

## Agriculture Technical Advisory Group Report to the Steering Committee

The High Rock Lake Agriculture Technical Advisory Group (TAG) consists of several farmers from across the watershed and representatives from the following organizations:

- Davie, Davidson, Yadkin, and Wilkes Soil and Water Conservation Districts (SWCDs)
- Natural Resources Conservation Service (NRCS)
- Alexander, Caldwell, Forsyth, Surry, and Yadkin County Cooperative Extension Service (CES)
- NC Department of Agriculture & Consumer Services (NCDA&CS) Division of Agronomic Services (AS)
- NCDA&CS Division of Soil and Water Conservation (DSWC)
- NC Farm Bureau (NCFB)
- Piedmont Triad Regional Council (PTRC), and
- Yadkin Riverkeeper.

The Agriculture TAG met with representatives from the Division of Water Resources (DWR) five times between December 2022 and December 2023. This report presents background information about agricultural and conservation program trends in the High Rock Lake watershed as well as the TAG's considerations for nutrient strategy development and sector collaboration. Agriculture TAG discussions and member perspectives, both consensus views and differing positions among members, have been catalogued in this report for consideration by the High Rock Lake Steering Committee.

### Background – Agriculture in the High Rock Lake Watershed

Due to the dispersed and varied nature of agriculture across the landscape, identifying watershed wide opportunities for sector improvements can be challenging. Between 2012 and 2014, a statistically valid survey was completed to provide High Rock Lake watershed-specific information about agricultural cropping systems, soil types, Best Management Practices (BMPs), livestock types, and farmers. Key findings from this agricultural characterization watershed study include:

- Almost half of farmers do not farm full-time;
- Pasture and hay land are the dominant agricultural land uses and most is under-fertilized;
- Dominant pastured livestock are cattle and horses;
- Crops other than hay generally receive appropriate agronomic nitrogen (N) fertilizer rates (hay is mostly under-fertilized);
- Cattle stocking rates are generally at recommended levels (with some exceptions);
- Weighted average soil test phosphorus index (P-I) values for most counties in the High Rock Lake watershed were High or Very High (P-I>60). Soil test P-I values indicate the probability of a crop response to fertilizer. Phosphorus loss potential from agricultural lands is a function of soil test P-I and the amount of soil loss and runoff. Average High or Very High soil test P-I values seen in this watershed increases the potential risk of soluble phosphorus loss through runoff, although certain BMPs and other factors affecting soil

loss and runoff can mitigate this risk. Phosphorus loss potential from agricultural fields is calculated using the Phosphorus Loss Assessment Tool (PLAT) which considers soil test results and crop response along with mitigating practices and other parameters;<sup>1</sup>

- Approximately 40% of fields sampled in the High Rock Lake watershed were fertilized with phosphorus (P). Of these fields, 14% were over fertilized and 29% needed fertilizer and received it;
- Soil testing is frequently completed although soil test recommendations for applied P are generally not matched when fertilizer is applied. Most fertilization is occurring at an agronomic rate for N, which can result in overapplication of P;
- Predominant organic fertilizer applications are varying types of chicken waste and dairy waste;
- 89% of farmers did not have a nutrient management plan (11% of farmers did have a management plan). Of those without a nutrient management plan, 75% individually determined nutrient recommendations, 13% did not apply commercial fertilizer, 6% received recommendations from a fertilizer dealer and 6% used recommendations from other sources (NRCS, other farmers, etc.). For fields with nutrient management plans, 32% used commercial and animal waste fertilizer, 13% used only animal waste fertilizer, and 55% had commercial fertilizer applied. Most nutrient management plans were written by NRCS and fertilizer dealers;
- There is a high frequency of riparian buffers on agricultural fields (with some exceptions); and
- Generalized PLAT ratings based on averaged or weighted mean county data and simplifying assumptions indicate low phosphorus (P) loss potential from most buffered and unbuffered crop, pasture, and hay land in the watershed. This conclusion does not negate that specific fields with High or Very High soil test P-I values and high P application rates have the potential to have medium to very high P losses.<sup>2</sup>

Agriculture TAG members largely found study conclusions coincided with experience and current knowledge of local management. The TAG members went on to collect and discuss additional management and practice information. Some TAG members reported, based on anecdotal evidence, that many large cropland farmers in their county have transitioned, without cost share assistance, to precision nutrient management due to market forces. Precision nutrient management involves variable fertilizer application based on high resolution spatial data resulting in concentrated applications only in locations with nutrient deficiency. TAG

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<sup>1</sup> The phosphorus index (P-I) provided on a soil test reflects the level of phosphorus found in soil. An average P-I for a county in Dr. Osmond's study was calculated by summing all P-I from individual soil tests and dividing by the number of tests. A weighted P-I for a county was calculated by factoring field acreage as a 'weighting factor' for P-I values from individual soil tests. Accuracy of county P-I averages depend on the quantity and quality of soil tests conducted.

