The Mississippi Legislature in an August special session pumped hundreds of millions of dollars over the next 10 years into road and bridge repairs on the city, county and state road systems.

Lawmakers, in session from Aug. 23-29, also settled on how to divide the $700 million the state will receive from BP oil spill settlement. The agreement is 75 percent will be spent on the Coast and 25 percent in the rest of the state.

Gov. Phil Bryant called lawmakers into special session to consider a road and bridge funding bill and a bill creating a state lottery. When the House and Senate sent those two bills to the governor’s desk, he added the BP settlement to the agenda.

The Mississippi Poultry Association has been working with legislators since 2012 to provide some new source of revenue to cities, counties and the Miss. Department of Transportation to keep up with maintenance of roads, highways and bridges. Rising construction costs have meant the 1987 gas taxes were not providing enough to maintain the transportation system.

MPA commends Gov. Bryant, Lt. Gov. Tate Reeves, House Speaker Phillip Gunn and the Legislature for finding solutions to keep bridges open and roads maintained. Mississippi’s poultry industry has about 3,000 trucks per day travelling Mississippi roads.

Two recent U.S. Supreme Court decisions earlier in the summer cleared the way for the Legislature to tap two new sources of revenue without raising taxes. The Supreme Court ruled states can tax internet sales and
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EMERGING TRENDS
A Newsletter of the Mississippi Poultry Association

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that states could allow and tax sports betting. The use tax of 7 percent is a sales tax on out of state purchases, now collected on internet purchases.

Creating a lottery and dividing the BP oil spill settlement had long been contentious issues in the halls of the Capitol. The bill to create the lottery died once in the House before it finally passed 58-54. Gulf Coast business leaders wanted 100 percent of the oil spill settlement spent on the Coast.

Here is a summary of the funds that will flow into infrastructure repairs all over the state.

• **Lottery** – up to $80 million annually through 2028. If there is more than $80 million, the extra goes to education and after 2028, all lottery proceeds go to education.

• **Use Tax Diversion** – 35% of the use tax annually to cities and counties. Estimated to be $118.23 million annually at FY2018 collection levels. This will phase in over four years to reach 35%.

• **Sports Betting taxes** - $5 million to $15 million annually to the Mississippi Department of Transportation (MDOT) for state highways and bridges.

• **Annual fees on hybrid ($75) and electric ($150) vehicles** distributed the same way as current gas and diesel tax revenue. Mississippi doesn’t have many of these vehicles yet, but the number is expected to grow.

• **Bonds** - $300 million one-time (to be repaid with gaming tax revenue). The money is divided $250 million to an Emergency Road and Bridge Repair fund administered by MDOT for cities, counties and state systems. MPA has a seat on a board to advise MDOT on needed repairs. $50 million to cities and counties for projects set by the Legislature.

• **Groundwater Protection Fund Diversion** – Currently .04 cents of the gas tax goes into a fund to repair leaking underground storage tanks. The tax rolls off when the groundwater fund reaches $10 million and back on when it drops to $6 million. Now the fee will be collected continuously and go to MDOT when the groundwater protection fund reaches $10 million.

• $61 million to cities and counties statewide from the BP oil spill funds in 2018 for city and county projects named by the Legislature.

---

**Got a Deficient Bridge or Crumbling Road? Let MPA Know**

MPA will have a seat on the board advising the Miss. Transportation Commission on how to spend the $250 million in the Emergency Road and Bridge Repair Fund. If, as an MPA member, you have specific transportation issues that impact your farm or plant, please call the MPA office at 601-932-7560 or email leggett@mspoultry.org.
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REFERENCES
1 Data on file.
2 Data on file.

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Environmental Law Group

Brunini’s environmental team is “one of the premier practices in the state” and represents major manufacturers and private industry clients.

Brunini has considerable expertise in environmental litigation, regulatory permitting and compliance issues as well as due diligence and transactional matters. John Milner was noted by Chambers USA as being “instrumental in developing Brunini’s environmental practice” into the leadership position it holds today.

John Milner serves as counsel to the Mississippi Poultry Association and has special expertise in poultry-related environmental issues. Partner Gene Wasson also has impressive abilities in the environmental sector.

As a poultry grower, you have a general permit from the Miss. Department of Environmental Quality (MDEQ) that covers your farm. The largest part of the permit is the comprehensive nutrient management plan (CNMP) from USDA Natural Resource Conservation Service (NRCS) which you must obtain before filing for a certificate of coverage under the general permit.

The current MDEQ permit will expire on January 31, 2019. Every current permit holder will be required to file for coverage under the new permit once it takes effect. MDEQ will be writing a new permit this summer and fall to take effect when the current one expires.

The permit is good for five years and the CNMP lasts five years, but they often do not expire on the same date. You must keep the CNMP current to keep the permit active and be in compliance. The NRCS is expecting a large number of growers to come to the NRCS offices this year and into 2019 to get new plans written.

If your plan is currently expired or is set to expire in 2018 or 2019, you must go to the local NRCS office and give them the information needed to get an updated CNMP. Once the general permit is reissued, MDEQ will send out a forms package that will contain the Notice of Intent (NOI) for re-coverage. Once you submit the NOI for re-coverage and your plan is up to date, the MDEQ staff can issue the certificate of coverage under the new permit.

Please continue with the recordkeeping requirements. A grower is subject to inspection by DEQ. Mainly the inspection is a recordkeeping review. If there is a complaint, DEQ is obligated to come check the farm.

But for now, check the dates on your nutrient management plan and contact your local NRCS office to begin the process to get a current plan.
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A LOT IS HAPPENING ON EPA'S LONG AND WINDING WOTUS ROAD

John E. Milner - Brunini, Grantham, Grower & Hewes, PLLC

There have been several important developments relating to the U.S. EPA and, more particularly, the Waters of the United State (WOTUS) definition under the federal Clean Water Act, since we addressed WOTUS in the fall of 2017. First, responding to increasing Congressional, political and media pressure, President Trump asked for and received EPA Administrator Scott Pruitt's resignation on July 5, 2018 over concern about Pruitt's numerous spending and ethics issues. The President quickly appointed Deputy Administrator Andrew Wheeler as Acting Administrator on July 9, 2018.

Acting Administrator Wheeler has announced his commitment to continue the Trump Administration agenda for EPA regulatory rollbacks:

[T]he agenda for the agency was set out by President Trump. And Administrator Pruitt has been working to implement that. I will try to work to implement the president’s agenda as well. I don’t think the overall agenda is going to change that much, because we’re implementing what the president has laid out for the agency. He made several campaign promises that we are working to fulfill here. But there will probably be a little bit of difference in the way Administrator Pruitt and I talk about some issues. There have already been some differences in how I’ve talked to EPA employees since I’ve been here....

