5. The .40 tumbled 3 out of 8 shots and the .45 only tumbled 1 out of 8 shots into tissue in Phase 4/5.

- a. Penetration. The Fort Scott penetrated very deeply and went through all 24 inches of IWBA gel on all failures to tumble.
- b. Reliability and Consistency. We recorded the highest amount of failure to function (tumble) with this round between gel and tissue tests.
- c. Barrier Performance. This round went through all barriers extremely well with no deformation and minimal degradation regardless of function.
- d. PWC. In all 3 calibers with more than 50 rounds tested the average PWC was very small and barely exceeded that of FMJ rounds. PWCs were of good size when tumbling did occur but still smaller than the best hollow points.

The Underwood XD uses the Lehigh Defense Xtreme Defense Technology bullet. They are the same bullet and in some cases Underwood uses slightly higher pressure which produces more velocity. The radial flutes increase tissue pressure and direct the tissue outward to increase wound diameter. There is one main characteristic to XD performance.... Velocity. The faster this round goes the larger the wound diameter. We tested the 9mm XD, 9 +P, 9+P+ and the 357 SIG in multiple tests in gel and tissue. That's 4 of the exact same projectiles with the only difference being velocity. The wound channel size increased exactly in proportion to increase in velocity. Unlike hollow points which are designed for a certain impact velocity to best perform as designed, the XD always works better when faster.

The data sheet shows results from Phase 2/3 with enormous wound diameters. The radial flutes work perfectly in fluid/gel. Calculated PWCs are the largest ever recorded in all calibers!

Many of our testers wondered if vectoring real compressed tissue sideways into tissue would actually destroy that adjacent tissue that is not directly in the path of the projectile. For those who think this will only work in a non-compressible fluid like gel as we initially did, we can confirm that this technology works extremely well in actual animal tissue with or without barriers. Remember that hollow points expand because tissue which fills the hole in the hollow point is compressed to such a point that the outward pressure inside the bullet pushes and tears the metal and forces it outward where friction then takes over to complete the expansion. If tissue can be compressed to the point of tearing metal (hollow point) then tissue can certainly be compressed to the point of tearing tissue. The Phase 4/5 tissue tests confirmed that in over 100 shots the measured wound channel was not only larger than that of an FMJ but in most cases was the largest wound channel produced in that caliber compared to all other rounds to include fully functioning hollow points.

- a. Penetration. All rounds in all calibers tested penetrated 15.2 – 20 inches with and without barriers.
- b. Reliability and Consistency. Every single shot did roughly the same thing. There is a 0% chance of failure to function because there can be no failure to tumble or expand (because they don't) and no chance to fragment. This was the most Reliable and Consistent round tested.

- c. Barrier Performance. The XD round, the 5.7 mm rounds and FMJs were the most barrier blind rounds tested. Not only did barriers not deflect the round it didn't change the wound diameter much and only slightly reduced penetration depth. XD Barrier degradation was approximately 5%.
- d. PWC. In the Phase 4/5 realistic tissue tests the XD produced the largest wound areas and with the incredible penetration depth exhibited in the Phase 2/3 gel tests the XD recorded the largest overall PWC in all calibers. As noted the PWC numbers are inflated in the Phase 2/3 gel tests due to non-compressible gel, but the penetration depths are more realistic to compare.

Overall: This was by far the most impressive round tested. After over a year of testing this round became the most requested round to test after some of the agencies reviewed draft shot data. In continued testing this round became the most measured and compared round in this test. We had more XD data points than any other round. Because the XD relies so heavily on velocity the results showed that the 357 SIG, 10mm and 9mm were the best calibers in this round followed by the .45 and then the .40, the exact opposite of the hollow point results.

The 5.7 mm rounds are solid copper and use tumbling and velocity as its destructive mechanism. The 5.7mm round is similar to the 5.56 mm but weighs less and has lower velocity, but believe it or not the projectile is longer than the 5.56 making the center of gravity (CG) farther aft which greatly aids in its ability to tumble reliably and consistently. Since this type of rifle-like projectile is only available in 5.7 mm we will cover the specifics in the 5.7 Caliber Summary.

FRANGIBLE ROUND SUMMARY

Frangible bullets are designed to break apart, fragment or disintegrate into small pieces upon striking any solid object either immediately on target contact or after minimal penetration. They were created to minimize penetration and to be less likely to cause injury or damage to unintended objects. They are designed to create large diameter wounds and not penetrate deeply. During this test in all cases the Frangible rounds did not penetrate the required 12 inches of ballistics gel, except for the core of one type of round. Since this test was mostly concerned with defensive ammunition and all agencies that took part in the test agreed that > 12 inches of penetration in ballistics gel (Phase 2) is a requirement and that penetration is the most important characteristic in determining projectile effectiveness, frangible rounds were only superficially tested.

Rounds included in this category are the Glaser Blue and the G2 RIP.

1. Frangible rounds are not supposed to penetrate deeply and they don't. The Glaser Blue penetrates between 5.5 – 7.25 inches in gel in all calibers. The G2 RIP is difficult to judge because the petals/trocar in all calibers only penetrate between 3.5 – 5 inches and the core independently penetrates 11 – 16 inches in gel. Remember that the resistance of skin to projectile penetration is equal to about 3-4 inches of IWBA calibrated ballistics gelatin. The Glaser never penetrated through the tissue in either Phase 4 or Phase 5. The RIP Phase 4/5 tissue tests showed the core would penetrate completely through the tissue except on rounds that failed to expand.
2. Reliability and Consistency. The Glaser Blue had extremely consistent numbers and reliably opened on every test shot in all phases. The RIP round had Failures To Expand (FTE on the data sheet) on 4 occasions out of 21 shots.
3. Barrier Performance. Frangible rounds are supposed to be Barrier Fail rounds. All Glaser shots properly opened in contact with barriers. When the RIP Failed To Expand it was during barrier tests and the penetration was limited, yet when functioning properly the core went through the barrier.
4. The Permanent Wound Cavity size of frangible rounds is extremely difficult to measure because in gel the multiple fragments/projectiles produce many tiny hard to measure wound paths and in tissue most of the rounds Did Not Exit (DNE on the data sheet) so measuring wound exit diameters was problematic. The G2 RIP

PWC in the Phase 2/3 gel tests was calculated by adding the PWC of the core alone to the PWC caused by the trocars.

Overall: If your agency requires minimal penetration or absolute barrier failure than these rounds are designed for that task. Some have an extremely high reliability rate and consistency to break apart on contact and should be considered. Other frangible rounds were less consistent and sometimes failed to break apart during barrier and tissue tests and should be avoided.

9mm SUMMARY

The 9mm is the most used ammunition in the world and was the most used caliber by all the agencies involved in this test. The most used type of 9mm ammunition is the hollow point followed by the FMJ. The 9mm is used as the Ballistic Standard for calculations of Ballistic Ratio which compares results from different ballistic tests.

9mm hollow points tend to have sufficient penetration but have one of the lowest reliability, consistency and barrier performance of all the hollow points. Permanent wound cavity size of the 9mm was the smallest of all the calibers tested. These results are also recorded and verified in the other 6 tests mentioned earlier. The 9mm hollow point tends to be degraded about 30% by the barriers used.

FMJs create a wound diameter roughly the size of the caliber and all caliber FMJs penetrate very deeply. So the 9mm and 357 SIG FMJs have the smallest PWC with equal penetration, reliability, consistency and barrier performance to other calibers.

The solid copper rounds available in 9mm present some of the best bullets available in this caliber. The jump in performance and wounding capability between hollow points and solid copper is the largest of any caliber. Deeper more consistent penetration, great barrier performance and the largest PWC was recorded with a solid copper round.

Frangible rounds have a very specific function and since low penetration and barrier failure is a must the typical 9mm problems disappear. If frangible rounds are required or desired the 9mm is an excellent choice.

357 SIG SUMMARY

The 357 SIG cartridge is used by multiple law enforcement agencies. Feed reliability is typically very high with bottleneck cartridges. All known agencies utilize hollow points in their 357 SIGs.

357 SIG hollow points tend to have excellent deep penetration but suffer from the lowest reliability and consistency numbers. Sometimes the deep penetration is caused by the fails. The small size and extremely high velocity of this hollow point caused the most fail to functions in the test. This was exasperated by barriers. 357 SIG hollow points recorded an average of a 35% degradation due to barriers. The higher velocity caused more cases of accidental fragmentation as evidenced in both Phase 3 and Phase 5 barrier data. Permanent wound cavity size of the best 357 SIG hollow points was bigger than the 9mm and a little smaller than the .40. Our results are also recorded and verified in the other 6 tests mentioned earlier.

FMJs create a wound diameter roughly the size of the caliber and all FMJs penetrate very deeply. 357 SIG and 9mm FMJs have the smallest PWC with equal penetration, reliability, consistency and barrier performance to other calibers.

The solid copper rounds available in 357 SIG present the best bullets available in this caliber. The jump in performance, reliability and wounding capability between hollow points and solid copper rounds is very large. More consistent penetration, reliability, great barrier performance and the largest PWC was recorded with a solid copper round.