<sup>2</sup> Osmond, D. and K. Neas. 2015. *Delineating Agriculture in the High Rock Lake Watershed*. NC State University Department of Soil Science and United States Department of Agriculture National Agricultural Statistics Service. <https://content.ces.ncsu.edu/delineating-agriculture-in-the-high-rock-lake-watershed>

members have reported that precision nutrient management is rapidly becoming industry standard given high costs of fertilizer inputs and labor shortages. Technology is also rapidly advancing resulting in precision application becoming more accurate. TAG members also reported that poultry litter is frequently used as a fertilizer in the watershed, although certain counties and regions have more access to litter than others. Litter is frequently analyzed for nutrient content and is commonly applied at an agronomic rate for nitrogen. This fertilization approach often builds phosphorus reserves in the soil. TAG members have reported that fields nearest poultry houses and barns tend to receive more litter than fields that are more difficult to access or are a further distance away.

Representatives from DSWC and NRCS provided information on practices implemented in the High Rock Lake watershed since 2006. The DSWC found over 60% of conservation practices implemented were for pastured systems (livestock exclusion fencing, heavy use area protection, watering tanks, pasture renovation, and stream protection wells). Similarly, NRCS funded significant amounts of fencing, stream crossings, access control, and prescribed grazing on pastured systems in the watershed since baseline. The NRCS also funded large, more expensive practices such as waste storage facilities, along with nutrient management, cover crop, and tillage management acreage. All told, since 2006, over 46 million was spent on cost-share assistance in the 12 counties with acreage in the High Rock Lake watershed.

Data from the National Agricultural Statistics Service (NASS) was pulled and agricultural trends in the 12 counties with significant acreage in the High Rock Lake watershed were identified. The NASS publishes two independent sets of data containing county crop and livestock information: censuses and annual surveys. Censuses are conducted every five years and completely account for all crops and livestock produced on all farms for the census year. Annual surveys provide county estimates based on reports from a sample of farms and are completed for select commodities (major crops and livestock types) determined federally and by individual state departments of agriculture.

Linear trendline analyses on annual survey data display a slight reduction in cattle and swine since 2000 (Figure 1). Trend analyses on agriculture census data for swine and cattle from 2002 to 2017 also show slight reductions in inventory totals over time (Figure 2). Layer and pullet annual inventory data indicate an increasing trend since 2007 (Figure 3) and annual broiler production data from 2006 indicates a slight increase trend as well (Figure 4). When comparing Figure 3 and Figure 4 note that production values signify total birds produced annually, which differs from inventory values, which are birds being raised at a given moment that year. Poultry agriculture census data from 2002 to 2017, combining broiler, layer, pullet, and rooster inventory totals do not exhibit a clear increase or reduction trend (Figure 5). Bird inventory totals remained largely static during the last four census periods (Figure 5). Agriculture TAG members reported an increase in poultry production due to larger houses being built and utilized, and more efficient production of flocks. However, members also shared that poultry litter material (shavings) are becoming harder to procure and the current economic investment (and risk) associated with entering the poultry market is likely to deter interest in the short-

term. Longer-term growth in the industry is harder to predict and dependent on market conditions.

