2.6 – Eligible Entity Implementation Activities Attachments

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Impacts of Broadband High-Speed Internet on K-12 Education

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Impact of Broadband High-Speed Internet on K-12 Education

By University of South Carolina College of Education

Broadband high-speed internet has had a profound impact on the education system. Below are a few ways in which broadband has changed the education sector and has impacted families, rural schools and teachers, and students, in South Carolina.

1) Broadband Access for Families in South Carolina

Roughly 18,480 citizens from South Carolina provided at least partial completion of the Better Internet Survey administered in spring of 2023, as part of the Broadband Equity, Access, and Deployment (BEAD) program.

- One-third (33%) of respondents have pre-Kindergarten to 12th grade students in the house and 17% households included college/vocational/other students.
- Among those who have internet but their needs are not met, roughly **34% stated that the internet currently in the household does not meet educational needs** in terms of stability or speed
  - This increases to 43% for rural locales in South Carolina
- More people who are Under/Unserved[1] identified their critical need for internet to support children's PreK-12 Education than those whose internet needs are met.
- One-third (34%) of those who report needing internet access for children to complete school assignments (outside of school) are Unserved (9%) or Underserved (25%).
- **Two-thirds (65%)** of those that report being Nervous about their child(ren) success in school live in a **Rural Location.**

2) Impact of Broadband High Speed Internet for Rural Schools and Teachers

With broadband high-speed internet available in school, teachers have a wealth of online resources such as educational videos, websites, and articles to supplement classroom learning. The ability to use online resources during the class day can help teachers make the learning process more engaging and effective. However, rural schools in South Carolina and across the U.S may gain additional benefits from access to a broadband connection. A few of these benefits may include:

- Increased access to professional development opportunities through virtual participation. Besides providing additional training and learning for educators, online training may be cost-effective.
- Enhanced communities for collaboration and sharing teaching strategies and activities, mentoring, and observations.
- Sharing information with guidance counselors about grant opportunities, financial aid, and college admission insights needed to prepare students for post-high school opportunities. Virtual campus tours are an option as is social media to facilitate connections between students, educators, and other professionals (e.g., admissions representatives, college advisors).
- Schools can expand course offerings for students. Courses can be provided by teachers and experts who may not be full-time employees of or visit school sites every day.

3) Broadband Impact on Students

Incorporating home broadband access for students means that they will have the ability to access fast, reliable internet at an affordable rate. With access to broadband outside of the school day, more students will be able to participate in online classes in general as well as:

- access online resources and videos
- handle homework assignments that require internet access
- access necessary research for more significant projects
- explore topics of interest on their own time
- learn computer skills necessary to help secure a job in the future.

Better access to broadband internet helps enhance educational opportunities for educators and students, higher potential for success, and business and community development for South Carolina and beyond.

Sources:

- Kelley, B., & Sisneros, L. (2020). Broadband Access and the Digital Divides. Policy Brief. Education Commission of the States.
- Graves, J. M., Abshire, D. A., Amiri, S., & Mackelprang, J. L. (2021). Disparities in technology and broadband internet access across rurality: implications for health and education. *Family & community health*, 44(4), 257.
- NCTA (August 2018) How High-Speed Internet is Improving Education in Rural Schools
- Broadband Communities Magazine (October 2022) How High-Speed Fiber Broadband Benefits Public Education
- USC BEAD Survey, July 2023

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[1] Underserved Community are those who have internet at home, but it does not meet their needs; Unserved Community are those who do not have internet at home or access the internet via cell only and wants it.

Impact of Residential Connectivity on Telehealth

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Impact of Residential Connectivity on Telehealth:

Broadband Equity, Access, and Deployment Program (BEAD)

Medical University of South Carolina

August 31, 2023

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I. Broadband Access on Telehealth in South Carolina

Telehealth utilization increased dramatically during the pandemic and has remained at significantly increased utilization in the post-pandemic era.[1,2] This increase has been seen across all populations and geographies, with use cases found across all medical specialties.[3] However, healthcare access disparities can be seen within these utilization patterns, representing a persistence, and in some cases widening access inequities. While there are many factors contributing to this digital divide, it is clear that a lack of access to high-speed broadband connectivity limits the utilization of virtual care[4] and likely reduces the willingness of healthcare systems to engage in robust virtual care strategies to serve the underserved.

In lockstep with the significant investment in broadband infrastructure, South Carolina (SC) will leverage its longstanding experience in deploying collaborative strategies to enhance the use of telehealth in the state through the South Carolina Telehealth Alliance (SCTA). The SCTA is a statewide collaboration of many organizations whose mission is to expand telehealth services across the state. Through engagement with longstanding community health partnerships, enhancing digital literacy, and continued telehealth service development, SC has the unique ability to achieve the scope and scale of ensuring all South Carolinians have access to care through telehealth. SC also has significant research and data evaluation capacities to monitor the use of virtual care in the state through the federally designated Center of Excellence in Telehealth. The MUSC Center for Telehealth is recognized as one of only two Telehealth Centers of Excellence (COE) in the United States (US), awarded by the Health Resources and Service Administration (HRSA). MUSC was awarded this national designation in 2017 because of the Center's successful telehealth programs with a high annual volume of telehealth visits, substantial service to rural and medically underserved populations through telehealth, and its financially sustainable telehealth models. The role of the COE is to fill important knowledge gaps in the national telehealth landscape through research, regional and national collaborations, and proactive dissemination of telehealth resources.

In this report, we provide an overview of the status of virtual care and detail several high-priority use cases that would greatly benefit from the expansion of broadband accessibility. Additionally, in order to balance the current inequities in care access for the selected use cases, each section provides a bold goal of the number of patient interactions that will need to occur to achieve equity. The target set of five-year goals is ambitious, yet obtainable with enhanced broadband access and our significant telehealth support infrastructure. The services will be performed in a variety of settings, leveraging both the use of synchronous and asynchronous telehealth modalities. A key element of success will be the leveraging of the existing partnerships with local primary care, clinics, and community hospitals afforded through the SCTA.

Delivery of care into the home will be increasingly at the center of care delivery, which is a setting of untapped potential for most individuals. Care delivery in the home setting has advantages that arguably supersede advantages of the clinical setting, as the interventions directly contribute to the improvement of daily living within the context of individuals' daily activities, environment, and social support structure. The home is therefore at the core of the biopsychosocial care conceptual model, which seeks the improvement of an individual's life as the primary goal, as opposed to solely preventing and treating disease.[5] The use of virtual care allows this conceptual model to become reality at scale, and the dawning of the broadband movement for our state will accelerate this trajectory.[5]

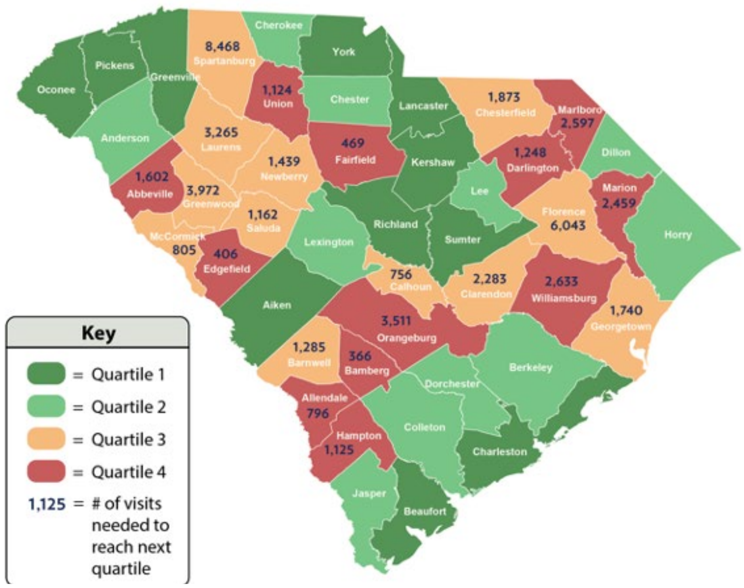
II. Specialty Access

Rural communities face significant health disparities compared to urban communities.[6] Rural Americans are more likely to die from heart disease, cancer, unintentional injury, and stroke compared to urban Americans. Children residing in rural areas with mental, behavioral, and developmental disorders experience more community and family challenges than children with the same disorders who live in urban communities.[6] Patients experiencing conditions such as these can often benefit from care from specialists; however, specialists tend to be located in urban areas.[7] Specifically, according to the National Rural Health Association, the number of specialists in rural communities is 30 per 10,000 residents compared to 263 specialists per 10,000 residents in urban areas.[8] Lack of specialty care access can cause adverse medical outcomes and has the potential for higher costs resulting in greater utilization of emergency department visits and hospitalizations.[9] Furthermore, providing access to specialists in the patient's community improves health equity.[10]

Patients in SC face significant challenges accessing specialty care providers. Out of the state's 46 counties, HRSA designates 43 (or 93.5%) as completely or partially medically underserved.[11] Workforce distribution and access issues are evident in that 44, or 95.6%, of SC's counties are designated as full or partial Primary Care Health Professional Shortage Areas (HPSAs).[11]

Telehealth visits for specialty care at MUSC are offered in a diverse array of subspecialties including neurology, endocrinology, rheumatology, psychiatry, and nutrition. Accessing these services would be otherwise limited by travel and related barriers to care. As a primary initiative to address care access inequities in the setting of universal access to broadband, the rate of specialty-advised care delivered by geography will be targeted. The disparities in access to specialty-advised care are highly prevalent in rural areas and in areas with minority populations. The extent of these disparities has been identified in SC, and target goals have been established to mitigate the gaps. If broadband is universally provided to all of our citizens, the goals presented here are achievable through the development and growth of telehealth services, the improvements of digital literacy, community engagement, and the continued collaboration of healthcare systems and insurance companies to make this vision cheaper.

Figure A. Specialty Utilization Among Medicare Population in South Carolina for Neurology:[12]



Using a 5% national sample of Medicare data from 2018-2019, neurology visit consultation volumes per capita for each county were calculated, and counties were stratified into quartiles for mapping based on county visit rates. For the counties in the bottom 3 quartiles, the number of visits needed for each county to advance to the quartile above them was calculated and overlayed onto the county map. This helped visualize the scale of added telehealth specialty visits needed in each county to achieve more equitable access to specialty care access using neurology consultations as a point of reference. As shown in Figure A, map results show low neurology outpatient utilization among Medicare participants in rural counties in SC, particularly along the I-95 corridor which is a region known for low access to care and poorer health outcomes. [13]

5-year goal:
Increase all highest-need counties to the next quartile of specialty access. For neurology, this would indicate at least 18,336 additional specialty visits in these counties annually.

III. Virtual Urgent Care

All citizens in SC should have access to affordable and immediately available patient-initiated acute and urgent care from an in-state provider. Virtual urgent care (VUC) is a convenient service designed to engage individual patients through their own available devices in order to optimize utilization and maximize healthcare engagement. These services are offered to meet both the immediate needs of the patient and to achieve patient engagement to enhance population health and preventive care. Usually completed asynchronously (not in real-time), these virtual visits allow patients to complete an online questionnaire specific to their health concern, connect with a provider, and receive a diagnosis and next steps such as a prescription the same day. This program opens the door to simple, accessible care for our SC residents, at their fingertips.

MUSC, along with other health systems in the state, offers an iteration of VUC with a wide range of low-acuity visit types to any South Carolinian in need of care. In 2022 alone, 65,000+ virtual urgent care visits were conducted in SC.[14]

With a diminished digital divide, patient VUC utilization has the potential to increase across SC households, targeting the most socially vulnerable areas that otherwise lack access to brick-and-mortar care. To assess geographical rates of VUC utilization in relation to social vulnerability, the maps below were created. Rates of VUC encounters were calculated per capita by patient zip code using MUSC's VUC telehealth platform data (Figure B). Zip codes were stratified into quartiles based on VUC utilization rates and quartiles were mapped. Utilization rate maps of MUSC's primary tri-county market (Charleston, Berkley, and Dorchester counties) were then compared with zip code mapping of social vulnerability based on the CDC's social vulnerability index (SVI) (Figure C). In Figure B, the top quartile (darker blue) represents highest VUC utilization, and in Figure C it represents the highest social vulnerability. Maps of virtual urgent care visits per capita (that were free during COVID) within the large contiguous Charleston tri-county area in coastal SC show an inverse relationship to the areas with the lowest social vulnerability. This trend of low utilization among the most vulnerable population was also found in a New York study.[15]

Figure B. Tri-County Virtual Urgent Care Visits[12]

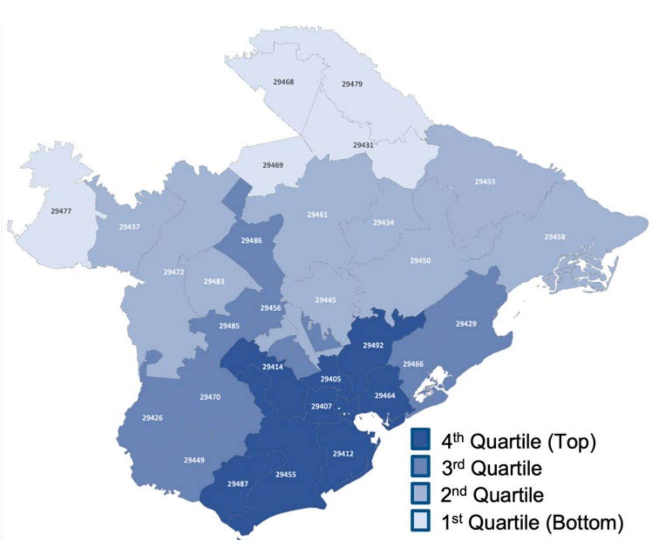
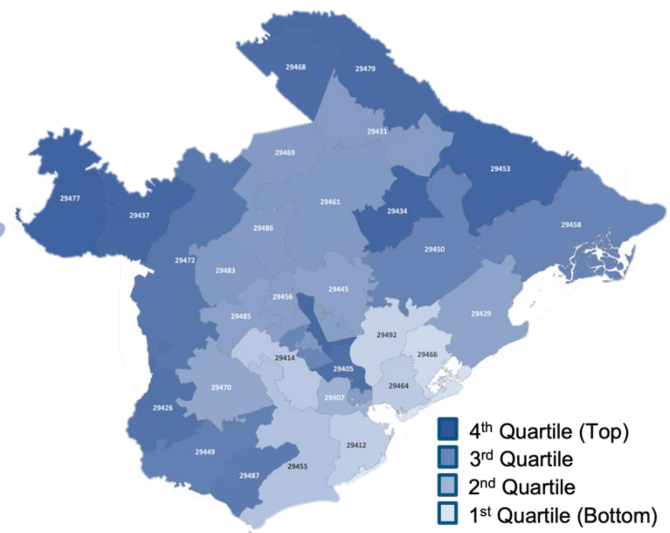


Figure C. Tri-County Social Vulnerability[12]



5-year goal:

Achieve equality of VUC utilization in the tricounty area by targeting the most socially vulnerable counties. This would indicate at least 11,100 additional virtual urgent care visits in these counties annually.

IV. Behavioral Health Access

Mental illness and substance use disorder are highly prevalent in the US. It is estimated that 1 in 5 adults and 1 in 6 youth aged 6-17 experience mental illness each year,[16] and annually 13.9% of US adults meet the criteria for alcohol use disorder[17] and 3.9% for another drug use disorder.[18] Suicide—often the result of untreated mental illness—is the 2nd leading cause of death among people aged 10-34, and the 12th leading cause among all age groups.[19] The high prevalence and acuity of mental illness and substance use disorder—henceforth referred to jointly as behavioral health (BH)—have only worsened since the COVID-19 pandemic.[20] BH is especially concerning in rural communities, which experience similar rates of BH disorders as non-rural communities yet severely lack access to adequate treatment. There are significantly fewer BH providers working in rural areas as compared to the rest of the country.[21,22,23] As a result, rural residents often must either travel far to access BH services or must receive BH treatment from their primary care providers (PCPs), many of whom lack the training and resources to adequately do so.[16,24,25] Limited access to BH services is a likely contributor to the higher rate of suicide among rural Americans, which is nearly twice that of urban Americans.[26]

SC, which has a higher proportion of rural residents (34%) than the national average (19%),[27] is representative of these national trends in rural BH access, with 17 of SC's 46 counties being without a practicing psychiatrist, and 22 of the 46 having fewer than ten psychiatrists.[28] This limited access has led to SC being ranked 43rd out of US states in terms of mental health care access.[29]

According to the Substance Abuse and Mental Health Services Administration, "Telehealth has the potential to address gaps in mental health and substance use treatment, make treatment services more accessible and convenient, improve health outcomes, and reduce health disparities. But this is all dependent on broadband access."[30] In 2023, approximately 75% of MUSC's outpatient BH services were provided via telehealth directly to patients' homes, and this rate is closer to 87% for patients living outside the Charleston Tri-County Area, suggesting many are using telehealth to address challenges to accessing BH services. Given its amenability to behavioral health treatment, telehealth could truly level the playing field for BH access. However, this requires equitable broadband access.

Moreover, because rural residents often seek BH services from their PCP, integrating BH services into the context of primary care is of utmost importance. MUSC's longstanding outpatient telepsychiatric consultation program, in which primary care coordinated psych consultations, recently began providing its services directly to patients' homes.[31] MUSC also is piloting a telehealth-enabled psychiatric collaborative care model (CoCM)[32] in four rural clinics. This program takes a team-based approach, leveraging a behavioral healthcare manager who works closely with PCPs across multiple locations to manage patients and receives weekly case reviews and recommendations from a consulting psychiatrist. Patients participating in this model can participate in app- or web-based monitoring and psychoeducation as well as video visits with the care manager. Removing the digital divide would allow us to expand these models to more primary care patients in rural areas.

5-year goal:
Based on mapping of BH outpatient access currently underway using claims data, target counties in the lowest two quartiles with direct and primary care integrated BH services. Improve the mean utilization among the lowest two quartiles by 35%. Expand CoCM program to support primary care clinics in 80% of at least 15 of the lowest-utilizing counties.

V. Remote Patient Monitoring

Diabetes was the 7th leading cause of death in 2019 and affects 11.3% of the US population.[33] For those 65 years old or older, the percentage of adults with diabetes increases to 29.2%.[34] According to the American Diabetes Association, people with diabetes have medical expenses that are approximately 2.3 times higher than those who do not have diabetes.[35] The estimated cost of diagnosed diabetes in 2017 was $327 billion, including $237 billion in direct medical costs and $90 billion in reduced productivity.[36] Diabetes disproportionally affects rural, underserved, and minority communities at a disproportionate rate[37,38] compared to urban communities due to several risk factors associated with living in rural communities and workforce shortage challenges.[37]

SC has the 6th highest prevalence of diabetes in the country with 1 in 7 adults being diagnosed with the disease.[39] The cost of care for South Carolinian adults with diabetes in 2017 was estimated to be $4.3 billion.[35] Social determinants of health, race, and ethnicity influence health outcomes for individuals with diabetes.[40,41] Rural communities face additional barriers including poor transportation and technological infrastructure.[41] Furthermore, the prevalence of diabetes highlights significant disparities that exist in our state as 1 in 5 African Americans have been diagnosed with diabetes compared to 1 in 8 adults.[39]

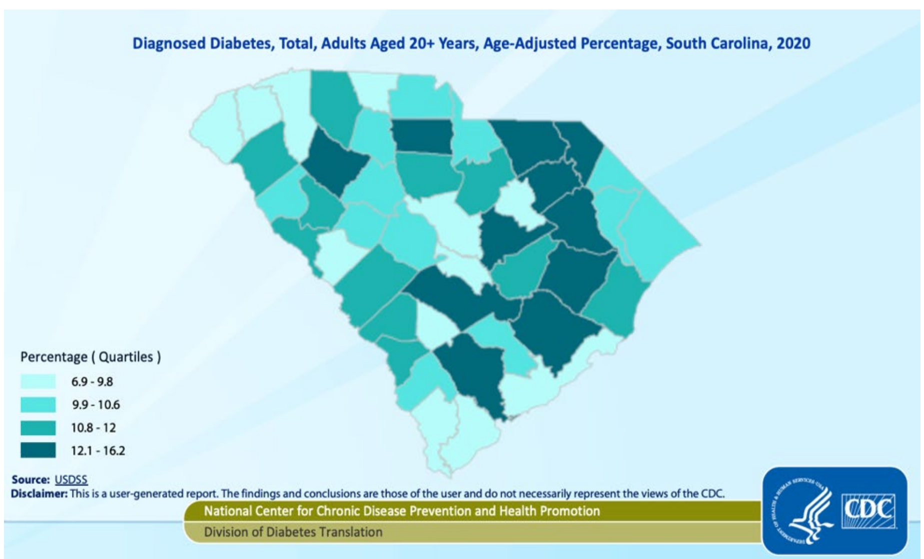
The need for interventions to enhance diabetic control is dire in SC, particularly for those patients who also have comorbid hypertension which can seriously exacerbate the sequelae associated with uncontrolled diabetes. Specifically, 2 out of 3 people with type 2 diabetes also have hypertension.[42] People who have both diabetes and hypertension have approximately twice the risk of having a heart attack and stroke as those without diabetes and hypertension.[42]

Telehealth services are being used increasingly to remotely monitor patient health data[43] regardless of access to care in a patient's community.[41] Remote physiological monitoring (RPM) is a type of telemedicine that supports the transmission of data from the patient to a provider.[41] MUSC's diabetic RPM program, Technology Assisted Care Management 2 (TACM2) specifically targets improving diabetes and hypertension among low-income and rural populations across the state. Using a telehealth monitoring device, participants are provided materials to daily test their blood glucose and blood pressure levels. These daily readings are automatically uploaded and stored to a secure server, which the MUSC case managers can access in real-time to intervene with patient education or medication modification as necessary.

Remote physiologic monitoring of both blood sugar and blood pressure is feasible and effective.[41] Specifically, a study on the effectiveness of the TACM-2 program found clinically significant reductions in HbA_{1c} and that the program helped patients attain and maintain improved glycemic control.[41] Furthermore, a RPM program based at the University of Mississippi Medical Center targeting rural and low-income populations with a focus on uncontrolled hypertension found that participants had a significant blood pressure reduction.[41]

In summary, the implementation of RPM has the ability to change primary care management of chronic diseases such as diabetes and hypertension. A goal of making RPM available to at least 10% of diabetic patients, targeting the most poorly controlled diabetes and those with comorbid hypertension in SC's highest-needs counties. This is achievable following the deployment of broadband to all homes coupled with investments in home-based technologies and an inclusive reimbursement landscape. If achieved, approximately 10,000 citizens annually would be supported to manage their chronic disease with expert RPM nursing teams and ongoing monitoring as calculated by reaching the 11 counties with the highest prevalence of diabetes[44] (as shown in Figure C) and who are estimated to have hypertension as a comorbid condition.

Figure C. Centers for Disease Control and Prevention SC Map of Diabetes Diagnoses[45]



VI. Maternal Mental Health & Substance Use Care

Moms IMPACTT [**Imp**roving **A**ccess to Perinatal Mental Health and Substance Use Disorder **C**are Through **T**elehealth and **T**ele-mentoring] provides direct access to mental health treatment in response to the state's treatment services gaps including a large percentage of rural, low or no maternity care access and Medically Underserved Areas in Primary Care and Mental Health Healthcare Provider Shortage Areas. The program has demonstrated benefits in creating better access to care for women with perinatal mental health and substance use disorders and supporting frontline health providers that care for them. The program leverages statewide partnerships and a home-based virtual care model to provide: 1) perinatal women with immediate access by phone or internet to a trained clinician who can provide care coordination and an appropriate level of perinatal psychiatry services (i.e., psychotherapy and/or medication management) during pregnancy and throughout the postpartum year; 2) communication and care coordination with the women's healthcare provider, as appropriate; and 3) healthcare provider training and real-time psychiatric consultation for the management and treatment of perinatal mental health and substance use disorders.

Year 1 Outcomes:
Within the first 12 months, the program reached 45 of SC's 46 counties. There were 938 encounters with 74% resulting in patient-provider telehealth visits or provider-provider teleconsultation. Most calls were directly from perinatal women, with 97.2% (911/938) of women requesting mental health support. Services were delivered to 906 perinatal women (63% white, 31% black, 9.3% Hispanic) of which 59% were insured by Medicaid, 94% reside in counties designed as fully Medically Underserved Areas, and 45% reside in counties designed as fully rural. Mood, anxiety, and trauma-related disorders (62.4%, 58% and 36.3%, respectively) were the most common diagnoses among patients receiving care from Women's Reproductive Behavioral Health providers via telemedicine. Of the 15% of patients diagnosed with a substance use disorder, Alcohol Use Disorder (30.3%) and Opioid Use Disorder (27.3%) were the most common. Interestingly, 65% of all patients contacting the program requested resources for peer and/or community support. Additionally, the program completed 27 consultations, and trainings with a total of 443 providers. Importantly, we know this is only a fraction of women needing these services. With approximately 60,000 births per year in SC and a ~20% prevalence rate of perinatal mood, anxiety, and substance use disorders, we are only providing care for less than 10% of women needing this care.

Current broadband gaps prevent women from accessing this program and receiving home-based telehealth services which are the preferred, easily accessible, and utilized forms of tele-mental health care. Home-based tele-mental health services overcome gender specific barriers to care such as lack of transportation, time, and/or childcare resulting in a significant volume of women accessing care and greater retention in treatment.

If the digital divide in SC were eliminated it would create greater equity in access to maternal mental health and substance use disorder care for all pregnant and postpartum women.
We would ensure statewide broadband access and provide devices and internet service coverage to women without access. Outreach efforts to patient populations would include digital literacy educational programs. These educational programs could be incorporated into labor and delivery units and local libraries.

Maternal mental health conditions are a leading cause of maternal mortality and carry significant morbidity for women's health and children's development. Treatment of these conditions has been shown to reduce suicide and improve women's health and functioning and children's development. Untreated maternal mental health and substance use disorders are costly.

Unrecognized and untreated perinatal mood and anxiety disorders alone cost $32,000 per mother/infant dyad. Therefore we anticipate with greater access to care, we anticipate cost savings and improvements in women's and children's health.