I really think we need to provide more certainty to the American public. And I look at certainty in three different areas. The first is certainty on permits. The second is certainty on enforcement actions. And the third - the one that’s most important to me - is certainty on risk communication.

Wheeler is pledging more transparency regarding agency activities than Pruitt and he is pushing back against criticism concerning his prior job of lobbying for a major coal producer. Wheeler “is expected to take a more methodological approach to setting policy in part to improve the agency’s chances of defending its work in court.”

As a refresher concerning the WOTUS issue, in 2015, the Obama EPA sought to define “waters of the United States” (WOTUS) for purposes of determining the jurisdictional scope of the Clean Water Act (CWA). The final rulemaking by EPA, joined by the U.S. Army Corps of Engineers, sought to “clarify” WOTUS and the extent of CWA jurisdictional authority for water discharge permits and remediation (WOTUS Rule). The WOTUS Rule was challenged in a number of federal district courts and courts of appeal.

On January 18, 2018, the United States Supreme Court determined that federal district courts, rather than courts of appeal, have original jurisdiction for WOTUS Rule challenges in National Association of Manufacturers v. Department of Defense. The next round of litigation regarding WOTUS is already underway and is focusing on district court challenges to two rules issued by the Trump administration EPA rather than on challenges to the 2015 WOTUS Rule:

(1) a rule intended to replace the 2015 WOTUS Rule, “Definition of ‘Waters of the United States’—Recodification of Pre-Existing Rules,” 82 Fed. Reg. 34,899 (July 27, 2017) (the “Replacement Rule”); and

(2) a rule intended to delay the WOTUS Rule “so that it will not go into effect before February 2020,” “Definition of ‘Waters of the United States’—Addition of an Applicability Date to 2015 [WOTUS] Rule,” 80 Fed. Reg. 5200 (Feb. 6, 2018) (the “Delay Rule”).

The Replacement Rule would set a new and narrower definition of WOTUS for purposes of CWA jurisdiction while the Delay Rule seeks to ensure that, upon the issuance of the Sixth Circuit’s mandate, the 2015 WOTUS Rule never has a realistic chance of going into effect. Parties have already begun to challenge or defend the Replacement and Delay Rules and seek to have the existing district court suits, previously stayed pending the U.S. Supreme Court’s jurisdictional decision, proceed to decision.

The new proposed Replacement Rule was sent by EPA and the Corps of Engineers to the White House Office of Management and Budget (OMB) on June 15, 2018. This Replacement Rule is expected to apply the late Justice Scalia’s relatively narrow test for CWA jurisdiction, which limits the law’s reach only to “relatively permanent” waters and requires a “continuous surface connection” with navigable waters in order for a tributary, wetland or other upstream water in order to qualify for CWA applicability. OMB review is generally slated for 90 days (which would end on September 13, 2018) but that date is non-binding and can take more or less time depending on the type of rule.
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Commissioner of Agriculture and Commerce Andy Gipson announced the Mississippi Department of Agriculture and Commerce's new state branding program, Genuine MS, to the public recently at the Mississippi Agriculture and Forestry Museum. Gipson kicked off the Genuine MS launch by showing a short video that explained the program through the eyes of the four inaugural Genuine MS companies — Two Brooks Farm of Sumner, Simmons Farm Raised Catfish of Yazoo City, Flathau’s Fine Foods of Petal, and Short Line Manufacturing of Shaw. He then reiterated their sentiments and delved further into the program’s purpose.

“We are extremely excited to share Genuine MS with the world,” Gipson said. “This state-wide initiative creates a brand for Mississippi products and connects consumers across the globe with our products. Genuine MS serves as an economic development tool to promote the products grown, raised, crafted and made right here in Mississippi.”

Genuine MS was developed by the Mississippi Department of Agriculture and Commerce to identify and promote products proudly created or produced by Mississippi farmers, artisans, entrepreneurs and manufacturers. The purpose of the Genuine MS program is to increase public awareness of Mississippi’s farm, food, crafted and fabricated products by branding them as Genuine MS.

The website, GenuineMS.com, serves as a centralized location featuring members' products, while connecting consumers across the globe with the people and places that grow, raise, craft and make Genuine MS products. The program allows member companies to share their unique stories in an effort to increase consumer awareness of their products. Genuine MS shows Mississippi state pride and keeps the economy strong.

There are four classifications of membership determined by the members' products in the Genuine MS program — Grown, Raised, Crafted and Made. The Genuine MS Grown classification consists of farmers who grow everything from produce, nuts and row crops to horticulture and timber in Mississippi. The Genuine MS Raised classification consists of farmers, ranchers and aquaculturists with animals and aquaculture...
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products raised in Mississippi or those selling products from animals and aquaculture products raised in Mississippi. The Genuine MS Crafted classification consists of crafters whose products are hand-created in Mississippi from agricultural products, which includes specialty foods and beverages and pet and artisan products. The Genuine MS Made classification consists of manufacturers whose products are 51% or more manufactured in Mississippi to benefit agriculture.

Genuine MS also offers an associate membership status for those who support agriculture. The Associate Member classification consists of retailers who sell Genuine MS products, restaurants who serve dishes that incorporate Mississippi agricultural products, farmers markets with local Mississippi farmers, agritourism operations that offer a genuine experience and organizations and associations that support Mississippi agriculture.

“The Mississippi Department of Agriculture and Commerce created Genuine MS in an effort to tell the stories of hardworking, creative Mississippians and their products,” Gipson said. “We want consumers, not only across Mississippi but around the globe, to know what Mississippi has to offer.”

Genuine MS member companies have the ability to brand themselves as Genuine MS by using the logo as a stamp of authenticity on their products, packaging and promotional materials. Members have a profile on the GenuineMS.com website that contains information about their Genuine MS products, the stories behind them, photos, contact information, links to their direct websites and social media accounts, and a listing of places to purchase. Members have password-protected access to their profile allowing them to update their profiles as often as they like.

“By supporting Genuine MS, you are supporting your neighbors and communities,” Gipson said. “Our local farms and businesses not only provide great products, they provide their communities with jobs and economic development opportunities. I am proud to be Genuine MS. Are you?”

If you are interested in joining Genuine MS, visit GenuineMS.com and submit the online application for either a Genuine Member or Associate Member. Members pay an annual membership fee of $75, which is used to promote the program.

For more information, visit GenuineMS.com or contact the Mississippi Department of Agriculture and Commerce’s Market Development Division at (601) 359-1159 or Info@GenuineMS.com. Follow Genuine MS on Facebook and Instagram at @GenuineMississippi or on Twitter at @GenMississippi.
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As we choose two U.S. Senators and four Congressmen, Mississippi voters will be electing Supreme Court Justices and judges for the Court of Appeals, Circuit Courts and Chancery Courts on Nov. 6, and if a runoff is required, on Nov. 27.