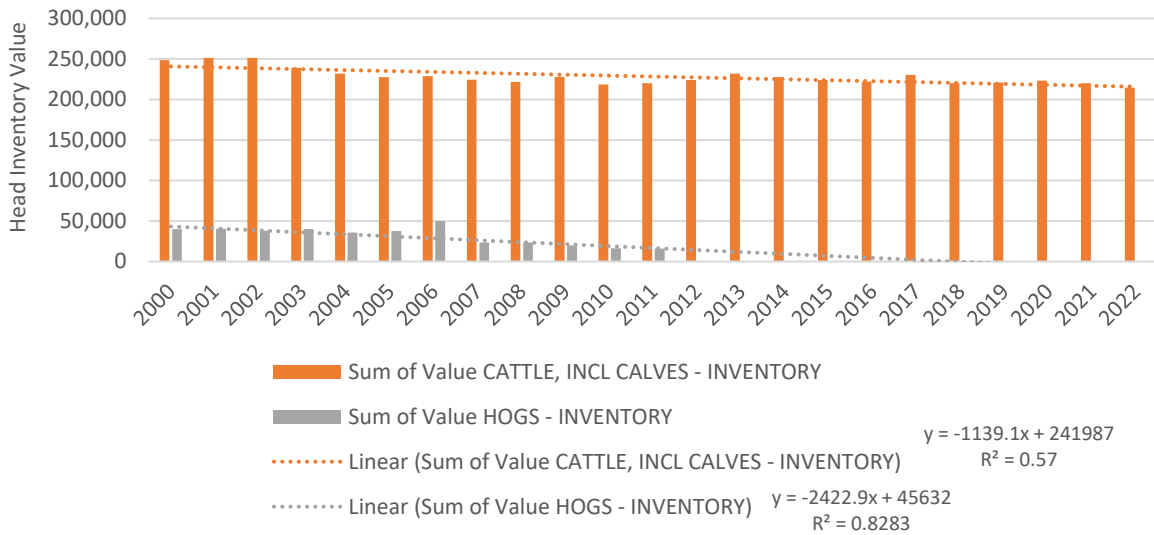


Figure 1 - Annual NASS Survey Data for Cattle and Swine: A sum of annual inventory totals for cattle and swine provided by NASS are graphed above for the twelve counties with acreage in the High Rock Lake watershed. County values were not adjusted by the percentage of each county lying within the High Rock Lake watershed.

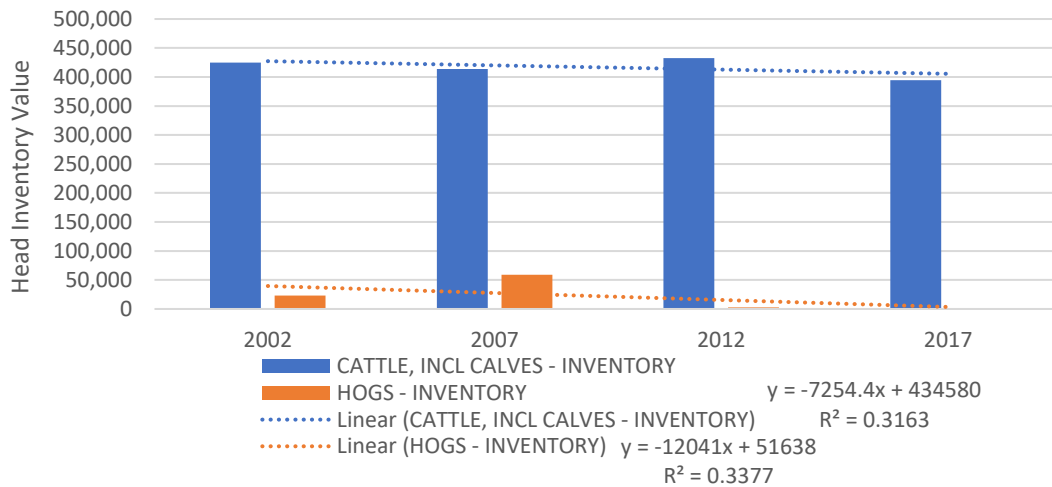


Figure 2 - NASS Census Data for Cattle and Swine: A sum of census year inventory totals for cattle and swine provided by NASS are graphed above for the twelve counties with acreage in the High Rock Lake watershed. County values were not adjusted by the percentage of each county lying within the High Rock Lake watershed.