As an extension to the Mom IMPACTT program, MUSC has demonstrated the viability of a newborn home visitation program (Listening to Women), with evidence of improved outcomes from both mothers and babies, while lowering costly emergency care.[46] This program provides the rapid connection to social support resources from nurse experts to mothers and their newborn babies through secure text messaging and video-based home assessments. Over the next five years, this program will be extended to SC community birthing hospitals, prioritizing those serving rural areas.[47]

5-year goal:
Increase access to maternal mental health and substance use disorder care via telehealth to pregnant and postpartum mothers in SC by expanding offerings to our highest-need areas in the state. A goal of ensuring that all mothers and their infants of SC counties with the highest maternal vulnerability are offered enrollment in these virtual support programs would be an achievement of serving over 4,000 additional families in rural areas of the state directly into their homes.[48]

VII. *Stroke* Telerehabilitation-Occupational Therapy

South Carolina (SC) is in the center of the 'stroke belt', an area of the southeastern USA where stroke prevalence is high, and the age of stroke survivors is low. Stroke is the leading cause of disability in the USA. Because of long-term movement and/or cognitive deficits, most stroke survivors require assistance with functional daily self/home care, work, or community activities and cannot drive. Specialized stroke rehabilitation services reduce disability, but the CDC estimates that in rural southeastern states like SC ~50% of the population resides in areas requiring >30 minutes' drive to rehabilitation facilities. This is a significant barrier because friends/family may not be able to take time off work for transport, and public transportation may be limited or non-existent. Thus, for many stroke survivors, stroke telerehabilitation is their only rehabilitation option.

The mission of MUSC's Stroke Telerehabilitation-Occupational Therapy (Stroke Tele-OT) program is to provide high-quality telerehabilitation to stroke survivors throughout SC who otherwise have little or no access to specialized stroke rehabilitation services. With Duke Endowment funding, we created a comprehensive, occupational therapy-led, stroke telerehabilitation program that focuses on survivors' functional independence in the home and community.

In the first 8 months of the program's full implementation, 100 stroke survivors were referred. Referrals average 55 years of age, i.e., are young, employed, and busy with family responsibilities. Approximately 40% are underrepresented minorities and ~80% reside in a medically underserved SC County. For those patients with broadband access and who complete a ~6-week program (2-3 tele visits per week), the response is overwhelmingly positive with ~90% demonstrating significant improvements in achieving meaningful home/community functional independence goals thus improving quality of life, return to work, and enabling survivors to safely thrive at home.

Approximately 1/3 of our Stroke Telerehabilitation referrals are unable to either begin or complete the telerehab program because of barriers with broadband access. There are weeks where 3 or more stroke survivors are unable to enroll in the program because each had no broadband access in their rural community. Sadly, each of these survivors would have no other rehabilitation option.

The prevailing broadband gaps within SC have a profound impact on this program in 3 ways. First, patients with no broadband access are unable to access telerehabilitation healthcare services. Survivors and caregivers have limited access to critical stroke recovery information provided via telehealth including preventive and wellness care, mental health support, specialized stroke educational programs, clinical rehabilitation sessions, and online support groups. This exclusionary impact undermines the comprehensiveness and inclusivity of our program, further distances rural and marginalized populations from the benefits of stroke rehabilitation, and ultimately leads to poor outcomes.

Second, patients with poor-quality broadband can experience life-threatening safety issues. In-home telerehabilitation often involves having a patient practice everyday activities with therapist skill-coaching via a video call. The therapist must pay close attention to the patient's balance (e.g., while bending/reaching in the kitchen) and/or the patient's position relative to objects (e.g., cutting with a knife during a cooking activity). Poor broadband (e.g., slow connection, grainy video, continuous buffering stoppages, or dropped video) heightens the risk of a serious fall and/or patient injury.

Finally, poor quality broadband, (1) increases tele-session difficulty, and (2) decreases tele-session efficacy. When poor quality broadband makes accessing a tele-session more difficult, the cognitive skill demands placed on the patient increase and may exceed their capacity, hence unfairly disqualifying patients with cognitive impairment. Moreover, the tech demands on the therapist increase as he/she must spend valuable (and costly) time assisting with connectivity issues rather than addressing rehab goals.

Eliminating the digital divide would have a positive impact on this program by enabling more equitable patient access to specialized stroke rehabilitation across the state. The program would have the ability to expand into rural and medically underserved areas where there are currently no rehabilitation providers and very few rehabilitation opportunities for stroke survivors. By offering stroke survivors access to high-quality broadband, the initiative can provide seamless rehabilitation for a wider SC population.

5-year goal:
Establish community-driven partnerships to expand telerehab access in areas of SC known to have a high population of stroke survivors help to identify/solve community-specific issues relative to

stroke survivors' telerehabilitation access. By prioritizing the highest stroke prevalence counties in South Carolina and offering stroke rehab to all survivors, over 1000 patients annually would be receiving in-home telerehab services.

VIII. *Conclusion*

As evidenced by the experience and potential strategies of these significant use cases, the leveraging of telehealth has significant potential to reduce care disparities in South Carolina. The previous investments from state and federal resources have positioned the state to take full advantage of the growth in broadband access in a targeted and impactful way. Enhancements in digital literacy, continued collaboration and focus on technical ingenuity to enhance care delivery efficiencies will be essential to realizing the state visions. The strategic and goal-driven approach stated for these select use cases has even further potential for impact as the approach is extended across a broader variety of settings, and South Carolina eagerly looks forward to the challenge of realizing the benefits of increased access to broadband for the citizens we serve.

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[1] FAIRHealth. *The Evolution of Telehealth during the COVID-19 Pandemic*; FAIR Health: New York, NY, USA, 2022. Available online: https://s3.amazonaws.com/media2.fairhealth.org/brief/asset/The%20Evolution%20of%20Telehealth%20during%20the%20COVID-19%20Pandemic-A%20FAIR%20Health%20Brief.pdf (accessed on 17 July 2023).

[2] FAIRHealth. Monthly Telehealth Regional Tracker. 2023. Availabe online: https://www.fairhealth.org/fh-trackers/telehealth (accessed on 18 July 2023). Shaver, J. The State of Telehealth Before and After the COVID-19 Pandemic. *Prim. Care* 2022, *49*, 517–530. https://doi.org/10.1016/j.pop.2022.04.002.

[3] Hsiao V, Chandereng T, Huebner JA, Kunstman DT, Flood GE, Tevaarwerk AJ, Schneider DF. Telemedicine Use across Medical Specialties and Diagnoses. Appl Clin Inform. 2023 Jan;14(1):172-184. doi: 10.1055/s-0043-1762595. Epub 2023 Mar 1. PMID: 36858112; PMCID: PMC9977562.

[4] Rodriguez, J.A.; Shachar, C.; Bates, D.W. Digital Inclusion as Health Care—Supporting Health Care Equity with Digital-Infrastructure Initiatives. *N. Engl. J. Med.* 2022, *386*, 1101–1103. https://doi.org/10.1056/NEJMp2115646.

[5] Washington University School of Medicine. (2021). *Three Aspects of Health and Healing: The Biopsychosocial Model in Medicine*. Retrieved August 30, 2023 from: https://surgery.wustl.edu/three-aspects-of-health-and-healing-the-biopsychosocial-model/

[6] Centers for Disease Control and Prevention. (2023). *About Rural Health.* Retrieved August 29, 2023 from: https://www.cdc.gov/ruralhealth/about.html

[7] Rural Health Information Hub. (2023). *Telehealth Models for Increasing Access to Specialty Care. Retrieved August 29, 2023 from:* https://www.ruralhealthinfo.org/toolkits/telehealth/2/care-delivery/specialty-care

[8] National Rural Health Association. (n.d.) *About Rural Health Care*. Retrieved August 29, 2023 from: https://www.ruralhealth.us/about-nrha/about-rural-health-care

[9] Felland LE, Lechner AE, Sommers A. Improving access to specialty care for medicaid patients: policy issues and options. New York: Commonwealth Fund, 2013.

[10] Lesher AP, Fakhry SM, DuBose-Morris R, Harvey J, Langston LB, Wheeler DM, Brack JT, McElligott JT. Development and Evolution of a Statewide Outpatient Consultation Service: Leveraging Telemedicine to Improve Access to Specialty Care. Popul Health Manag. 2020 Feb;23(1):20-28. doi: 10.1089/pop.2018.0212. Epub 2019 Jun 4. PMID: 31161963.

[11] U.S. Department of Health and Human Services. HRSA Data Warehouse. Health Shortage Areas. https://data.hrsa.gov/. Published 2022. Accessed March 8, 2022.

[12] Kruis, R., Dooley, M., Simpson, A., & McElligott, J. (n.d.). Use of health care utilization heatmaps to inform statewide telehealth policy and expansion in South Carolina. Telehealth Center of Excellence (COE). https://telehealthcoe.org/wp-content/uploads/2023/01/ICHPS_Poster_122222.pdf

[13] Healthcare Cost and Utilization Project (HCUP). Agency for Healthcare Research and Quality, Rockville, MD. https://www.ahrq.gov/data/hcup/index.html
[14] 2022 SCTA Annual Report . South Carolina Telehealth Alliance. (n.d.). https://sctelehealth.org/-/sm/sctelehealth/f/reports/2023/scta-2022-annual-report-accessible.ashx
[15] Lame, M., Leyden, D., & Platt, S. L. (2021). Geocode Maps Spotlight Disparities in Telehealth Utilization During the COVID-19 Pandemic in New York City. Telemedicine journal and e-health : the official journal of the American Telemedicine Association, 27(3), 251–253.
[16] National Alliance on Mental Illness. Mental Health By the Numbers. Accessed 2/25/2023, https://www.nami.org/mhstats
[17] Grant BF, Goldstein RB, Saha TD, et al. Epidemiology of DSM-5 Alcohol Use Disorder: Results From the National Epidemiologic Survey on Alcohol and Related Conditions III. *JAMA Psychiatry*. 2015;72(8):757-766. doi:10.1001/jamapsychiatry.2015.0584
[18] Grant BF, Saha TD, Ruan WJ, et al. Epidemiology of DSM-5 Drug Use Disorder: Results From the National Epidemiologic Survey on Alcohol and Related Conditions–III. *JAMA Psychiatry*. 2016;73(1):39-47. doi:10.1001/jamapsychiatry.2015.2132
[19] National Institute of Mental Health. Suicide. Accessed 2/23/23, https://www.nimh.nih.gov/health/statistics/suicide
[20] SAMHSA releases 2020 National Survey on Drug Use and Health. 10/26/2021, 2021. Accessed 10/1/2022. https://www.samhsa.gov/newsroom/press-announcements/202110260320
[21] Andrilla CHA, Patterson DG, Garberson LA, Coulthard C, Larson EH. Geographic Variation in the Supply of Selected Behavioral Health Providers. *Am J Prev Med*. Jun 2018;54(6 Suppl 3):S199-s207. doi:10.1016/j.amepre.2018.01.004
[22] Miller BF, Petterson S, Burke BT, Phillips RL, Jr., Green LA. Proximity of providers: Colocating behavioral health and primary care and the prospects for an integrated workforce. *Am Psychol*. May-Jun 2014;69(4):443-51. doi:10.1037/a0036093
[23] Morales DA, Barksdale CL, Beckel-Mitchener AC. A call to action to address rural mental health disparities. *J Clin Transl Sci*. May 4 2020;4(5):463-467. doi:10.1017/cts.2020.42
[24] Wang PS, Demler O, Olfson M, Pincus HA, Wells KB, Kessler RC. Changing profiles of service sectors used for mental health care in the United States. *Am J Psychiatry*. Jul 2006;163(7):1187-98. doi:10.1176/appi.ajp.163.7.1187
[25] Powers DM, Bowen DJ, Arao RF, et al. Rural clinics implementing collaborative care for low-income patients can achieve comparable or better depression outcomes. *Fam Syst Health*. Sep 2020;38(3):242-254. doi:10.1037/fsh0000522
[26] Hedegaard H, Curtin, S. C., Warner, M. *Suicide Mortality in the United States, 1999–2017*. Data Brief. 2018. *NCHS Data Brief*. November 2018. Accessed 10/1/22. https://www.cdc.gov/nchs/data/databriefs/db330-h.pdf
[27] U.S. Census Beureau. Data from: DEC Summary File 1: P2 | Urban and Rural. 2010. *https://data.census.gov/*.
[28] Unützer J, Katon W, Callahan CM, et al. Collaborative care management of late-life depression in the primary care setting: a randomized controlled trial. *Jama*. Dec 11 2002;288(22):2836-45. doi:10.1001/jama.288.22.2836
[29] Mental Health America. Access to Care Data 2022. Accessed 10/1/2022, https://mhanational.org/issues/2022/mental-health-america-access-care-data
[30] Substance Abuse and Mental Health Services Administration. Digital Access: A Super Determinant of Health. *SAMSHA Blog* blog. March 22, 2023, Accessed August 24, 2023.
[31] Lesher AP, Fakhry SM, Dubose-Morris R, et al. Development and Evolution of a Statewide Outpatient Consultation Service: Leveraging Telemedicine to Improve Access to Specialty Care. Article. *Population Health Management*. 2020;23(1):20-28. doi:10.1089/pop.2018.0212
[32] Centers for Medicare and Medicaid Services: Medicare Learning Network. *Behavioral Health Integration Services (MLN909432)*. 2022. MLN909432. February 2022. Accessed 10/1/2022. https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/Downloads/BehavioralHealthIntegration.pdf
[33] American Diabetes Association. (2022). *Statistics About Diabetes.* Retrieved August 29, 2023 from: https://diabetes.org/about-us/statistics/about-diabetes
[34] National Diabetes Statistics Report. Centers for Disease Control and Prevention 2022. https://www.cdc.gov/diabetes/data/statistics/statistics-report.html.
[35] American Diabetes Association. (n.d.) *The Burden of Diabetes in South Carolina.* Retrieved August 30, 3023 from: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://diabetes.org/sites/default/files/2021-11/ADV_2021_State_Fact_sheets_South%20Carolina_rev.pdf

[36] American Diabetes Association. (n.d.) *The Cost of Diabetes.* Retrieved August 29, 2023 from: https://diabetes.org/about-us/statistics/cost-diabetes
[37] Rural Health Information Hub. (n.d.) *Why Diabetes is a Concern for Rural Communities.* Retrieved August 29, 2023 from: https://www.ruralhealthinfo.org/toolkits/diabetes/1/rural-concerns
[38] Centers for Disease Control and Prevention. (2023). Advancing Health Equity. Retrieved August 30, 2023 from: https://www.cdc.gov/diabetes/health-equity/index.html
[39] SC Department of Health and Environmental Control. (2022). *Diabetes Impact in South Carolina.* Retrieved August 29, 2023 from: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://scdhec.gov/sites/default/files/Library/CR-013028.pdf
[40] Walker RJ, Strom Williams J, Egede LE. Influence of Race, Ethnicity and Social Determinants ofHealth on Diabetes Outcomes. Am J Med Sci. 2016 4;351(4):366–73. doi: 10.1016/j.amjms.2016.01.008. [PubMed: 27079342]
[41] Kirkland EB, Marsden J, Zhang J, Schumann SO, Bian J, Mauldin P, Moran WP. Remote patient monitoring sustains reductions of hemoglobin A1c in underserved patients to 12 months. Prim Care Diabetes. 2021 Jun;15(3):459-463. doi: 10.1016/j.pcd.2021.01.005. Epub 2021 Jan 25. PMID: 33509728; PMCID: PMC8131229.
[42] New York-Presbyterian. (n.d.) *Diabetes Resource Center.* Retrieved August 29, 2023 from: https://www.nyp.org/diabetes-and-endocrinology/diabetes-resource-center/diabetes-and-hypertension#:~:text=%E2%80%9CDiabetes%20causes%20damage%20by%20scarring,contribute%20to%20high%20blood%20pressure.%E2%80%9D
[43] Eric L. Johnson, Eden Miller; Remote Patient Monitoring in Diabetes: How to Acquire, Manage, and Use All of the Data. *Diabetes Spectr* 15 February 2022; 35 (1): 43–56. https://doi.org/10.2337/dsi21-0015
[44] Greenberg KP, Sarrica Barefoot B, Gaul K. (2021). 2021 South Carolina Health Professions Data Book. Charleston, SC: South Carolina Office for Healthcare Workforce, South Carolina Area Health Education Consortium.
[45] Centers for Disease Control and Prevention. (n.d.). Diagnosed Diabetes - Total, Adults Aged 18+ Years, Age-Adjusted Percentage. Centers for Disease Control and Prevention. https://gis.cdc.gov/grasp/diabetes/diabetesatlas-surveillance.html
[46] Dodge KA, Goodman WB, Murphy RA, O'Donnell K, Sato J, Guptill S. Implementation and randomized controlled trial evaluation of universal postnatal nurse home visiting. Am J Public Health. 2014 Feb;104 Suppl 1(Suppl 1):S136-43. doi: 10.2105/AJPH.2013.301361. Epub 2013 Dec 19. PMID: 24354833; PMCID: PMC4011097.
[47] National Vital Statistics Reports. Centers for Disease Control and Prevention. (2023, January 30). https://www.cdc.gov/nchs/data/nvsr/nvsr72/nvsr72-01.pdf?ftag=MSF0951a18
[48] March of Dimes. (n.d.). 2022 March of Dimes Report Card for South Carolina. March of Dimes | PeriStats. https://www.marchofdimes.org/peristats/reports/south-carolina/report-card

High-Speed Internet Connectivity and Precision Agriculture

BROADBAND OFFICE

Broadband Equity, Access, and Deployment (BEAD) Program High-Speed Internet Connectivity and Precision Agriculture

October 16, 2023

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CLEMSON ENGINEERS FOR DEVELOPING COMMUNITIES

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CLEMSON UNIVERSITY

CU-CAT
CLEMSON® UNIVERSITY CENTER FOR AGRICULTURAL TECHNOLOGY

Title: TECHFARM: A program to encourage adoption of rural broadband expansion among farms and agribusinesses in South Carolina

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INTRODUCTION

Last year, only 14% of producers in South Carolina reported using precision agriculture practices, and additionally, only 83% reported having internet access (USDA-NASS, 2023). Improvement of rural connectivity in South Carolina can substantially benefit rural economies through improved agricultural productivity and profitability, among other mechanisms. However, ensuring that consumers capitalize on the expanded network capabilities will best be supported through a multi-faceted research, extension and outreach, and teaching and training plan with the ability to: (1) assign or assist in valuation of farmer and agribusiness adoption of various technologies, (2) validate profitability in South Carolina of various new and emerging technologies, (3) demonstrate new opportunities to rural agribusinesses, (4) and provide opportunities for training so that adopters can maximize their potential benefits of connected technologies. With recent establishment of its Center for Agricultural Technology (CU-CAT) in collaboration with the Clemson Engineers for Developing Communities program (CEDC), Clemson University is well-positioned to strategically coordinate execution of each of these tasks in collaboration across its extension, research, and teaching units through the Technology, Education, and Connectivity for High-Performance Farming (TECHFARM) program envisioned here.

Existing Status of Connectivity Surrounding Clemson Research and Education Centers

A detailed assessment of Clemson's Research and Education Centers (RECs) has been performed looking at access to broadband at the REC and the surrounding population centers. Evaluations were also performed looking at crop coverage across the State and specifically in 5-, 10-, and 25-mile buffers around the RECs. Based on the lack of available broadband and the percentage of acreage the Edisto REC is clearly the location benefitting the most from investment in broadband infrastructure and precision agriculture due to the highest percentage of crop acreage within proximity and generally low levels of current connectivity. Additional details are included in the Appendix. Within the plan proposed here, Edisto REC is proposed to be the state's Flagship Precision Agriculture training, demonstration, and innovation facility, to serve as a model for other demonstration sites located throughout the state.

General Benefits of Improving Rural Connectivity

Improved connectivity in rural areas addresses a wide range of essential needs, many of which are related to agriculture. Improved connectivity can transform agriculture and rural economies by providing access to information, markets, education, training, financial services, technology, healthcare, and emergency services. This, in turn, has the potential to transform rural communities, lead to increased agricultural productivity and profitability, enhance their quality of life, and contribute to their long-term sustainable development. There are several specific ways outlined in this document demonstrating how improved connectivity can benefit agriculture and rural economies, including, but not limited to the following:

1. Access to Information. Rural areas often lack access to timely and relevant information, such as weather forecasts, market prices, and agricultural best practices. Improved connectivity allows farmers to access this information, enabling them to make informed decisions about their farming activities.
2. Market Access. Rural farmers often face challenges in accessing markets for their products. Improved connectivity can connect them to regional, national, and international markets, expanding their customer base and increasing their sales opportunities.

3. Financial Inclusion. Many rural residents lack access to formal banking and financial services. Improved connectivity can enable the provision of mobile banking, digital payments, and access to credit, helping rural communities manage their finances and invest in their livelihoods.
4. Agricultural Extension Services. Rural areas typically have limited access to agricultural extension services, which provide crucial knowledge and support to farmers. Connectivity can facilitate the delivery of virtual extension services, including advice, training, and information on new technologies.
5. Education and Training. Rural residents, including farmers, often lack access to quality education and training opportunities. Improved connectivity can support online education, vocational training, and skill development programs, enhancing the knowledge and capabilities of rural populations.
6. Healthcare Services. Rural healthcare facilities may be limited, making it challenging for residents to access medical advice and services. Improved connectivity can enable telemedicine and telehealth solutions, allowing rural communities to receive medical consultations and support remotely.
7. Entrepreneurship and Job Opportunities. Improved connectivity can foster entrepreneurship and job creation in rural areas. It enables individuals to access online job platforms, start online businesses, and participate in the gig economy, reducing rural-to-urban migration.
8. Emergency Services. Rural communities often face challenges in accessing emergency services and disaster relief. Improved connectivity can support the development of early warning systems and communication networks for emergency response.
9. Infrastructure Development. Connectivity is essential for the efficient development and maintenance of rural infrastructure, including roads, bridges, and utilities. It facilitates communication and coordination among government agencies, contractors, and local communities.
10. Social Inclusion. Improved connectivity can reduce social isolation in rural areas by enabling residents to connect with friends and family through social media and online communication tools. This can contribute to improved mental health and well-being.
11. E-Government Services. Connectivity can facilitate the delivery of government services to rural populations, including online access to government forms, applications, and information, streamlining administrative processes.
12. Agricultural Productivity. Connectivity supports precision agriculture by enabling the use of sensors, drones, and data analytics. This leads to more efficient resource management, reduced input costs, and increased agricultural productivity.
13. Environmental Conservation: Connectivity can aid rural communities in monitoring and managing their natural resources and ecosystems. It supports data collection and analysis for sustainable land use and conservation efforts.
14. Empowerment of Women and Youth: Improved connectivity can empower women and youth in rural areas by providing them with access to education, employment opportunities, and platforms for entrepreneurship.
15. Disaster Preparedness: Rural areas are often vulnerable to natural disasters. Connectivity can enhance disaster preparedness and response by providing real-time information and communication during emergencies.

Demonstrated Success Stories

There are several success stories from various rural areas around the world that demonstrate the tangible benefits of improving rural connectivity. These success stories highlight how enhanced connectivity has positively impacted various aspects of rural life, including agriculture, education, healthcare, and economic development, and they also serve as examples to South Carolina of ways that our overall, rural well-being might benefit from improved connectivity.

In rural areas of the United States, precision agriculture has become more prevalent due to improved connectivity. Farmers use sensors, GPS technology, and data analytics to optimize resource allocation, resulting in higher crop yields and reduced environmental impact.

India has made significant strides in improving rural connectivity through initiatives like the Digital India program. One notable success story is the use of digital platforms to disseminate agricultural information to farmers. Farmers can access weather forecasts, market prices, and best practices through mobile apps, resulting in improved crop yields and income.

The Scottish government's commitment to rural connectivity has led to the installation of a fiber-optic broadband network in remote areas. This has boosted local businesses, supported tourism, and improved residents' quality of life.

Trends in Ag Connectivity

Trends in bandwidth requirements for farming and agribusiness operations

Historical trends in agriculture have shown a consistent increase in bandwidth requirements due to the growing reliance on data-driven technologies, remote sensing, IoT devices, and real-time decision-making. As agriculture continues to advance technologically, the need for reliable and high-speed internet connectivity will remain a critical factor in the industry's success and sustainability.

Early adoption of precision agriculture such as GPS-guided tractors and yield monitoring systems, began in the late 20th century. These early systems required relatively low bandwidth as they primarily involved data logging and simple data transfer.

With the emergence of remote sensing technologies and the Internet of Things (IoT), agriculture became more data-intensive. Farmers started using sensors, drones, and cameras to collect data on soil conditions, weather, crop health, and pest infestations. These devices generate a substantial amount of data that needs to be transmitted and processed, leading to increased bandwidth demands.

Data analytics and machine learning have become integral to modern agriculture. Farmers use data from various sources to make informed decisions about planting, irrigation, and crop management. Analyzing large datasets requires high-speed internet connections and cloud-based solutions. Modern precision agriculture equipment, such as autonomous tractors and robotic harvesters, rely on real-time data and connectivity to operate efficiently. These technologies require low-latency, high-bandwidth connections for remote monitoring and control. Video cameras and remote monitoring systems are increasingly used in agriculture for tasks like livestock management and security. These systems require sufficient bandwidth to transmit high-quality video feeds.

In addition to on-farm data collection, there is a growing trend toward data sharing and collaboration among farmers, researchers, and agricultural stakeholders. This requires robust internet connectivity for secure and efficient data exchange. Because the digitization of agriculture increasingly relies on connectivity, reliable and widely accessible high-speed internet is fundamental for realizing the potential gains associated with using these technologies (McFadden, et al., 2022). Other general summaries of technologies relevant to various connectivity levels and application benefits are provided the literature cited here (USDA, 2019; van Hilten & Wolfert, 2022).

Future projections in bandwidth needs

As automation, artificial intelligence (AI), and machine learning become more prevalent in agriculture, the demand for bandwidth increases further. These technologies require constant data exchanges between farm equipment and cloud-based AI platforms for analysis and decision-making. These technologies often employ photo or video records, which can rapidly consume bandwidth; the outcomes of such technologies are generally proportional to the amount of data available. Therefore, for instance, more imagery translates to improved results for the farmer, regardless of the application. In the interim, many platforms requiring significant processing capabilities are supporting these needs through edge computing using on-board processors – often several of them. These interim solutions drastically increase cost to farmers who adopt these technologies, versus the costs associated with conducting the same processes via cloud computing solutions, which would require robust and high bandwidth capabilities.

Examples of On-Farm Connectivity Solutions and Their Benefits

The list of connected technologies in this section is not meant to be exhaustive, but it is intended to demonstrate the quickly growing, broad space of connected solutions in the agriculture space. The Clemson University Cooperative Extension Service currently has program teams in place to support Agribusiness, Agronomy, Food Systems and Safety, Forestry and Wildlife, Horticulture, Livestock and Forage Production, Rural Health and Nutrition, Water Resources, and Youth and 4-H. While each of these teams has ability to support South Carolina citizens in issues related to various aspects of connected technology, the explosion of technologies across relevant aspects of all of these teams supports the critical need for development of an Extension program team that can specialize in connected agricultural technology and build supportive and collaborative relationships spanning the other program teams. In a recent case study on rural broadband development and adoption (LaRose, et al., 2011), it was stated that "concerted public outreach efforts might be needed to stimulate adoption [of existing broadband in rural areas]." In this study they pointed out that simply building broadband infrastructure would not guarantee adoption, but that when combined with community education, chances for adoption could be improved.