In the only state Supreme Court seat up for election, Justice David Ishee of Gulfport is unopposed in the Southern District.

There are four Court of Appeals Districts up for election in 2018 with one justice unopposed and three open seats. Judge Donna Barnes is unopposed in the 1st District in Northeast Mississippi.

In the 2nd District, in the Delta, Judge Tyree Irving's retirement has drawn three candidates: Eric Hawkins, a Washington County prosecutor, Ceola James, a former Court of Appeals Judge from Vicksburg and Deborah McDonald a family law attorney from Natchez.

In the 4th District open seat in Jackson and Southwest Mississippi, the Mississippi Poultry Association Political Committee is supporting Jeff Weill, Sr. of Jackson. Judge Weill retired from the Hinds County Circuit Court to run for the Court of Appeals. If elected, he will be the only judge on the 10 person Court of Appeals with trial court experience. Weill faces two Jackson lawyers after two other dropped out.

In the 5th District in Southeast Mississippi, judges are unopposed. Sean Tindell of Gulfport, a former state Senator whom Gov. Bryant appointed in October 2017, is unopposed for Position 2, for Position 1, the retirement of Judge Eugene Fair has Anthony Lawrence III, the Jackson County district attorney.

All circuit and chancery judges are up for election this year. All judges, except justice court judges, run in non-partisan elections. The elections will be November 6 when U.S. Senators and Congressmen are being elected.

If there is a runoff in any of the non-partisan judicial elections, the runoff will be November 27. The only other runoff that day will be for the U.S. Senate seat currently held by U.S. Sen. Cindy Hyde-Smith. A list of candidates for U.S. Senate and House of Representatives is on the MPA website - www.mspoultry.org.

**2018 Mississippi Judicial Elections.**

- 146 judicial positions available.
- 36 incumbents chose to retire or not seek reelection - 25%
- 95 positions not contested - 65%
- 51 positions are contested, by 136 candidates - 35%
- 15 incumbent judges were challenged - 10%

Source: Tweet by Appeals Court Judge Kenny Griffis.
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The 2018 annual Mississippi Poultry Association Breeder Hatchery Seminars in Peal and Collins provided members with the latest research and technology to members working in hatcheries and on breeder farms.

Sponsors who provided experts as speakers and covered meals, breaks and meeting space rental for the events at the MSU Lab and the Collins Civic Center were: Aviagen, Big Dutchman, Ceva, Chickmaster, Cobb-Vantress, Hubbard LLC, Jamesway and MWI Animal Health.

MPA appreciates these sponsors sharing their expertise with members and with Dr. Tom Tabler of the MSU Poultry Science Department for arranging the speakers for the agenda.

Jiggs Kilgore with Hubbard spoke about hatchery breakout and the importance of good data in determining the exact time of embryo mortality, especially differentiating infertility vs. early dead. He said accurate data is key to solving problems in order to solve them. He said the breakout person may be the most important person in the hatchery.

Dr. Leonard Fussell with Cobb-Vantress, speaking about early management for replacement pullets, said that the basics - Feed, Light, Air, Water and Stress - are more important today than they have ever been when dealing with day old chicks that today are more costly to raise. He noted that pullets may be under more stress than broilers.

Nikki Jeffcoat with the Mississippi Board of Animal Health reported on the 93 cases of Virulent Newcastle Disease in California. She said the outbreak, which was imported from Mexico, had been confined to two counties in California backyard flocks. Jeffcoat reminded the audience that growers are required to have a catastrophic mortality burial location chosen on their farms. The location must be approved by the USDA Natural Resource Conservation Service and the site location and approval sent to the state Department of Animal Health. Currently, she said, the board’s records show only half of the farms in the state have completed the process.

Dr. Keith Bramwell with Jamesway spoke about mating efficiency. He said weight does not equal dominance and that heavier birds show less libido. He stressed the need to maintain 130% weight difference between hens and rooster for optimal mating behavior.

Nate Collett with Hubbard spoke about controlling pullet nervousness. He said that supplemental water lids on the 1st day are important. He showed data on a comparison of a 4/3 feeding schedule and a skip-day schedule. He said birds would be most nervous on the skip-day and that outside noises such as mowers or feed delivery on those days would add to the nervousness. He recommended easing flocks from full feed to limited feed over several weeks instead of abrupt changes, never getting to feeding every other day if avoidable. He said preventing pecking behavior required consistent light intensity, uniform temperature throughout the house, as well as stocking density.

Jake Anderson with MWI Animal Health focused on hatchery sanitation. He said that sanitation is critical to the success of hatchery operations and that fogging in the hatchery is not a substitute for cleaning and disinfection. He said that no chemical is a substitute for thorough cleaning. Sanitation efforts should focus on 80 percent removing dirt and 20 percent disinfection.

Leasea Butler with Cobb spoke on nutritional requirements for proper female feathering from day old to end of lay. She talked about the amino acids and other nutrients such as folic acid, zinc, B-12 and niacin, required for feathering. After losing down, the hens go through four generations of feathers over 30 weeks. She explained the effect of stress on hormones chickens’ produce in feathering. Stressors can include, temperature, bacteria, water, transition in feeding programs, vaccination, introduction to the other sex, egg production and mating.

David Freeman with Big Dutchman talked about colony nests. He said customers are driving the change to colony housing. He also talked about new watering and feeding equipment.

Carolina Diaz with Chickmaster emphasized the importance of good and uniform ventilation during incubation for removing water, heat and CO2, and ensuring that there is enough oxygen for good embryo development. The difference in single stage and multi-stage machines was utilized as a tool to demonstrate temperatures required to meet embryo needs. Flock age and egg size are important considerations in ventilation needed in the hatchery machines.

Darren Rakestraw with Aviagen indicated that breeder technicians should follow weight guidelines published by primary breeders. Technicians should weekly weigh a representative sample with an accurate digital scale to check for positive weight gain each week and fleshing by age. He urged technicians to keep a close eye on feed stealing. Activity levels and comb and face color are good indicators of underfeeding.
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Two MSU Graduate Students Split International Paper Scholarship

Two Mississippi State University graduate students working with poultry professors on research to benefit the poultry industry received the 2018 International Paper Scholarship. Saman Fatemi and Tomi Obe will split $5,000 donated to the Mississippi Poultry Foundation by International Paper.

This is the fifth year that International Paper has funded the scholarship through the Mississippi Poultry Foundation and the third year that the award has been based on research priorities of the Mississippi Board of Directors.