40 S&W SUMMARY

The 40 S&W cartridge is used by multiple federal, state and local agencies as well as security firms. It is the second most used ammunition in the US and by all the agencies involved in this test. The most used type of .40 ammunition is the hollow point.

40 S&W hollow points tend to have average penetration, reliability, consistency and barrier performance of all the hollow points. Reviewing all 7 tests the permanent wound cavity size of the 40 S&W was larger than the 9mm by about 20% and smaller than the .45 by about 20%. The 40 S&W hollow point tends to only be degraded about 15% by the barriers used. It is almost directly in between the 9mm and 45ACP in every measurable characteristic.

FMJs create a wound diameter roughly the size of the caliber and all caliber FMJs penetrate very deeply. So the .40 FMJs have an average PWC and equal penetration, reliability, consistency and barrier performance to other calibers.

The solid copper rounds available in 40 S&W present some of the best bullets available in this caliber although the jump in overall capability from hollow point to solid copper is not as exaggerated as in other calibers. The excellent solid copper rounds require high velocities and the 357 SIG and 9mm actually have better overall PWC size over the .40. Deeper more consistent penetration, great barrier performance and the largest PWC was recorded with a solid copper round in the 40 S&W.

Frangible rounds have a very specific function and there are some available to perform that function.

10mm SUMMARY

The 10mm was first selected for service by the Federal Bureau of Investigation in 1989 from the aftermath of the 1986 FBI Miami shootout, following the first full scale federal ballistics test (one of the 6 previous tests referred to earlier). The cartridge was later decommissioned after their Firearms Training Unit eventually concluded that excessive recoil and pistols chambered for the cartridge were too large for some agents. Currently none of the federal, state, local agencies or security firms involved in this test field the 10mm.

10mm hollow points tend to have excellent penetration, on par with the 45ACP. Reliability and consistency issues have resulted from extremely high velocities. Like the 357 SIG velocities over 1,200 fps result in excessive impact pressures which cause jacket separation and accidental fragmentation which lowers effectiveness by shrinking wound diameter and making penetration numbers very inconsistent which averages don't show. The 10mm hollow points recorded an average of 20-25% degradation in penetration and PWC due to barriers. This ranks it 3rd of 5. Reviewing all 7 tests the permanent wound cavity size of the 10mm is about the same size as the 40 S&W (5% larger) and smaller than the .45 by about 15%.

FMJs create a wound diameter roughly the size of the caliber. The 10mm due to its fantastic sectional density has the deepest penetration. Its FMJs exhibits average PWC, reliability, consistency and barrier performance to other calibers.

The solid copper rounds available in 10mm showed the most impressive results, with excellent penetration, 100% reliability, better consistency and the largest PWC size in this caliber. The best solid copper round requires high velocities and the 10mm provides that.

45ACP SUMMARY

The 45ACPs are the largest, heaviest and slowest rounds tested. This helps with some ammunition types and hurts in others. Many of the agencies involved in this test use this cartridge.

45ACP hollow points have traditionally recorded the best results when grading penetration and PWC when compared to all other calibers. The penetration results from this test match the previous 6 tests. The 45 and the 10mm have the best penetration and the 45 has the most consistency. It also demonstrates the most reliability by having the lowest fail to function percentage. The design features the largest meplat resulting in better functioning. The 45ACP recorded an average of only 10% degradation due to barriers which are the best numbers for any hollow point. The 45ACP hollow points have a PWC which is larger than all other calibers. Also, like the other calibers hollow points the 45ACPs results are best when utilizing the heaviest grain available. Lastly, on average after 7 tests the 45 hollow point creates an average PWC size 50% larger than a 9mm and 15-30% larger than the other calibers in both gel and actual tissue media.

FMJs create a wound diameter roughly the size of the caliber and all caliber FMJs penetrate very deeply. So the 45ACP FMJ has the largest PWC with equal penetration, reliability, consistency and barrier performance to other calibers.

The area of the 9mm/357 SIG is .1 and the area of a 45 is .16. So with an FMJ or an unexpanded hollow point if both the 9mm/357 SIG and 45 penetrate the same depth the 45 will create a PWC that is 60% larger! The area of a 40S&W/10mm is .12.

The solid copper rounds available in 45ACP exhibit excellent qualities. The best hollow points almost match the best solid copper round. Solid copper rounds require high velocity unlike hollow points and the 45 solid copper are the slowest rounds in that ammunition category resulting in minimal improvement over hollow points. Deeper penetration, great barrier performance and a large PWC was recorded with a solid copper round.

Frangible rounds have a very specific function and since low penetration and barrier failure is a must the typical 45 frangible round has only minimal improvement over the other calibers.

5.7mm SUMMARY

The 5.7mm is a small-caliber, high-velocity, rebated rim, bottlenecked, rifle cartridge. They are the fastest, smallest and lightest rounds tested. They are the only rifle rounds included and only because this chambering has a pistol that employs it. Designed and proven to have better wound ballistic terminal performance than the 9mm, better barrier performance especially versus armor with low recoil and lightweight it is a misunderstood and controversial cartridge. This is the first large scale test involving the 5.7 alongside other more traditional calibers hollow points in the U.S. Only a couple of agencies involved in this test use this cartridge.

Starting in 2002, NATO conducted several tests to replace the 9×19mm cartridge. The tests compared the FNH 5.7×28mm cartridge and the HK 4.6×30mm cartridge. The NATO group recommended the 5.7×28mm cartridge, recording vastly superior performance in testing. Comparing the results of the NATO test and one other federal test with this test has confirmed our results.

5.7mm rounds use tumbling and velocity as its destructive mechanism. The 5.7mm round is similar to the 5.56mm in form and function but weighs less and has lower velocity, but the projectile is longer than the 5.56 making the center of gravity (CG) farther aft which greatly aids in its ability to tumble reliably and consistently and increase its wound size. The variances in design and capability of the tested rounds was vast. Results were the most varied of any caliber tested. There were 4 duty rounds that demonstrated superior characteristics over the others in all grading criteria. Many of the other rounds are simply training rounds. Great penetration, reliability, consistency and barrier performance proved to be very easy to grade.

1. Penetration was surprisingly deep and consistent for the duty rounds regardless of barriers in Phase 2/3 and very close to the best from the 45ACP and 10mm hollow points averaging just over 17 inches.
2. The rounds exhibited near perfect reliability with no tested rounds failing to function/tumble in any phase regardless of media/barriers. None of the rounds fragmented unless designed to do so. Shot to shot consistency was extremely high similar to the solid copper rounds and the FMJs. Each wound channel looked completely different but the measurements were very close and consistent.
3. Barrier degradation was almost zero. 5.7 rounds are the closest thing to barrier blind that was tested. During a couple of the test shoots certain agencies

introduced different more robust barriers and the 5.7 continued its flawless minimal degradation results.

4. Measuring the Permanent Wound Cavity (PWC) in gel proved to be very difficult. High speed, tumbling rounds create a compression which results in larger than actual wound channels in non-compressible IWBA gel similar to what some of the solid copper rounds did only worse. Also, the rounds normally followed a fairly linear path but in some instances wound paths were curved. Lastly, the wound diameter is small while the bullet is in line but is much wider during tumbling, requiring almost infinite measurements to be made to accurately calculate the actual PWC in gel similar to the frangible rounds. Averages could be made but all our other measurements were so exact and rechecked that we decided to not estimate and be inaccurate. It was decided that wound channel dimensions would be more accurate and realistic in Phase 4/5 in actual tissue where exact measurements could be made and tissue dissection could verify tumbling and overall damage. The Phase 4/5 results were extremely surprising and much extra testing was done as many agencies wanted to be present for comparisons to more traditional rounds. Measurements taken on over 100 shots verified that wound channels through tissue with or without barriers equaled or exceeded that of hollow points in all calibers! There was a solid copper round that produced larger average wound dimensions. As previously mentioned rounds over 2,000 fps can create stretches that exceed the body's limits. In a few select tests rifle rounds >3,000 fps were tested to analyze the wounds in tissue. Dissection showed tearing, which increases overall wounding. Only minimal tearing was ever witnessed during 5.7mm testing and we believe the effects were nominal and did not contribute to any measurements or data.

PENETRATION GRADING CRITERIA SUMMARY

Penetration is the overall distance traveled by the bullet through the selected media or target. All agencies that took part in this test agreed that Penetration is the most important characteristic of projectile wounding.

The average human male is 10" thick front to back. A bullet must penetrate deep enough to pass through and destroy vital organ tissue. This must be accomplished from different target body angles and through common barriers such as clothes and bone. Side shots through an arm must penetrate greater than 10 inches to contact the heart and frontal shots must penetrate at least 7 inches to reach the back of the abdominal cavity. These are human tissue penetration depths, not ballistics gel depths.

All of the agencies in this test require a minimum of 12 inches of penetration in IWBA calibrated ballistics gel. Some of the agencies involved desire 15-18 inches and other agencies desire 18 inches $\pm 10\%$ (16-20 inches) of overall calibrated ballistics gel penetration. FBI and DoD protocols call for a minimum penetration of 12 inches with a goal of around 18 inches.