Without such a team specializing in connected agricultural technology, it will be challenging to support our farmers in outreach demonstrating opportunities to fully take advantage of various technologies supported by their existing connectivity levels. In the discussion below, analyses of Web of Science (Clarivate, London, UK) search results for various keywords are used to demonstrate trends over time in the academic space for various topics, to be used as a proxy for rate of growth in the commercial, or applied, on-farm and agribusiness space. The Web of Science provides access to multiple databases and contains over 170 million records from more than 12,000 journals and 160,000 conference proceedings.

Online decision aids / decision support tools

In recent years, several native apps and mobile-friendly web apps have been developed that farmers regularly use to assist in making on-farm management decisions (Figure 1). In most cases, these tools are designed to be accessed by phone or tablet while in the field or working on the farm. The bandwidth requirements for these applications are generally small, however minimum functionality often requires that some connectivity be available. An Australian study suggested that app adoption by farmers – while presenting significant opportunities for improving farm efficiency, information gathering, and maintaining business networks – was hindered substantially by limitations on internet speeds and phone reception in rural areas (Roberts & McIntosh, 2012).

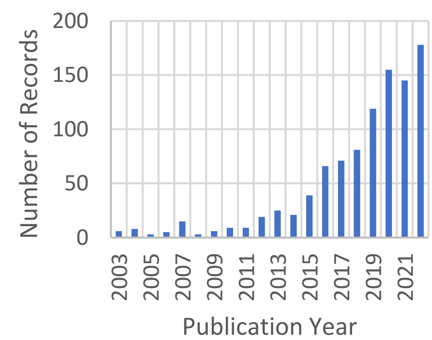

Figure 1. Trend for last 20 years showing number of publications containing "agriculture app" as topic in Web of Science databases.

The Clemson Precision Agriculture program, administered by CU-CAT, has developed sixteen web apps or decision support tools for farmers in the last several years which are accessible online at https://precisionag.sites.clemson.edu/calculators/ and all generally designed to be operated by farmer-users on mobile devices. While these tools are developed and designed for South Carolina farmers and their needs, they are visited by users across the world. In the one year prior to 10 October 2023, these tools attracted more than 106k pageviews from more than 52k users in 175 countries and visitors from every U.S. state. About 5% of these pageviews were from South Carolina users. Applications of these tools include determination of correct fertilizer and lime rates and blends, determination of settings for fertigation (injection of fertilizer through irrigation system), determination of livestock feed ration nutrition and blend optimization, and irrigation scheduling based on soil moisture sensor response. Other connected, calculators and decision support tools developed by Clemson University researchers include tools for irrigation scheduling, evapotranspiration estimation, crop water use, chill hours calculations, growing degree days calculations, and irrigation pumping cost calculations.

Online training support and e-learning

Online training or educational support for agricultural technologies, farm, crop, and livestock management, and machinery and equipment maintenance and troubleshooting comes in many different forms and recent developments are largely towards digitalized formats, especially mobile learning or m-learning, which are often best supported by high bandwidth connections. Recent studies have highlighted the rising importance of bandwidth and bandwidth limitations in various training formats (Figure 1). Furthermore, it was demonstrated in a 2006 dataset that rural broadband users access more online education than those in urban areas (LaRose, et al., 2011).

Because rural connectivity can generate obstacles to adoption of best practices for online training, trends demonstrated outside of the agricultural industry, where connectivity is less likely to be limiting may be better indicators of the practices we *should* be supporting in the agricultural industry. In corporate training, e-learning has generally been demonstrated to be a cost effective solution to deliver training, citing benefits in addition to reduced costs such as convenience, standardized delivery, self-paced learning, and reduced time away from the job (Strother, 2002); these same benefits can be realized by farmers in their relationship with the Cooperative Extension Service and also with related industry representatives – but only if their available connectivity supports e-learning requirements. Specific examples of success stories in the corporate e-learning space include: IBM provided five times the learning at one-third of their prior costs, Ernst & Young improved scalability and consistency while reducing training costs by 35%, and Rockwell Collins converted only 25% of their training to web-based resources resulting in a 40% reduction in training expenditures (Strother, 2002). In many cases, farmers will be seeking opportunities to learn that provide these benefits and our support of the South Carolina farmer will therefore increasingly be dependent on our ability to support them in (1) *development and delivery* of learning opportunities that provide these benefits and (2) supporting development of sufficient connectivity to *enable* these types of digital learning formats.

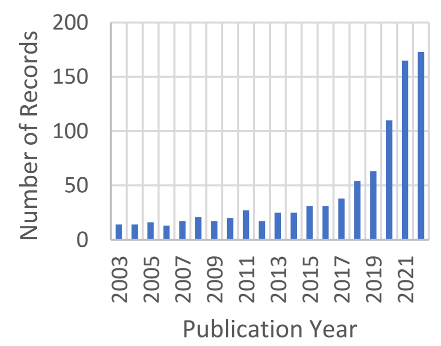

Figure 2. Trend for last 20 years showing number of publications containing "limited bandwidth training" as topic in Web of Science databases.

Improved rural connectivity not only extends functional opportunities to the public from various external sources, it also expands our Clemson Extension impact and ability to reach various audiences with our educational and outreach content, including especially those in our remote, rural communities in the state, but also those at our primary and secondary schools, those in our FFA and 4-H programs, as well as industry collaborators. Moving forward, we believe that successful Extension programming will largely be dependent on ability to reach the relevant audiences in ways that embrace technology to the benefit of the content consumers, in this case the farmers in the rural communities. Delivery of Extension programming has largely used similar formats and mechanisms for the last century. Without intentional investment in this space, our messaging will fail to reach many members of our intended audience. Furthermore, investment in this space will foster technology adoption and encourage public utilization of and capitalization on expanded network capabilities, both of which will stimulate rural economies in South Carolina.

Crop and Machinery Management

Connectivity is critical for modern crop management and input management practices. It enables farmers to make data-driven decisions, optimize resource use, reduce risks, and enhance overall farm productivity and sustainability. In short, absence of connectivity puts South Carolina farmers at a disadvantage for quality of life and competitiveness as compared to areas of the country where rural connectivity is superior. High-speed internet connectivity is essential for accessing, controlling, and analyzing the wealth of data and technologies available for crop management in modern agriculture. In many cases, such as those data-driven solutions supported through image analysis, big data, Internet of Things (IoT), and machine learning models, more data results in better answers. Therefore, while some level of minimum connectivity is critical, increasing bandwidth translates to increasing value to the informed farmer.

Connectivity provides farmers with access to real-time weather data, market information, and disaster alerts. This enables them to make informed decisions about planting, harvesting, and market timing, reducing risks associated with adverse weather events, price fluctuations, and natural disasters. For instance, the use of weather data (from online sources, mobile apps, or connected weather stations) to predict frost events has enabled peach (Figure 3) and strawberry producers in South Carolina to protect their crops from freezing temperatures, preserving the harvest and reducing losses. Many of these systems today can be automated so that frost protection measures can be triggered by connected data sources.

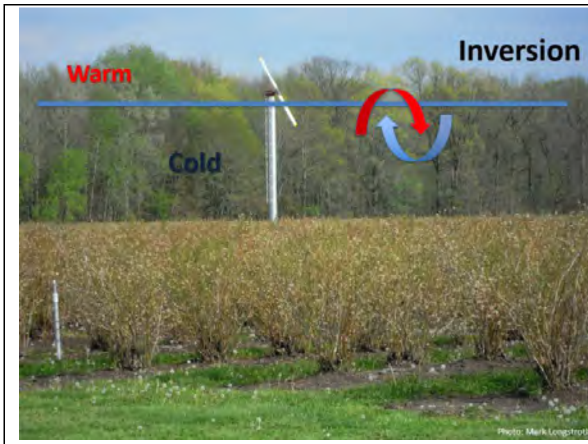

Figure 3. Concept of how a wind machine can be used in an orchard to respond to foreccast of freezing temperatures (Schwallier, et al., 2020).

High-speed internet connectivity facilitates the use of precision agriculture technologies like GPS-guided equipment, drones, and sensors, which help farmers understand and manage variability within their fields. By analyzing data on soil quality, moisture levels, and crop health, they can tailor their management practices to optimize yields and reduce input costs. For instance, seed and crop protection companies, as well as third-party analytics providers offer digital farming platforms that combine weather, soil, and field-specific crop data to provide recommendations to farmers. These platforms enable farmers to make informed decisions about planting, fertilization, and irrigation, reducing weather-related risks and maximizing profit potential for inherent, in-field spatial variability.

Connectivity is crucial for facilitating variable rate fertilizer applications. By accessing soil nutrient data, satellite imagery, crop history, and weather forecasts, farmers can adjust their fertilizer applications in real-time to match the specific needs of different areas in a field. This precision helps improve crop health, reduce over-fertilization, and minimize environmental impact. In earlier generation variable rate fertilizer controllers, active sensors, known as canopy reflectance sensors, provided real-time data on crop health and plant fertility levels, which were used to adjust fertilizer (e.g., nitrogen) rates on-the-go, as a fertilizer applicator was travelling through the field. These systems did not require connectivity, although adoption was limited; a major drawback of this method is that total fertilizer amounts required for a field are unknown at the time of fertilizer application – i.e., farmers did not know how much fertilizer they needed to order for a given field. More recent variable rate fertilizer systems can collect canopy reflectance data from other field operations, center pivots,

Figure 4. A variable rate fertilizer prescription plan on a display in the cab of a self-propelled fertilizer spreader as it travels through the field. This prescription plan was developed using image analysis of drone imagery in a Clemson University and USC-Aiken project supported by the SC Soybean Board.

drone imagery, or satellite imagery. The canopy reflectance data is transmitted to a central control system or a cloud-based platform through a wireless or cellular connection and fertilizer prescription plans (Figure 4) can then be wirelessly passed from the cloud to the controller used for the fertilizer application. Connectivity allows farmers in addition to their crop advisors to access and interpret this data, helping them make timely and informed fertilization decisions to optimize crop health and yield.

Connectivity is crucial for integrated pest management. Farmers can access pest forecasts, monitor pest populations remotely, and receive alerts about potential infestations. This information enables them to target pesticide applications only where and when they are needed, reducing chemical use and costs. For example, various online platforms and mobile apps provide farmers with access to pest forecasting services. These services use real-time weather data, historical pest patterns, and predictive modeling to forecast potential pest outbreaks in specific regions. Among the latest developments in pest monitoring includes smart insect traps that use combinations of IoT sensors, cameras, and cellular technology to automatically monitor and count trapped insects, saving the farmers a trip to the field to determine when to apply crop protection products.

Several products have also been released recently for weed detection and control, as supported by growing research in this area (Figure 5). Most of these systems use imaging technologies, which translates to high quantities of data to be handled and processed. Because of the general lack of connectivity in agricultural settings, almost all of these systems use on-board data processors for mapping and automated control, although if there were no barriers to connectivity, cloud computing for similar tasks would be less expensive for the farmer. Some applications, however, will continue to require on-board or edge computing, such as John Deere's See and Spray technology, which uses ten CPUs mounted on a sprayer to process 4 GB/s of data. Nonetheless, as rural connectivity improves, we will see more agricultural solution providers taking advantage of cloud computing, reducing costs to the farmer, to improve cost competitiveness of their products and services.

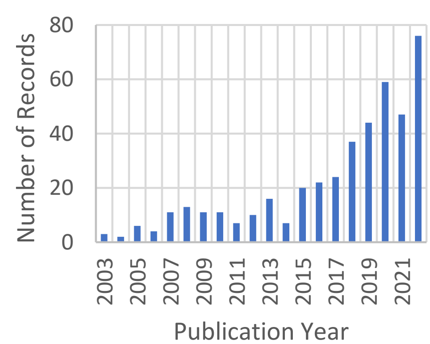

Figure 5. Trend for last 20 years showing number of publications containing "automatic weed detection" as topic in Web of Science databases.

Real-time access to weather data and soil moisture levels is essential for effective irrigation water management. Connectivity allows farmers to remotely control irrigation systems and adjust water application rates based on real-time conditions, conserving water resources and optimizing crop growth. Modern, data-driven irrigation scheduling relies on various combinations of data from soil moisture sensors placed in the field, local weather history and forecasts, rain gauge and weather station data, aerial imagery, and radar-indicated rainfall maps. All of these solutions require connectivity for a farmer to implement. Investments in irrigation systems are among the most expensive infrastructure improvements to most farmland and in many years and crops, irrigation timing and amount is among the most profitable crop input on the farm. These factors combined make it critical for farmers with irrigation to have connected solutions so that they can get the most out of their investment. Industry is increasingly developing new, connected solutions for agricultural irrigation systems, which allow the farmer or manager to operate the system remotely based on automated, sensor-based insights from the field.

GPS and autosteer technologies are integral to precision agriculture. They rely on high-precision GPS signals and real-time connectivity for precise navigation and control of farm equipment, ensuring that operations like planting and harvesting are accurate and efficient. For sufficient accuracy to support requirements for autosteering, GPS corrections are delivered to a controller on the tractor via radio communication from a nearby tower or base station, cellular communication via an in-cab modem from a network of base stations, or via messages delivered from communication satellites. In the absence of cellular connectivity, tractor autosteering is possible, however the cellular option establishes market competition to support affordable and competitive subscription costs for farmers.

Emerging, advanced machinery, like self-driving tractors, automated harvesters, robotic weeders, and other autonomous machine solutions rely on high-speed, low latency internet connectivity for real-time control and monitoring. Self-driving, automation reduces labor costs, enhances efficiency, and ensures consistent and accurate operations. The increasing academic work in this space (Figure 6) is indicative of similar efforts in the commercial space. Automation and autonomy solutions are currently available from CNH Industrial (Case IH, New Holland, Raven Automation) and John Deere; these available solutions are expected to eventually cover all field operations and all farmer segments. Absent of high bandwidth, low latency connectivity in our rural areas, many of our farmers will be at an inherent, competitive disadvantage with those who have access to this infrastructure. Where solutions are capable of offering field machinery autonomy in absence of superior connectivity, the functionality of these solutions will invariably be inferior to those that operate without connectivity limitations.

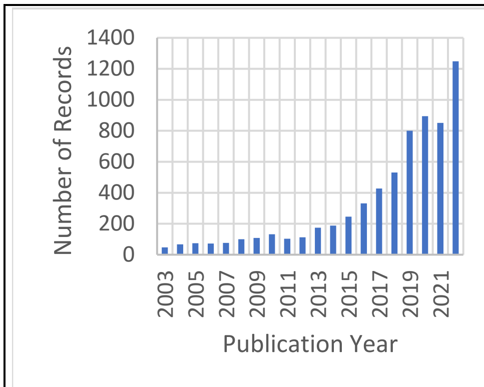

Figure 6. Trend for last 20 years showing number of publications containing "autonomous agriculture" as topic in Web of Science databases.

Drones are used for various crop monitoring tasks, from assessing crop health to pest scouting. Furthermore, spray drones are now increasingly also used to supplement functionality of traditional, wheeled sprayers. Real-time connectivity enables farmers to control drones, receive live imagery, and make informed decisions based on the data collected. Current FAA restrictions largely preclude unsupervised, automated operation of drones, however, as regulations evolve to support emerging technologies, such unsupervised flights would be tremendously valuable to crop and livestock production and could only be supported with superior connectivity. For instance, automated flights of imaging drones, paired with image analysis and AI could be used to automatically build prescription plans for automated spray drone flights. Current regulations require a substantial amount of labor to support data collection and field work involving drone technology. However, even currently employed drone imaging activities would be improved through cloud connectivity and cloud computing for generation and development of real-time insights for the farmer.


Figure 7. Clemson University staff working with a collaborating spray drone service provider to prepare a drone for a research herbicide application protocol.

There are many other currently available technologies and countless emerging technologies that leverage connectivity to allow farmers to access real-time data from remote sensors, drones, and satellite imagery. These data are crucial for continuous crop monitoring, enabling early detection of issues like nutrient deficiencies, disease outbreaks, or drought stress. Cloud computed image analysis solutions allow farmers, for instance, to generate yield estimations, which can be useful for crop insurance purposes, in coordinating harvest logistics, and in generating data to support in-season management decisions based on anticipated profitability. In short, crop management generates large amounts of data, from soil tests to yield maps. High-speed internet connections are essential for uploading, storing, and managing this data efficiently, ensuring that it is readily available for future decision-making and reporting.

Post-harvest management

Post-harvest management of stored grains and oilseeds is critical for maintaining value. The losses in quality, quantity, and nutrients after harvest are often a result of poor handling, storage, transportation and processing methods. Most of these are avoidable or can be minimized by adopting improved practices and advanced technologies. Post harvest monitoring systems utilize a range of sensors (ex. temperature & relative humidity sensors embedded in the grain, CO_2 monitoring, weather data) to enable intelligent control and inform management decisions. Together these can reduce operating costs selectively running fans only when productive air is present. These monitoring systems also serve as a risk management tool, by enabling early detection of hot spots and mold growth. The generally increased quality also improves safety around grain centers by reducing the need for bin entry. Web applications that utilize the same principles can offer decision support for fan operation at grain centers lacking intelligent systems, as well as provide guidance on harvest timing and incoming moisture management (Figure 8).

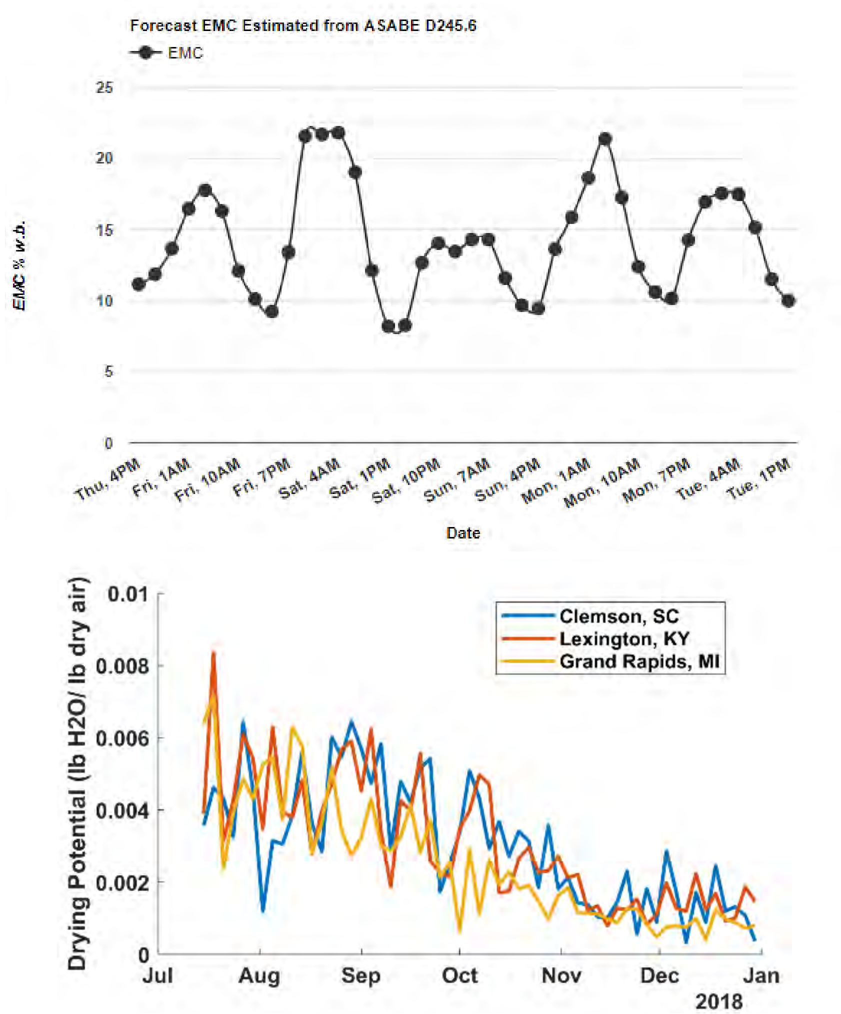

Figure 8. ***Top:*** *Example web tool output showing Forecast Equilbrium Moisture Content (Turner, et al., 2020).* ***Bottom:*** *Drying potential over the course of the harvest season. Based on the difference between the humidity ratio at average daily conditions and at saturation.*

Larger grain centers with continuous flow dryers increasingly rely on automation to control the outgoing moisture content. These automatically move grain through the drying process and into storage. During the peak of harvest these systems typically run around the clock, and connected solutions allow operators to remotely monitor the system. This has the potential to reduce labor costs and fatigue during one of the busiest times of the year. Long-term, lights-out automation of grain receiving/distribution centers, represents the ability to receive, move, store, and sell grain without staff physical present (Kilger, 2002).

Across commodities, fleet management systems, which rely on GPS tracking, provide real-time vehicle location data that can improve operational planning (dispatching, scheduling, and monitoring) and overall efficiency. For fresh market products, examples of how this data adds value include traceability systems and databases that help maintain traceability for food safety, as well as technologies for cold-chain monitoring/verification.

Additional, information related to a commodity's origin can also be leveraged to create a value-added commodity. Current examples of this include identity preserved grains, which can attract a premium as a sole-source commodity with desirable traits (ex. high protein content). A next step in this evolution is to leverage production data (e.g., growing history, pesticide applications, field origin, conditions during storage) to create a commodity with known providence. This requires connected databases of existing production data be combined with emerging technologies related to harvest logistics to track data as it moves through multiple processes (Figure 9). An example of this is cotton modules equipped with RFID tags (Figure 10) that, in a fully connected system, could enable traceability from the field through to the final product. This data can also allow enhanced field management for non-traditional quality attributes (Figure 11).

Figure 9. Typical grain harvest operations with field, transportation, and machine data from multiple sources that need to be aggregated. (Turner, et al., 2019)

Figure 10. RFID enabled cotton picker. Tags are embedded in the module wrap.

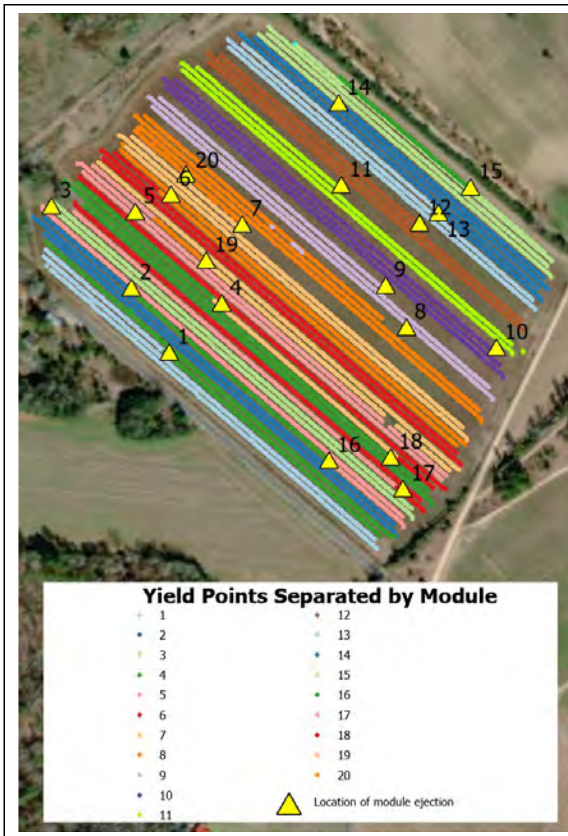

Figure 11. Map displaying cotton yield monitor datapoints, classified by final module.

Livestock tracking and animal welfare management

Development and research of connectivity solutions for livestock management (Figure 12) are on the rise and they offer several advantages for the livestock producer, including, but not limited to:

improved herd management, improved forage management, increased profitability, expanded sales and marketing opportunities, access to expertise, and labor reductions. Virtual-fencing for rotational grazing is one such, new and effective technology for improving grassland utilization within a pasture. It allows a cattle manager to move animals – usually from an app on his smart phone – within a pasture more often without the need to build cross fencing that can be disruptive to wildlife patterns and cause changes in the distribution of naturally occurring plants along those fences. Moving cattle on cattle time is less stressful on those animals since grazing rotation can be planned and executed over several hours or days. Better and more often animal rotation can also better distribute manure in a grazed area to mitigate the effects of concentrated nutrients in the soil, reducing runoff and its effects. It can also be a cost-effective way to keep livestock away from riparian or other sensitive areas within a landscape for conservation purposes.

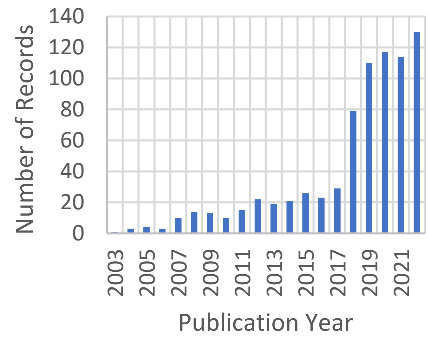

Figure 12. Trend for last 20 years showing number of publications containing "livestock connectivity" as topic in Web of Science databases.

Herd health and weight monitoring of livestock in connected feedlots and pastures can be better managed with a wearable (i.e., Fitbit-like) device attached to each animal. Feedlot and herd managers can more easily locate animals that are lethargic, have higher than average body temperatures, and may be in early stages of becoming sick. If an animal falls outside of the herd averages for these measurable health factors, an LED can be lit within that animal's ear tag or collar indicating which animals in a large lot is in early stages of developing health issues. This allows pen riders and herd managers to separate and treat animals in early stages of a sickness before others become infected, reducing the total amount of medication that needs to be used to treat the herd, reducing the chance of problems in the food supply.

Finishing weight monitoring and thermal connected technologies such as thermal imagers can measure the state of the animals (normally cattle or hogs, but with developing technologies for poultry) as they reach a market ready status. Increased backfat can indicate that an animal is ready for market. This can improve feed efficiency and reduce unnecessary over-feeding of animals that have reached markable weight and finish. Thermal imaging is also increasingly being used for health monitoring in livestock production.

Connected, tracking technologies for livestock are also increasingly being adopted to reduce labor requirements for livestock management. Drone technologies for inventory and tracking are currently being used to find livestock in pastures that are difficult to view and navigate. A thermal camera mounted on a drone can spot missing animals as hot-spots against background-normalized heat signatures in difficult to view parts of a pasture. Cellular GPS locators networked to a central mapping system allows a manager to store and study animal preferences, behaviors, and locations within a grazing area. This can lead to clues about why one part of a pasture is more attractive to animals when compared to other areas at different times of the year. Management decisions can be made to re-distribute grass varieties, water access, mineral tubs, and other persuasive tools to lure animals into a better usage pattern within that managed pasture. These cellular locators are progressively also being used to monitor and automatically flag behaviors which may be indicative of animal health concerns.