"International Paper is pleased to partner with our poultry company customers to reward promising young researchers searching for solutions to obstacles to the growth and prosperity of the industry. We believe the IP scholarship supporting these bright students at Mississippi State University will benefit the poultry industry," said Clay D. Adkins, IP National Account Manager-Protein.

Recipients must be a full-time graduate student enrolled in Poultry Science or related field at Mississippi State University, have demonstrated leadership abilities, and have a Grade Point Average of 3.0 on a 4.0 scale.

Saman Fatemi is a poultry science doctoral student at Mississippi State University working with Dr. David Peebles. He received his master’s degree in Poultry Science from the University of Alberta, in Canada. His particular area of research is Embryo Physiology.

Saman’s research focused on determining effects of the in ovo administration of vitamin D3 on broiler performance using broiler hatching eggs for four different treatments. Some of the birds were fed a lower calcium diet. During his research, it was observed that birds fed lower calcium performed worse and meat yield was less. The in ovo injection of Vitamin D3 sources increased meat yield at 14 and 40 days of age without impacting meat quality. However, the increase in meat yield may be realized in association with improvements in bird health through calcium absorption.

Tomi Obe is a Poultry Science doctoral student at Mississippi State University working with Dr. Aaron Kiess. She received her undergraduate and master’s degree from MSU. Her research focused on the persistence of Salmonella on poultry processing equipment.

Her research evaluated the persistence of Salmonella on poultry processing equipment following cleaning and sanitation. Nineteen locations within a processing plant were sampled: 171 samples over three visits. Her research aimed to validate cleaning procedures and identify the reasons Salmonella may persist in a plant. Her research showed that Salmonella prevalence was significantly higher after processing and there were location differences within the plant. Data suggests that salmonella is able to adapt to the quaternary ammonium compounds used for cleaning.

The MPA Board of Directors reviewed abstracts of the research projects and selected two that were judged to have the most promise for solving industry problems.
The 5090EL is now at MS Ag!

The 5090EL features a low stance and is built on the rugged John Deere 5E 4-cylinder tractor platform. With an overall height of only 69 inches and 90 engine horsepower, it fits easily through small doors like those found in poultry houses or horse barns and has plenty of power to pull a variety of implements.

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BANKPLUS SCHOLARSHIP WINNER

Mississippi State graduate student researching ways to improve poultry litter quality received the 2018 BankPlus Travel Grant to attend the Poultry Science Association convention in July to present research. Abdul Alqtani received $1,000 donated to the Mississippi Poultry Foundation by BankPlus.

The BankPlus - Mississippi Poultry Foundation scholarship is given to a graduate or undergraduate student with a 3.25 Grade Point Average based on research activities. BankPlus is one of the state’s major lenders for poultry farms.

“BankPlus makes loans to poultry growers all over Mississippi and we are glad to help further this research that could make growers more productive,” said BankPlus Senior Vice President & Commercial Lending Team Leader Kenny Williamson.

Abdul Alqtani is a Poultry Science doctoral student at Mississippi State University working under Dr. Aaron Kiess. He received his master’s degree in Poultry Science from the University of Georgia. His particular area of research is poultry house environment and microbiology.

He conducted an experiment to determine if copper and propionic acid (PA) are bactericidal and have the potential to be used as a litter amendment in addition to sodium bisulfate to improve the quality of broiler litter. His research showed that sodium bisulfate had a lower litter pH on day 7 when compared to all other treatments, but no differences were detected for any of the other litter quality variables; copper and PA did not reduce bacterial counts.

ALABAMA FRESHMAN RECEIVES FIRST MS POULTRY ENDOMENT SCHOLARSHIP AT MSU

An incoming freshman majoring in poultry science at Mississippi State University is the first student to receive a $750 scholarship from an endowment created in the Miss. State University Foundation by the Mississippi Poultry Foundation.

Grant Wallace from Hartselle, Ala. is a freshman at Mississippi State. He was introduced to poultry science through Future Farmers of America competitions in high school and fell in love with the field.

“When I decided that I wanted to pursue a career in poultry science, I knew it was between Mississippi State and Auburn, and it only took one visit to MSU to know that it was the place for me. Winning the MPA scholarship is making it easier to turn my dream of a career in poultry science into reality, and I am humbled and honored to have been chosen to receive it,” he said.

The Miss. Poultry Foundation Board of Directors donated $25,000 to the MSU Foundation in 2016. In future years the $25,000 endowment will generate a $1,000 scholarship.

The deadline for the scholarships is April 15 each year and scholarship recipients will be chosen and then notified by the MSU Poultry Science Department in August.

The Miss. Poultry Foundation Board of Directors in August voted to add another $10,000 to the endowment at MSU and plans to continue growing the corpus of the Endowment so it can generate even more significant scholarships from the earnings.
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Supporters of removing restrictions on where backyard poultry producers can sell their meat spoke at a hearing at the Capitol in August. Two growers of pasture-raised chickens and three chefs testified in favor of removing regulations on sales of uninspected meat.

MPA believes that all poultry sold in restaurants, grocery stores and farmers’ markets should be inspected as meat from commercial farms is.

Sen. Angela Hill, R-Picayune, author of legislation to remove restrictions on sales said Mississippi’s regulations on small poultry producers are more restrictive than federal law and her bill would prevent the state from exceeding federal law. Her bill passed the Senate Agriculture Committee and died in the Senate Public Health Committee in the 2018 regular session.

Senate Agriculture Committee Chairman Billy Hudson said “we are trying to determine –do we need another bill or not or is it just an interpretation of the rules” that state agencies can change.

Mississippi adopted the federal exemptions for small farmers in the 1960s. The Mississippi Department of Agriculture and Commerce regulations allow a poultry grower to slaughter and sell from his farm 1,000 birds per year but the law was loosened several years ago to allow backyard growers to sell over the internet and deliver poultry to customers. If a grower sells between 1,000 and 20,000 birds, he must have a building with water that includes a drain and a bathroom in which to slaughter birds. Sales greater than 20,000 per year require bird-by-bird inspection. The Miss. Department of Health requires that any poultry in a restaurant or grocery store come from an “approved” -federal or state inspected- source.

Ben Simmons of Nature’s Gourmet Farm in Perry County said state regulations limit the number of his pasture-raised chickens that he can sell from his farm, how they are transported (must be kept refrigerated), and where he can sell them. He said the state is losing revenue because people who want to buy local must go out of state.

Simmons said 40 states are like North Carolina which he praised as a model. He said North Carolina adopted the federal exemptions and has easy-to-understand regulations that have allowed 1,000 small farms to spring up. He said the 10 states that don’t allow easy sales include Arkansas, Louisiana, Mississippi, Alabama and Georgia. These are all major poultry producing states.