Grading Penetration was accomplished using Phase 2 (IWBA gel and denim) data for a desired 18" and a minimum of 12". Also, Penetration using Phase 3 (IWBA gel with denim and plywood) barrier data was important for all agencies. Many agencies averaged the Phase 2 and 3 penetration depths for their assessment.

In order the best penetration depths were observed by some of the solid copper rounds in all calibers that consistently penetrated 15.2 – 20 inches with and without barriers. The duty 5.7mm rounds averaged over 17 inches of penetration. The 45ACP and 10mm were the best penetrating hollow points tested. Reference the data sheets for exact rounds and measurements. Penetration depth consistency should be considered very important and is referenced in the caliber and bullet type summaries.

RELIABILITY AND CONSISTENCY GRADING CRITERIA SUMMARY

After the primary importance of penetration was determined by all of the involved agencies the other three characteristics were agreed to be of roughly equal importance with individual groups ranking them differently. All involved stressed how important Reliability and Consistency was and demanded that it be addressed and reported. Most of the other tests do not reference this critical benchmark.

Reliability: In this test reliability was defined and graded as to whether the round performed as designed or failed to function properly. Function depended on the type of round. Failure to perform as designed (Failure to open/tumble, accidental fragmentation and jacket separation) will be noted and included in the data and in the caliber summaries.

1. Hollow Points. They are designed to expand and retain weight. Rounds of this type that either failed to expand or accidentally fragmented were ruled as a failure and that counted against the round in terms of Reliability. In these cases, regardless of the cause, penetration depth and permanent wound cavity (PWC) size was greatly affected. Of all 4 types of rounds tested hollow points recorded the worst reliability. Hollow point bullets in this test failed approximately 25% of the time in the Phase 2 gel test. (30% in the previous tests). Reliability continued to be degraded as barriers were added in Phase 3. Tissue testing in Phase 4/5 showed even more reliability issues. Failure factors include the caliber, velocity, target media, barriers and bullet design. In realistic tissue with barriers such as clothes and bone almost 35% of hollow point shots resulted in failure to function.
 - a. Failure to expand was particularly noted for low speed rounds less than 900 fps. Barriers also caused failures to expand especially in the 9mm and less so as the caliber and weight were increased.
 - b. Fragmentation was noted in high speed hollow points like the 357 SIG and 10mm resulting in much smaller PWC. Also, the smaller the caliber the more cases of fragmentation that occurred.
2. Full Metal Jacket. These rounds are not designed to do anything except retain weight. No failures were noted since none of the rounds tested fragmented or deformed enough to alter the results. All FMJ rounds tested had excellent reliability.

3. Solid Copper Rounds. The Extreme Expansion subcategory had failure rates that were better (lower) than the hollow points. We had no failures to expand although some of the expansion was not as designed. Several of the rounds turned sideways greatly reducing the diameter of the wound channel. Only rarely did we see any of the rounds fragment. These rounds were less reliable in the tissue tests and when barriers were present they were similar to the hollow points. The Non-Expanding subcategory was a mixed bag with one round failing to function by tumbling only about half the time in all phases and the XD having complete reliability in all phases. Also, the 5.7mm showed excellent reliability by tumbling as designed on virtually every shot and only fragmenting when designed to do so.
4. Frangible Rounds. The Glaser Blue had extremely consistent numbers and reliably opened on every test shot in all phases. The G2 RIP round had Failures To Expand (FTE on the data sheet) on 4 occasions out of 21 shots.

Consistency: In this test consistency was defined and graded as to whether the rounds penetration and PWC numbers were reliable and persistent. The standard deviation for each shot tested within a Phase. Large changes in the values showed rounds to perform differently shot to shot which was deemed low consistency. Obviously failure rates were the largest cause of inconsistency but some rounds were inconsistent even while functioning. Generally speaking hollow points, Extreme Expansion solid copper rounds and some of the frangible rounds exhibited the lowest consistency. The FMJs and XD were the most consistent followed by the duty 5.7mm rounds.

Overall: Reliability to function on target as designed cannot be overstated. All agencies involved agreed that choosing a round with excellent characteristics really doesn't matter if it fails to function. Most agreed that round reliability rates under 80-90% are serious problems. Consistency is also important but less so than reliability. Bullet type summaries and caliber summaries contain more detailed information on reliability and consistency. There were some rounds that were extremely reliable (nearly 100%) and very consistent in the solid copper and FMJ categories and the 5.7mm. Agencies wishing to review all the individual shot data of some particular rounds for more detail on reliability and consistency should contact us and we will provide the data requested.

BARRIER PERFORMANCE GRADING CRITERIA SUMMARY

The main target area to stop/incapacitate a human target is the upper thoracic cavity and head. Bone protects over 70% of that area and in most conditions clothes cover about the same percentage. Barriers are encountered on about 2 of 3 shots taken. Bone tissue is an excellent protective barrier and is similar but stronger than the plywood that was used in 2 phases (Phase 3 and 5) of this test as a consistent barrier IAW IWBA standards. Shot placement is NOT wound placement and where a shot hits the target does not always determine the path of the bullet through the target due to barriers (clothes, bones and outside items) and bullet performance/failures. Many common defensive rounds are easy to defeat/vector away from the original path of the bullet. Barrier performance is extremely important in judging whether a round will continue on its original path or be deflected/defeated and how much a round is degraded by going through barriers.

Barrier performance was graded by comparing the results from Phase 2 to Phase 3 and comparing the data from Phase 4 to Phase 5 where the only differences were the addition of a single ¾ inch thick AA fir plywood panel IAW FBI / DoD protocols.

Penetration and PWC degradation: Percent of penetration and PWC size lost from non-barrier shots to barrier shots from Phase 2/3 and Phase 4/5.

1. Hollow Points.
 - a. 9mm- 30% degradation due to barriers.
 - b. 357 SIG- 35% degradation due to barriers.
 - c. 40 S&W- 15% degradation due to barriers.
 - d. 10mm- 20-25% degradation due to barriers.
 - e. 45ACP- 10% degradation due to barriers.
2. Full Metal Jacket. No measureable degradation in penetration or PWC. Barrier Blind.

3. Solid Copper.

- a. Extreme Expansion- The expansion and shape of the recovered round was changed by barriers. Barriers limited the amount of penetration that was already extremely low. In 9mm and .40 the Underwood ME round had some fragmentation issues which resulted in smaller wound diameters but deeper penetration. The two solid copper extreme expansion rounds behaved exactly like hollow points when it came to barriers.
- b. Non-Expanding- 5% degradation in penetration and PWC regardless of caliber.
- c. The 5.7 exhibited almost zero degradation due to barriers. Barrier Blind

4. Frangible. Frangible rounds are supposed to be Barrier Fail rounds. All Glaser shots performed as designed by functioning and opening due to contact with barriers. The RIP Failed To Expand (FTE on the data sheet) on 4 of 12 barrier shots and the penetration was limited.

Overall: The ultimate goal is for a round to be either barrier blind or barrier fail, that way the shooter will know the capability of the rounds and not have unexpected results. 5.7mm, some solid copper rounds and all FMJs were barrier blind, while the Glaser Blue was barrier fail as designed. For hollow points the 45ACP had the least degradation due to barriers.

PERMANENT WOUND CAVITY GRADING CRITERIA SUMMARY

Penetration was judged the most important characteristic of a defensive handgun bullet. Permanent Wound Cavity (PWC) is a mathematical calculation comprised of penetration depth and wound diameter converted to area and is expressed in cubic inches of destroyed material. Literally it's how big a hole was made by the bullet. Whereas this seems to be extremely important, there are four issues with concentrating solely on this number.

1. A large PWC that doesn't destroy any important body tissue because the wound is so shallow is virtually meaningless. Since the important organs are deep within the body this drives up the importance of penetration. Destroying a lot of skin and subcutaneous material does little to stop/incapacitate a human target.
2. Many rounds that create large PWC are less reliable or inconsistent. Many of the hollow points that open extremely far tend to do it inconsistently or accidentally fragment often.
3. Most of the PWC calculations are done using IWBA gel. Human tissue is compressible and gel is non-compressible which creates results that don't represent reality. Using a media closer to human tissue is required to get actual realistic data.
4. About 70% of the target area of a human is covered by clothes and bones. So 2/3^{rds} of the shots are going to encounter barriers which are not considered for most PWC calculations. Barriers greatly lowered some PWC figures.

For this test we did the normal PWC calculations for comparison purposes with other tests and we also did measurements and grades with actual animal tissue and barriers along with calculating reliability and consistency. That way a more realistic overall picture of bullet capability on a human target could be achieved.

Challenges with calculating PWC: The previous 6 tests only graded hollow points, where wound channel diameter is generally the same as recovered round diameter. This is the same when testing FMJ rounds. Two issues were encountered when the other 2 types of ammunition were included in this test.

1. Tumbling rounds (5.7mm and one solid copper round), non-expanding rounds (one solid copper round) and frangible rounds that create intentional

fragmentation and multiple tiny difficult to measure wound channels, change diameter of wounding throughout the wound path making measurement very inaccurate.

2. Rounds that generate a large amount of compression due to velocity or design (5.7mm and one non-expanding solid copper round) create wound channels in gel that are unrealistic and overestimate their effectiveness, due to compression.