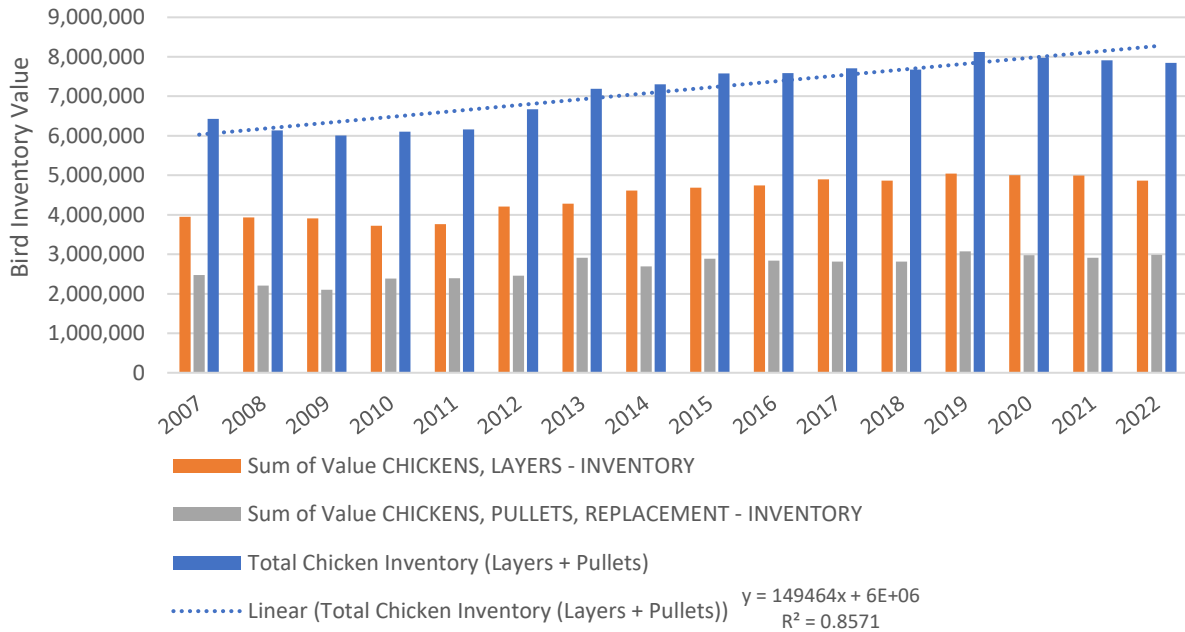


Figure 3 - Annual NASS Survey Data for Layer Chickens, Pullets, and Replacements: A sum of annual inventory totals for layer, pullet, and replacement chickens provided by NASS are graphed above for the twelve counties with acreage in the High Rock Lake watershed. County values were not adjusted by the percentage of each county lying within the High Rock Lake watershed.

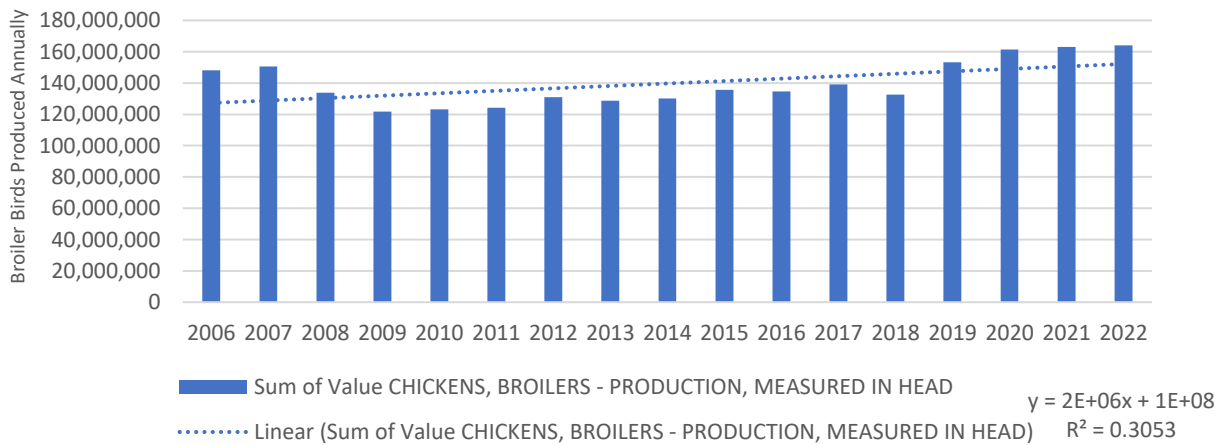


Figure 4 - Annual NASS Survey Data for Broiler Chickens Produced: A sum of annual production totals for broiler chickens provided by NASS are graphed above for the twelve counties with acreage in the High Rock Lake watershed. County values were not adjusted by the percentage of each county lying within the High Rock Lake watershed. Production values signify total broilers produced annually, which differs from inventory values, which are birds being raised at a given moment that year. The NASS does not provide annual inventory data for broilers.