The next pasture-raised poultry producer to speak was Rose Picazo of Mize. She said the state regulations are overwhelming, that her chickens are handled less than commercial birds and that she chills the carcasses for four to five minutes after slaughter. She said the regulations should be simplified into a booklet and training should be offered. She also wants only the 20,000 bird limit followed and complained about transport rules.

The last three speakers were three chefs who said they want to buy local chicken but can’t.

Mississippi produces more than 725 million chickens per year and the poultry industry has an $18 billion impact on the state’s economy. Growers and processors have invested billions to supply a safe healthy product to customers and MPA believes that investment should be protected by requiring all chicken sold to be inspected.
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The success of vaccination programs depends on the ability of the birds to establish a strong immune response after vaccination, this immune response is mediated by the immune system. The immune system is a complex group of organs that are present in the animals, including poultry. These organs are committed to produce the cells that will play a main role in the defense against pathogenic microorganisms. The bursa of Fabricius and thymus are the most important immune organs. The cells in the bursa, denominated as B-cells will produce proteins called antibodies. These antibodies will block (neutralize) viruses and bacteria and thus make them unable to infect.

There are numerous factors that may impact the protection conferred by the immune system. There are some viruses with the ability to directly injure the immune system. These viruses include the infectious bursal disease virus (IBDV), chicken anemia virus (CAV), Marek’s disease, and avian reovirus among others. Because of their negative effect on the immune system, these viruses are also known as immunosuppressive virus.

Infectious bursal disease virus can induce in the birds a state of immunosuppression that consists of a temporary or permanent dysfunction of the immune response as a result of damage to the immunocompetent cells, with the consequent increase in susceptibility to pathogens.

The main effects of an eventual state of immunosuppression include:

a) Increase in susceptibility to some infectious diseases such as complicated chronic respiratory disease, Newcastle disease, hepatitis with inclusion bodies, laryngotracheitis, salmonellosis and even infections by coocidia (Eimeria sp), among others. On the other hand, it also increases the presentation of “opportunistic” infections.

b) Reduction of the immune response to vaccinations, for example, it has been demonstrated that the infectious disease virus affects the immune response by vaccination against Newcastle disease, infectious coryza, infectious bronchitis, laryngotracheitis, among others.

c) Immunosuppression has a negative impact on poultry processing because of increased plant condemnations due to airsacculitis or to lesions associated with E. coli infections. Furthermore, immunosuppression may produce reduced responsiveness to vaccinations, and may contribute to long-lasting (rolling) and severe vaccine reactions.

d) Finally there is a negative impact on productive parameters, since there are poor food conversions, increased morbidity and mortality and even increase of birds seized in the slaughterhouse. One study in Ireland described that healthy flocks had a weight greater than 10% compared to flocks affected by the subclinical form of Gumboro disease.

In the United States, the most prevalent presentation of infectious bursal disease is the subclinical form produced by viral strains denominated Delaware type. This problem usually occurs in birds less than three weeks old and the most important consequence of this presentation is the immunosuppression charts. The earlier the infection, the more severe the immunosuppression will be.

However, there are more aggressive (virulent) strains of IBDV, and they can induce severe clinical outbreaks characterized by widespread hemorrhagic lesions with high mortality.
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The outbreaks of Gumboro disease of high virulence are characterized by high mortality percentages in affected flocks, with the presence of generalized hemorrhages especially in muscle masses, bursitis with bloody exudate, nephrosis and nephritis as well as dehydration. Outbreaks by very virulent strains have been observed with backyard flocks in California and Washington.

Along with biosecurity measures in the poultry farms, vaccination programs with inactivated and live attenuated viruses have been used to prevent IBDV. Vaccination of hens, with the subsequent maternal immunity transferred to the progeny, is the primary way of controlling infectious bursal disease virus. This means that poultry integrators use live IBDV vaccines and two or more inactivated vaccines in replacement pullets and hens in order to generate high levels of antibodies (hyperimmunization). When the hens develop high levels of antibodies, these are transferred to broiler progeny providing some level of early protection in the broilers against field challenge. This is also known as “passive immunity”. In addition to passive immunity, live IBDV vaccines may be given to broilers in an effort to gain active immunity against IBDV. Live IBDV vaccines are administered either in ovo, at hatching and by booster vaccinations in the field. Live Delaware variants and classic combinations are often recommended.

Although satisfactory protection may be provided by the induction of high neutralizing antibody titers, interference mediated by maternal antibodies against the immunity induced by vaccination with live attenuated vaccines has become the most important obstacle in the establishment of control programs. In this context, recombinant and immune complex vaccines may show promising results. Live attenuated vaccines show a different degree of attenuation; many of them may cause bursal atrophy and even immunosuppression. Furthermore, depending on their characteristics or on the vaccination schedules, some of the vaccines may not induce full protection against the very virulent IBDV strains or recent antigenic variants.

Effective vaccination programs depend on rapid and accurate diagnosis of the subtype present in a flock because vaccines based on the standard subtype of IBDV can fail to protect against challenge with a variant subtype. Detection and strain identification of IBDV is important because of the emergence of different antigenic subtypes, this makes necessary to tailor vaccination programs to the antigenic type found in the poultry farms. Currently rapid and sensitive molecular diagnostic methods are available, these methods that are extremely sensitive, powerful, and efficient.

Environmental factors can exacerbate the negative impact of immunosuppressive viral diseases, because these factors have a considerable influence on the immune system. The role of environmental stress induced by several management factors has been described as one of the most common sources of immunosuppression in modern poultry operations. The common sources of stress can be grouped under the following categories:

a) Climatic (extreme heat, cold or humidity)
b) Environmental (poor ventilation, wet litter, harsh caretakers)
c) Nutritional (shortages of nutrients, feed intake problems)
d) Physiological (rapid growth, sexual development in pullets)
e) Physical (catching, immobilization, injections, transport)

Additional strategies to control immunosuppressive diseases or their effects occur in the management area. Providing an environment with less stress is important to maintain bird health. Poor ventilation and cool temperatures are stressors that make birds more susceptible to disease.

Finally, hygiene and biosecurity are important to reduce the exposure of the birds to pathogenic agents. To reduce birds’ susceptibility, vaccination against other diseases such as Marek disease and infectious bronchitis is also important. The vaccination techniques should be monitored routinely to guarantee the birds receive the vaccine properly.
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Introduction
Everyone raising chickens knows that an adequate supply of water is necessary to be a successful chicken grower. However, not everyone understands the importance that both water pressure and water volume play in providing an adequate supply. Pressure and volume are two different things and both are critical to chicken production. Water pressure refers to the force that allows water to flow through pipes; including fittings, filters, distribution lines, overcoming elevation, and still reach the drinkers and cool cell pads. The amount of water coming out of the pipe or hose is the volume. A deficiency in either pressure or volume will cause serious water restriction issues for any given flock.