It is recommended that wound areas in tissue (Phase 4/5) be used for these rounds and if comparison between ammunition types is to be done that Phase 4/5 data be used for wound area and Phase 2/3 data be used for penetration.

1. Hollow Points. The PWC of hollow points were some of the biggest seen along with some solid copper rounds and the 5.7mm. Reference the data sheet for particular rounds and exact numbers.
2. FMJ. The PWCs measured were the smallest of all 4 bullet types.
3. Solid Copper. Several of the solid copper rounds produced the largest wound areas, but some of them had extremely low penetration depths that limit the overall size of the PWC. One of the solid coppers, the Underwood XD had excellent realistic wound diameters/areas in animal tissue and very deep reliable consistent penetration in both gel tests with and without barriers in all calibers. The duty 5.7mm ammunition produced very large wound areas in realistic Phase 4/5 tissue testing and had very deep reliable consistent penetration in both gel tests with and without barriers.
4. Frangible. Results varied depending on ammo. Some large wound channels were observed but difficult to measure due to fragmentation creating multiple wound paths. Also, since penetration depth was so low the overall PWC was smaller than some of the other bullet types.

Overall: PWC is important but should not be overestimated and the data used should be from a realistic media, should include barriers and must take into account the reliability and consistency of the wounding by looking at a great many shots. Lastly, the PWC has to be deep enough to actually account for the destruction of important organs/material and not just superficial tissue.

ACKNOWLEDGEMENTS

There are so many agencies and people to credit with the amazing amount of data that was measured and calculated in this report. So many new things were accomplished and considered like Ballistic Ratio, consulting of medical professionals to create the first large scale test using realistic animal tissue as a primary media and the testing of all four types of ammunition instead of just hollow points.

People involved in this 2016-17 Joint Agency Ballistics Test For Defensive Handgun Ammunition came from the Department of Defense, Department of Justice, Marshalls, two Texas State departments, 4 police and Sherriff departments, 2 security firms, 3 local gun stores and 2 training schools. We had 2 companies that sponsored some of the tests by providing supplies and food. One local grocery store chain gave great discount on brisket used in Phase 4/5. The tests were accomplished at 4 outdoor ranges starting in March of 2016 and finishing in October of 2017. Ammunition was provided by multiple sources ranging from the manufacturers to gun stores and finally most provided by the agencies involved. No ammunition manufacturers were allowed to sponsor or attend any test. They were only allowed to provide ammunition and nothing else.

The people involved were active, retired and by the end some of the active retired! Many wished to remain anonymous and it was agreed that two final reports would be made. One only for the agencies involved and one for general use that would have all specific agencies, individuals and companies information removed, with the exception of the company compiling and disseminating the final report. No agency, company or individual received any financial or gift compensation of any kind for testing or the report. A very special thanks to all the volunteers who helped set up, tear down, film, photograph, measure, re-measure, document, calculate and check all the data. Only through their diligent thorough work could this much accurate data be generated.

Sanitized version

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The individual test reports were written by many testers, chapters were written and reviewed by many and final composition and editing was accomplished by the training company that provided continuity of testing and scheduling: Viper Weapons Training LLC.

There are no conclusions in this test. Testing was accomplished only to provide raw data on a large scale with an enormous sample size on multiple media with 4 predetermined quantifiable grading criteria. Each agency should first determine which characteristics are important to them in order, before using the data for ammunition determination or for ballistics training.

A 2019 test is being scheduled to include newer rounds, more direct competitions of rounds by requested agencies and more tissue dissection data. The same protocols will be maintained in that test so that comparisons and combined sample sizes may be accomplished.

There were a few videos produced to promote the test to different agencies that are available for viewing on youtube from Viper Weapons Training LLC.

<https://www.youtube.com/channel/UCv9CSMeBybM65XiHHFd-EBA>

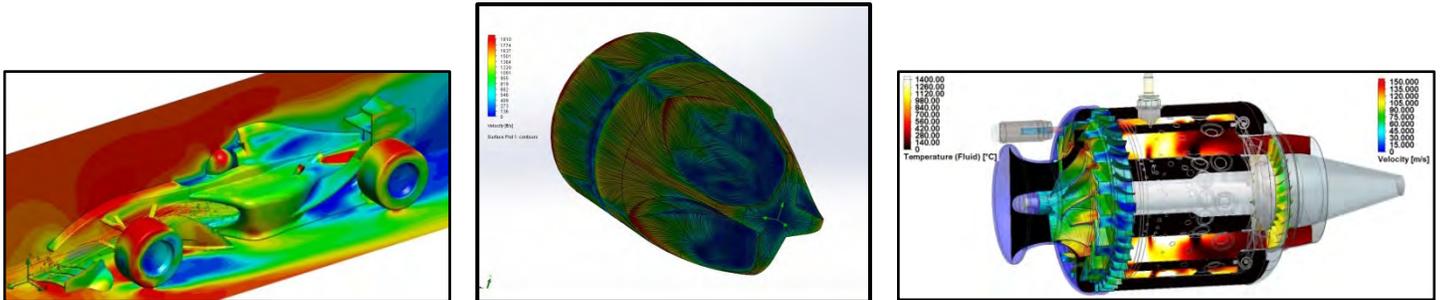
A power point presentation is available for any agency wishing to have this report in that format.

Any agency wanting more information please make a request to viperweaponstraining@gmail.com

Sanitized version

UNCLASSIFIED

Computational Fluid Dynamics (CFD) Analysis of the Lehigh Defense 90gr Xtreme Defense Projectile



In the same way that Boeing models a wing for flight, a Formula 1 team models its high-speed vehicles, or Lockheed Martin models a gas turbine engine for military airplanes, we have modeled our Fluid Transfer Monolithic™ (FTM) projectiles. Traditional hollow points change geometry when they hit a soft target while the FTM series projectiles do not. This allows an engineering model to be derived using state of the art computational fluid dynamics (CFD).

How it works:

The FTM projectile has “fluted” sections of removed material from the ogive of the bullet. These flutes create large pressure changes and consequently move fluid through them. As the fluid moves from a very high pressure (stagnation) point at the front section of the flute, to very low pressure regions in the rearward and upward moving portion of the flute, the fluid is rapidly accelerated to velocities potentially higher than the muzzle velocity of the projectile. This is all verified by the CFD.

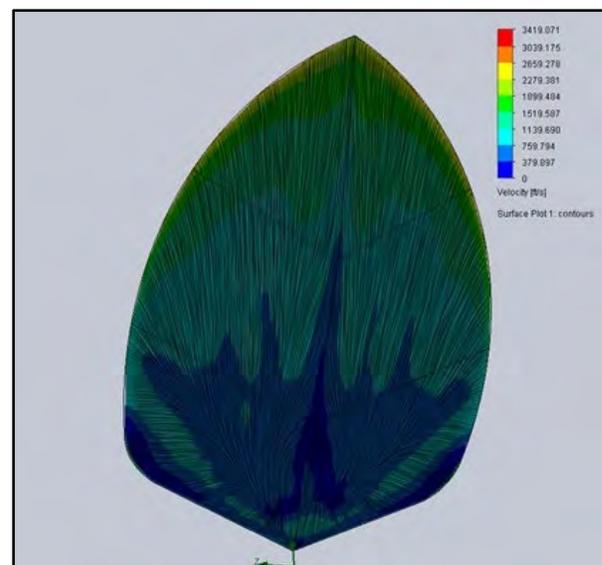


Diagram A – Flute Velocity Overview

Pressure Relations:

Diagram B shows a pressure gradient showing various pressures at different points around the projectile. Noting that pressure and velocity are inversely related, and therefore are great indicators of what we should expect from the other.

1. The pressure at “freestream” or prior to being affected by the projectile is 158 psi.
2. The pressure at the front of the projectile (stagnation) has increased 77x to 12,247 psi.
3. The pressure further up the flute is decreasing as the flute angle steepens.
4. The pressure near the rear of the flute has reduced dramatically, from 12,247 psi to 4,321 psi then to -12,395 psi (the negative pressure is cavitation or air pockets forming).
5. The pressure radially away from the projectile is still negative; therefore the velocity will be greater than the freestream at this point.