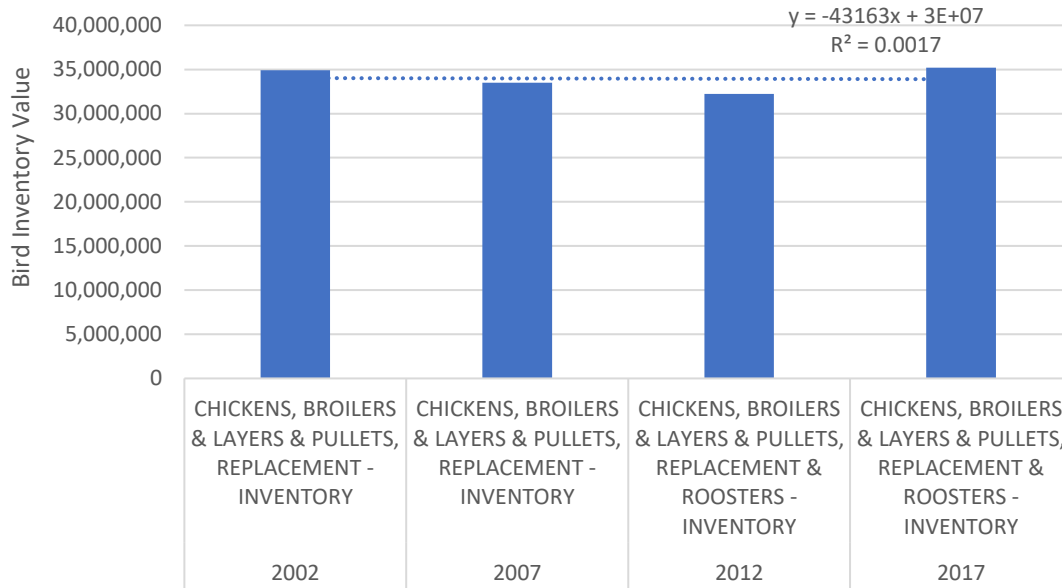


Figure 5: NASS Census Data for Chickens (Broilers, Layers, Pullets, and Roosters): A sum of census year inventory totals for chickens provided by NASS are graphed above for the twelve counties with acreage in the High Rock Lake watershed. County values were not adjusted by the percentage of each county lying within the High Rock Lake watershed. Rooster totals were only available in the 2012 and 2017 censuses.

### Considerations – Sector Collaboration and Strategy Development

The Agriculture TAG acknowledges that agricultural activity is a nonpoint source contributor to water quality impairments in High Rock Lake. The TAG also recognizes there is significant benefit for maintaining the agriculture sector’s relevance and profitability within the watershed. Agriculture land, most basically, is pervious land. Sustainably managed pastures and crop fields can contribute to the longevity of nutrient management in stressed watersheds by maintaining watershed hydrologic processes and hydraulic continuity. The Agriculture TAG was committed to discussing strategy development and collaborative work that would result in meaningful nutrient reduction benefits for High Rock Lake, while preserving the feasibility and profitability of farming in the watershed.

### Non-regulatory Considerations

Agriculture TAG members discussed many recommendations for reducing nutrient losses from agricultural land in the High Rock Lake watershed, several of which a nutrient strategy rule package will likely not address due to regulatory feasibility or other factors. Non-regulatory recommendations include:

- Keep (and expand) existing conservation cost share programs (state Agriculture Cost Share Program (ACSP) and federal Environmental Quality Incentives Program (EQIP)). Providing funding support is critical to implement necessary conservation on private lands including expanding precision nutrient management, excluding additional

livestock, encouraging appropriate stocking, and closing waste lagoon systems. An important caveat is farmers who have previously participated in state and federal cost share programs may have already reached lifetime funding caps and cannot qualify for more funding. Program policies are continuously reviewed and changing to meet the needs of a majority of farmers.

- Increase targeted education and technical assistance to inform small farmers of proper nutrient management and yield/profitability optimization, the cost effectiveness of livestock exclusion from surface waters and stocking livestock at appropriate rates, and the benefits of enrolling environmentally sensitive land in the Conservation Reserve Program (CRP) or the Conservation Reserve Enhancement Program (CREP).
- Expand staff capacity to provide necessary education and technical assistance and hire additional certified nutrient management specialists and certified conservation planners. A stronger talent pipeline between colleges and universities and local/state/federal government is necessary to ensure continued staff capacity and organizational expertise.
- Encourage local and larger market opportunities for poultry litter to expand the distribution range of application toward areas with phosphorus deficient soils.
- Regularly reassess soil rental rates to reduce distortion of local rental markets and ensure CRP and CREP remains competitive and economically viable for farmers. Rental rates can be highly variable between locations and the price setting process is largely standardized.
- Incentivize submitting waste for analysis before application.
- Require or incentivize government and commercial entities to complete nutrient management training.
- Increase inspection of facilities with required waste utilization plans and take necessary enforcement measures as appropriate.
- Pursue tax credits to increase adoption of precision nutrient management, livestock exclusion, and riparian buffer establishment.
- Increase rural broadband access and cellular service for farmers to incorporate the next generation of agriculture technologies, including digital precision agriculture, to enable productivity and profitability for small farmers.

## Regulatory Considerations

### **Agriculture Rule Concept – Reporting**

In May, the DWR brought forward a reporting concept for inclusion in a watershed-specific Agriculture Rule detailed below:

- Overall nutrient management strategy percentage reduction goals established for the watershed would apply. Reduction goals are proposed to apply as an overall target; however, accounting for reductions in N and P will not be a mandatory measure of compliance.
- Agriculture representatives would submit two reports every five years. One report would be created at the end of year two in the five-year period, focusing on BMP

implementation, soil test phosphorus results, and cost share program expenditures. The second report would be created at the conclusion of the five-year period. This report would primarily function as a planning and strategy document providing ongoing recommendations for the agriculture sector. The report would include a summary of trends from Census of Agriculture publications (animal numbers, pasture acres, and crop acres) as well as BMP implementation and cost share program expenditures, easement enrollment, and soil test phosphorus results. Nitrogen loss accounting through the Nitrogen Loss Estimation Worksheet (NLEW) tool, used for accounting in other basins and watersheds with nutrient management strategies and Agriculture Rules, would not be required to be completed and included in iterative reporting.