Perhaps the simplest way to understand the difference is this; Pressure is how much force is needed for water to overcome resistance or drag; Volume is how much water is needed to meet drinker and cool cell demands. It is possible to have excellent water pressure but only a small amount of water coming out of the pipe. It is also possible to have a pipe full of water coming out of the line but almost no pressure behind it. Both of these situations are bad when it comes to commercial chicken houses. You must have the proper amount of each working together to be successful. Therefore, let’s take a look at the importance of each.

Pressure vs. volume
An adequate water supply must be available on every commercial poultry farm and should be verified before the houses are ever constructed. This supply is often either multiple wells or perhaps a well(s) and a municipal supply. Multiple wells should be connected so water can still go to all houses in case you have a problem with a well. The water supply should be tested for mineral content and absence of bacterial contamination to ensure the water is safe for poultry to drink. Once you know the water is safe, you must also determine if the supply is adequate to meet demands of both the chickens and the evaporative cooling system. Well drillers can usually tell you how strong your well is by pumping it for approximately 24 hours and telling you how many gallons per minute it was capable of pumping. Your poultry company will have guidelines on how many gallons of water per minute your water supply sources must be able to deliver. (Remember it is better to oversize the system than install a system that does not meet your needs. Also a larger system will allow you to expand in the future).

If it is determined that you have an adequate amount of water in your wells, you still aren’t out of the woods. You now have to deliver that water to the chicken houses with enough pressure at sufficient flow rates to meet demands of the birds for both drinking and cooling water purposes. There are multiple ways to make mistakes between the well and the chicken houses. Installing a pump that is unable to meet the demand of the chicken houses is a common mistake. If you install a pump capable of pumping 50 gallons per minute but the total water supply demanded by all your chicken houses is 70 gallons per minute, you are going to have serious water restriction problems; especially in those houses farthest from the well. Having an adequate supply of water in the well is useless if you can’t get it pumped to the houses in a timely manner.

Another common mistake is installing a supply line from the well to the chicken houses that is too small to carry the volume of water needed. If the water demand on your farm is 60 gallons per minute and you have a 2 inch supply line from the well to the chicken houses, you cannot supply 60 gallons per minute! A 2 inch pipe will only supply about 48-50 gallons per minute. You may have plenty of water in the well and you may have a pump that can pump 75 gals per minute, but if you want to pump 60 gallons per minute out the end of the pipe, you will need a 2.5 inch supply line. If you want to pump 75 gallons per minute, you will need a 3 inch supply line. Both pressure and volume must work together. If one is less than adequate, regardless of which one, you will not be able to provide your chickens with an adequate water supply.

Adequate water supply
Adding additional houses to a farm without increasing the size of the supply line is another common mistake. Your 4-house farm may be just fine with a 2 inch supply line. However, if you build 2 additional houses and do not upgrade your supply line to a 3 inch line or add an additional water source, you are likely going to have water restriction issues. You must have properly sized and installed pumps, supply lines, and other equipment to get enough water to the chicken houses for the birds. For the past few years, conventional thinking has been that a typical 40’x500’ broiler house requires about 2 gallons per minute (gpm) for drinking and about 8 gpm for the cool cell pads (or a total of about 10 gpm per house; naturally, bigger houses will require even more water). However, chicken genetics change...
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You must size your equipment such as well pumps and supply line of larger birds.

Growing larger birds requires more water for both drinking and cooling purposes. Improved cooling is typically achieved by adding an additional 20 feet or more of cool cell space to each side of your house and an additional one or two tunnel fans, which will require a lot more water. If you have an older farm that may only have a ¾ inch or 1 inch supply line (Figure 1) that worked fine for smaller birds, that line likely cannot adequately handle the drinking and cooling water demands of larger birds during the later stages of the growout. You may need to increase the size of the well pump and the supply line size in order to meet water demands of larger birds.

Another common mistake is switching from growing a small bird (4.50 pounds or less) to a large bird (9 pounds or more) without upgrading the supply line. Growing larger birds requires more water for both drinking and cooling purposes. Improved cooling is typically achieved by adding an additional 20 feet or more of cool cell space to each side of your house and an additional one or two tunnel fans, which will require a lot more water. If you have an older farm that may only have a ¾ inch or 1 inch supply line (Figure 1) that worked fine for smaller birds, that line likely cannot adequately handle the drinking and cooling water demands of larger birds during the later stages of the growout. You may need to increase the size of the well pump and the supply line size in order to meet water demands of larger birds.

You must size your equipment such as well pumps and supply lines to meet peak demand in summer with big chickens on the farm. You may only reach peak demand once or twice a year but you must have the ability to reach that demand. Otherwise, drinking and/or cooling water will be limited; which could prove disastrous with large birds in hot weather. There are several common questions related to poultry house water supply you should be able to answer to improve your water supply management. These include:

- How much water does a poultry house use?
- How much water do all my poultry houses use?
- What size should my main supply line be from the well to the houses?
- How can I tell if I am short on water?
- Do I need water storage tanks?
- What are my options (bigger pump, larger supply line, stronger well, etc.)?
- I may have been short on water last summer – what steps do I take now?

To answer these questions, there are a number of things you need to know. These include:

- Tunnel fan capacity - how many fans and how big? How many cubic feet per minute (cfm) of air can be moved?
- Type and thickness of pad (cool cell or fogger pad; 2", 4", 6")
- Number of birds per house and bird size
- Drinking water needs
- Cooling water needs
- Main supply line and meter size (3/4", 1", 2", etc.)
- Farm layout - is water pushed uphill from the well?
- Location - house distance from well or municipal water supply

The following tables will provide information to help you make informed decisions concerning water demands on your farm and how best to meet those demands. Table 1 lists various total tunnel fan air moving capacity based on cubic feet per minute (cfm) and the maximum amount of water usage (gals/min) associated with either a 6 inch cool cell pad or a 2 inch fogger pad at the various cfm capacities. While 2 inch fogger pads are becoming less common, there are still some older houses growing smaller birds that continue to utilize them. Interior fogging nozzles are a common sight in many poultry houses today. However, some growers have moved away from using them as they can increase humidity in the house to high levels which can make it more difficult for the birds to cool themselves. The amount of water used by fogging nozzles is listed in Table 2.