Natural resource management

In the agricultural space, there are several technologies useful for monitoring natural resources that can benefit farmers, researchers, and government agencies responsible for natural resources management. Real-time, connected groundwater sensors can report how irrigation and other water uses affect aquifers. Connected sensor technologies can support rainfall recharge and surface water interaction models to sustain water resources sustainable levels, with respect to use. Surface water tracking is important, especially after rainfall events, for monitoring potential crop input runoff. Water quality monitoring through sensors located at drainage culverts are already being used to monitor and improve models of the effects of cropping practices on chemical or fertilizer runoff from a field, which can sometimes have environmental implications but generally also results in profit losses to the farmer. Water quality monitoring is currently being used to compare the effects of different cropping practices and how those cropping systems affect water quality through reduced runoff of surface water. The effects of water quality from differences in cropping management systems and practices can encourage and corroborate more efficient use of inputs through precision farming practices.

Drainage management can be modeled through water flow sensors placed by analyzing elevation models within a study area. A good drainage model from sensor data combined with high resolution elevation models can allow you to prioritize the dollars spent on terraces and tile systems built within a field. Combining water flow with elevation and soil type data allows better water management practices to improve environmental impact and field profitability for the producer.

Pumping plant monitoring and real time management can be the result of connected moisture probes linked to information centers that can send variable rate irrigation (VRI) plans or commands to balance water demand in a connected area. No adjustments for rainfall, crop growth stages, or equipment status can be made unless the data from the pump, weather, and soil moisture probes can be connected to a common management center for more efficient water and equipment allocation during a growing season. A related practice, precision soil fertility management relies on strong rural connections to move data collected by active soil sensors or crop imagery that monitor crop health and soil nutrient availability in real time. The more reliable this data movement is from the field to the grower or the crop consultant for that field, the more confidence they will have in matching the actual crop needs with the inputs that are applied on the field. In this case, as in many others, increased data capabilities equate to improved insights. Furthermore, improved monitoring confidence means that there is less temptation to over-apply inputs or mis-time those applications for “just-in-case deficiency insurance.” In short, these technologies that support improved fertilizer use efficiency can lead to reduced environmental footprints in addition to increased farmer profitability.

Soil mapping needs to be improved for use in precision farming applications. Farmers and their advisors can start with the typical 1:24000 scale soil surveys, but to match equipment and the management resolution needs of crop management, soil conductivity or EM38 data is collected to improve the resolution of the soil characteristics within a field. These types of maps are like yield maps from a combine, but show clay-silt-sand content changes, or soil texture changes within small distances in a field. This can be critical for placing moisture probes, changing seed populations, and setting yield goals within different parts of each field to make better use of the soils natural productivity. Timely delivery of these maps from the field to the agronomist, manager, or crop consultant for development of fertilizer prescription plans is best supported through connectivity in the rural environments where the data are collected. Once a prescription plan is developed, telemetry is critical for delivering the plan to the field machinery which will be putting the right inputs into the right parts of the field at the right time to maximize its effectiveness while minimizing environmental impact. As-Intended plans are developed remotely through sensors and mapped historic field information and these plans must be delivered to variable rate irrigation systems (VRI) as well as application equipment at the field. In turn, connectivity allows for As-Applied information to be transmitted back to the cloud for further analysis and refinement, but only if sufficient and quality network connectivity is available.

Environmental monitoring

Successful food systems begin with the successful production of food products, often dependent on local weather conditions. Clemson is building climate resilience for food systems by investing and deploying local weather networks across the state. Hyper-local weather data is critical to producing many food crops but availability is limited in many rural, high agriculture-use areas. This project aims to establish a network of weather stations throughout South Carolina, providing real-time weather data to producers, partners, researchers, and other professionals.

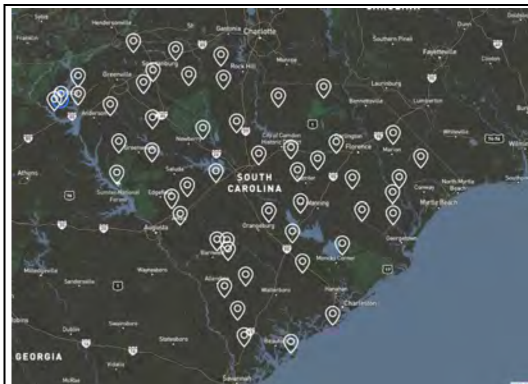

Figure 13. Weather station website map identifying each location of sited stations.

The Clemson Extension Weather Network was conceived in 2020 in response to lack of weather data being reported in and around food systems production. To date, one station has been installed in all 46 counites across South Carolina (Figure 13 and https://clemsonweather.app.clemson.edu/index.php), with three counties having more than one weather station. The website interface is "live" and provides real-time weather data for producers, researchers, and industry partners. Ongoing software development efforts are underway to build end-user analytics and calculators (e.g., growing degree day, chilling hours, historical trends) to better capitalize on data generated by this network of weather stations, providing tools to directly benefit the South Carolina farmer. In addition to real-time data, WeatherFlow provides a custom point forecast based on hyperlocal weather data modeling. Priority for installation was assigned based on feedback from the South Carolina State Climate office regarding identifying rural geographic locations with minimal weather data reporting.

Of the 51 stations installed, 42 (82%) were close to a production area contributing to a food system. While the presence of weather data is critical for food production decisions, decision aids and tool kits will be the key to building climate resilience. According to the Center for Climate and Energy Solutions, climate resilience is the ability to anticipate, prepare for, and disturbances related to climate. The Clemson Extension Weather Network (powered by WeatherFlow, Figure 14) provides real-time lightning alerts, custom point forecasts by location, real-time rainfall start/volume, and temperature.

Figure 14. WeatherFlow Tempest station sensor and functionality outline.

Forecasting and documenting drought, flood, frost/freeze, and other natural disaster events and effects on food system production will aid in weather station infrastructure (stations and website). Once completed, the aim is to build calculators and alerts that will help growers make management decisions based off hyperlocal, real-time and projected weather data.

Commercial agricultural services

Crop consultants need to share data with their customers as much or more than they need to communicate written or verbal information. Spatial information including drone imagery, scouting maps, prescription plans, and other large datasets for managing crops in the field are substituting for larger amounts of crop inputs. This substitution of data for inputs improves the efficiency of the inputs that are applied to cropland and can reduce the costs and environmental impact of profitable crop production.

Drone spraying is the Action Plan or result of good scouting. Managing the mapped data required to plan spraying missions in areas where traditional spray aircraft cannot or do not efficiently operate is a tremendous advantage for precisely placing seed, fertilizer, and herbicide in managed fields. Substituting more precise, smaller doses of drone placed spray onto just the parts of the field where the input is needed requires a large amount of data movement and a way to efficiently monitor the drone's position and input application in real time (if possible). This can also protect sensitive areas where spray drift can impact neighboring crops, residential, or natural resources.

Types of ISP-provided connectivity (levels) and their relevance to agriculture

In the modern agricultural landscape, a diverse array of connectivity options plays a pivotal role in addressing the unique needs of rural farming operations. From the backbone of internet connectivity, encompassing Fiber to the Farm (FTTx) and high-speed 5G networks, ensuring data access and real-time communication, to the far-reaching capabilities of Long Range Wide Area Network (LoRaWAN) for remote field monitoring and sensor data collection, these technologies serve as the bedrock for precision agriculture. In tandem, localized solutions like LoRa, XBee, and long-range WiFi cater to the specific demands of the agricultural industry, enabling seamless communication between sensors, equipment, and devices on the farm. Together, these connectivity options foster sustainable farming practices, boost productivity, and enhance decision-making for the future of agriculture in rural settings.

Fiber to the Home/Farm (FTTx)

Fiber to the Home/Farm (FTTx) communication technology offers distinct advantages compared to other technologies in rural and agricultural settings. Some of these advantages include reliability and consistency, higher speeds and lower latency, greater capacity, lower operating costs, and future proofing.

Compared to other technologies mentioned below, which are all wireless based, FTTx based technologies aren't affected by signal strength and interference in remote areas. With regards to bandwidth and latency, FTTx based technology enables faster data transfer and real-time communication, which is vital for tasks like remote machinery control, precision agriculture, and monitoring. FTTx also has an advantage over other communication technologies due to the higher data capacity which can handle larger volumes of data, which is essential for applications like high-resolution video surveillance, large-scale data analytics, and the Internet of Things (IoT) in agriculture, which is expected to see continued growth. One of the biggest factors of FTTx is that it is a more future-proof solution, as it can be more easily upgraded to meet increasing data demands and emerging technologies, while other communication technologies require more frequent infrastructure upgrades.

The only downside of this route would be high initial installation costs. Installing fiber infrastructure in rural areas can be expensive due to the need to lay cables over long distances. However the benefits outweigh the costs because it empowers rural and agricultural communities with reliable, high-speed Internet access, unlocking opportunities for precision farming, real-time data analysis, and digital inclusion, ultimately leading to increased productivity and economic growth. The benefits also carry over into other sectors, including but not limited to, education, healthcare, business and industry, emergency services, and government services.

5G Cellular

A second connectivity option is building out 5G cellular coverage to rural areas. This option would still require some fiber buildout, however. 5G offers several advantages compared to Fiber to the Home/Farm, including wireless connectivity, quick deployment, scalability, lower initial costs, and enhanced mobility services.

5G is wireless, thus providing greater mobility for agricultural applications that require real-time data and control in the field, such as precision agricultural and autonomous machinery. 5G networks can be deployed faster than laying physical fiber-optic cables, making them suitable for temporary or rapidly changing agricultural setups. 5G can also be scaled up or down more easily in response to fluctuating agricultural needs, providing flexibility in bandwidth allocation. In some cases, the initial costs of 5G infrastructure may be lower than laying fiber-optic cables over long distances, depending on whether the fiber infrastructure is available in the areas needing to be served. Finally, 5G networks can support innovative services in agriculture, including remote drone control, mobile farm equipment connectivity, and data collection from various sources and remote sites.

However, it is important to note that 5G also has limitations, such as lower data capacity and signal range compared to fiber, which can affect its performance and suitability in certain scenarios. Also, in order to support these 5G towers, fiber will still need to be installed to serve these towers and provide redundancy.

LoRaWAN network

A complementary technology that would provide wireless communication benefits is LoRaWAN (Long Range Wide Area Network). LoRaWAN is a wireless communication protocol designed for low-power, long-range communication between devices, and it offers several advantages in the agricultural industry, including long-range connectivity, low power consumption, cost-effective deployment, real-time data, scalability, remote monitoring and control, and environmental sensing. It also work similar to the Internet where people share access to individual towers to connect to an Internet backlink.

LoRaWAN provides extensive coverage, making it well-suited for connecting remote sensors, monitoring equipment, and devices spread across several miles, even in rural or obstructed environments. LoRaWAN devices are energy-efficient, allowing them to operate for extended periods on battery power. This is crucial in agriculture, where many sensors and monitoring devices need to run for extended seasons without frequent battery replacement. LoRaWAN infrastructure is cost-effective to deploy and maintain, making it accessible for smaller farms and agricultural operations. It doesn't require significant ongoing costs, such as data plan fees, which can be a benefit for budget-conscious farmers. LoRaWAN enables real-time data collection from various agricultural sensors and equipment, including soil moisture, weather, livestock tracking, and crop monitoring. This data empowers farmers to make informed decisions for resource optimization, yield improvement, and risk mitigation. LoRaWAN networks can scale to accommodate an increasing number of devices, making it suitable for expanding agricultural operations or the integration of more sensors and devices.

However, LoRaWAN is not a replacement for fiber (FTTx) or 5G cellular, but mainly a complement communication technology. The main limitations are limited bandwidth, latency, and data packet size limitations.

LoRaWAN is primarily designed for low data rate applications, which may restrict its ability to support high-bandwidth requirements common in applications like real time video surveillance and data intensive operations such as remote machinery control. LoRaWAN introduces higher latency, which can be a challenge for agricultural applications that demand instant data exchange, such as autonomous farming equipment or quick decision-making in response to changing conditions. LoRaWAN imposes restrictions on the size of data packets, potentially hindering agricultural applications that involve transmitting large datasets or complex instructions to equipment and sensors.

LoRaWAN technology offers benefits for specific agricultural applications, but mainly to serve as a complement to either fiber (FTTx) and/or 5G cellular.

Consumer and localized radio communication solutions:

With the need to provide communication across on a local farm region, LoRa, XBee, and long-range WiFi technology exist to bridge that last gap. These communication technologies will require access to Internet connectivity to provide real time data from the actual sensors and devices, and for device-to-device communication.

LoRa (Long Range) is a wireless communication protocol designed for low-power, long-range communication. It operates on unlicensed frequency bands and can transmit data over several miles. LoRa provides extensive coverage, making it suitable for large agricultural areas, even in remote or obstructed environments. LoRa devices are energy-efficient, offering long battery life for remote sensors and devices. Also, LoRa enables real-time data collection from various sensors for precision agriculture, such as soil moisture, weather, and livestock tracking.

XBee is a brand of low-power, wireless communication modules commonly used for short-range data exchange. It's often used in applications requiring wireless sensor networks and device-to-device communication. XBee has advantages such as low power consumption, short range, reliable communication, that has a benefit of ease of use. XBee is suitable for localized applications, such as monitoring sensors within a greenhouse or controlling nearby equipment. XBee modules are also easy to deploy, configure, and maintain, making them accessible for small-scale farmers and researchers. Its reliability within its short range also ensures data integrity for localized agricultural applications.

Long-range WiFi involves using standard WiFi technology with specialized antennas and equipment to extend the range of a WiFi network. It can provide connectivity over longer distances than traditional WiFi. Long-range WiFi can deliver high data rates, making it suitable for applications that require the transfer of large datasets, such as video monitoring and remote machinery control. Long-range WiFi uses familiar WiFi technology, simplifying its adoption for those already experienced with WiFi networks. It's well-suited for localized agricultural applications, such as connecting equipment within a specific area or extending WiFi coverage to remote locations on a farm. Long-range WiFi can be cost-effective compared to other technologies for medium-range applications, especially when using existing WiFi infrastructure.

In summary, LoRa, XBee, and long-range WiFi technologies offer various advantages for localized radio communication in the agricultural industry. Each technology is tailored to specific use cases, ranging from long-range and low-power LoRa for extensive field monitoring to short-range and low-power XBee for localized sensor networks, and long-range WiFi for applications requiring high data rates within a local area. The choice of technology depends on the specific requirements and scale of the agricultural operation.

THE PROPOSED TECHFARM PROGRAM

Vision

Our vision for a Technology, Education, and Connectivity for High-Performance Farming (TECHFARM) program is to create a hub of innovation, knowledge, and hands-on learning that will empower farmers with the skills and expertise needed to harness the full potential of connected agricultural technologies. TECHFARM will serve as a beacon of agricultural excellence, fostering the adoption of digital solutions and precision agriculture practices across rural communities.

Key Components of the Vision:

1. Cutting-Edge Demonstrations: TECHFARM will feature state-of-the-art technology demonstrations showcasing a wide range of connected, commercially available agricultural technologies *at various levels of connectivity requirements*. These demonstrations will cover precision planting, irrigation, crop monitoring, livestock management, and more, providing farmers with tangible examples of how these technologies can improve their operations. To facilitate access to demonstration sites, they will be placed at Clemson's Research and Education Centers across the state, other Clemson properties in strategic counties, and on-farm with various farmer-cooperators throughout the state.
2. Hands-On Training: A key element of the TECHFARM vision is hands-on training. Farmers, agricultural professionals, and students will have the opportunity to actively engage with and operate connected agricultural equipment, sensors, and data analytics tools. Training programs will cover digital literacy, data management, and technology integration.
3. Educational Workshops and Seminars: Regular workshops and seminars will be held in-person and as e-learning modules, featuring expert speakers and specialists, collaborating technology providers, and researchers. These events will focus on best practices, emerging trends, and case studies of successful technology adoption in agriculture.
4. Access to Connectivity: TECHFARM will be equipped with high-speed internet connectivity, ensuring that participants can access real-time data and information. This connectivity will be integral to the training and demonstration processes and will enable remote learning for those who can't physically visit the demonstration facilities.
5. Research and Development: Through CU-CAT and its industry collaborators, TECHFARM will also serve as a research hub, facilitating experimentation and innovation in the application of connected technologies in agriculture. Researchers will work on projects related to crop management, livestock care, and the development of new solutions that can be scaled for the benefit of farmers.

6. Community Engagement: Our vision includes active community engagement and outreach programs. The program will collaborate with local farming communities, schools, and government agencies to ensure that the knowledge and benefits of connected agricultural technologies are spread far and wide.
7. Demonstrated Benefits: The success of the program will be measured not only by the number of participants but also by the actual impact on agricultural productivity, resource efficiency, and sustainability. Success stories of farmers who have adopted these technologies and achieved tangible benefits will be highlighted to inspire others.
8. Sustainability: The program will strive for sustainability by incorporating renewable energy sources, eco-friendly agricultural practices, and responsible water management. It will lead by example, showcasing how technology can be used to improve both agricultural and environmental outcomes.

Intended audiences for the various TECHFARM program initiatives generally include farmers, Clemson University and SC State University Cooperative Extension team members (e.g., those specializing in agronomy, horticulture, forage and livestock), industry professionals (e.g., consultants, crop scouts, start-ups, suppliers, dealerships), government agencies (e.g., NRCS, SCDA, DHEC, DNR, Soil and Water Conservation Districts), higher education (public and private university students and personnel), and K-12 education (to especially include FFA and 4-H programs).

In summary, our vision for the TECHFARM program is to empower farmers and the public with the knowledge and skills to embrace connected agricultural technologies. By providing hands-on training, access to the latest innovations, and a strong sense of community engagement, the program aims to be a catalyst for positive change in the agricultural sector and rural communities, helping farmers thrive in the digital age while promoting sustainable and efficient practices.

Execution

It is proposed that the TECHFARM program will be administered by the Clemson University Center for Agricultural Technology (CU-CAT, headquartered at Edisto Research & Education Center in Blackville, SC), in close collaboration with Clemson's Cooperative Extension Service and the Clemson Engineers for Developing Communities program (CEDC). In alignment with CU-CAT's established mission and vision, the TECHFARM program will inherently bring external organizations and private partners to the community for collaboration in delivering on the program initiatives.

- CU-CAT Mission: To collaborate with external organizations to enhance the productivity and sustainability of South Carolina farmers and agribusinesses through cutting-edge research, outreach, and education in precision agriculture technology and digital solutions.
- CU-CAT Vision: CU-CAT envisions a future where the agricultural industry is revolutionized by innovative technology solutions, resulting in sustainable and productive farming practices that benefit farmers, agribusinesses, and the environment. We strive to be a leader in this transformation by collaborating with public and private partners in research, outreach, and education to develop, investigate, and share cutting-edge solutions that positively impact communities locally and globally.

Personnel Needed to Support TECHFARM Program

Agricultural Technology Extension Agents Trained as Digital Navigators

The TECHFARM program vision includes establishment of a group of Extension agents devoted to maintaining outreach and expertise in various areas of connected technologies, especially those relating to agricultural production. These agents will be trained as digital navigators, to strengthen their understanding of broadband solutions and implementation. The Agricultural Technology Extension agents will be critical to implementing the vision, establishing relationships within the farming communities, encouraging collaboration across existing Extension program teams, demonstrating connected technology solutions for agriculture, assisting farmers in "right-size" technology selection, education farmers on various aspects to consider relative to adoption and non-adoption, and training and integration of various connected technologies.

Digital Extension Communication Specialists

As generally discussed above, we progressively see members from all industry sectors adopting e-learning formats for education and technology training; agricultural production is no exception. Educational initiatives pursued through the TECHFARM program will be substantially limited in reach without intentional development of modular, electronic resources (e.g., videos, interactive tools, electronic documentation, etc.) to be made available on-demand via the internet. For example, digital delivery of media and communications can be used to effectively expand in the in-person attendance from field days, workshops, trainings, and various other technology demonstrations. Dissemination of information will therefore be best supported by establishing communications specialists as a part of the TECHFARM program. These specialists are envisioned to be personnel whose time is devoted to creation, curation, and distribution of electronic content and media consistent with current learning formats.

Agricultural Technology Software Specialists

As a part of the TECHFARM vision, one or more software specialists must be put into place to facilitate continued app development, database management and aggregated GIS data analysis. Industry-provided software solutions are useful to farmers for a wide range of needs, however, industry-provided tools do not fulfill all of the needs of South Carolina farmers, as demonstrated by the large pageview count on our existing online calculators. To fully take advantage of growth in connectivity, we must continue to build tools that our farmers and Extension specialists identify as needs for the state and its producers. Furthermore, such software specialists will be able to support technology demonstrations, especially those that seek to validate technology for various applications, performing database/dashboard development and management, as well as assisting in aggregated GIS data analysis, which will be critical to capitalizing on user data generated from developed software. For instance, existing tools that we have in place for balancing feed rations for livestock producers can generate data supporting localized and regional price data for various feedstuffs. This information is extremely valuable to economists and producers for planning and management purposes.

Technicians

Establishment and support of technology demonstrations through the TECHFARM program at University RECs, other university facilities, and at on-farm sites will require technician support to be successful. The technicians will collaborate with agents and communications specialists so that opportunities for installation and maintenance may also be used for training and education, including development of supporting digital content. Technicians will also be critical for maintenance and troubleshooting of demonstration technologies, and data collection/management to support various, regional validation efforts to support technology recommendations to farmers.

Graduate students

The TECHFARM program vision includes support for graduate student assistantships to support research focused on benefits and best practices for agricultural technology adoption in South Carolina. Funding will be pursued to seek to leverage these positions through commodity boards and existing institutional and federal funding programs. Graduate students will be instrumental in generating datasets and analyses to support social/economic benefits of connectivity, return on investment analyses, technology validation studies, in addition to supporting collaborative work to develop and integrate new technologies to address SC-relevant issues and challenges.

Clemson Facilities and Infrastructure to Support TECHFARM Program

Under the TECHFARM program vision, Edisto REC will be established as the State's Flagship Precision Agriculture training, demonstration, and innovation facility, with additional demonstration sites being identified in other strategic areas of the state. At Edisto REC, a dedicated training and technology demonstration facility will be established to accompany adjacent, on-site, in-field demonstrations. Technology demonstrations will include sensors, networks, hardware, controls, and crop management tools and platforms, including and/or similar to those discussed earlier in this document, but also to include emerging technologies not mentioned here. The TECHFARM vision includes development of a remote-access (online) dashboard to support real-time off-site demonstration and trainings. Development of this dashboard will be supported through advisory by the agricultural technology Extension agents with development supported by the TECHFARM software specialists, in collaboration with industry cooperators as relevant.

Key Clemson Personnel

Dependent on the final scope of the TECHFARM program effort, the list of key Clemson University personnel will likely evolve. For instance, as a part of the demonstration component of this program, we plan to seek collaboration with more than a dozen discipline-specific research and Extension specialists to solicit their involvement by fostering connected agricultural technologies under the TECHFARM program, specific to their field of work. Individuals named below, listed alphabetically, were instrumental in development of this proposed scope of work.

Kevin Autry is a GIS Project Manager with more than 20 years of demonstrated work experience in various areas including project and personnel management. Strengths include recognized ability to communicate with people at all levels of an organization and efficiently coordinate resources while simultaneously adhering to strict project deadlines. Established experience in civil and industrial engineering, GIS systems and surveying. He operates as lead planner as he can utilize disparate data sets to develop solutions that are not readily apparent.

Matthew Burns serves as Assistant Director for Agriculture and Natural Resources with Clemson Cooperative Extension Service. Dr. Burns completed his B.S. degree at Clemson University in Animal and Veterinary Sciences followed by a M.S. degree in Animal Science and Industry from Kansas State University. He returned to South Carolina working as an Area Livestock Agent, aiding producers across his region to adopt new/emerging technologies to aid in more efficient production of livestock. Dr. Burns works with all of the Agricultural and Natural Resource related program areas to increase outreach and impact across the state of South Carolina. He also serves as the PI for the Clemson Weather Mesonet project, which strives to provide more hyper local weather data for real-time decisions that impact management.

Kendall Kirk is a Precision Agriculture Engineer and the Director of CU-CAT. He has worked at Edisto Research and Education Center since 2014 and in the agricultural technology space since 2005. He earned his Ph.D. in Biosystems Engineering in 2010. Kirk's research and Extension program focuses on development and evaluation of applied agricultural technologies and software applications for crop input management, irrigation, machine automation, yield documentation, and GIS analysis. Kirk has been first inventor on five utility patents in applied agricultural technologies, has participated as an author on 18 web apps for agricultural decision support, and has authored four publicly available software utilities for agricultural GIS management.

Trey McAlhany is the Lead Info Tech Specialist for CU-CAT and Edisto Research and Education Center. With a BS in Computer Science from Clemson University (Class of 2015), Trey has over 9 years of experience in the IT field. Trey has previously supported the IT needs for Clemson's Cooperative Extension Service and Edisto REC for nearly 6 years, before joining the CU-CAT team in 2023.

Jose Payero is an Assistant Professor in Clemson University's Department of Agricultural Sciences and also serves as an Irrigation Specialist at Edisto Research and Education Center, leading the Irrigation Research and Extension program. Payero's research focuses on on-farm agricultural water management, especially related to situations where water is limited. His research includes modeling and direct measurement of crop water use, crop response to water stress, water use efficiency, plant-water-atmosphere interactions, adaptation strategies for climate change and climate variability, irrigation scheduling, and the development of online decision support tools for irrigation planning and irrigation scheduling. Payero has authored more than 120 research and extension publications, covering a variety of subjects related to irrigated agriculture.

Kevin Royal is a Precision Agriculture Extension Specialist for CU-CAT and is located at Edisto Research and Education Center. Royal completed his degree in Agricultural Business and later received his master's degree in Geographic Information Science from Northwest Missouri State University. Royal has worked in several precision agriculture positions, including farm management, GIS software training and support, and local and national agricultural cooperatives managing variable rate crop input systems and application plans. He taught precision agriculture classes at Northwest Missouri State University for 8 years before joining CU-CAT in August of 2023.

Aaron Turner is an Assistant Professor in Clemson University's Department of Agricultural Sciences, where he also serves as the Student Engagement Coordinator for CU-CAT. Dr. Turner completed his graduate work in Biosystems and Agricultural Engineering at the University of Kentucky. He teaches courses related to the fundamentals of grain drying and storage, agricultural calculations, and capstone design in the Agricultural Mechanization and Business program. His research program examines engineering aspects of harvest and post-harvest systems and evaluates how sensors and agricultural data can be leveraged to allow producers to make better decisions. These efforts include developing tools for stored crop management, evaluating issues around harvest timing, and developing system models to improve the efficiency and sustainability of production. He also maintains a research focus around quantifying the physical properties of bulk materials and the calibration of a science-based model for determining packing of grains in upright storage structures.