- A centralized oversight committee consisting of farmers and agency and organization representatives would be created to review and approve reports and complete periodic strategic planning on mitigating agricultural resource concerns in the watershed. No other local committees would be required to be established or meet as part of the Agriculture Rule.

The Agriculture TAG discussed the reporting concept recommendation outlined above and ultimately reached consensus in supporting the incorporation of the reporting concept as outlined above in the final Agriculture Rule. In the discussion, the burden of data collection on existing staff was noted as well as the benefits of conducting third party, statistically significant and rigorous studies every five to ten years characterizing agricultural activity and management in the watershed. Funding for conducting such third-party studies is currently not secured, but Agriculture TAG members strongly note the importance and benefits such work would have for local and watershed-wide strategic planning and adaptive management to address persisting and emerging agricultural resource concerns.

### **Agriculture Rule Concept – Livestock Exclusion Implementation Target**

In May and September, the Agriculture TAG discussed including livestock exclusion implementation targets in the High Rock Lake Agriculture Rule. The DWR shared existing precedent set in active Agriculture Rules in other watersheds, which provide a collective compliance option for the agriculture sector and a backstop that additional rulemaking can commence if collective compliance is not achieved.

In September, the DWR described two potential concepts to the Agriculture TAG for including livestock exclusion implementation targets in the proposed Agriculture Rule for High Rock Lake watershed. The first concept was to set an individual compliance mandate, where all farmers meeting certain criteria would be required to exclude livestock from surface waters as specified in Rule. The second concept was to provide a collective compliance target for livestock exclusion from surface waters with a backstop that an individual compliance measure, to be specified in the same Rule, be activated if collective compliance was not achieved by the period set in Rule.

The DWR was not supportive of an Agriculture Rule concept that would set a collective compliance target for livestock exclusion with a backstop that additional rulemaking could



commence if collective compliance was not achieved (the existing precedent for other active Agriculture Rules). Deterrence of this concept was in part due to the assertion that collective compliance with the backstop of additional rulemaking is not enforceable, thereby such a concept could be accomplished without rulemaking. The DWR also shared concerns that the Rules Review Commission, which must approve the Agriculture Rule and the overall nutrient strategy, may not approve an Agriculture Rule including a concept for additional rulemaking if collective compliance is not achieved, because the Rule is non-enforceable. The DWR also contended that practice implementation in other watersheds and basins with Agriculture Rules utilizing such a collective compliance concept is influenced more so by funding availability than in response to rulemaking.

After describing the potential concepts for including livestock exclusion implementation targets in the watershed's Agriculture Rule, and rulemaking concerns to consider, the DWR ultimately proposed the second concept (collective compliance with individual compliance backstop set in Rule) to the TAG for inclusion in the High Rock Lake Agriculture Rule.

The Agriculture TAG discussed all the conceptual recommendations outlined above, particularly the second concept that DWR ultimately proposed for inclusion in the Agriculture Rule. The Agriculture TAG did not reach consensus on this proposal. No member was opposed to additional consideration of this concept; however, some TAG members considered the recommendation premature until more information could be gathered and additional details on the overall concept could be discussed more thoroughly, particularly backstop individual compliance requirements. Additional time was not able to be provided due to the DWR's and the Facilitation Team's schedule and many TAG members ultimately could not support this broad conceptual approach without additional consideration and delineation. Several TAG members were in support of moving forward with the proposed Rule concept with minor or moderate reservations. Several Agriculture TAG members, including some that were in support of moving forward with the proposal, noted the following concerns with the concept proposal:

- Exclusion system requirements - types of systems (and fencing) that could count toward a livestock exclusion implementation target - were only briefly discussed. There was an openness to consider simpler, less expensive exclusion systems (single strand electric wire, watering ramps, etc.) to discourage livestock access to most (if not all) sections of streams running through stocked pastures. Much remains to be discussed regarding the advantages and disadvantages of counting exclusion systems that do not meet state or federal cost share program technical standards and policies, specifically with regards to their water quality benefits and accounting for their implementation and long-term maintenance.
- Applicability of exclusion system implementation targets to livestock types were only briefly discussed. The TAG did not have time to discuss whether this target for exclusion would apply to only cattle or other types of pastured livestock (including horses, sheep, goats, etc.).
- Specifics on variances to exclusion system implementation, including site difficulty, economic barriers, emergency situations, livestock types, etc. were only briefly discussed. More consideration is needed to clarify reasonable exceptions.