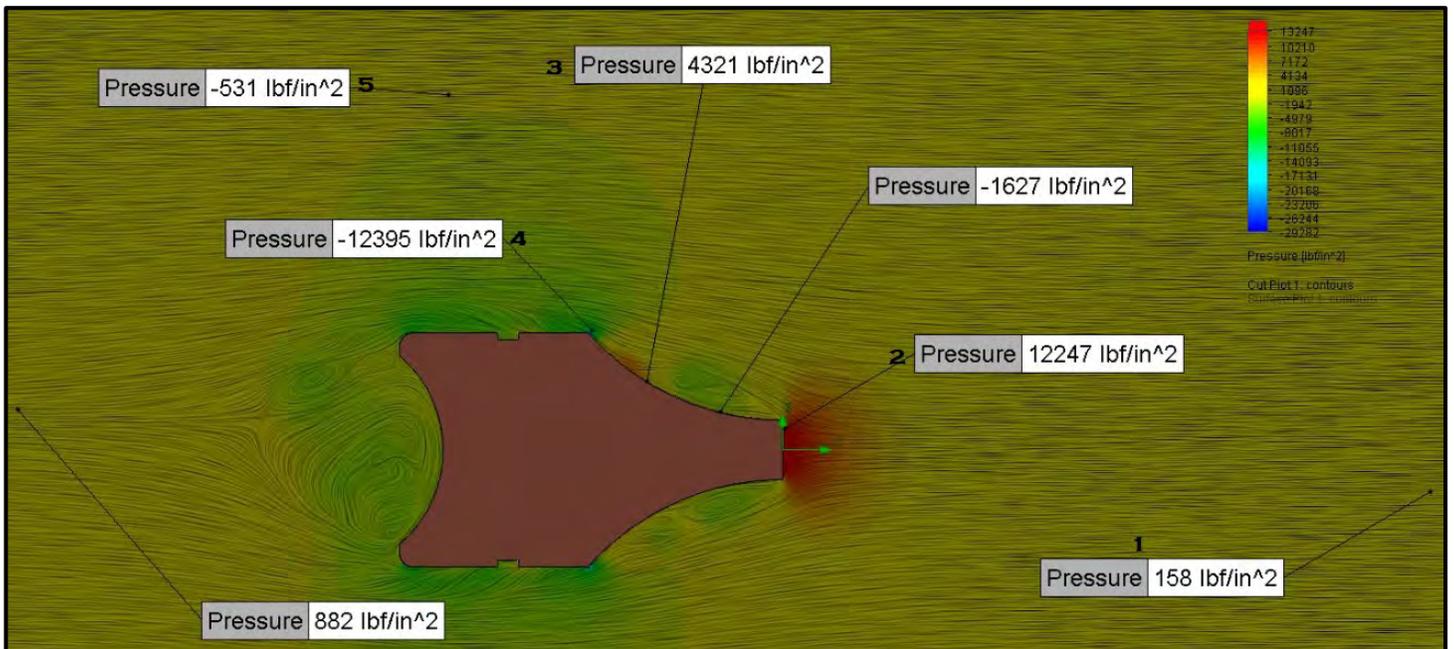


Diagram B – Pressure Gradient

Velocity Relations:

Diagram C shows a velocity gradient with various velocities at different points around the projectile. These points correlate with the above pressures and an apparent inverse relationship should easily be seen between diagrams B and C.

1. The fluid velocity at “freestream” is shown at 1,396 ft/s to verify muzzle velocity.
2. The fluid velocity slows down to 46 ft/s at the front of the projectile. The pressure is “stalling” the fluid by 97% of its original muzzle velocity of 1,400 ft/s.
3. The fluid velocity further up the flute is increasing as the flute angle steepens.
4. The fluid velocity at the end of the flute is now over 1,900 ft/s. The pressure has driven the fluid to rapidly accelerate to 4,000% of the velocity seen at the front of the projectile and 36% above freestream velocity.
 - a. This means that fluid emerging from the flute at 1,910 ft/s is acting like a water jet (blood jet), concentrating fluid and moving it away very quickly.
5. The velocity radially away from the projectile (1,498 ft/s) is still greater than the freestream velocity of 1,396 ft/s. This shows that the fluid emerging from the flutes is radially disrupting flow outside of the projectile's path of forward motion (i.e. crushed cavity).

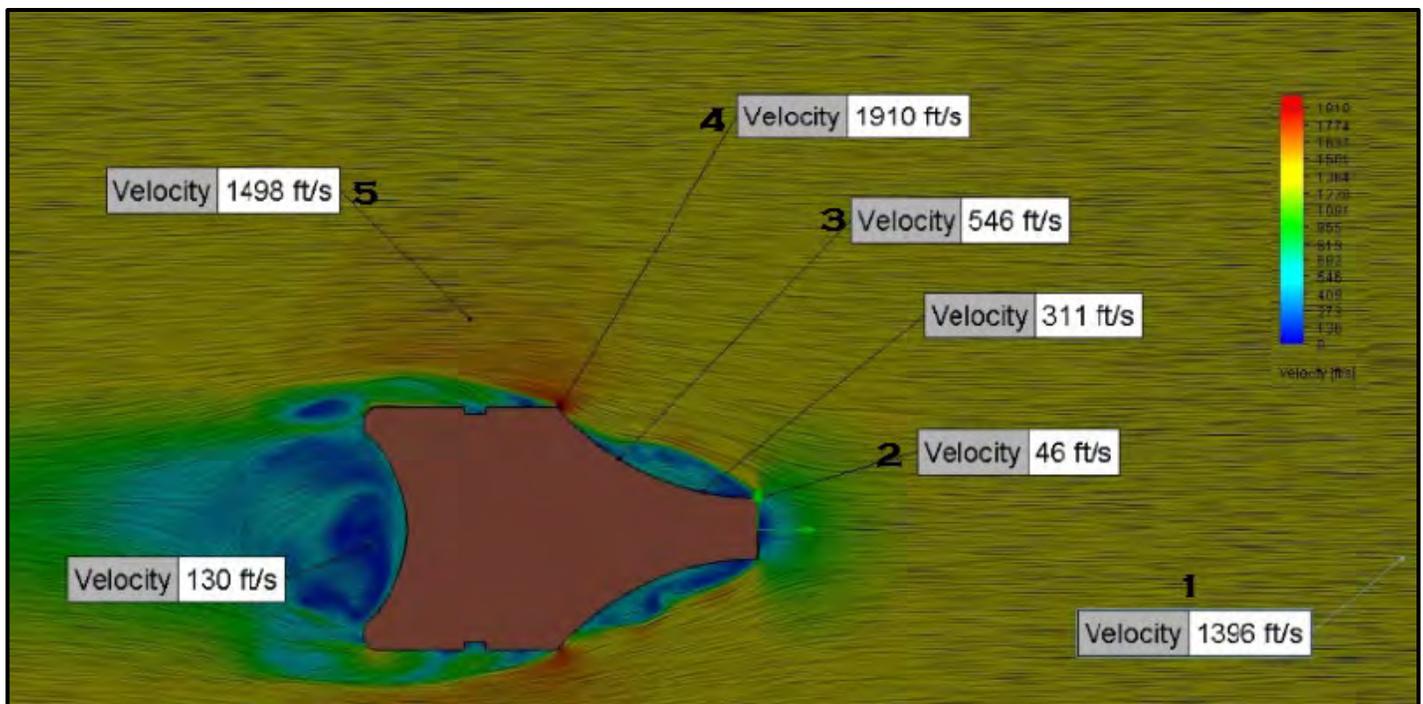


Diagram C – Velocity Gradient

Other Analysis:

Diagram D shows a close-up of what is happening at the end of the flute. A maximum fluid velocity was found to be 1,910 ft/s at 0.02" off the surface of the projectile.

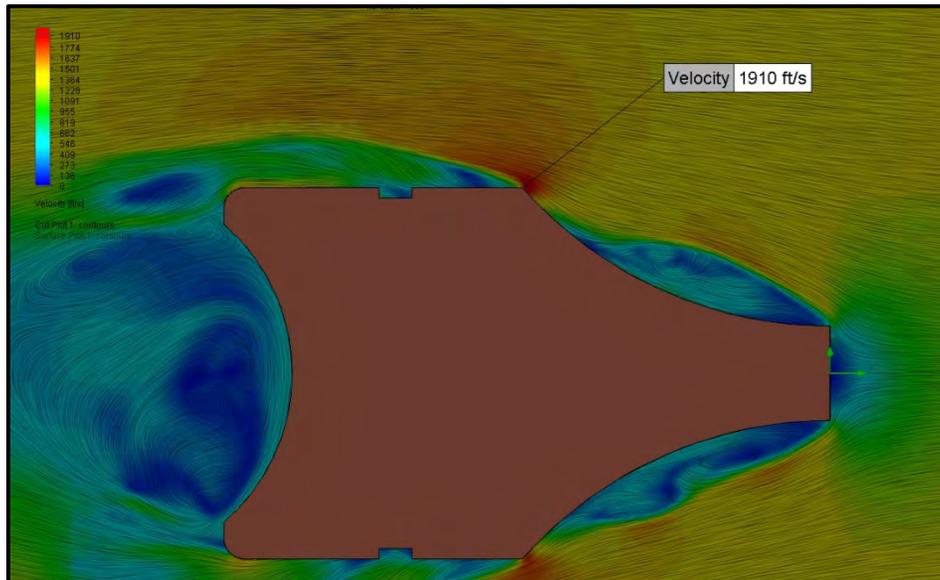


Diagram D – Flute Exit Velocity

Shown in Diagram E, the velocity does not return to freestream velocity until approx. 0.6123" radially away from the center of the projectile's central axis. Knowing that the velocity of the blood cannot change without an outside force acting on it, we can conclude that any velocity found above 1,400 ft/s is a result of the projectile disrupting the blood. Knowing that the radius is half the diameter, a 0.6123" radius is equal to a diameter of 1.225". Given this value, and knowing that the 90gr Xtreme Defense has a diameter of 0.355" and displayed as a ratio of the two, we conclude that this projectile is influencing/disrupting fluid flow in a path which is approximately 3.5 times wider than the projectile.