David Vaughn is a Professor of Practice within Clemson University's College of Engineering, Computing and Applied Sciences; the Director of Clemson Engineers for Developing Communities; a subject matter expert in community resilience and infrastructure investment for the Department of Homeland Security; the Director of Engagement for the newly forming SC Institute for Sustainability & Resilience; and the former Director of Global Engagement for Clemson's Risk Engineering and Systems Analytics Center, he is a former Fluor Fellow, Director of Resilience Solutions, and Secretariat of the World Economic Forum – Disaster Resource Partnership (WEF DRP). He founded and spearheaded the development of Fluor's Business Continuity and Disaster Management Services which helped clients build resilience by mitigating risk to natural disasters. He has +30 years of project management experience in diverse industries, including chemicals, oil & gas pharmaceuticals, steel mills, microelectronics, water treatment, and contingency operations. His experience in rapid deployment, planning, disaster management, and reconstruction is a culmination of his work in support of the U.S. Army Sustainment Command, DHS, FEMA, USACE, WEF, UN, numerous State agencies, and various private sector companies.

REFERENCES

Donovan, K., 2011. Anytime, anywhere: Mobile devices and services and their impact on agriculture and rural development. In: *ICT in Agriculture: Connecting smallholders to knowledge, networks, and institutions.* Washington, DC: s.n., pp. 49-70.

Kilger, S., 2002. *CHS automated elevator features 24-hour grain delivery.* [Online] Available at: https://www.feedandgrain.com/animal-feed-manufacturing/feed-mill-management/article/15384753/chs-automated-elevator-features-24hour-grain-delivery

LaRose, R., Strover, S., Gregg, J. L. & Straubhaar, J., 2011. The impact of rural broadband development: Lessons from a natural field experiment. *Government Information Quarterly,* Volume 28, pp. 91-99.

McFadden, J., Casalina, F., Griffin, T. & Anton, J., 2022. The digitalisation of agriculture: A literature review of emerging policy issues. *OECD Food, Agriculture and Fisheries Papers,* Volume 176.

Roberts, K. & McIntosh, G., 2012. *Use of mobile devices in extension and agricultural production- a case study.* Armidale, Australia, s.n.

Schwallier, P., Longstroth, M. & Irish-Brown, A., 2020. *What can fruit growers do if a freeze is coming?.* [Online]
Available at: https://www.canr.msu.edu/news/what-can-fruit-growers-do-if-a-freeze-is-coming [Accessed October 2023].

Strother, J., 2002. An assessment of the effectiveness of e-learning in corporate training programs. *International Review of Research in Open and Distance Learning,* April.3(1).

Turner, A. P. et al., 2019. A discrete event simulation model for analysis of farm scale grain transportation systems. *Computers and Electronics in Agriculture,* December.Volume 167.

Turner, A. P., Teddy, B. E. & Kirk, K. R., 2020. *Clemson EMC Calculator.* [Online] Available at: https://precisionag.sites.clemson.edu/Calculators/Grain_Storage/EMC_Calc/

USDA, 2019. *A case for rural broadband: Insights on rural broadband infrastructure and next generation precision agriculture technologies,* Washington, DC: United States Department of Agriculture.

USDA-NASS, 2023. *Quick Stats.* [Online]
Available at: https://quickstats.nass.usda.gov/

van Hilten, M. & Wolfert, S., 2022. 5G in agri-food - A review on current status, opportunities and challenges. *Computers and Electronics in Agriculture,* Volume 201.

APPENDIX

Listing of Map Products and Supporting Documents

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Map book Products and Supporting Document Explanation

Section 1 – Supporting Products

- **South Carolina Councils of Government (COG) Regions and Clemson Extension Office Locations:** Location map of the ten (10) South Carolina Regional Councils of Governments indicating the counties in each COG and the headquarter office. In addition, the location of the 46 county Cooperative Extension Offices are indicated.
- **Location of Clemson University Research and Education Centers:** Location map of the six (6) Clemson University College of Agriculture, Forestry and Life Sciences Research and Education Centers (REC).
- **Research and Education Centers Overviews:** Image and boundary overviews of the six (6) REC locations throughout the state. Boundaries are approximated based on data derived from the South Carolia state real property inventories along with local county GIS parcel boundary datasets. Locations include Belle W. Baruch Institute of Coastal Ecology and Forest Science; Coastal Research and Education Center; Edisto Research and Education Center; Pee Dee Research and Education Center; Piedmont Research and Education Center and Sandhill Research and Education Center.

Section 2 – Data Summaries and Comparisons

- **USDA Crop Boundary Acreage:** Table indicating crop acreage within five (5), ten (10), and twenty-five (25) miles of each of the REC locations. Cropland data was derived from the USDA Crop Sequence Boundaries. Note: Piedmont REC is comprised of multiple facilities located in Anderson, Pickens, and Oconee counties. Buffers applied to these locations were combined into single non-circular areas by distance.
- **Top 10 Crops /Boundary Type by Acreage for 2022:** Table indicating the top ten (10) crop boundary types by acreage and buffer distance for each of the REC locations for the 2022 USDA Crop Sequence Boundaries reporting year. Highlighted cells indicate developed acreage for 2022 that had been previously identified as crop boundaries in earlier study years (2015 – 2022).
- **SCBBO Statistics – Eligibility in Proximity to REC:** Table summarizing the Eligibility for Broadband Service of census blocks within the five (5), ten (10), and twenty-five (25) mile buffers around each REC Location. Eligibility data was sourced from the South Carolina Broadband Office's Digital Drive website and is current through March 2023. Highlighted cells indicate the REC location with the highest need compared to the other RECs.
- **SCBBO Statistics – Area of Need in Proximity to REC:** Table summarizing the number of unserved housing units for Broadband Service by census blocks within the five (5), ten (10), and twenty-five (25) mile buffers around each REC Location. Data was sourced from the South Carolina Broadband Office's Digital Drive website and is current through March 2023. Highlighted cells indicate the REC location with the highest percentage of unserved compared to the other RECs.
- **SCBBO Statistics – Available Technology in Proximity to REC:** Table summarizing the technologies available by census block within the five (5), ten (10), and twenty-five (25) mile buffers around each REC Location. Data was sourced from the South Carolina Broadband Office's Digital Drive website and is current through March 2023. Highlighted

cells indicate the REC locations with (1) lowest percentages of Fiber technology, and (2) the highest percentage of census blocks with no technology availability.

- **SCBBO Statistics - Local Impact in Proximity to REC:** Table indicating the number of housing units and K-12 students that could potentially benefit from increased broadband technology within proximity to the REC Locations. Highlighted cells indicate the impact around the Edisto REC as it shows the greatest need for Broadband Technologies based upon Eligibility, Need and Available Technologies when compared to the other RECs.

Section 3 – Research and Education Center Profiles

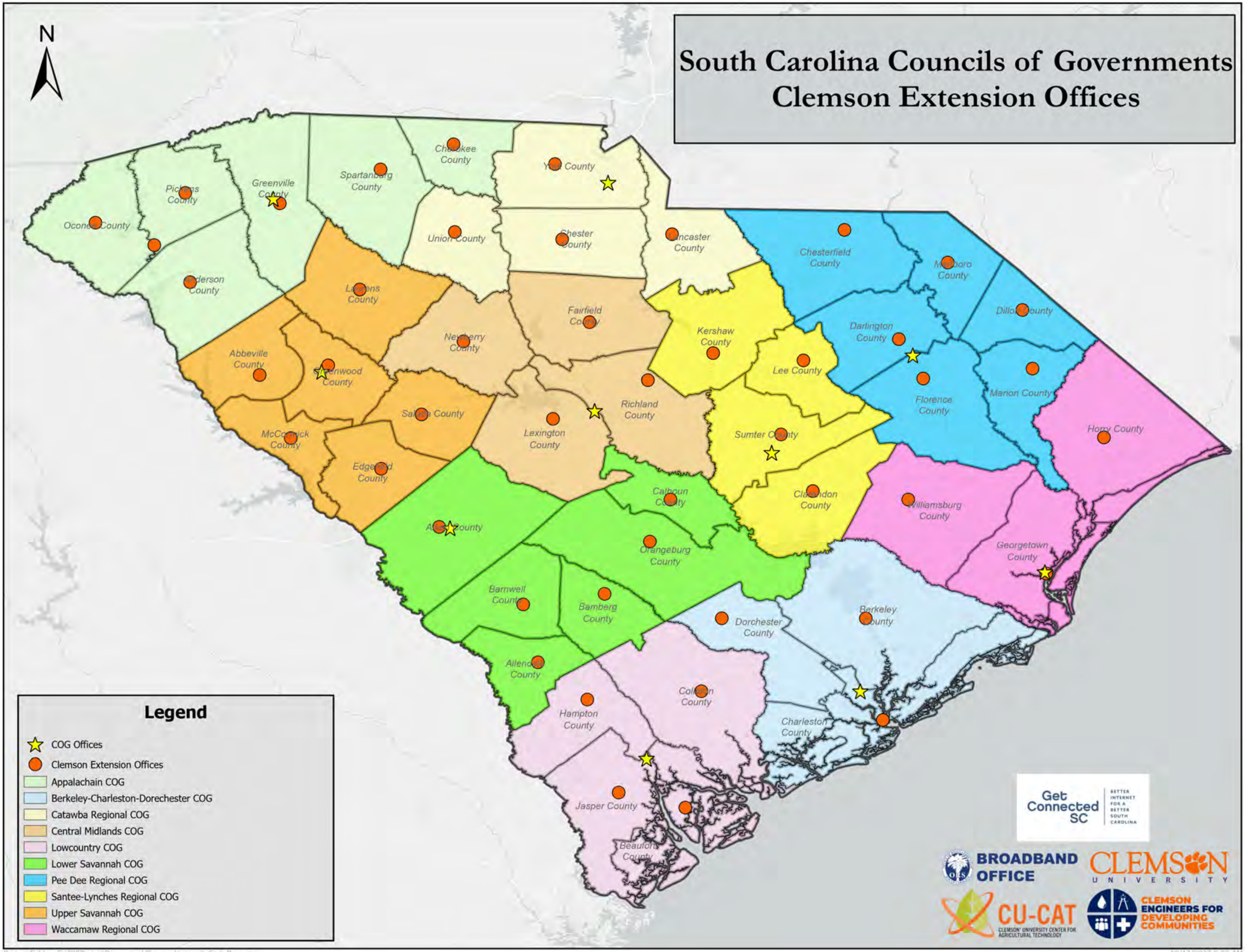
Section 3 graphically represents the distribution of SCBBO and USDA data in relation to each of the six (6) Research and Education Centers:

- Belle W. Baruch Institute of Coastal Ecology and Forest Science
- Coastal Research and Education Center
- Edisto Research and Education Center
- Pee Dee Research and Education Center
- Piedmont Research and Education Center
- Sandhill Research and Education Center.

- **SCBBO Statistics - Area of Need:** Count of census blocks indicating speed tiers available or number of unserved housing units.
- **SCBBO Statistics – Eligibility:** Count of census blocks indicating served, partially or unserved locations. In addition, SCBBO indicates priority areas.
- **SCBBO Statistics - Available Technology:** Count of census blocks defined by best available technology within the census area.
- **SCBBO Statistics – Planning:** County of census blocks identified with Federal, State and Private managed investment.
- **SCBBO Statistics - Residential Units:** Categorization of census blocks by number of residential housing units
- **SCBBO Statistics - K-12 Students:** Categorization of census blocks by number of K-12 students
- **USDA Crop Sequence Boundaries 2022:** Distribution of crop boundaries by type
- **Crop Acreage by Year - 5 Mile Proximity to REC:** Listing of crops by acreage within 5-mile buffer
- **Crop Acreage by Year - 10 Mile Proximity to REC:** Listing of crops by acreage within 10-mile buffer
- **Crop Acreage by Year - 25 Mile Proximity to REC:** Listing of crops by acreage within 25-mile buffer

Section 1

Supporting Products



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Clemson University
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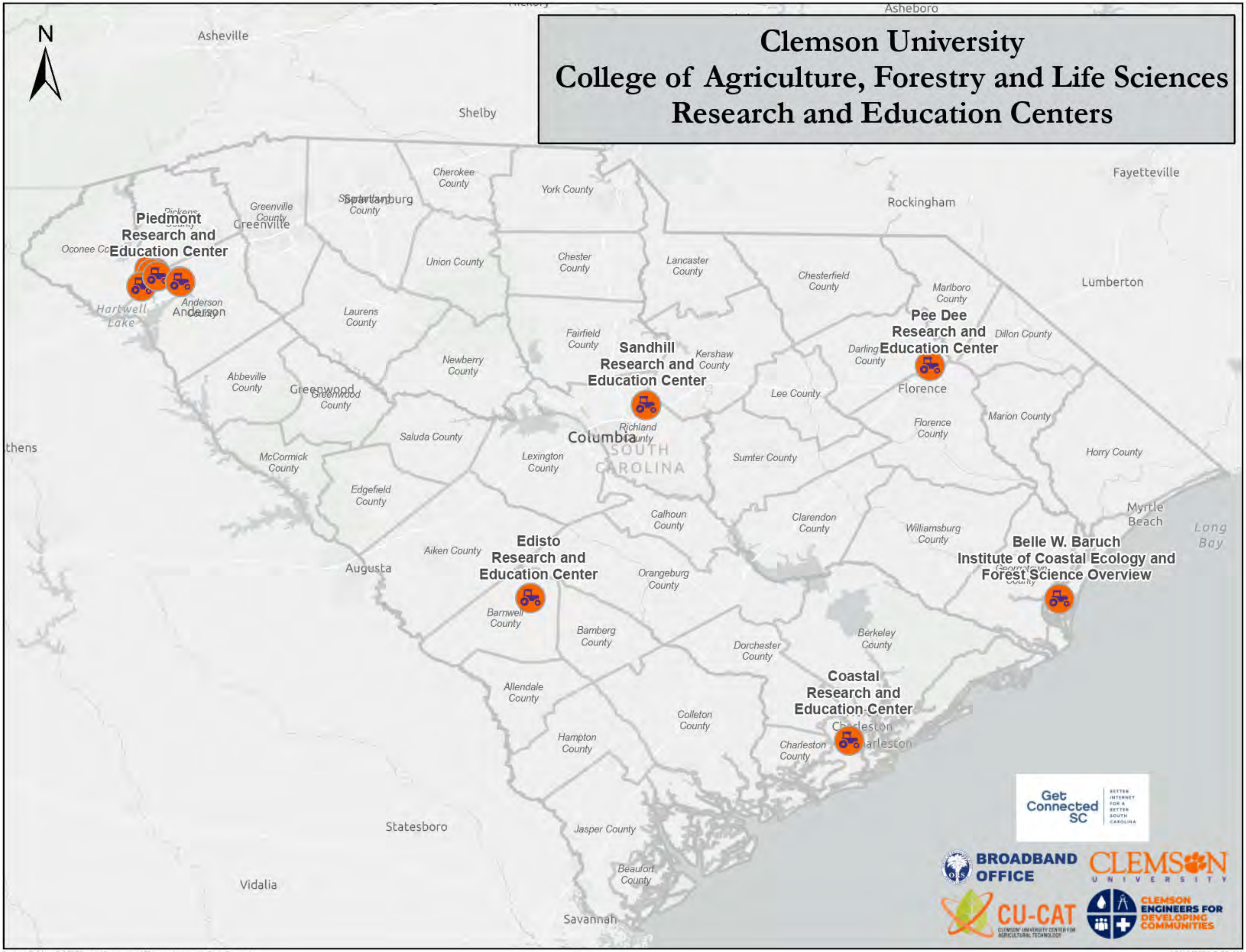

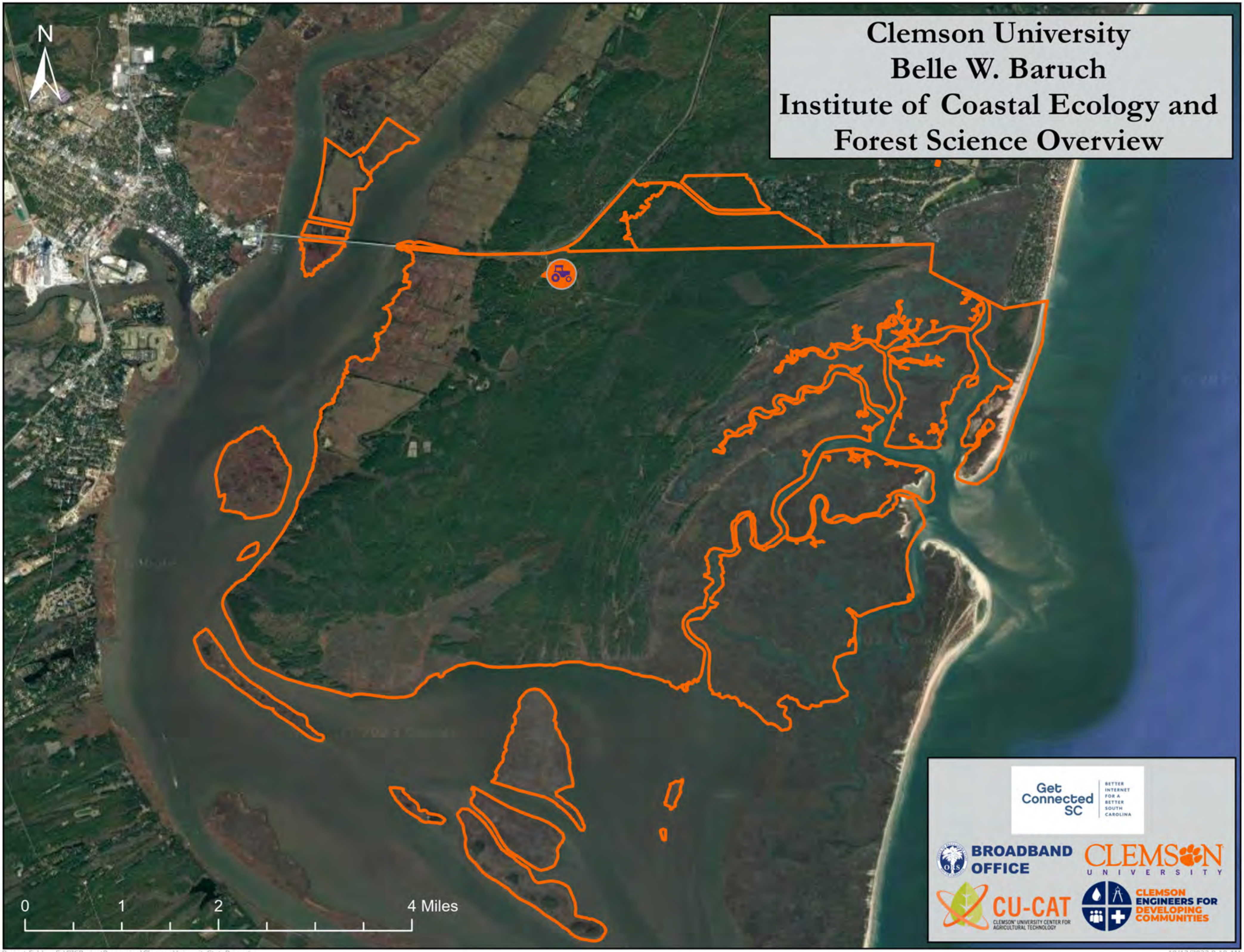
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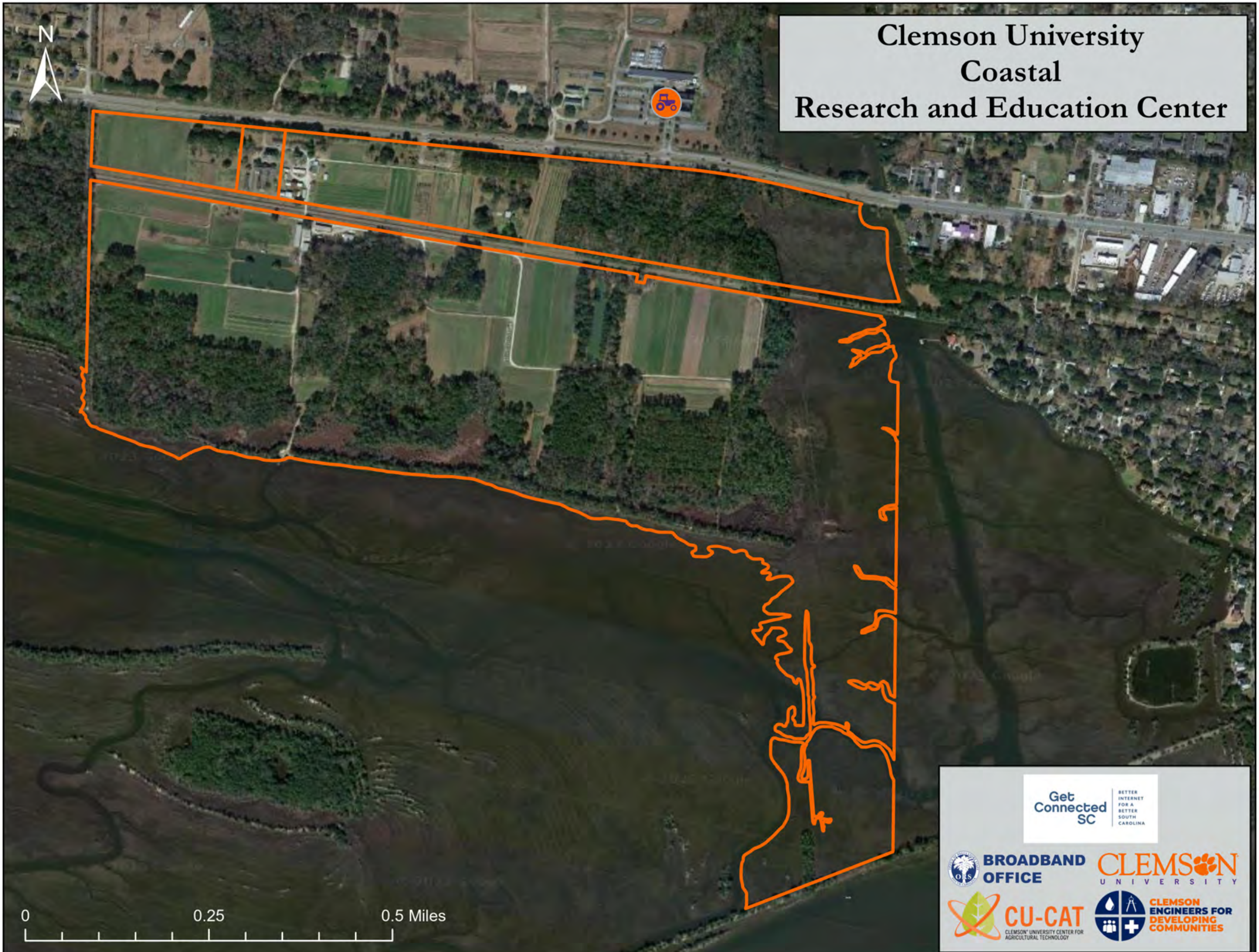