- The DWR has limited staff to inspect farms and measure compliance.
- No comprehensive data is available to quantify the extent of livestock exclusion in the strategy's intended baseline year (2006) or the current extent of livestock exclusion in the watershed (2023). This presents significant difficulties in determining a reasonable and feasible collective target for livestock exclusion system implementation to set in Rule. There is a significant likelihood that a target set without more understanding of livestock exclusion implementation in the watershed could result in a Rule that has already been met. Conversely, the target set in Rule could prove to be totally infeasible for farmers to collectively meet in the set period given current staff capacity to provide necessary technical assistance. In which case, the Rule, though providing a collective compliance option, would in effect function to require individual farmer compliance.
- Any rule concept that is, or has the capacity in effect, to function as individual compliance presents a number of concerns to TAG members:
  - **Perceived threat to livelihood** - Individual compliance can foster negative narratives and sentiments among farmers around the strategy, the Agriculture Rule, and other stakeholders.
  - **Disrupted cost effectiveness and farm economics** – Individual compliance does not recognize the benefits of excluding livestock from locations where it is significantly more cost-effective to initially install and maintain long-term.
  - **Shifting resource concerns** – An uneven regulatory landscape can drive farmers to switch to other commodity types with less regulatory cost burdens that cause differing resource concerns.
  - **Added cost-share program funding uncertainty** – Practice implementation requirements, and subsequent perception by outside parties that implementation is now a fixed business expense, can create funding uncertainties for conservation programs.

## Remaining Considerations

The Agriculture TAG did not consider any regulatory concepts or proposals specifically addressing waste application (animal waste and biosolids) in the High Rock Lake watershed. Agriculture TAG members invited local animal agriculture farmers to attend a November meeting to begin discussions regarding regulatory (and non-regulatory) concepts for addressing waste application-related resource concerns in the watershed. The November meeting was ultimately canceled. In 2024, the DWR intends to convene a technical committee consisting of technical experts from NCDA&CS, USDA, and other organizations to discuss waste generation from various source sectors and application management options to encourage nutrient management and reduce over-enrichment of phosphorus in soils. The formation of a technical committee was opted for in part due to the complicated regulatory framework that governs applications of animal waste and biosolids. The DWR seeks additional time to solicit department legal counsel before consulting with partners and opening any regulatory concepts impacting waste application for public review.

## Conclusion

Agriculture is a diverse and robust sector in the High Rock Lake watershed and its continued relevance and profitability is important to many communities and citizens that work, recreate, and live within the watershed. The agriculture sector understands the unique responsibility it holds to remedy long-standing impacts on natural resources and the important role it can play in safeguarding resources and watershed function for future generations. Over the last year, the Agriculture TAG has met five times to discuss various approaches to achieve meaningful nutrient reduction benefits for High Rock Lake. Regulatory and non-regulatory recommendations and considerations resulting from these preliminary discussions have been described thoroughly in prior sections of this report. The Agriculture TAG remains committed to continuing the conversation on the various approaches already discussed to improve management of agricultural nonpoint source pollution in the High Rock Lake watershed.

Date Approved: 12/6/2023

Report Approved by:

| <b>Name</b>        | <b>Representative/Affiliation</b> |
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| Keith Larick       | NC Farm Bureau                    |
| Adam Hilton        | Davidson SWCD                     |
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| Andy Miller        | Davidson SWCD                     |
| Bailey Wood        | Surry CES                         |
| Brad Newsome       | Farmer                            |
| Brent Barnes       | Farmer                            |
| Dwayne Livengood   | Farmer                            |
| Bill Davis         | Wilkes SWCD                       |
| Edgar Miller       | Yadkin Riverkeeper                |
| Frankie Singleton  | Davie SWCD                        |
| Jennifer Bedrosian | PTRC                              |
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| Seth Nagy          | Caldwell CES                      |
| Taylor Darnell     | Forsyth CES                       |
| Danica Heflin      | PTRC                              |

## **DWR Policy Recommendation**

DWR Planning staff understand the importance of distributing load reduction goals fairly across the various point and nonpoint sources in the watershed and recognize the inherent challenges in seeking strategy numeric goal-proportionate reductions from the agriculture sector. In the decades since the first nutrient strategies took effect in North Carolina, staff have worked with experts across the state to review the effects of agricultural nutrient strategy requirements. A number of limitations were identified with existing collective compliance requirements for crop and pasture systems across the state. Staff developed alternative proposals for High Rock watershed to address these limitations, many of which were introduced as described above, and elicited extensive feedback.