Table 3 lists peak drinking water usage in gallons per minute per 1,000 birds for birds at various days of age. Knowing the number of birds in your house, you can use these figures to calculate the gallons per minute per house, gallons drunk or consumed per hour, and the total gallons consumed in 24 hours per house. As mentioned previously, chicken genetics improve each year and this results in an increase in water and feed intake by birds from each round of genetic improvements. Table 4 lists the estimated per house water consumption in gallons per minute at various bird numbers per house. Table 5 lists various house sizes and fan capacities (cfm) along with the estimated peak water demand for a 6 inch cool cell pad system (calculated using an outside air temperature of 90° F and an outside relative humidity of 20%) and estimated peak drinking demand. Table 6 lists various house sizes and fan capacities (cfm) along with the water demand for the pad system and the birds, a specified number of houses on the farm, and the estimated total farm water demand in gallons per minute. This total farm water demand in gallons per minute is what your well pump and supply line must be able to provide at the time of peak water usage. A bottleneck anywhere in the system will limit the ability of the system to provide adequate water flow rates. A pump that is not sized to deliver the flow rate needed at the required pressure or a supply line too small leading to high pressure loss will mean a restriction in water availability. Water is the most important nutrient that a chicken consumes. Therefore, restricting water availability will affect feed intake, growth rate, bird performance, and if severe enough, mortality rates.

Table 7 lists estimated farm supply line pipe size based on estimated farm water demand and house size and fan capacity. Note that bigger houses require bigger supply lines to adequately deliver the flow rates of water needed. Bigger houses will hold more birds and will have additional cool cell area to keep those birds cool during summer which will place heavier demands on the water supply and delivery system. Make sure your supply line can furnish what your farm needs (Figure 2). Table 8 lists PVC pipe sizes required to meet various flow rates in gallons per minute. Most new house construction today and many retrofits require in excess of 30 gallons per minute. This means anything less than a 2 inch supply line will likely not be adequate to meet demands of a modern chicken house.

<table>
<thead>
<tr>
<th>Table 1. Fan capacity and pad system water use1.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pad System</strong></td>
</tr>
<tr>
<td><strong>Tunnel fan capacity (ft³/min)</strong></td>
</tr>
<tr>
<td><strong>Maximum water usage (gals/min)</strong></td>
</tr>
<tr>
<td><strong>6 inch pad</strong></td>
</tr>
<tr>
<td><strong>2 inch fogging pad</strong></td>
</tr>
<tr>
<td>160,000</td>
</tr>
<tr>
<td>180,000</td>
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<tr>
<td>200,000</td>
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<tr>
<td>220,000</td>
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<tr>
<td>300,000</td>
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<tr>
<td>320,000</td>
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<tr>
<td>450,000</td>
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</tbody>
</table>

1Adapted from Czarick, 2007.

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Potential problems

Water filters can further restrict flow and create additional problems. Water pressure will decrease approximately 5 pounds per square inch (psi) for each in-line water filter that the water passes through. In addition, pushing water uphill also results in a significant pressure loss. Water pressure loss due to rise in elevation can be calculated by the following equation:

Feet rise in elevation \times 0.433 = \text{Pressure Loss}

Therefore, a 50 foot rise in elevation would result in a pressure loss of 21.7 psi (50 \times 0.433 = 21.7).

Most chicken house controllers today are capable of monitoring daily water usage by the drinkers. You should know what your peak 24-hour water demand is. This peak is likely in summer (July or August) with big chickens on the farm. Watch for changes in water consumption (it should always be increasing each day). Water and feed intake should increase each day to support the growth rate. If consumption tends to plateau for several days towards the end of the flock, this could be an indication that there is a water restriction somewhere in the system. If your controller can record hourly data (or smaller increments), watch for plateaus of a couple of hours during the hottest part of the day when demand is greatest. It could be the pump, supply, supply line, or perhaps a combination of all three. Water lines for the drinkers should come off the supply line first before the line(s) supplying the cool cells and possibly foggers. Cool cell water should not come off first because if there is a restriction, it will be the drinking water that suffers the most. If there is not a water meter on your cool cell line, you might consider adding one to track cool cell water being used. On hot days with big chickens, cool cells can use as much or more water than the drinkers.

Some growers have water storage tanks on their farm to help meet water demands during peak usage. How much water storage is enough? You most likely can never have too much storage but a quick rule of thumb is 100 gallons per 1,000 birds. However, this could quickly become a huge amount of water on a six to ten house farm. With 25,000 birds per house, this would mean 2,500 gallons of storage per house (25,000/1,000 = 25 \times 100 = 2,500 gallons). Therefore, a six house farm would require 15,000 gallons of storage while a 10 house farm would require 25,000 gallons.

There are a variety of problems that can threaten both the pressure and the volume of the water supply at your chicken houses. Several common problems include:

- Poor planning
- Undersized main line
- Undersized water meters
- Distance between farm and well or municipal line
- Changes in elevation
- No municipal supply available

---

**Table 2. Fogging nozzle water use*.  
Fogging nozzles (1.5 gal/hr/nozzle) 
Maximum water use (gals/min)**

<table>
<thead>
<tr>
<th>number of nozzles</th>
<th>water use</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>1.3</td>
</tr>
<tr>
<td>100</td>
<td>2.5</td>
</tr>
<tr>
<td>150</td>
<td>3.8</td>
</tr>
<tr>
<td>200</td>
<td>5</td>
</tr>
</tbody>
</table>

*Adapted from Czarick, 2007.

**Table 3. Peak water use at day of age*.  
Bird age (days) | Peak water use (gals/min/1000 birds) |
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>35</td>
<td>0.08</td>
</tr>
<tr>
<td>42</td>
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</tr>
<tr>
<td>49</td>
<td>0.1</td>
</tr>
<tr>
<td>56</td>
<td>0.1</td>
</tr>
</tbody>
</table>

*Adapted from Czarick, 2007.

**Table 4. Gals/min water use at various bird numbers at 49 days.**

<table>
<thead>
<tr>
<th>Number of birds/house</th>
<th>Est per house maximum (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15,000</td>
<td>1.5</td>
</tr>
<tr>
<td>20,000</td>
<td>2</td>
</tr>
<tr>
<td>25,000</td>
<td>2.5</td>
</tr>
<tr>
<td>30,000</td>
<td>3</td>
</tr>
<tr>
<td>35,000</td>
<td>3.5</td>
</tr>
<tr>
<td>40,000</td>
<td>4</td>
</tr>
<tr>
<td>45,000</td>
<td>4.5</td>
</tr>
<tr>
<td>50,000</td>
<td>5</td>
</tr>
</tbody>
</table>

**Table 5. House size, fan capacity, and house water demand.**

<table>
<thead>
<tr>
<th>House size &amp; fan capacity</th>
<th>Est. peak demand for 6&quot; pad system (gpm)</th>
<th>Est. peak drinking demand for birds @ 0.70 density (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40'x500'@ 228,000 cfm</td>
<td>10.8</td>
<td>2.9</td>
</tr>
<tr>
<td>50'x500'@ 285,000 cfm</td>
<td>13.5</td>
<td>3.6</td>
</tr>
<tr>
<td>60'x500'@ 342,000 cfm</td>
<td>16.2</td>
<td>4.3</td>
</tr>
<tr>
<td>66'x600'@ 450,000 cfm</td>
<td>21.3</td>
<td>5.7</td>
</tr>
</tbody>
</table>