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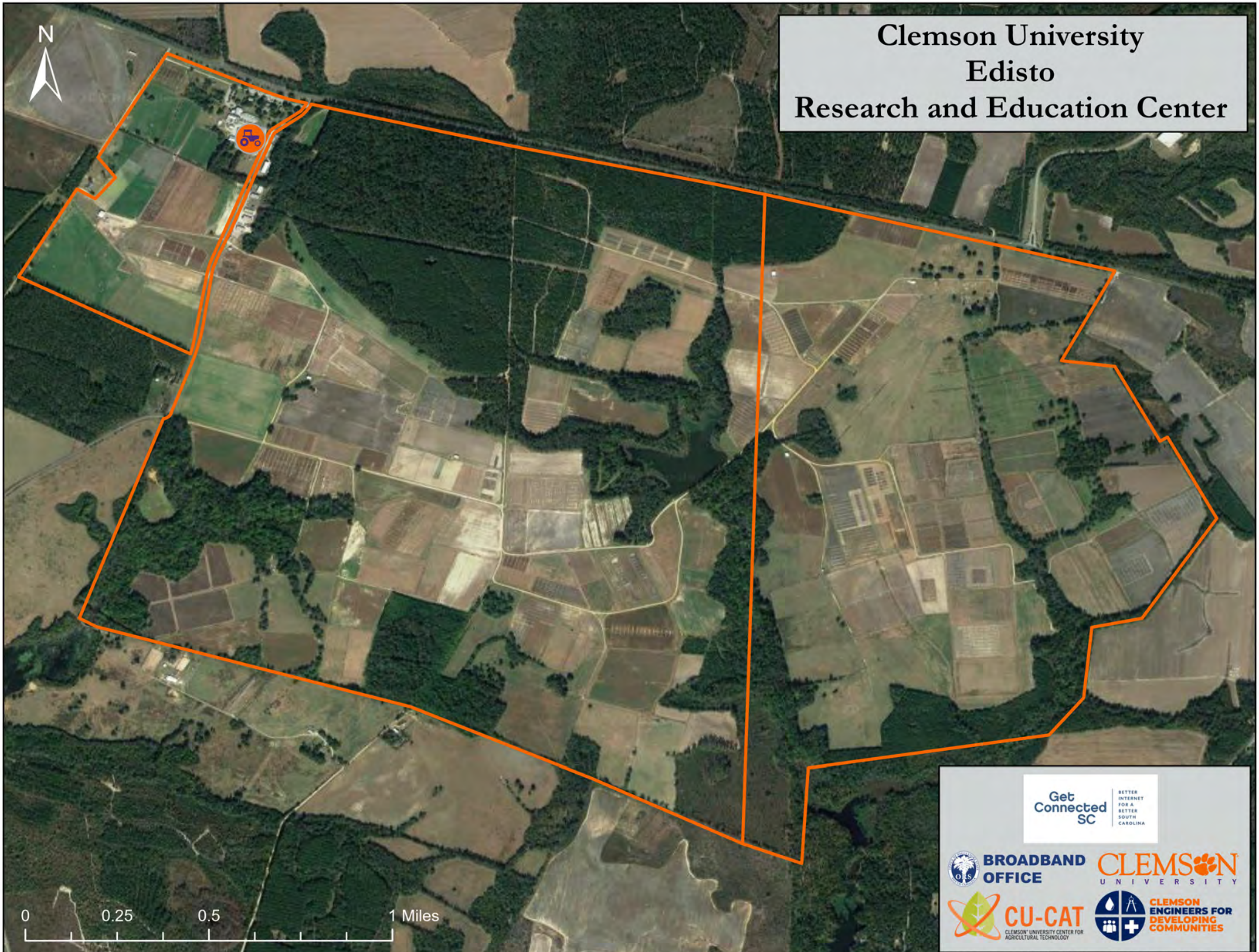
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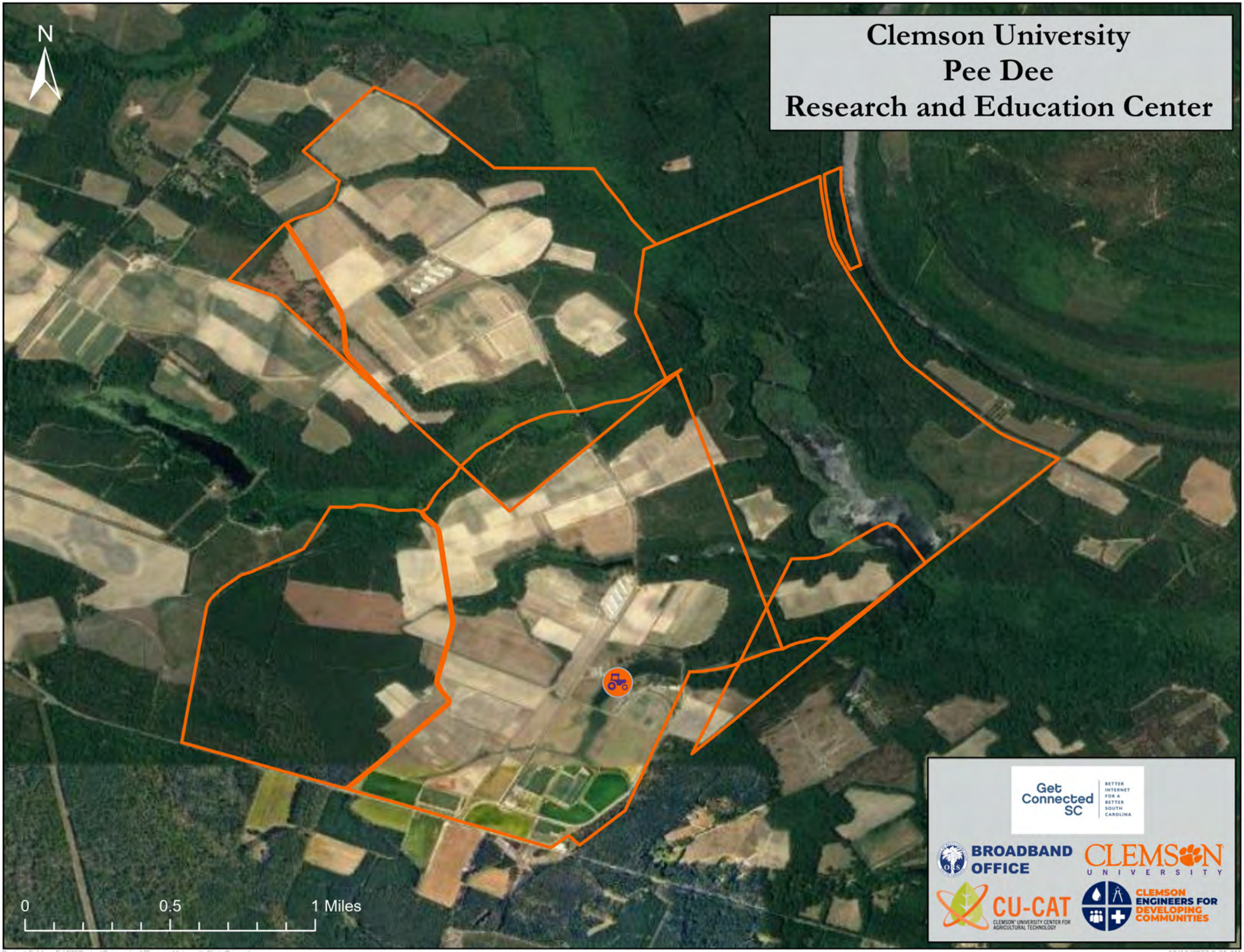

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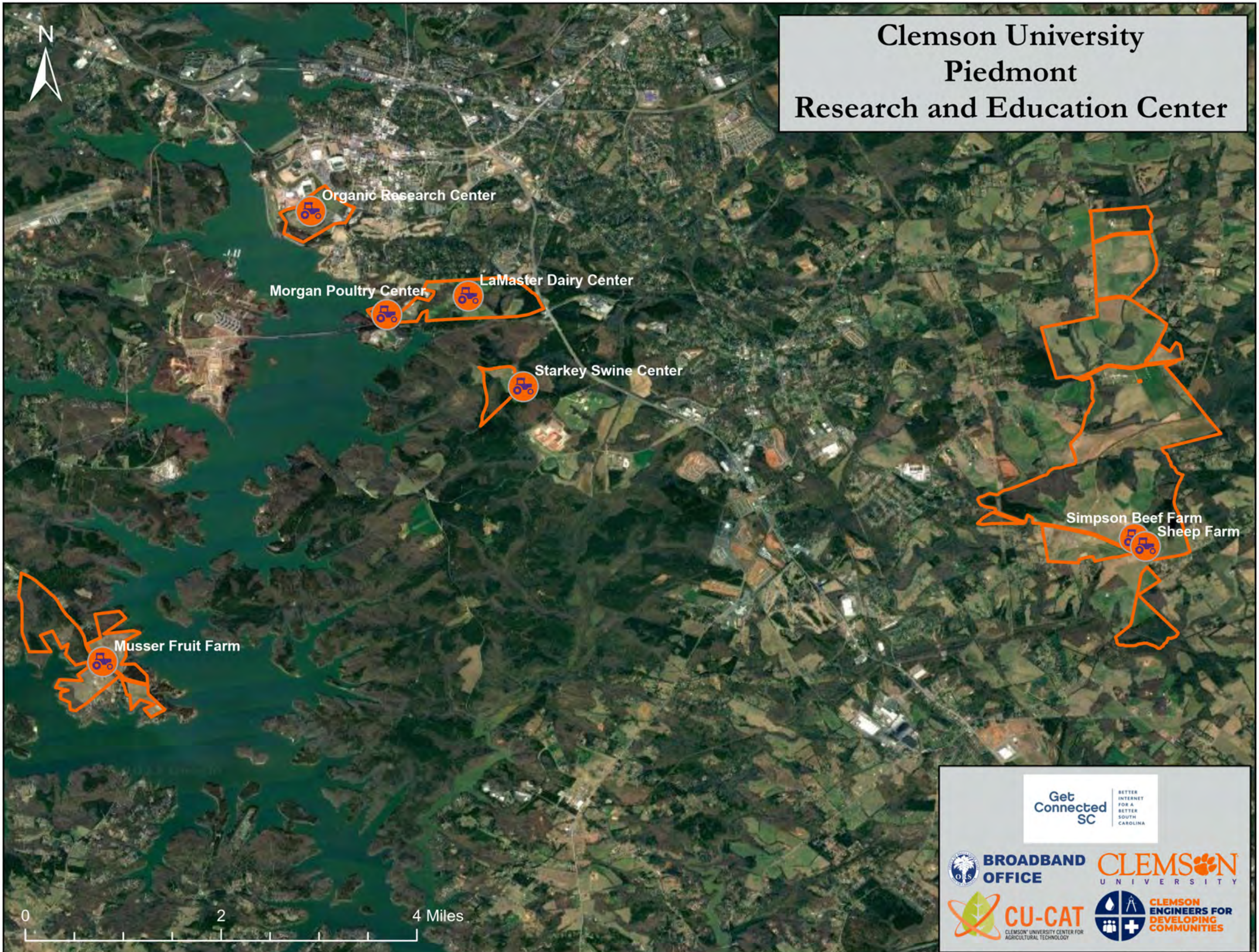
Clemson University Piedmont Research and Education Center



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Section 2

Data Summaries and Comparisons

USDA Crop Boundary Acreage

Facility	5 Mile Buffer			10 Mile Buffer			25 Mile Buffer		
	Number of Crop Boundaries	Total Crop Acrage	Percentage Of Buffer Area	Number of Crop Boundaries	Total Crop Acrage	Percentage Of Buffer Area	Number of Crop Boundaries	Total Crop Acrage	Percentage Of Buffer Area
Baruch Institute	7	36.05	0.07%	55	269.65	0.13%	931	6,246.92	0.50%
Coastal REC	24	96.75	0.19%	113	745.80	0.37%	728	4,551.95	0.36%
Edisto REC	920	9,582.61	19.06%	2656	26,261.86	13.06%	13087	138,465.61	11.02%
Pee Dee REC	735	7,710.30	15.34%	2208	24,342.15	12.11%	18785	230,473.01	18.34%
Piedmont REC*	547	4,838.50	5.11%	1444	12,483.39	4.85%	3856	31,099.43	2.72%
Sandhill REC	40	220.45	0.44%	158	811.25	0.40%	3204	31,172.69	2.48%

* Piedmont REC consists of multiple properties. Buffer boundary is based on combining the multiple buffers into a single non-circular area

Radius	5	miles	Radius	10	miles	Radius	25	miles
Area	78.540	Sq Miles	Area	314.159	Sq Miles	Area	1963.495	Sq Miles
Area	**50265.48**	**Acres**	**Area**	**201061.93**	**Acres**	**Area**	**1256637.06**	**Acres**
Piedmont Area	**94,735.66**	**Acres**	**Piedmont Area**	**257,586.65**	**Acres**	**Piedmont Area**	**1,142,942.46**	**Acres**

Top 10 Crops/Boundary Types by Acreage for 2022

Baruch Institute

5 Mile Buffer		10 Mile Buffer		25 Mile Buffer	
Crop	Total Acres	Crop	Total Acres	Crop	Total Acres
Grassland/Pasture	22.63	Grassland/Pasture	93.44	Soybeans	3112.36
Herbaceous Wetlands	7.99	Soybeans	65.28	Corn	1058.99
Soybeans	2.91	Corn	28.04	Other Hay/Non Alfalfa	757.63
Shrubland	2.52	Other Hay/Non Alfalfa	18.02	Grassland/Pasture	567.41
		Herbaceous Wetlands	17.34	Cotton	223.65
Note: Only four identified crop types within 5 miles		Shrubland	15.98	Peanuts	207.11
		Developed/Low Intensity	7.13	Evergreen Forest	72.63
		Evergreen Forest	5.27	Shrubland	49.34
		Developed/Med Intensity	4.67	Sod/Grass Seed	33.60
		Developed/Open Space	3.96	Woody Wetlands	31.32

Coastal REC

5 Mile Buffer		10 Mile Buffer		25 Mile Buffer	
Crop	Total Acres	Crop	Total Acres	Crop	Total Acres
Grassland/Pasture	57.86	Grassland/Pasture	352.81	Grassland/Pasture	1830.00
Corn	14.16	Corn	243.74	Corn	1492.73
Soybeans	11.39	Peanuts	66.09	Peanuts	563.86
Cotton	7.26	Soybeans	28.59	Soybeans	272.77
Barren	6.08	Fallow/Idle Cropland	16.41	Cotton	80.08
		Barren	9.91	Other Hay/Non Alfalfa	75.18
Note: Only five identified crop types within 5 miles		Dbl Crop WinWht/Soybeans	7.50	Evergreen Forest	44.27
		Cotton	7.26	Dbl Crop WinWht/Soybeans	35.94
		Open Water	6.69	Developed/Med Intensity	35.56
		Developed/Open Space	4.20	Open Water	25.54

Edisto REC

5 Mile Buffer		10 Mile Buffer		25 Mile Buffer	
Crop	Total Acres	Crop	Total Acres	Crop	Total Acres
Cotton	4635.97	Cotton	10475.49	Cotton	43128.06
Peanuts	1296.31	Other Hay/Non Alfalfa	4229.21	Corn	24612.07
Other Hay/Non Alfalfa	1141.99	Corn	3600.57	Other Hay/Non Alfalfa	23770.27
Corn	801.98	Soybeans	2244.81	Soybeans	10626.52
Grassland/Pasture	541.79	Peanuts	2106.30	Peanuts	9931.21
Soybeans	417.67	Grassland/Pasture	1391.48	Grassland/Pasture	9747.94
Sod/Grass Seed	280.45	Potatoes	445.67	Evergreen Forest	2827.59
Millet	154.23	Evergreen Forest	298.31	Shrubland	2396.76
Winter Wheat	53.11	Sod/Grass Seed	288.96	Dbl Crop WinWht/Soybeans	2389.48
Shrubland	49.49	Millet	236.47	Sod/Grass Seed	2356.22

Pee Dee REC

5 Mile Buffer		10 Mile Buffer		25 Mile Buffer	
Crop	Total Acres	Crop	Total Acres	Crop	Total Acres
Soybeans	3773.52	Soybeans	10049.73	Soybeans	80895.67
Other Hay/Non Alfalfa	1162.52	Cotton	4695.46	Cotton	48838.00
Cotton	1092.15	Other Hay/Non Alfalfa	3639.67	Corn	38773.46
Corn	791.18	Corn	2735.35	Other Hay/Non Alfalfa	30473.75
Dbl Crop WinWht/Soybeans	215.63	Dbl Crop WinWht/Soybeans	1136.21	Dbl Crop WinWht/Soybeans	13136.66
Sod/Grass Seed	199.04	Peanuts	461.52	Peanuts	6662.28
Evergreen Forest	152.98	Developed/Open Space	277.09	Evergreen Forest	2709.99
Woody Wetlands	95.64	Evergreen Forest	265.73	Developed/Open Space	1640.75
Developed/Open Space	84.40	Developed/Med Intensity	233.70	Woody Wetlands	1320.18
Developed/Med Intensity	48.47	Sod/Grass Seed	201.92	Sod/Grass Seed	1266.32

Piedmont REC*

5 Mile Buffer		10 Mile Buffer		25 Mile Buffer	
Crop	Total Acres	Crop	Total Acres	Crop	Total Acres
Other Hay/Non Alfalfa	1698.21	Other Hay/Non Alfalfa	4666.08	Other Hay/Non Alfalfa	14898.45
Grassland/Pasture	1370.61	Grassland/Pasture	2783.77	Grassland/Pasture	8601.48
Corn	543.05	Soybeans	1384.23	Soybeans	2161.54
Soybeans	500.58	Corn	1310.11	Corn	1753.04
Sorghum	187.47	Dbl Crop WinWht/Soybeans	887.14	Dbl Crop WinWht/Soybeans	1210.97
Dbl Crop WinWht/Soybeans	124.59	Sorghum	597.01	Sorghum	633.26
Oats	81.36	Developed/Low Intensity	165.76	Developed/Low Intensity	250.73
Developed/Low Intensity	80.29	Dbl Crop Barley/Soybeans	140.29	Cotton	194.37
Dbl Crop Barley/Soybeans	65.58	Oats	115.15	Oats	161.24
Winter Wheat	60.69	Winter Wheat	108.95	Dbl Crop Barley/Soybeans	140.29

Sandhill REC

5 Mile Buffer		10 Mile Buffer		25 Mile Buffer	
Crop	Total Acres	Crop	Total Acres	Crop	Total Acres
Other Hay/Non Alfalfa	111.86	Other Hay/Non Alfalfa	297.61	Corn	10589.34
Evergreen Forest	25.51	Grassland/Pasture	185.11	Cotton	5343.65
Corn	24.22	Barren	84.90	Other Hay/Non Alfalfa	4590.51
Grassland/Pasture	23.82	Corn	76.36	Soybeans	3117.86
Developed/Open Space	16.46	Cotton	64.77	Dbl Crop WinWht/Soybeans	2473.96
Cotton	5.16	Evergreen Forest	34.41	Evergreen Forest	1419.60
Developed/Low Intensity	4.91	Developed/Open Space	22.68	Grassland/Pasture	1124.61
Developed/Med Intensity	3.27	Developed/Low Intensity	13.32	Peanuts	654.05
Barren	2.69	Soybeans	12.72	Winter Wheat	520.28
Developed/High Intensity	2.54	Developed/Med Intensity	10.21	Developed/Open Space	236.03

* Piedmont REC consists of multiple properties. Buffer boundary is based on combining the multiple buffers into a single non-circular area

SCBBO Statistics - Eligibility In Proximity to REC

Eligibility (5 Mile Buffer)	Baruch Institute		Coastal REC		Edisto REC		Pee Dee REC		Piedmont REC*		Sandhill REC	
Census Blocks in Buffer	139		2,004		187		171		1,304		820	
Status	Blocks With Status	Percentage	Blocks With Status	Percentage	Blocks With Status	Percentage	Blocks With Status	Percentage	Blocks With Status	Percentage	Blocks With Status	Percentage
Served	76	54.68%	1680	83.83%	92	49.20%	115	67.25%	768	58.90%	685	83.54%
Partially Served	0	0.00%	25	1.25%	31	16.58%	18	10.53%	80	6.13%	2	0.24%
Unserved	4	2.88%	12	0.60%	23	12.30%	3	1.75%	66	5.06%	5	0.61%
Priority Areas	1	0.72%	2	0.10%	17	9.09%	3	1.75%	27	2.07%	1	0.12%
Main Street	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Zero Housing Units	58	41.73%	285	14.22%	24	12.83%	32	18.71%	363	27.84%	127	15.49%

Eligibility (10 Mile Buffer)	Baruch Institute		Coastal REC		Edisto REC		Pee Dee REC		Piedmont REC*		Sandhill REC	
Census Blocks in Buffer	846		5,638		689		1,439		3,714		2,089	
Status	Blocks With Status	Percentage	Blocks With Status	Percentage	Blocks With Status	Percentage	Blocks With Status	Percentage	Blocks With Status	Percentage	Blocks With Status	Percentage
Served	588	69.50%	4314	76.52%	388	56.31%	1111	77.21%	2582	69.52%	1623	77.69%
Partially Served	10	1.18%	111	1.97%	80	11.61%	73	5.07%	206	5.55%	77	3.69%
Unserved	12	1.42%	42	0.74%	50	7.26%	16	1.11%	101	2.72%	23	1.10%
Priority Areas	2	0.24%	16	0.28%	69	10.01%	10	0.69%	43	1.16%	4	0.19%
Main Street	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
Zero Housing Units	234	27.66%	1155	20.49%	102	14.80%	229	15.91%	782	21.06%	362	17.33%

Eligibility (25 Mile Buffer)	Baruch Institute		Coastal REC		Edisto REC		Pee Dee REC		Piedmont REC*		Sandhill REC	
Census Blocks in Buffer	2,277		14,615		3,249		4,852		11,689		10,908	
Status	Blocks With Status	Percentage	Blocks With Status	Percentage	Blocks With Status	Percentage	Blocks With Status	Percentage	Blocks With Status	Percentage	Blocks With Status	Percentage
Served	1412	62.01%	10609	72.59%	1790	55.09%	3281	67.62%	8291	70.93%	8005	73.39%
Partially Served	34	1.49%	323	2.21%	206	6.34%	363	7.48%	952	8.14%	468	4.29%
Unserved	56	2.46%	132	0.90%	237	7.29%	104	2.14%	286	2.45%	167	1.53%
Priority Areas	17	0.75%	86	0.59%	285	8.77%	229	4.72%	181	1.55%	68	0.62%
Main Street	0	0.00%	0	0.00%	75	2.31%	0	0.00%	0	0.00%	0	0.00%
Zero Housing Units	758	33.29%	3465	23.71%	656	20.19%	875	18.03%	1979	16.93%	2200	20.17%

* Piedmont REC consists of multiple properties. Buffer boundary is based on combining the multiple buffers into a single non-circular area

SCBBO Statistics - Area of Need In Proximity to REC

Area of Needs (5 Mile Buffer)		Baruch Institute	Coastal REC	Edisto REC	Pee Dee REC	Piedmont REC*	Sandhill REC
Number of Census Blocks		139	2004	187	171	1304	820
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	4	156	0	0	97	150
	>= 100 Mbps/20 Mbps	71	1504	75	84	622	502
Unserved Housing Units	100 or More Unserved Housing Units	0	4	0	0	0	0
	26 - 99 Unserved Housing Units	0	6	6	1	22	0
	11 - 25 Unserved Housing Units	0	8	12	11	33	5
	1 - 10 Unserved Housing Units	2	34	63	37	146	51
	Total Unserved	2	52	81	49	201	56
	Zero Housing Units	62	292	31	38	384	112
	Percent Unserved	2.60%	3.04%	51.92%	36.84%	21.85%	7.91%

Area of Needs (10 Mile Buffer)		Baruch Institute	Coastal REC	Edisto REC	Pee Dee REC	Piedmont REC*	Sandhill REC
Number of Census Blocks		846	5638	689	1439	3714	2089
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	11	349	0	39	211	258
	>= 100 Mbps/20 Mbps	575	3927	320	1022	2133	1274
Unserved Housing Units	100 or More Unserved Housing Units	0	7	0	0	2	2
	26 - 99 Unserved Housing Units	0	11	20	3	63	0
	11 - 25 Unserved Housing Units	0	33	51	18	113	30
	1 - 10 Unserved Housing Units	10	116	177	104	379	144
	Total Unserved	10	167	248	125	557	176
	Zero Housing Units	250	1195	121	253	813	381
	Percent Unserved	1.68%	3.76%	43.66%	10.54%	19.20%	10.30%

Area of Needs (25 Mile Buffer)		Baruch Institute	Coastal REC	Edisto REC	Pee Dee REC	Piedmont REC*	Sandhill REC
Number of Census Blocks		2277	14615	3249	4852	11689	10908
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	168	1562	60	154	406	748
	>= 100 Mbps/20 Mbps	1218	8841	1302	2893	6913	6981
Unserved Housing Units	100 or More Unserved Housing Units	0	12	3	1	8	9
	26 - 99 Unserved Housing Units	6	52	91	55	197	50
	11 - 25 Unserved Housing Units	6	101	229	143	437	105
	1 - 10 Unserved Housing Units	76	455	826	674	1669	708
	Total Unserved	88	620	1149	873	2311	872
	Zero Housing Units	803	3592	738	932	2059	2307
	Percent Unserved	5.97%	5.62%	45.76%	22.27%	24.00%	10.14%

* Piedmont REC consists of multiple properties. Buffer boundary is based on combining the multiple buffers into a single non-circular area

SCBBO Statistics - Available Technology In Proximity to REC

Technology (5 Mile Buffer)	Baruch Institute		Coastal REC		Edisto REC		Pee Dee REC		Piedmont REC*		Sandhill REC	
Census Blocks in Buffer	139		2004		187		171		1,304		820	
Technology Type	Blocks with Tech	Percentage	Blocks with Tech	Percentage	Blocks with Tech	Percentage	Blocks with Tech	Percentage	Blocks with Tech	Percentage	Blocks with Tech	Percentage
Fiber | Speeds >= 100 Mbps/100 Mbps (symmetric)	2	1.44%	352	17.56%	0	0.00%	3	1.75%	242	18.56%	206	25.12%
Cable (DOCSIS X.X) | Speeds >= 100 Mbps/20 Mbps	69	49.64%	1249	62.33%	85	45.45%	99	57.89%	496	38.04%	444	54.15%
xDSL | Speeds < 25 Mbps/3 Mbps	0	0.00%	16	0.80%	37	19.79%	4	2.34%	85	6.52%	13	1.59%
Fixed Wireless | Speeds >= 10 Mbps/1 Mbps	0	0.00%	0	0.00%	1	0.53%	0	0.00%	3	0.23%	0	0.00%
No Internet Service Available	1	0.72%	6	0.30%	29	15.51%	24	14.04%	45	3.45%	2	0.24%
Zero Housing Units	67	48.20%	381	19.01%	35	18.72%	41	23.98%	433	33.21%	155	18.90%

Technology (10 Mile Buffer)	Baruch Institute		Coastal REC		Edisto REC		Pee Dee REC		Piedmont REC*		Sandhill REC	
Census Blocks in Buffer	846		5,638		689		1,439		3,714		2,089	
Technology Type	Blocks with Tech	Percentage	Blocks with Tech	Percentage	Blocks with Tech	Percentage	Blocks with Tech	Percentage	Blocks with Tech	Percentage	Blocks with Tech	Percentage
Fiber | Speeds >= 100 Mbps/100 Mbps (symmetric)	19	2.25%	934	16.57%	56	8.13%	156	10.84%	648	17.45%	446	21.35%
Cable (DOCSIS X.X) | Speeds >= 100 Mbps/20 Mbps	518	61.23%	3103	55.04%	269	39.04%	893	62.06%	1678	45.18%	1075	51.46%
xDSL | Speeds < 25 Mbps/3 Mbps	1	0.12%	57	1.01%	75	10.89%	10	0.69%	236	6.35%	48	2.30%
Fixed Wireless | Speeds >= 10 Mbps/1 Mbps	0	0.00%	0	0.00%	13	1.89%	0	0.00%	31	0.83%	0	0.00%
No Internet Service Available	2	0.24%	28	0.50%	136	19.74%	42	2.92%	121	3.26%	21	1.01%
Zero Housing Units	306	36.17%	1516	26.89%	140	20.32%	338	23.49%	1000	26.93%	499	23.89%

Technology (25 Mile Buffer)	Baruch Institute		Coastal REC		Edisto REC		Pee Dee REC		Piedmont REC*		Sandhill REC	
Census Blocks in Buffer	2,277		14,615		3,249		4,852		11,689		10,908	
Technology Type	Blocks with Tech	Percentage	Blocks with Tech	Percentage	Blocks with Tech	Percentage	Blocks with Tech	Percentage	Blocks with Tech	Percentage	Blocks with Tech	Percentage
Fiber | Speeds >= 100 Mbps/100 Mbps (symmetric)	502	22.05%	3277	22.42%	813	25.02%	716	14.76%	1390	11.89%	2261	20.73%
Cable (DOCSIS X.X) | Speeds >= 100 Mbps/20 Mbps	832	36.54%	6713	45.93%	516	15.88%	2518	51.90%	6180	52.87%	5052	46.31%
xDSL | Speeds < 25 Mbps/3 Mbps	14	0.61%	200	1.37%	421	12.96%	85	1.75%	856	7.32%	411	3.77%
Fixed Wireless | Speeds >= 10 Mbps/1 Mbps	2	0.09%	5	0.03%	108	3.32%	58	1.20%	127	1.09%	6	0.06%
No Internet Service Available	25	1.10%	150	1.03%	534	16.44%	326	6.72%	577	4.94%	119	1.09%
Zero Housing Units	902	39.61%	4270	29.22%	857	26.38%	1149	23.68%	2559	21.89%	3059	28.04%

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SCBBO Statistics - Potential Local Impact In Proximity to REC