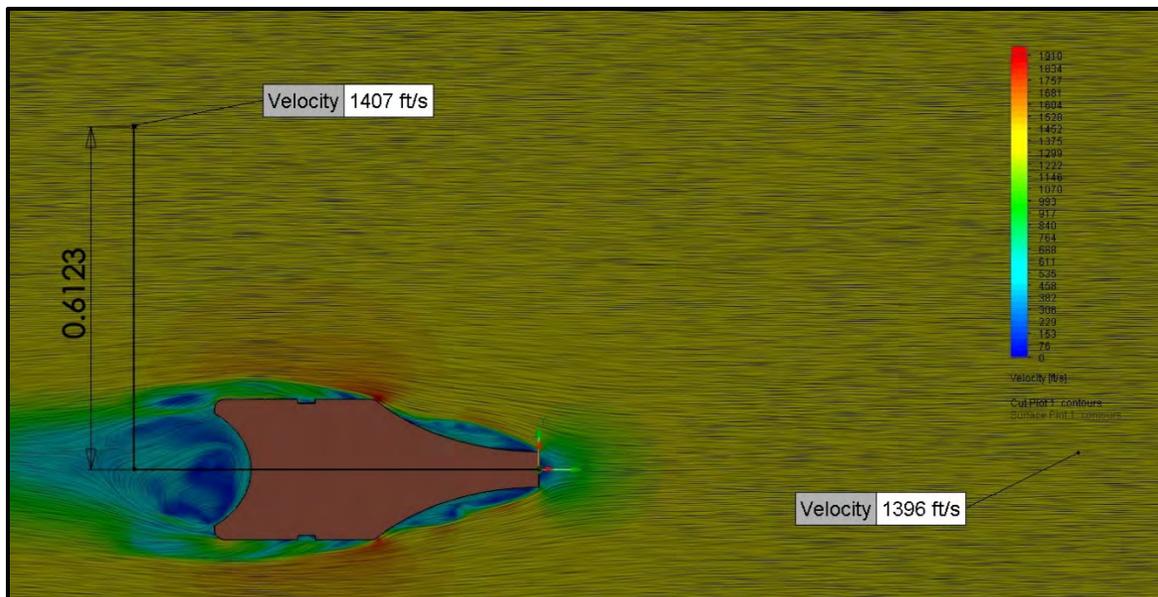


Diagram E – Velocity Shown Away from Body



90gr Xtreme Defense® - 9mm Luger **Enhanced - Fluid Transfer Monolithic® E-FTM**

The 90gr Xtreme Defense E-FTM projectile for the 9mm Luger is made with the same trusted geometry and standards of the traditional Xtreme Defense FTM projectile, but is now made using an advanced manufacturing method. The new and enhanced version has even greater strength, and will stand second to none when it comes to consistency, barrier performance, and terminal performance.



Instead of utilizing high pressure to initiate expansion like a traditional deforming hollow point, the same fluid pressure is used to direct fluid radially away from the projectile's path through the "fluted" sections. The massive pressure difference created by the flutes concentrates the fluid, as well as bone and tissue fragments and rapidly accelerates them through the fluted path and into its surroundings. This action creates violent tearing, cutting, and stretching of vital organs, tissues, and other fluid based systems. Made from solid copper, the E-FTM projectile is able to get through the hardest of barriers such as sheet metal and auto glass with minor deformation and still maintain the ability to effectively transfer energy to the target. The Xtreme Defense E-FTM design creates massive amounts of drag within soft targets and was designed from the ground up to meet the FBI's specifications for bullet performance and penetration. The 9mm, 90gr Xtreme Defense E-FTM is the optimum choice when uncompromised terminal performance is required and is utilized by military and law enforcement agencies around the world.

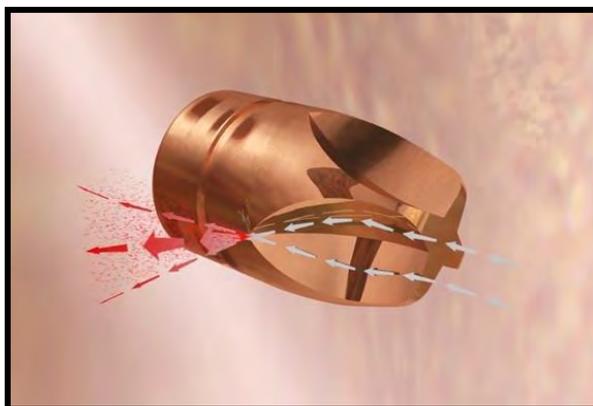
We Will Never Stop Innovating®



90gr Xtreme Defense® - 9mm Luger

Enhanced - Fluid Transfer Monolithic® E-FTM

The Xtreme Defense FTM family has “fluted” sections removed from the ogive of the projectile. These projectiles are designed with very specific geometries that allow them to perform in ways that a traditional deforming bullet cannot. The fallacy of a hollow point is that it is required to deform and change shape in order to transfer energy and be effective. In fact, it is designed



and engineered to do just that. Yet, it also must not deform when it moves through barriers or obstacles prior to hitting the intended target. So the projectile is mandated to deform under certain circumstances, but not others. This is why the non-expanding and non-deforming Xtreme Defense E-FTM projectile is revolutionizing the industry of defensive ammunition. It simply does not need to change shape in order to perform as designed.

The flutes in combination with a strategically designed meplat create large pressure changes and consequently move fluid rapidly through them. As the fluid moves from a very high pressure (stagnation) point at the front of the projectile, to very low pressure regions in the rearward and upward moving portion of the flute, the fluid is accelerated to velocities significantly higher than the muzzle velocity of the projectile. The 9mm 90gr Xtreme Defense E-FTM projectile when fired at 1450 fps from the muzzle accelerates fluid to nearly 2000 fps at the vertex of the flute. This incredibly fast moving fluid possesses the ability to cut and tear nearly anything in its path. These precision engineered Xtreme Defense E-FTM projectiles are the most consistent and barrier proven technology on the market.

We Will Never Stop Innovating®

Comes, Rachel

From: info@gfp.sd.us
Sent: Thursday, October 29, 2020 6:31 AM
To: jtlieberman@venturecomm.net
Cc: Comes, Rachel
Subject: Petition for Rule Change Form

South Dakota - Game, Fish, and Parks

Petition for Rule Change

A new form was just submitted from the <http://gfp.sd.gov/> website with the following information:

ID: 102
Petitioner Name: joshua lieberman
Address: 19156 281 ave
pierre, SD 57501
Email: jtlieberman@venturecomm.net
Phone: 605-220-4617
Rule Identification: 41:09:01:02
Describe Change: abolish the provision on any minimum release and keep provisions that refer to releasing birds prior to killing.
Reason for Change: placing monetary prerequisites on small business that is unnecessary speculation is unnecessary and limits small business entering the market.

GAME, FISH AND PARKS COMMISSION ACTION PROPOSAL

Nonmeandered Waters

Chapters 41:04:06

Commission Meeting Dates:	Proposal	Nov 4-5	Teleconference
	Public Hearing	Jan 14	Teleconference
	Finalization	Jan 14-15	Teleconference

DEPARTMENT RECOMMENDATION

- Create a new rule to establish a procedure for the public to request a navigation lane through a closed nonmeandered body of water when no other alternative legal access is available.
- An individual could petition the Commission for a rule change to establish a navigation lane in rule. This would then follow our administrative rule change process and provide for adequate public notice and allow for public comment through written comments and public testimony at the public hearing prior to finalization.
- Sample Rule:
 - ARSD 41:04:06:06 – Navigation lane petition. Upon receipt of a petition to establish a navigation lane the commission shall, at their next regularly schedule commission meeting, consider the request and either deny, grant, or modify the petition. If the commission grants or modifies a petition it shall be established by rule pursuant to SDCL 1-26 in this chapter.
 - ARSD 41:04:06:07 – Navigation lanes established. While accessing the navigation lane, the individual shall take the most direct path to the open nonmeandered body of water and shall not recreate in any manner while in the navigation lane. The department shall be responsible for marking all navigation lanes established pursuant to this section. The following navigation lanes are established for transportation purposes:

SUPPORTIVE INFORMATION

During a special legislative session in 2017, the Legislature passed the nonmeandered waters compromise. As part of the legislation, the Commission is obligated to promulgate rules to establish a process whereby a person may petition the commission to open a portion of waters or ice of a closed nonmeandered lake for the limited purposes of transportation to a portion of a nonmeandered lake that is open for recreational use.

RESIDENT/NONRESIDENT CRITERIA

Not applicable. The regulation would apply the same to residents and nonresidents.

RECRUITMENT, RETENTION, REACTIVATION (R3) CRITERIA

1. Does the regulation or fee inhibit a user's ability to participate?
 - a. No – the regulation would create an opportunity for the public to access blocked bodies of water.
2. Does the regulation increase the opportunity for new and existing users?
 - a. Yes – currently, there is no process in place to request a navigation lane through closed nonmeandered bodies of water.
3. How does the regulation impact the next generation of hunters, anglers, trappers and outdoor recreationists?
 - a. It has a positive impact by creating a fair process where both landowners and recreational users have input as to how the lanes should be created.