**Table 6. Estimated total farm water demand.**

<table>
<thead>
<tr>
<th>House size &amp; fan capacity</th>
<th>Water demand for pad and birds per house (gpm)</th>
<th># of houses on farm</th>
<th>Est total farm water demand (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40'x500'@ 228,000 cfm</td>
<td>13.7</td>
<td>4</td>
<td>55</td>
</tr>
<tr>
<td>50'x500'@ 285,000 cfm</td>
<td>17.1</td>
<td>4</td>
<td>68</td>
</tr>
<tr>
<td>60'x500'@ 342,000 cfm</td>
<td>20.5</td>
<td>4</td>
<td>82</td>
</tr>
<tr>
<td>66'x600'@ 450,000 cfm</td>
<td>27</td>
<td>4</td>
<td>108</td>
</tr>
</tbody>
</table>

**Table 7. Estimated farm water demand and supply line pipe size required.**

<table>
<thead>
<tr>
<th>House size &amp; fan capacity</th>
<th>Est total farm water demand (gpm)</th>
<th>Farm supply line required pipe size</th>
</tr>
</thead>
<tbody>
<tr>
<td>40'x500'@ 228,000 cfm</td>
<td>55</td>
<td>2.5&quot;</td>
</tr>
<tr>
<td>50'x500'@ 285,000 cfm</td>
<td>68</td>
<td>2.5&quot;</td>
</tr>
<tr>
<td>60'x500'@ 342,000 cfm</td>
<td>72</td>
<td>3&quot;</td>
</tr>
<tr>
<td>66'x600'@ 450,000 cfm</td>
<td>108</td>
<td>4&quot;</td>
</tr>
</tbody>
</table>

**Table 8. PVC pipe size to meet flow rate requirements*.  
Required flow rate (gals/min) | Pipe size (inches)**
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>1</td>
</tr>
<tr>
<td>10-20</td>
<td>1.25</td>
</tr>
<tr>
<td>20-30</td>
<td>1.5</td>
</tr>
<tr>
<td>30-50</td>
<td>2</td>
</tr>
<tr>
<td>50-70</td>
<td>2.5</td>
</tr>
<tr>
<td>70-100</td>
<td>3</td>
</tr>
</tbody>
</table>

*Adapted from Donald et al., 2000.
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Emerging Trends

- Insufficient well capacity
- Failure to maintain drinker system
- Not checking water availability before building
- Too many houses for the amount of water availability
- Adding additional houses that overloads water availability
- Retrofitting beyond water supply capability
- Failure to regularly test water supply
- No backup plan in place should something happen

A quick and easy estimation of how much water you can deliver is the 5-gallon bucket test. Fill a 5-gallon bucket with water from the control room and time how long it takes for the bucket to fill. It will likely make a difference whether you have birds in the house and what age they are, so it is best to conduct this test when birds are not present. (The bucket will fill slower with birds in the house). A quick estimation is:

- 5 gals in 10 seconds = 30 gals per minute
- 5 gals in 15 seconds = 20 gals per minute
- 5 gals in 30 seconds = 10 gals per minute

Summary

Water pressure and volume are both critical to commercial poultry production. Having enough of one without the other will limit your ability to be successful. **Water pressure is how fast water is flowing while water volume is how much water is flowing.** The two things are separate but there must be enough of each to supply your chicken houses with the drinking and cooling water they need for the birds to perform at their best. Pump size must be adequate to supply the amount of water recommended by your integrator. Supply line size must also be large enough to deliver the amount of water the well pump can pump. A bottleneck on either pump or supply line size will restrict the amount of water reaching your chicken houses and likely limit the ability of the chickens to reach their full potential. Becoming familiar with the tables in this publication will help you better understand how much water your chicken houses need and how you can better meet those needs. Knowing common problems associated with providing an adequate water supply to your chicken houses can help you avoid making mistakes when initially building, adding additional houses, or retrofitting older houses. For more information on poultry water well placement and sizing, please see MSU Extension publication Private Water Well Placement and Sizing for Poultry Production at: http://extension.msstate.edu/sites/default/files/publications/publications/p2953.pdf.

References


*Tom Tabler¹, F. Dustan Clark², Jonathan R. Moyle³, Jason R. Barrett⁴, Yi Liang⁵, and Jessica Wells⁶

¹Mississippi State University Extension Service, Poultry Science Department, ²Extension Poultry Health Veterinarian, University of Arkansas Cooperative Extension Service, ³Extension Poultry Specialist, University of Maryland Extension, ⁴Mississippi State University Extension Service, Center for Government and Community Development, and ⁵University of Arkansas Cooperative Extension Service, Biological and Agricultural Engineering Department
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OVEN BARBECUED WRAPPED CHICKEN BREASTS

Recipe by Shirley A. Glaab, Hattiesburg, MS.

6 Boneless, Skinless Chicken Breast
1/3 Cup Minced Red Onions
1 Teaspoon Bottled Minced Garlic
1/2 Cup Thick Ketchup
1/4 Cup Fresh Lemon Juice
1 Teaspoon Dried Basil Leaves
1/4 Cup Olive Oil
1 Tablespoon Honey
1 Tablespoon Worcestershire Sauce
1 Tablespoon Cream Styled Horseradish
2 Teaspoons Creole Seasoning
12 slices Lean Smoked Bacon
Lemon Wedges
Fresh Parsley

PREPARATION

In a medium saucepan, mix together red onion, garlic, ketchup, lemon juice, basil, olive oil, honey, Worcestershire sauce, horseradish and Creole seasoning. Place over low heat and cook, stirring until well blended, about 5 minutes. Wrap 2 slices of bacon, one at a time, around each chicken breast, taking care to tuck ends of bacon. Brush chicken with sauce and arrange on rack in a shallow baking pan. Place in 375-degree oven and bake about 45 minutes, basting every 10 minutes with sauce and turning twice. Remove chicken to bed of parsley on platter and garnish with lemon wedges. You may pass the remaining sauce. Makes 6 servings.

This recipe was the winning entry for Mississippi at the 44th national Chicken Cooking contest in 2001.
Upcoming events:

At all events involving growers, please practice strict biosecurity procedures.

- Food Safety Roundtable
  OCTOBER 4
  MSU Lab, Pearl, MS

- Election Day
  NOVEMBER 6

- Runoff Elections
  NOVEMBER 27

The Grower Advisory Committee will meet quarterly at the call of the Chairman.

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