### ***Issue 1 – Alternatives should be considered to collective compliance mandates without meaningful enforcement mechanisms***

In other nutrient strategy watersheds, the agricultural sector as a whole is responsible for complying with collective nitrogen loss reduction targets, and no individual producer is required to change their operation to comply with the requirement. Over time, data is collected to retroactively assess whether agriculture has achieved the required target reduction. In the event of noncompliance, rules specify that the Environmental Management Commission “may conduct additional rulemaking to require a more specific implementation plan”. To provide a more meaningful regulatory construct, Planning staff have proposed implementation of an initial collective pasture exclusion implementation target in the High Rock Lake Watershed, where in the event of noncompliance after a stated implementation period, individual pasture operators that meet certain applicability criteria would be required to remove cattle from streams on a specified and perhaps staged schedule.

Staff also believe a watershed agricultural indicator tracking and reporting process can be more flexibly achieved than currently done under existing watershed approaches with institutional agreements between DEQ and the Department of Agriculture and Consumer Services, which avoids unnecessary time and resource expenditure via the rulemaking process.

### ***Issue 2 – High Rock Lake has significantly more animal operations, including pasture, than traditional row crop systems***

The preponderance of pasture and poultry systems in the watershed, combined with an interest in prioritizing phosphorus and sediment control from nonpoint sources, suggest that these systems should be the primary focus of any agricultural compliance target. Pasture nitrogen loss targets are currently in effect for the Falls Lake and Jordan Lake Watershed, and Planning staff consider a similar pasture-based phosphorus compliance focus to be more feasible than a row crop compliance target for achieving long-term improvement in agricultural nutrient management in the watershed.

***Issue 3 – A focus on phosphorus improvement necessitates a requirement that more specifically addresses erosion and sediment loss and P application***

Given ongoing prolific sediment delivery problems both in the Yadkin River system and to High Rock Lake itself, and also the focus of other stakeholders on aggressively managing phosphorus in the early stages of implementation, Planning staff consider pasture management a vital component of a viable agricultural regulation. The most administratively straightforward means of reducing both direct delivery of waste to surface waters and bank destabilization with associated sediment export, is the exclusion of livestock from rivers and streams in the watershed. Multiple benefits can be achieved with what is already a very popular practice under both state and federal cost share systems. The most significant hurdle to implementation of livestock exclusion systems is funding, as such systems present numerous logistical and financial challenges for producers. Planning staff recognize ongoing implementation by NRCS and Soil & Water Conservation District staff and is optimistic that this implementation will continue. Moreover, Planning staff would like to incentivize and enable increased implementation given the magnitude of direct, multiple benefits provided by removing cattle from streams.

Additionally, waste application has been documented as resulting in ongoing phosphorus enrichment of soils in the High Rock Lake Watershed. Watershed field data from 2015 has shown that 57% of fields which are fertilized with phosphorus do not need it, and average soil test P values have the potential to increase soluble P loss through runoff. Notably, researchers have asserted that specific fields with high soil test P and high phosphorus application rates (generally from animal waste) are likely to have potential phosphorus losses from medium to very high (Osmond 2015). This points to a variable landscape where farmers in certain areas have ready access to animal waste which they are sometimes over-applying, and farmers in other areas either do not have ready access or are applying in accordance with agronomic recommendations. Stakeholders have pointed out that application of animal waste tends to follow the path of least resistance due to resource constraints, and poultry producers who apply their own waste tend to apply it to fields close to the houses where the waste is generated rather than on fields which are farther away or harder to access. This behavior tends to concentrate repeated waste application in certain areas and is likely leading to ongoing phosphorus soil enrichment. Because most phosphorus is non soluble, any excess application to soils in the area is likely to cause phosphorus content to accumulate over time, which leaves very few options for physical removal except uptake by planted crops, which can take many decades to result in more normal phosphorus levels. These over-application “hot spots” have the potential to disproportionately influence downstream delivery of nutrients to High Rock Lake, and any potential rule frameworks should be designed to specifically address this kind of problematic over-application.

***Issue 3 – Poultry industry growth necessitates additional discussion***

Although Planning staff sought to develop proposals to address concerns raised by stakeholders regarding the rapid growth and evolution of the poultry industry in the High Rock Lake Watershed, the regulatory complexity of deemed permitting and animal waste management proved too cumbersome for a meaningful proposal to be presented to TAG members within the allotted time. Ultimately, Planning staff decided to take additional time to convene a workgroup of internal and external regulatory experts, each of whom will be intimately familiar with current regulations, to identify what, if any, amendments to current practice may be feasible. This process will be conducted starting in early 2024 and will inform concurrent rule drafting.