4. Does the regulation enhance the quality of life for current and future generations by getting families outdoors?
 - a. Creating more opportunities of access provides greater opportunities for recreating and thus helps get more families outdoors.

Division of Parks and Recreation					
October 2020 Revenue by Item					
	2019		2020		%
	Number	Dollar	Number	Dollar	
Annual	2,329	\$ 69,883	3,027	\$ 108,988	56%
2nd Annual	242	\$ 3,635	264	\$ 4,752	31%
Combo	1,866	\$ 83,975	1,738	\$ 93,826	12%
Transferable	73	\$ 4,745	71	\$ 5,662	19%
Daily License	4,210	\$ 25,258	6,629	\$ 53,031	110%
Unattended Vehicle Daily	88	\$ 880	159	\$ 2,379	170%
GSM Annual Trail Pass	1,094	\$ 16,410	997	\$ 14,955	-9%
GSM Daily Trail Pass	4,978	\$ 19,912	3,289	\$ 13,156	-34%
Motorcoach Permit	7,608	\$ 22,824	638	\$ 1,914	-92%
CSP 7 Day Pass	8,872	\$ 177,433	15,713	\$ 314,260	77%
CSP 7 Day Bike Pass	125	\$ 1,251	201	\$ 4,020	221%
Rally Bike Band	-	\$ -			
One-Day Special Event		\$ -	20	\$ 400	
PERMITS	31,485	\$ 426,206	32,745	\$ 617,343	45%
Camping Services		\$ 177,986		\$ 380,544	114%
Picnic Reservations		\$ (50)		\$ 370	
Firewood	1,581	\$ 7,903	3,353	\$ 20,116	155%
Gift Card		\$ 400		\$ 895	124%
Boat Slips		\$ -		\$ -	
LODGING	1,581	\$ 186,239	3,353	\$ 401,925	116%
TOTAL	33,066	\$ 612,445	36,098	\$ 1,019,268	66%

Division of Parks and Recreation					
October YTD 2020 Revenue by Item					
	2019		2020		%
	Number	Dollar	Number	Dollar	
Annual	49,834	\$ 1,495,027	64,487	\$ 2,321,515	55%
2nd Annual	11,235	\$ 168,527	12,399	\$ 223,190	32%
Combo	30,178	\$ 1,357,998	32,888	\$ 1,775,936	31%
Transferable	2,060	\$ 133,913	1,950	\$ 155,961	16%
Daily License	100,982	\$ 605,891	132,824	\$ 1,062,593	75%
Unattended Vehicle Daily	1,955	\$ 19,548	2,470	\$ 37,045	90%
GSM Annual Trail Pass	3,982	\$ 59,730	6,119	\$ 91,785	54%
GSM Daily Trail Pass	12,446	\$ 49,784	16,363	\$ 65,452	31%
Motorcoach Permit	22,312	\$ 66,936	6,242	\$ 18,726	-72%
CSP 7 Day Pass	168,993	\$ 3,379,856	181,700	\$ 3,633,997	8%
CSP 7 Day Bike Band	19,202	\$ 192,023	19,319	\$ 386,375	101%
Rally Bike Band	29,364	\$ 293,640	29,638	\$ 592,752	102%
One-Day Special Event		\$ 9,400		\$ 3,700	-61%
PERMITS	452,543	\$ 7,832,273	506,397	\$ 10,369,026	32%
Camping Services		\$ 8,482,174		\$ 12,451,392	47%
Picnic Reservations		\$ 12,093		\$ 9,910	-18%
Firewood	43,619	\$ 218,093	54,295	\$ 325,768	49%
Gift Card		\$ 8,018		\$ 7,883	-2%
Boat Slips				\$ 144,735	
LODGING	43,619	\$ 8,720,378	54,295	\$ 12,939,688	48%
TOTAL	496,162	\$ 16,552,651	560,692	\$ 23,308,714	41%

Division of Parks and Recreation
October YTD 2020 Camping by District

<i>LOCATION</i>	2019	2020	%	<i>LOCATION</i>	2019	2020	%
Pickereel Lake	5,668	6,030	6%	Lewis & Clark	40,517	47,975	18%
Fort Sisseton	1,234	1,339	9%	Chief White Crane	11,755	14,408	23%
Roy Lake	5,897	8,094	37%	Pierson Ranch	4,565	5,784	27%
Sica Hollow	143	424	197%	Springfield	1,162	1,502	29%
DISTRICT 1	12,942	15,887	23%	Sand Creek	137	93	-32%
Richmond Lake	1,612	1,818	13%	Tabor	12	38	
Mina Lake	2,756	3,305	20%	DISTRICT 9	58,148	69,800	20%
Fisher Grove	1,117	1,368	22%	North Point	5,150	11,078	115%
Amsden	148	273	84%	North Wheeler	592	915	55%
Lake Louise	1,941	2,437	26%	Pease Creek	1,407	1,733	23%
DISTRICT 2	7,574	9,201	21%	Randall Creek	12	5,289	43975%
Pelican Lake	5,401	6,487	20%	South Shore	368	684	86%
Sandy Shore	1,425	1,854	30%	South Scalp	23	59	157%
Lake Cochrane	1,937	2,413	25%	Whetstone	259	661	155%
Hartford Beach	5,782	7,543	30%	White Swan	147	316	115%
DISTRICT 3	14,545	18,297	26%	DISTRICT 10	7,958	20,735	161%
Oakwood Lakes	8,512	10,764	26%	Farm Island	7,090	8,174	15%
Lake Poinsett	7,231	8,979	24%	West Bend	8,507	8,953	5%
Lake Thompson	6,055	7,480	24%	DISTRICT 11	15,597	17,127	10%
DISTRICT 4	21,798	27,223	25%	Oahe Downstream	12,468	14,988	20%
Lake Herman	4,541	5,939	31%	Cow Creek	2,767	3,668	33%
Walker's Point	2,842	3,350	18%	Okobojo	1,325	2,377	79%
Lake Carthage	713	1,138	60%	Spring Creek	-	4,202	
DISTRICT 5	8,096	10,427	29%	DISTRICT 12	16,560	25,235	52%
Snake Creek	8,269	9,582	16%	West Whitlock	4,381	5,222	19%
Platte Creek	1,093	2,095	92%	East Whitlock	45	118	162%
Buryanek	1,808	2,792	54%	Swan Creek	740	1,028	39%
Burke Lake	5	72	1340%	Indian Creek	7,186	8,136	13%
DISTRICT 6	11,175	14,541	30%	Lake Hiddenwood	-	-	
Palisades	4,754	6,294	32%	Walth Bay	7	48	586%
Big Sioux	5,432	6,899	27%	West Pollock	1,230	1,545	26%
Lake Vermillion	8,760	10,770	23%	DISTRICT 13	13,589	16,097	18%
DISTRICT 7	18,946	23,963	26%	Bear Butte	1,123	1,358	21%
Newton Hills	10,717	12,146	13%	DISTRICT 14	1,123	1,358	21%
Good Earth	1	-		Shadehill	5,499	6,901	25%
Union Grove	1,531	1,773	16%	Llewellyn Johns	436	571	31%
DISTRICT 8	12,249	13,919	14%	Rocky Point	6,018	7,290	21%
				DISTRICT 15	11,953	14,762	24%
				Custer	50,750	58,306	15%
				DISTRICT 16	50,750	58,306	15%
				Angostura	18,999	21,310	12%
				Sheps Canyon	1,824	2,367	30%
				DISTRICT 17	20,823	23,677	14%
				TOTAL YTD	303,826	380,555	25%
				TOTAL for Month	10,343	20,574	99%