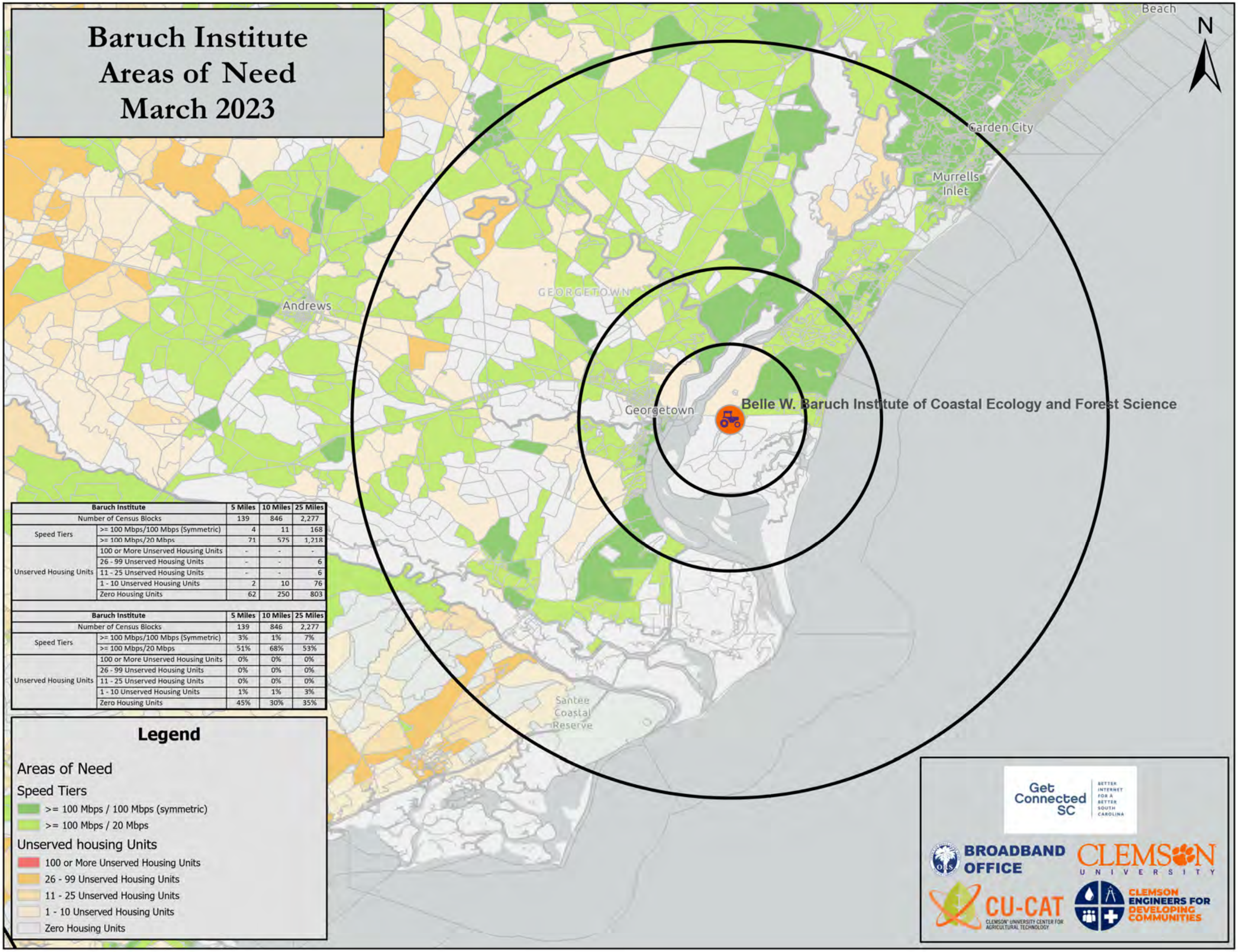
	K12 Students					
	Baruch Institute	**Coastal REC**	**Edisto REC**	**Pee Dee REC**	**Piedmont REC***	**Sandhill REC**
5 mile	450	10,478	602	805	6,015	15,675
10 mile	3,763	28,524	2,359	7,447	20,127	30,370
25 Mile	9,076	108,820	9,049	26,351	70,147	78,357

	Residential Units					
	Baruch Institute	**Coastal REC**	**Edisto REC**	**Pee Dee REC**	**Piedmont REC***	**Sandhill REC**
5 mile	2,363	32,529	1,720	2,819	27,329	33,715
10 mile	14,298	105,204	6,698	20,740	70,429	65,591
25 Mile	45,405	321,140	26,764	75,435	202,021	223,921

Section 3

Research and Education Center Profiles

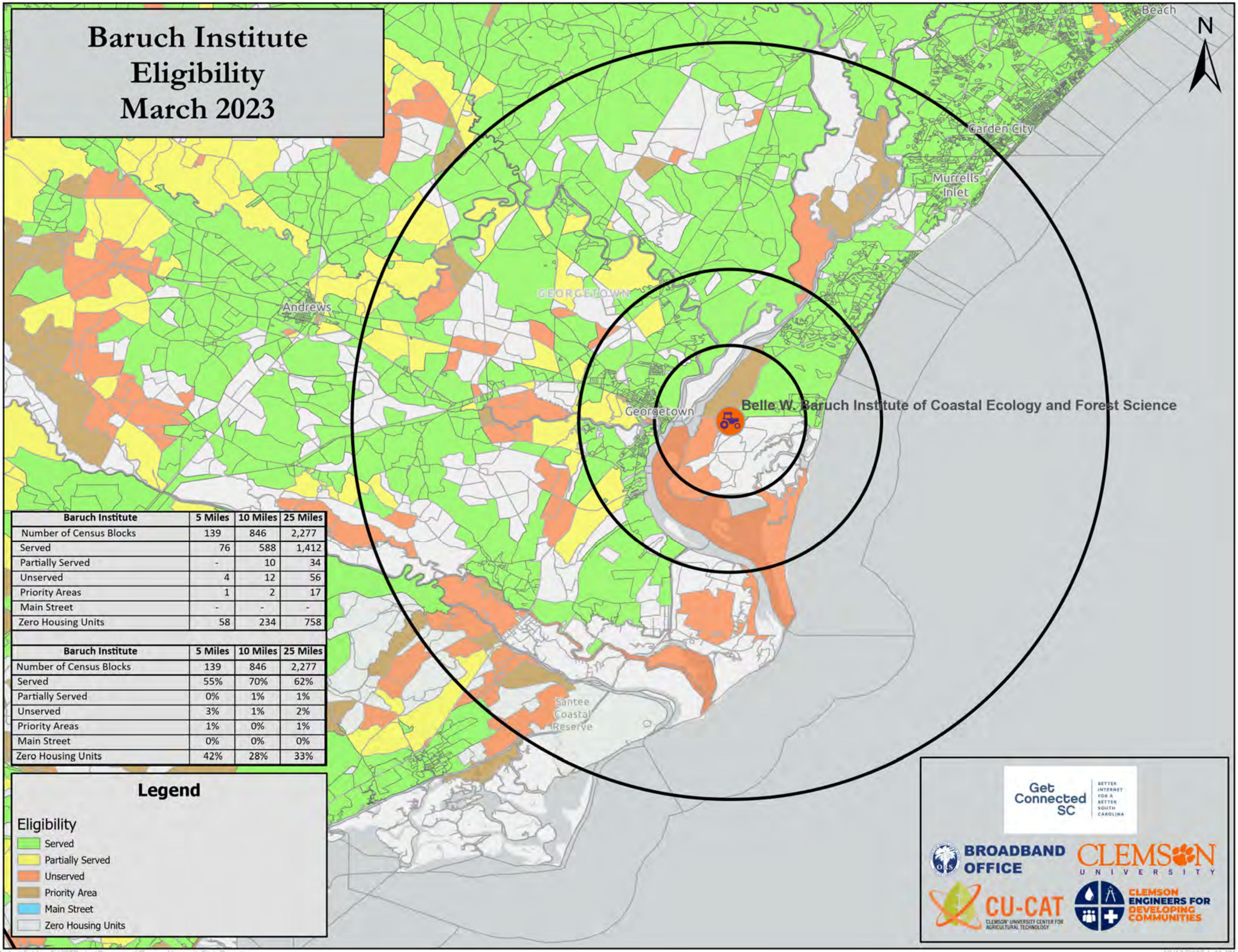
Baruch Institute Areas of Need March 2023



Baruch Institute		5 Miles	10 Miles	25 Miles
Number of Census Blocks		139	846	2,277
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	4	11	168
	>= 100 Mbps/20 Mbps	71	575	1,218
Unserved Housing Units	100 or More Unserved Housing Units	-	-	-
	26 - 99 Unserved Housing Units	-	-	6
	11 - 25 Unserved Housing Units	-	-	6
	1 - 10 Unserved Housing Units	2	10	76
	Zero Housing Units	62	250	803

Baruch Institute		5 Miles	10 Miles	25 Miles
Number of Census Blocks		139	846	2,277
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	3%	1%	7%
	>= 100 Mbps/20 Mbps	51%	68%	53%
Unserved Housing Units	100 or More Unserved Housing Units	0%	0%	0%
	26 - 99 Unserved Housing Units	0%	0%	0%
	11 - 25 Unserved Housing Units	0%	0%	0%
	1 - 10 Unserved Housing Units	1%	1%	3%
	Zero Housing Units	45%	30%	35%

Baruch Institute Eligibility March 2023



Baruch Institute	5 Miles	10 Miles	25 Miles
Number of Census Blocks	139	846	2,277
Served	76	588	1,412
Partially Served	-	10	34
Unserved	4	12	56
Priority Areas	1	2	17
Main Street	-	-	-
Zero Housing Units	58	234	758

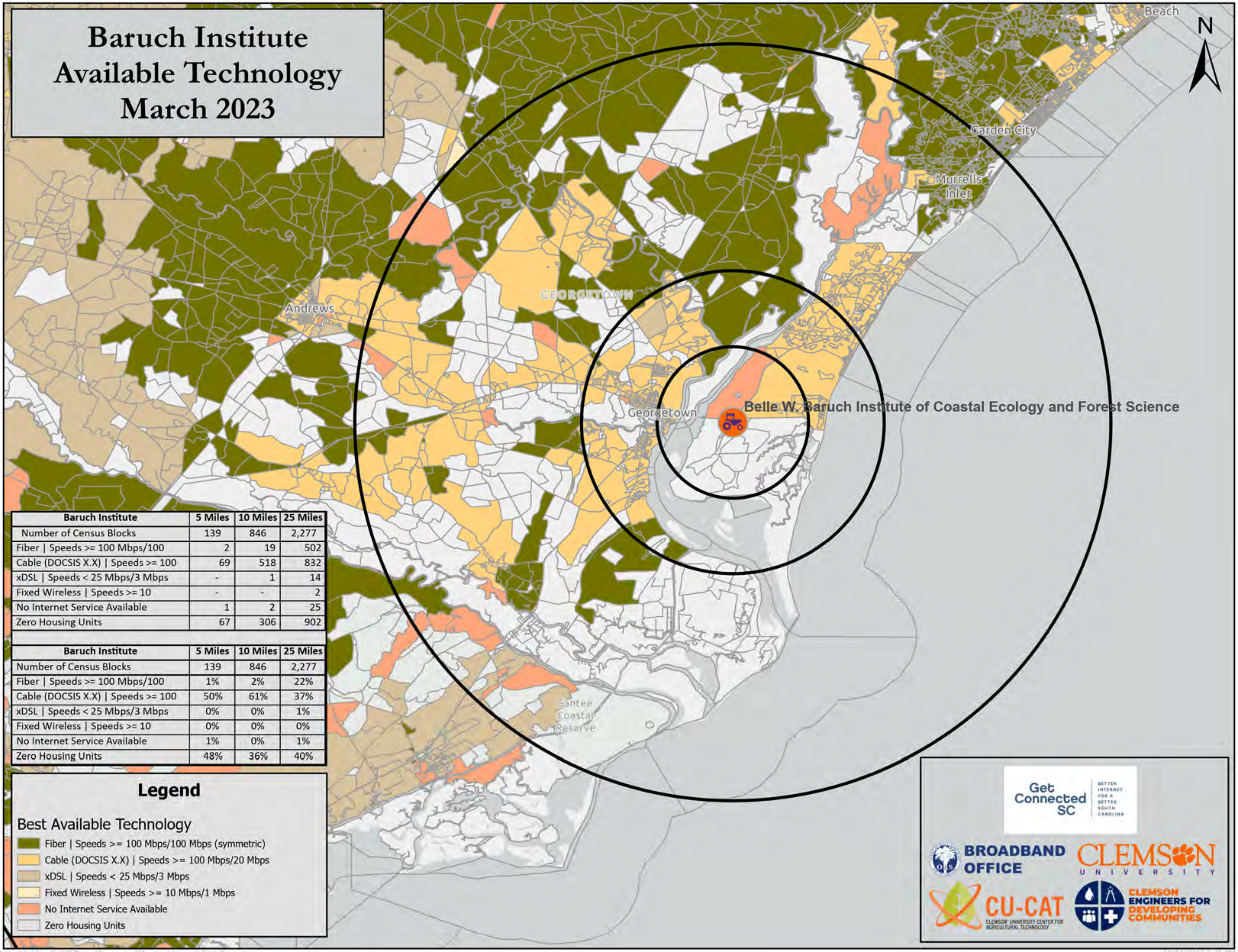
Baruch Institute	5 Miles	10 Miles	25 Miles
Number of Census Blocks	139	846	2,277
Served	55%	70%	62%
Partially Served	0%	1%	1%
Unserved	3%	1%	2%
Priority Areas	1%	0%	1%
Main Street	0%	0%	0%
Zero Housing Units	42%	28%	33%

Legend

Eligibility

- Served
- Partially Served
- Unserved
- Priority Area
- Main Street
- Zero Housing Units

Baruch Institute Available Technology March 2023



Baruch Institute	5 Miles	10 Miles	25 Miles
Number of Census Blocks	139	846	2,277
Fiber | Speeds >= 100 Mbps/100	2	19	502
Cable (DOCSIS X.X) | Speeds >= 100	69	518	832
xDSL | Speeds < 25 Mbps/3 Mbps	-	1	14
Fixed Wireless | Speeds >= 10	-	-	2
No Internet Service Available	1	2	25
Zero Housing Units	67	306	902

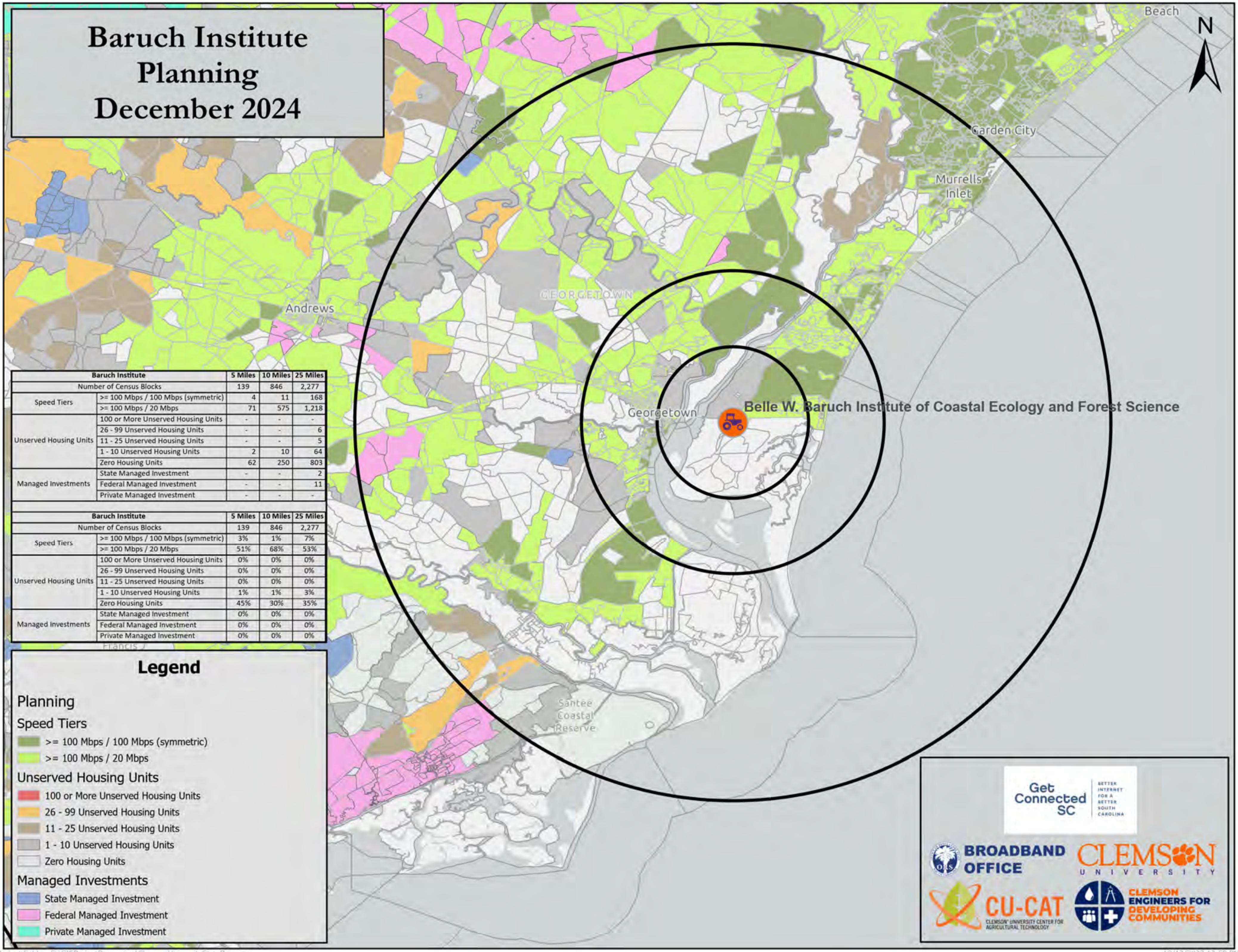
Baruch Institute	5 Miles	10 Miles	25 Miles
Number of Census Blocks	139	846	2,277
Fiber | Speeds >= 100 Mbps/100	1%	2%	22%
Cable (DOCSIS X.X) | Speeds >= 100	50%	61%	37%
xDSL | Speeds < 25 Mbps/3 Mbps	0%	0%	1%
Fixed Wireless | Speeds >= 10	0%	0%	0%
No Internet Service Available	1%	0%	1%
Zero Housing Units	48%	36%	40%

Legend

Best Available Technology

- Fiber | Speeds >= 100 Mbps/100 Mbps (symmetric)
- Cable (DOCSIS X.X) | Speeds >= 100 Mbps/20 Mbps
- xDSL | Speeds < 25 Mbps/3 Mbps
- Fixed Wireless | Speeds >= 10 Mbps/1 Mbps
- No Internet Service Available
- Zero Housing Units

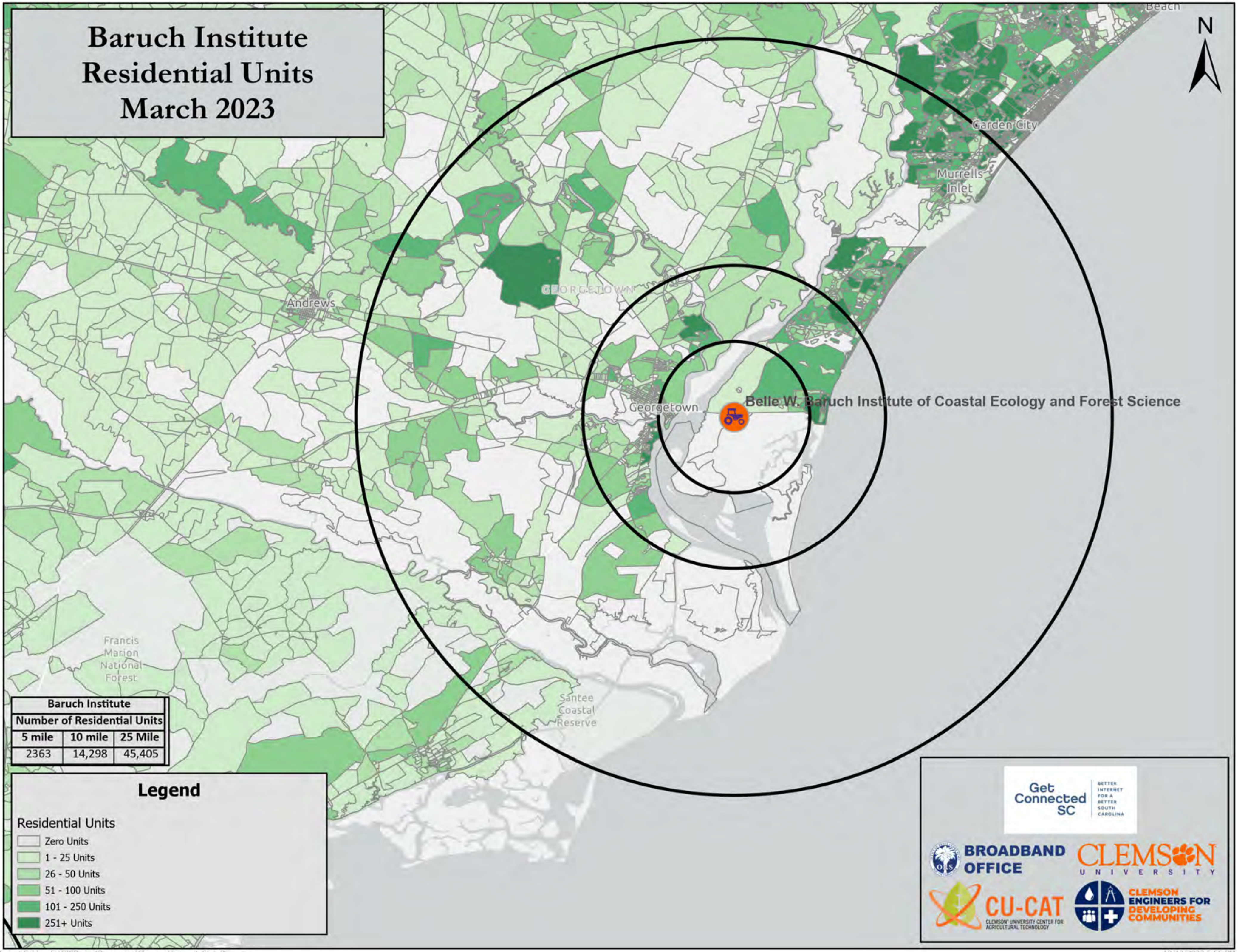
Baruch Institute Planning December 2024



Baruch Institute		5 Miles	10 Miles	25 Miles
Number of Census Blocks		139	846	2,277
Speed Tiers	>= 100 Mbps / 100 Mbps (symmetric)	4	11	168
	>= 100 Mbps / 20 Mbps	71	575	1,218
Unserved Housing Units	100 or More Unserved Housing Units	-	-	-
	26 - 99 Unserved Housing Units	-	-	6
	11 - 25 Unserved Housing Units	-	-	5
	1 - 10 Unserved Housing Units	2	10	64
	Zero Housing Units	62	250	803
Managed Investments	State Managed Investment	-	-	2
	Federal Managed Investment	-	-	11
	Private Managed Investment	-	-	-

Baruch Institute		5 Miles	10 Miles	25 Miles
Number of Census Blocks		139	846	2,277
Speed Tiers	>= 100 Mbps / 100 Mbps (symmetric)	3%	1%	7%
	>= 100 Mbps / 20 Mbps	51%	68%	53%
Unserved Housing Units	100 or More Unserved Housing Units	0%	0%	0%
	26 - 99 Unserved Housing Units	0%	0%	0%
	11 - 25 Unserved Housing Units	0%	0%	0%
	1 - 10 Unserved Housing Units	1%	1%	3%
	Zero Housing Units	45%	30%	35%
Managed Investments	State Managed Investment	0%	0%	0%
	Federal Managed Investment	0%	0%	0%
	Private Managed Investment	0%	0%	0%

Baruch Institute Residential Units March 2023



Baruch Institute		
Number of Residential Units		
5 mile	10 mile	25 Mile
2363	14,298	45,405

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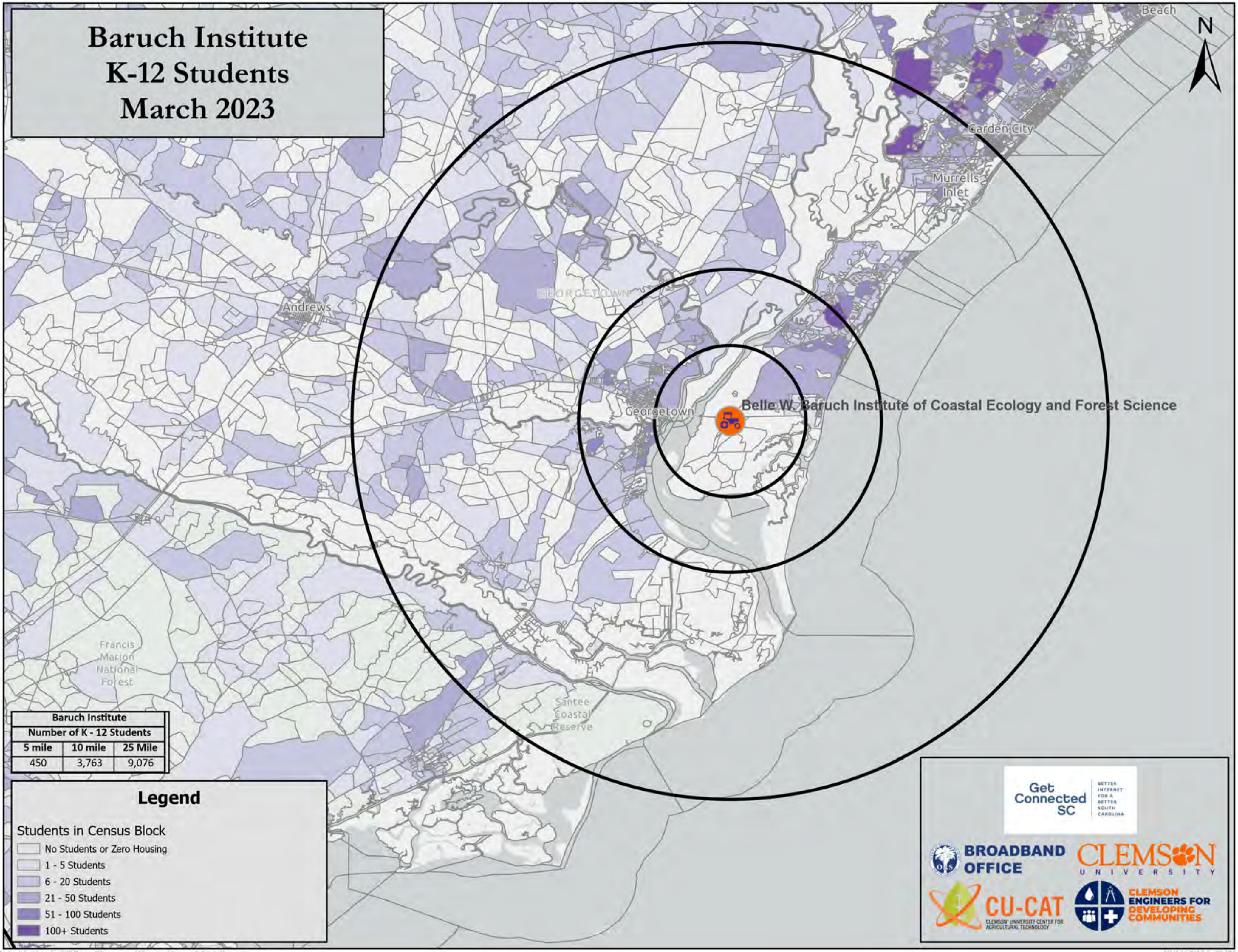
Baruch Institute
K-12 Students
March 2023