**Division of Parks and Recreation
October YTD 2020 Visitation by District**

<i>LOCATION</i>	2019	2020	%	<i>LOCATION</i>	2019	2020	%
Pickerel Lake	44,801	53,597	20%	Lewis & Clark	668,976	1,004,365	50%
Fort Sisseton	42,391	42,129	-1%	Chief White Crane	47,541	55,934	18%
Roy Lake	144,850	179,470	24%	Pierson Ranch	62,396	90,778	45%
Sica Hollow	13,365	22,413	68%	Springfield	104,962	156,544	49%
<i>DISTRICT 1</i>	245,407	297,609	21%	<i>DISTRICT 9</i>	883,875	1,307,621	48%
Richmond Lake	33,245	52,415	58%	North Point	70,786	106,229	50%
Mina Lake	36,831	54,683	48%	North Wheeler	12,167	15,756	29%
Fisher Grove	19,173	20,047	5%	Pease Creek	35,146	44,611	27%
Lake Louise	27,132	35,746	32%	Randall Creek	25,562	55,153	116%
<i>DISTRICT 2</i>	116,381	162,891	40%	Fort Randall Marina	15,864	20,255	28%
Pelican Lake	51,066	72,893	43%	<i>DISTRICT 10</i>	159,525	242,004	52%
Sandy Shore	21,801	36,442	67%	Farm Island	129,033	154,462	20%
Lake Cochrane	17,547	31,155	78%	West Bend	39,931	45,797	15%
Hartford Beach	110,860	141,523	28%	LaFramboise Island	62,302	79,495	28%
<i>DISTRICT 3</i>	201,274	282,013	40%	<i>DISTRICT 11</i>	231,266	279,754	21%
Oakwood Lakes	62,169	101,958	64%	Oahe Downstream	276,419	355,870	29%
Lake Poinsett	57,569	71,431	24%	Cow Creek	186,923	218,733	17%
Lake Thompson	37,355	55,022	47%	Okobojo	39,361	68,563	74%
<i>DISTRICT 4</i>	157,093	228,411	45%	Spring Creek	190,994	264,977	39%
Lake Herman	77,140	125,342	62%	<i>DISTRICT 12</i>	693,697	908,143	31%
Walker's Point	38,045	55,854	47%	West Whitlock	43,163	46,488	8%
<i>DISTRICT 5</i>	115,185	181,196	57%	Swan Creek	25,519	20,587	-19%
Snake Creek	112,384	155,796	39%	Indian Creek	61,399	73,912	20%
Platte Creek	112,805	170,091	51%	Lake Hiddenwood	-	-	
Buryanek	18,401	35,047	90%	Revheim Bay	39,447	52,968	34%
Burke Lake	15,064	16,745	11%	West Pollock	61,748	69,296	12%
<i>DISTRICT 6</i>	258,654	377,679	46%	<i>DISTRICT 13</i>	231,276	263,251	14%
Palisades	81,955	140,851	72%	Bear Butte	17,090	18,121	6%
Big Sioux	43,080	65,570	52%	<i>DISTRICT 14</i>	17,090	18,121	6%
Beaver Creek	16,162	23,612	46%	Shadehill	37,771	42,239	12%
Lake Vermillion	90,617	151,514	67%	Llewellyn Johns	3,784	5,101	35%
<i>DISTRICT 7</i>	231,814	381,547	65%	Little Moreau	17,190	13,258	-23%
Newton Hills	117,148	199,948	71%	Rocky Point	74,205	99,177	34%
Good Earth	54,473	68,572	26%	<i>DISTRICT 15</i>	132,950	159,775	20%
Union Grove	15,065	23,737	58%	Custer	1,811,990	2,014,520	11%
Lake Alvin	30,612	79,557	160%	<i>DISTRICT 16</i>	1,811,990	2,014,520	11%
Spirit Mound	19,091	27,014	42%	Angostura	171,184	213,662	25%
Adams	20,821	27,857	34%	Sheps Canyon	36,749	48,948	33%
<i>DISTRICT 8</i>	257,210	426,685	66%	<i>DISTRICT 17</i>	207,933	262,610	26%
				<i>TOTAL YTD</i>	5,952,619	7,793,830	31%
				<i>TOTAL for Month</i>	351,365	528,940	51%

Black Hills Elk Depredation Plan

As a result of concern from landowners and producers regarding elk damage to private property and a meeting held on January 7, 2020 with Game, Fish and Parks (GFP), GFP has developed the following management actions to help address these concerns.

1. GFP will recommend to the GFP Commission the issuance of additional antlerless elk licenses in areas where there is substantial damage to private property and concentrations of elk. Status: A total of 135 additional licenses were offered in units 3, 4, 7 and 9 starting with the 2020 elk season.
2. Increased food plot contract maximum payments, from \$6,000 to \$8,000.
3. Increased hayland contract maximum payments, from \$3,000 to \$4,000, and adjusted the percentage of eligible acres enrolled from 30% to 50% of the total field size and increased the rental rate incentive from \$10 to \$20 per acre.
4. Increased the elk stackyard program maximum limit from \$10,000 to \$15,000, annually.
5. Increased the elk fencing program maximum limit from \$10,000 to \$15,000, annually.
6. Create the development of a new program (Supplemental Hay Program), where in extreme situations GFP will consider providing hay to landowners/producers. Status: GFP is currently finalizing the details of this program and working with landowners to implement in some areas.
7. GFP will recommend to the GFP Commission a landowner-own-land (LOL) elk license in elk units with a “decrease” population objective and a longer season length (August 1 to March 31). Status: Discussion continues on this effort and GFP will solicit input from the elk management plan stakeholder group on September 23, 2020.
8. Increase the utilization of elk depredation hunts outside traditional hunting seasons with an emphasis in August in certain areas. Status: A depredation hunt was held July 15 – August 31 in unit 3. It is anticipated that a few more depredation hunts will be held after the regular season.
9. In extreme situations allow landowners to utilize the kill permit to kill elk on private property.
10. Work with GFP communications section to help make more of the public aware of GFP elk depredation programs.

In addition to these changes, GFP will continue to discuss new ways to provide the GFP’s services and programs to South Dakota landowners and producers. GFP will also be reviewing and updating the 2015

Elk Management Plan over the next several months (please see plan revision timeline below). This process will include the engagement of a stakeholder group to help guide GFP on elk management into the future.

Revised Elk Management Plan Revision Timeline

Activity	Scheduled
Pending weather and survey conditions, conduct Black Hills elk aerial survey to provide an updated population estimate	Completed
Finalize and begin administering public opinion survey	August of 2020
Staff begin updating supportive information document that provides background for objectives and strategies of revised management plan	April of 2020
Preliminary results from public opinion survey shared with Department planning team and elk stakeholder group	November of 2020
Hold first elk stakeholder group meeting	Completed
Department staff planning team meeting	August of 2020
Planning team work on management plan revision and finalize supportive information document	August-December of 2020
Final report of public opinion survey made available to public	January of 2021
Make revised plan available to Department staff for review and comment	March of 2021
Present revised management plan to Commission and make available for public comment	May 2021 GFP Commission Meeting
Plan available for a 60-day public comment period	May-June of 2021
Share public comments and hold final elk stakeholder group meeting	July of 2021
Present bulleted list of edits/changes and seek formal adoption of GFP Commission	September 2021 GFP Commission Meeting

*Additional stakeholder group meetings conducted as determined necessary.

Prairie Unit 11 Elk Reduction Plan

Following a meeting on June 17, 2020 with Department staff, landowners and legislators, GFP identified a need to remove additional antlerless elk in order to further address a growing elk population in Bennett County and surrounding areas. The following is a plan to remove 150 elk from prairie unit 11 by March 31, 2021.

License totals and season dates were increased and extended for the 2020 season. A total of 140 elk licenses were issued, 108 of which were antlerless elk licenses. GFP has contracted with a local resident of Bennett Co. to facilitate access, help place hunters on properties where elk are at varying times, as well as assist with elk removal after harvest. The prairie unit 11 elk season will run from July 15-Feb 28 and during this time, the contractor will likely have times when he is unavailable. During those times, GFP staff will assist hunters in locating elk, pairing hunters with willing landowners to ensure hunters have access to elk on private land and making arrangements to assist with retrieving harvested elk. GFP will contact all landowners who attended the meeting on June 17th as well as others to secure access and develop plans to harvest elk on private property. Because of the increase in licenses, the extension of the season dates and the increased focus on securing access to the properties where elk currently reside, GFP expects to see 90 elk harvested by licensed hunters by February 28th, 2021.

GFP staff and GFP contractors will more liberally utilize the standing kill permit to strategically remove elk during the hunting season without disturbing elk unnecessarily in order to not lower success of subsequent hunters. Beginning as soon as August 1st, GFP staff will utilize any and all methods to remove cow elk from locations where they are concentrated. The purpose of utilizing the kill permit throughout the year will be to distribute pressure to ensure elk are not immediately chased to properties where they are inaccessible and to also alleviate the issue of having a large number of elk to remove in a short time frame following the close of the season. All efforts will be made to ensure utilization of the kill permit only occurs during antlerless seasons when the majority of hunters have either filled or are done hunting. The goal will be to remove 20 antlerless elk using the kill permit process.

GFP will also utilize a large-scale kill permit hunt to harvest antlerless elk beginning as soon as January 15th or whenever the majority of the antlerless hunters for the Jan-Feb season have completed their hunt. GFP will issue kill permits to landowners and randomly selected hunters to remove additional antlerless elk. Because of the kill permit structure, the boundaries for this effort do not need to follow the unit boundaries for the normal PRE-11 elk unit. As such, GFP will include portions of western Todd county in this removal effort to focus pressure on elk that may not always be available for harvest in Bennett County. Again, because of the structure of the kill permit process, landowners themselves will be authorized to harvest a limited number of antlerless elk on kill permit tags. GFP will seek to sign up all willing landowners' land to be open for the kill permit hunt. GFP will be assisting hunters in locating, harvesting and retrieving harvested elk. By utilizing this process for this length of time, GFP expects to be able to remove 40 additional antlerless elk through the large-scale kill permit process from January 15 – March 31st.

This elk reduction plan is in place to harvest 150 elk by March 31st, 2020 through a combination of the hunting season, kill permits during the season and the large-scale late season kill permit hunt.

Elk harvested by licensed hunters and landowners will become the property of the licensee and the responsibility for care will fall to them. Elk killed by GFP staff under the kill permit will be donated to the Oglala Lakota Tribe, Rosebud Sioux Tribe or Feeding South Dakota through Sportsmen Against Hunger.