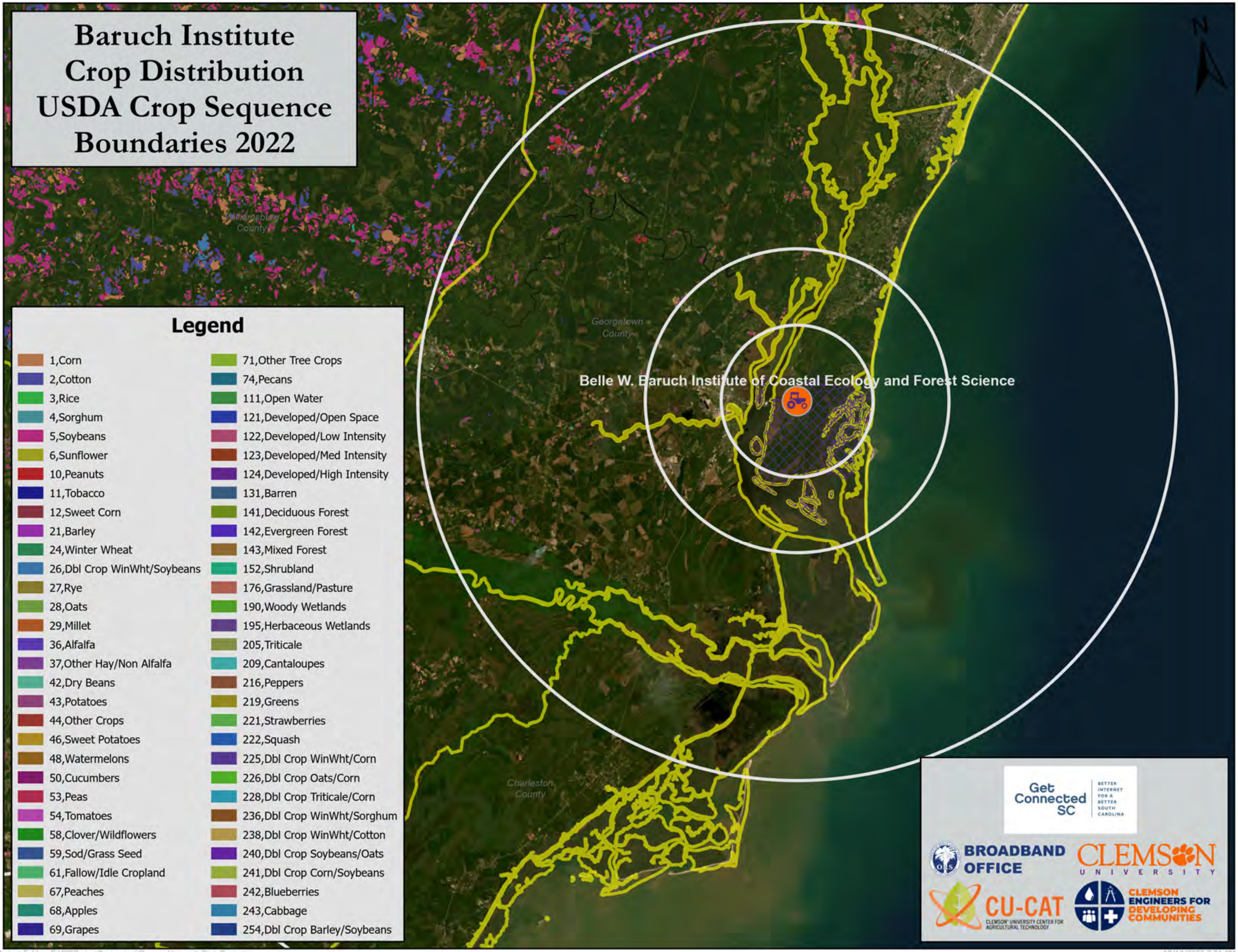


Baruch Institute		
Number of K - 12 Students		
5 mile	10 mile	25 Mile
450	3,763	9,076

Legend

Students in Census Block

- No Students or Zero Housing
- 1 - 5 Students
- 6 - 20 Students
- 21 - 50 Students
- 51 - 100 Students
- 100+ Students



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Baruch Institute
5 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	7
Total Acreage of Bounderies	36.05
Percent Crop Acreage in Buffer	0.07%

2015

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	14.19	39.37%
Fallow/Idle Cropland	8.85	24.55%
Soybeans	7.98	22.14%
Corn	5.03	13.95%

2016

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	25.55	70.88%
Soybeans	7.98	22.14%
Shrubland	2.52	6.98%

2017

Crop	Total Acres	Percent Acreage
Corn	28.07	77.86%
Soybeans	7.98	22.14%

2018

Crop	Total Acres	Percent Acreage
Corn	17.62	48.87%
Soybeans	13.01	36.08%
Fallow/Idle Cropland	2.91	8.06%
Grassland/Pasture	2.52	6.98%

2019

Crop	Total Acres	Percent Acreage
Soybeans	22.56	62.58%
Herbaceous Wetlands	7.99	22.17%
Corn	2.98	8.26%
Other Hay/Non Alfalfa	2.52	6.98%

2020

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	11.67	32.38%
Soybeans	10.89	30.20%
Woody Wetlands	7.99	22.17%
Shrubland	2.98	8.26%
Other Hay/Non Alfalfa	2.52	6.98%

2021

Crop	Total Acres	Percent Acreage
Corn	14.58	40.45%
Soybeans	7.98	22.14%
Herbaceous Wetlands	5.94	16.48%
Woody Wetlands	5.03	13.95%
Other Hay/Non Alfalfa	2.52	6.98%

2022

Crop	Total Acres	Percent Acreage
Grassland/Pasture	22.63	62.78%
Herbaceous Wetlands	7.99	22.17%
Soybeans	2.91	8.06%
Shrubland	2.52	6.98%

Baruch Institute
10 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	55
Total Acreage of Bounderies	269.65
Percent Crop Acreage in Buffer	0.13%

2015

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	129.66	48.09%
Other Hay/Non Alfalfa	70.79	26.25%
Soybeans	32.33	11.99%
Corn	19.67	7.30%
Grassland/Pasture	11.39	4.22%
Developed/Open Space	3.11	1.15%
Barren	2.70	1.00%

2016

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	171.63	63.65%
Soybeans	52.65	19.52%
Other Hay/Non Alfalfa	15.25	5.65%
Grassland/Pasture	11.39	4.22%
Corn	7.94	2.95%
Shrubland	5.19	1.92%
Developed/Open Space	3.11	1.15%
Peanuts	2.49	0.92%

2017

Crop	Total Acres	Percent Acreage
Corn	120.70	44.76%
Soybeans	78.91	29.26%
Other Hay/Non Alfalfa	30.33	11.25%
Grassland/Pasture	11.39	4.22%
Herbaceous Wetlands	9.35	3.47%
Peanuts	7.93	2.94%
Fallow/Idle Cropland	5.27	1.96%
Developed/Open Space	3.11	1.15%
Shrubland	2.67	0.99%

2018

Crop	Total Acres	Percent Acreage
Soybeans	114.89	42.61%
Corn	88.13	32.68%
Other Hay/Non Alfalfa	34.36	12.74%
Shrubland	11.39	4.22%
Herbaceous Wetlands	9.35	3.47%
Fallow/Idle Cropland	5.91	2.19%
Developed/Open Space	3.11	1.15%
Grassland/Pasture	2.52	0.93%

2019

Crop	Total Acres	Percent Acreage
Soybeans	70.48	26.14%
Corn	55.90	20.73%
Other Hay/Non Alfalfa	54.77	20.31%
Grassland/Pasture	39.19	14.53%
Herbaceous Wetlands	21.00	7.79%
Developed/Open Space	14.49	5.37%
Shrubland	5.27	1.96%
Developed/Med Intensity	4.67	1.73%
Barren	3.88	1.44%

2020

Crop	Total Acres	Percent Acreage
Soybeans	88.51	32.83%
Fallow/Idle Cropland	53.50	19.84%
Other Hay/Non Alfalfa	42.68	15.83%
Herbaceous Wetlands	16.09	5.97%
Shrubland	15.44	5.73%
Developed/Open Space	14.49	5.37%
Grassland/Pasture	13.26	4.92%
Corn	13.00	4.82%
Woody Wetlands	7.99	2.96%
Developed/Med Intensity	4.67	1.73%

2021

Crop	Total Acres	Percent Acreage
Corn	90.75	33.65%
Soybeans	52.67	19.53%
Grassland/Pasture	45.21	16.77%
Other Hay/Non Alfalfa	20.53	7.61%
Herbaceous Wetlands	18.95	7.03%
Shrubland	10.17	3.77%
Developed/Low Intensity	7.13	2.65%
Sod/Grass Seed	6.78	2.51%
Evergreen Forest	5.27	1.96%
Woody Wetlands	5.03	1.86%
Developed/Med Intensity	4.67	1.73%
Fallow/Idle Cropland	2.49	0.92%

2022

Crop	Total Acres	Percent Acreage
Grassland/Pasture	93.44	34.65%
Soybeans	65.28	24.21%
Corn	28.04	10.40%
Other Hay/Non Alfalfa	18.02	6.68%
Herbaceous Wetlands	17.34	6.43%
Shrubland	15.98	5.93%
Developed/Low Intensity	7.13	2.65%
Evergreen Forest	5.27	1.96%
Developed/Med Intensity	4.67	1.73%
Developed/Open Space	3.96	1.47%
Open Water	3.66	1.36%
Winter Wheat	3.47	1.29%
Barren	3.39	1.26%

Baruch Institute
25 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	931
Total Acreage of Bounderies	6,246.92
Percent Crop Acreage in Buffer	0.50%

2015

Crop	Total Acres	Percent Acreage
Soybeans	2198.61	35.20%
Fallow/Idle Cropland	1592.77	25.50%
Corn	889.32	14.24%
Other Hay/Non Alfalfa	588.07	9.41%
Dbl Crop WinWht/Soybeans	301.55	4.83%
Cotton	147.29	2.36%
Grassland/Pasture	122.44	1.96%
Shrubland	116.22	1.86%
Tobacco	100.93	1.62%
Peanuts	94.26	1.51%
Evergreen Forest	39.04	0.62%
Herbaceous Wetlands	24.70	0.40%
Barren	24.69	0.40%
Developed/Open Space	7.04	0.11%

2016

Crop	Total Acres	Percent Acreage
Soybeans	2589.61	41.45%
Fallow/Idle Cropland	2075.25	33.22%
Corn	575.91	9.22%
Other Hay/Non Alfalfa	429.58	6.88%
Cotton	115.84	1.85%
Shrubland	115.20	1.84%
Peanuts	90.95	1.46%
Grassland/Pasture	82.82	1.33%
Herbaceous Wetlands	55.50	0.89%
Millet	40.27	0.64%
Evergreen Forest	26.83	0.43%
Developed/Open Space	16.05	0.26%
Rye	13.61	0.22%
Sod/Grass Seed	13.26	0.21%
Woody Wetlands	3.68	0.06%
Open Water	2.58	0.04%

2017

Crop	Total Acres	Percent Acreage
Soybeans	2674.82	42.82%
Corn	1472.99	23.58%
Other Hay/Non Alfalfa	759.29	12.15%
Cotton	410.86	6.58%
Peanuts	198.21	3.17%
Dbl Crop WinWht/Soybeans	164.18	2.63%
Fallow/Idle Cropland	107.72	1.72%
Shrubland	92.58	1.48%
Sod/Grass Seed	92.16	1.48%
Grassland/Pasture	81.27	1.30%
Herbaceous Wetlands	73.93	1.18%
Barren	44.13	0.71%
Rye	28.38	0.45%
Evergreen Forest	22.62	0.36%
Developed/Open Space	12.64	0.20%
Woody Wetlands	8.54	0.14%
Deciduous Forest	2.58	0.04%

2018

Crop	Total Acres	Percent Acreage
Soybeans	3315.64	53.08%
Corn	942.87	15.09%
Other Hay/Non Alfalfa	837.42	13.41%
Cotton	429.81	6.88%
Fallow/Idle Cropland	149.34	2.39%
Peanuts	142.33	2.28%
Shrubland	107.39	1.72%
Sod/Grass Seed	88.52	1.42%
Tobacco	72.00	1.15%
Grassland/Pasture	54.76	0.88%
Evergreen Forest	53.05	0.85%
Herbaceous Wetlands	16.48	0.26%
Watermelons	12.06	0.19%
Developed/Open Space	12.06	0.19%
Rye	10.67	0.17%
Barren	2.51	0.04%

2019

Crop	Total Acres	Percent Acreage
Soybeans	2542.29	40.70%
Corn	1692.32	27.09%
Other Hay/Non Alfalfa	957.60	15.33%
Cotton	389.92	6.24%
Grassland/Pasture	303.90	4.86%
Fallow/Idle Cropland	118.63	1.90%
Sod/Grass Seed	51.64	0.83%
Evergreen Forest	40.63	0.65%
Shrubland	39.82	0.64%
Developed/Open Space	28.90	0.46%
Herbaceous Wetlands	21.00	0.34%
Peanuts	16.80	0.27%
Woody Wetlands	8.73	0.14%
Barren	7.72	0.12%
Rye	7.38	0.12%
Open Water	6.18	0.10%
Developed/Low Intensity	5.91	0.09%
Developed/Med Intensity	4.67	0.07%
Dbl Crop WinWht/Soybeans	2.88	0.05%

2020

Crop	Total Acres	Percent Acreage
Soybeans	2173.19	34.79%
Corn	1449.32	23.20%
Other Hay/Non Alfalfa	926.90	14.84%
Fallow/Idle Cropland	924.03	14.79%
Grassland/Pasture	199.16	3.19%
Shrubland	118.33	1.89%
Peanuts	96.52	1.55%
Dbl Crop WinWht/Soybeans	91.24	1.46%
Barren	43.95	0.70%
Evergreen Forest	43.51	0.70%
Herbaceous Wetlands	37.64	0.60%
Developed/Open Space	35.42	0.57%
Woody Wetlands	26.02	0.42%
Cotton	22.98	0.37%
Tobacco	14.63	0.23%
Open Water	13.32	0.21%
Sod/Grass Seed	9.92	0.16%
Developed/Low Intensity	5.91	0.09%
Developed/Med Intensity	4.67	0.07%
Oats	3.95	0.06%
Rye	3.75	0.06%
Dbl Crop Soybeans/Oats	2.57	0.04%

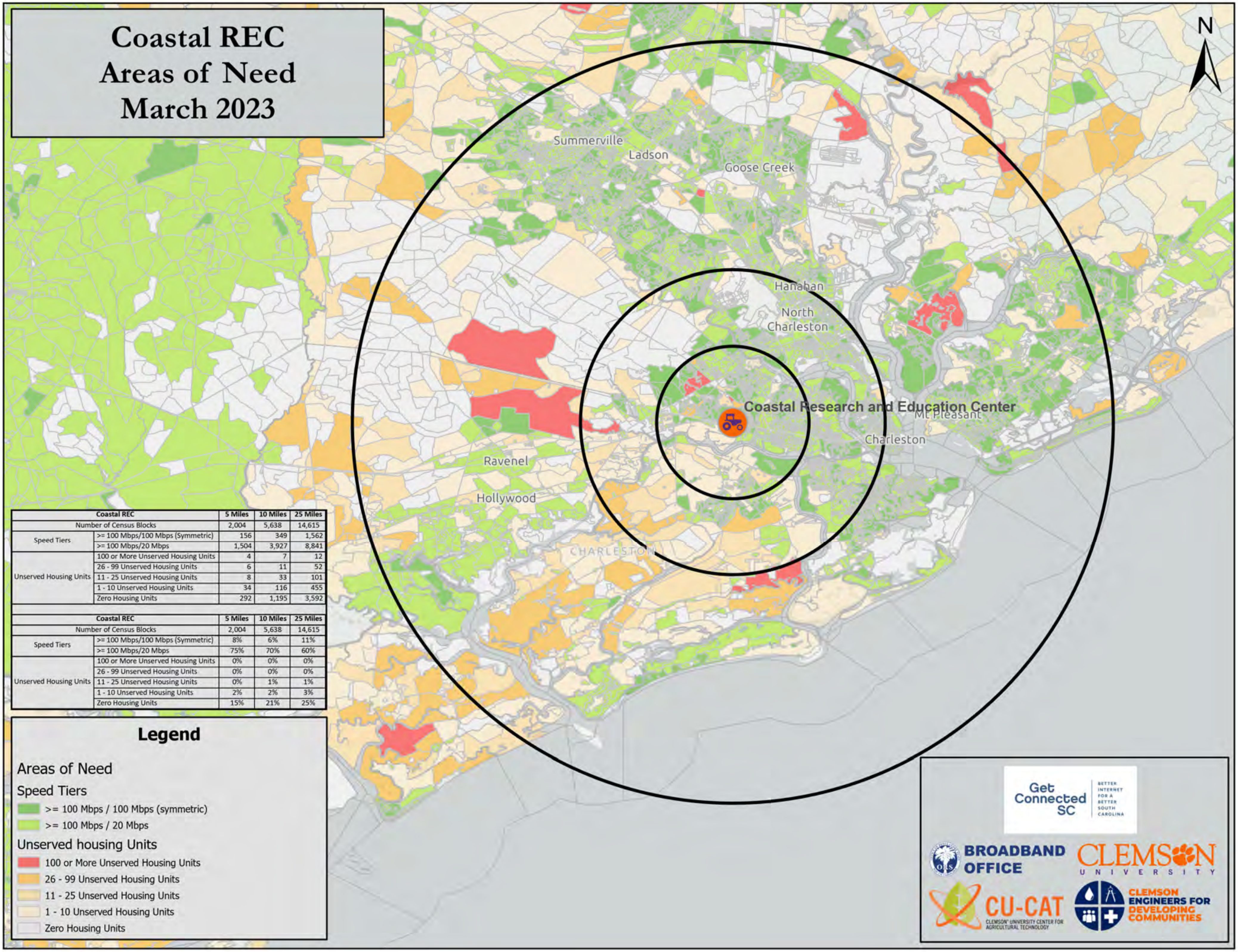
2021

Crop	Total Acres	Percent Acreage
Soybeans	3007.86	48.15%
Corn	1538.44	24.63%
Other Hay/Non Alfalfa	822.55	13.17%
Grassland/Pasture	362.33	5.80%
Fallow/Idle Cropland	143.72	2.30%
Evergreen Forest	78.74	1.26%
Sod/Grass Seed	56.78	0.91%
Shrubland	52.12	0.83%
Woody Wetlands	50.70	0.81%
Cotton	30.14	0.48%
Herbaceous Wetlands	21.88	0.35%
Developed/Low Intensity	20.36	0.33%
Developed/Open Space	17.21	0.28%
Millet	15.30	0.24%
Open Water	13.32	0.21%
Developed/Med Intensity	10.89	0.17%
Barren	4.58	0.07%

2022

Crop	Total Acres	Percent Acreage
Soybeans	3112.36	49.82%
Corn	1058.99	16.95%
Other Hay/Non Alfalfa	757.63	12.13%
Grassland/Pasture	567.41	9.08%
Cotton	223.65	3.58%
Peanuts	207.11	3.32%
Evergreen Forest	72.63	1.16%
Shrubland	49.34	0.79%
Sod/Grass Seed	33.60	0.54%
Woody Wetlands	31.32	0.50%
Herbaceous Wetlands	21.32	0.34%
Developed/Open Space	19.30	0.31%
Open Water	16.98	0.27%
Developed/Low Intensity	15.27	0.24%
Tobacco	11.56	0.19%
Developed/Med Intensity	10.89	0.17%
Barren	10.53	0.17%
Oats	9.09	0.15%
Dbl Crop WinWht/Soybeans	6.96	0.11%
Millet	4.84	0.08%
Winter Wheat	3.47	0.06%
Fallow/Idle Cropland	2.66	0.04%

Coastal REC Areas of Need March 2023



Coastal REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		2,004	5,638	14,615
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	156	349	1,562
	>= 100 Mbps/20 Mbps	1,504	3,927	8,841
Unserved Housing Units	100 or More Unserved Housing Units	4	7	12
	26 - 99 Unserved Housing Units	6	11	52
	11 - 25 Unserved Housing Units	8	33	101
	1 - 10 Unserved Housing Units	34	116	455
	Zero Housing Units	292	1,195	3,592

Coastal REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		2,004	5,638	14,615
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	8%	6%	11%
	>= 100 Mbps/20 Mbps	75%	70%	60%
Unserved Housing Units	100 or More Unserved Housing Units	0%	0%	0%
	26 - 99 Unserved Housing Units	0%	0%	0%
	11 - 25 Unserved Housing Units	0%	1%	1%
	1 - 10 Unserved Housing Units	2%	2%	3%
	Zero Housing Units	15%	21%	25%

Legend

Areas of Need

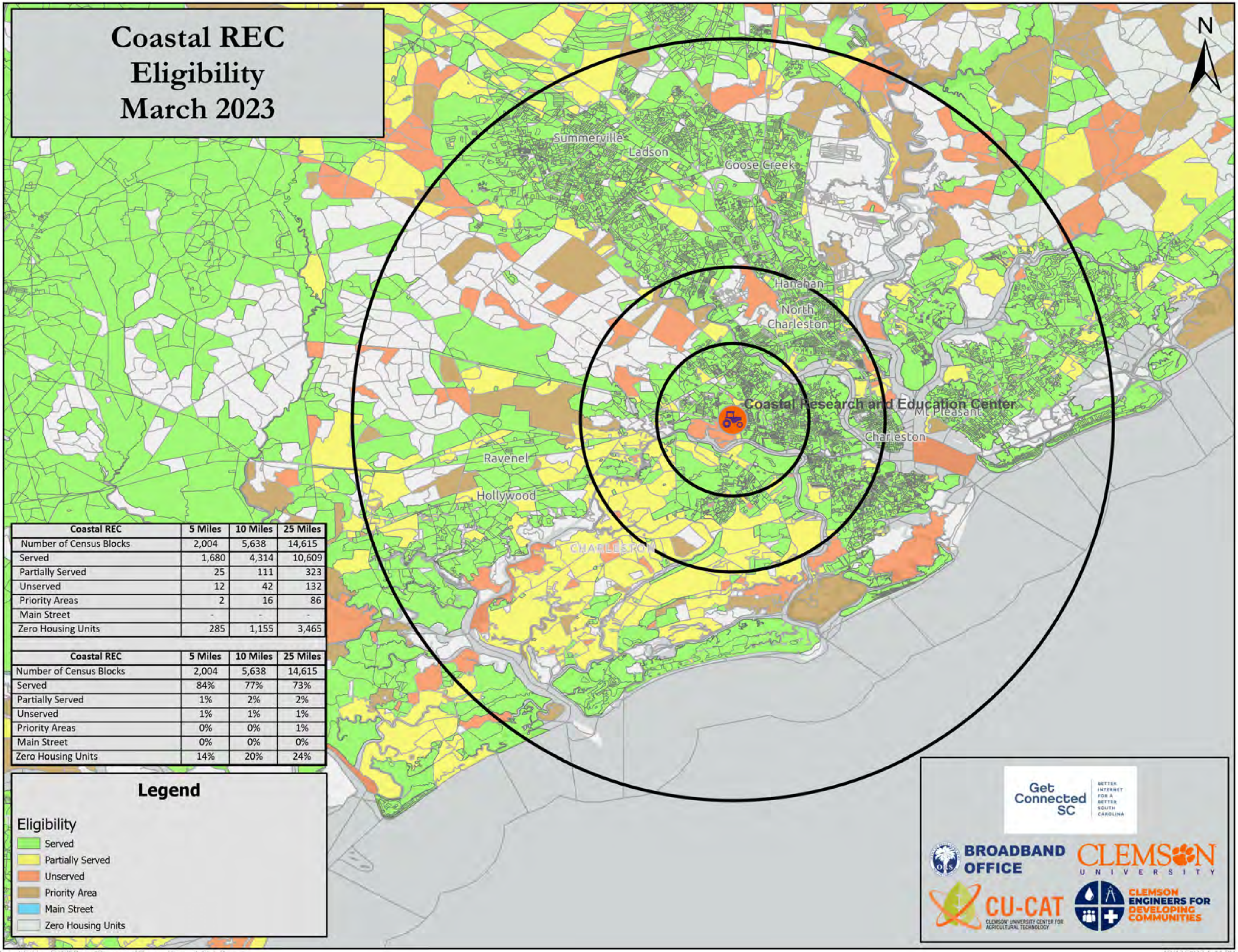
Speed Tiers

- >= 100 Mbps / 100 Mbps (symmetric)
- >= 100 Mbps / 20 Mbps

Unserved housing Units

- 100 or More Unserved Housing Units
- 26 - 99 Unserved Housing Units
- 11 - 25 Unserved Housing Units
- 1 - 10 Unserved Housing Units
- Zero Housing Units

Coastal REC Eligibility March 2023



Coastal REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	2,004	5,638	14,615
Served	1,680	4,314	10,609
Partially Served	25	111	323
Unserved	12	42	132
Priority Areas	2	16	86
Main Street	-	-	-
Zero Housing Units	285	1,155	3,465

Coastal REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	2,004	5,638	14,615
Served	84%	77%	73%
Partially Served	1%	2%	2%
Unserved	1%	1%	1%
Priority Areas	0%	0%	1%
Main Street	0%	0%	0%
Zero Housing Units	14%	20%	24%

Legend

Eligibility
- Served
- Partially Served
- Unserved
- Priority Area
- Main Street
- Zero Housing Units

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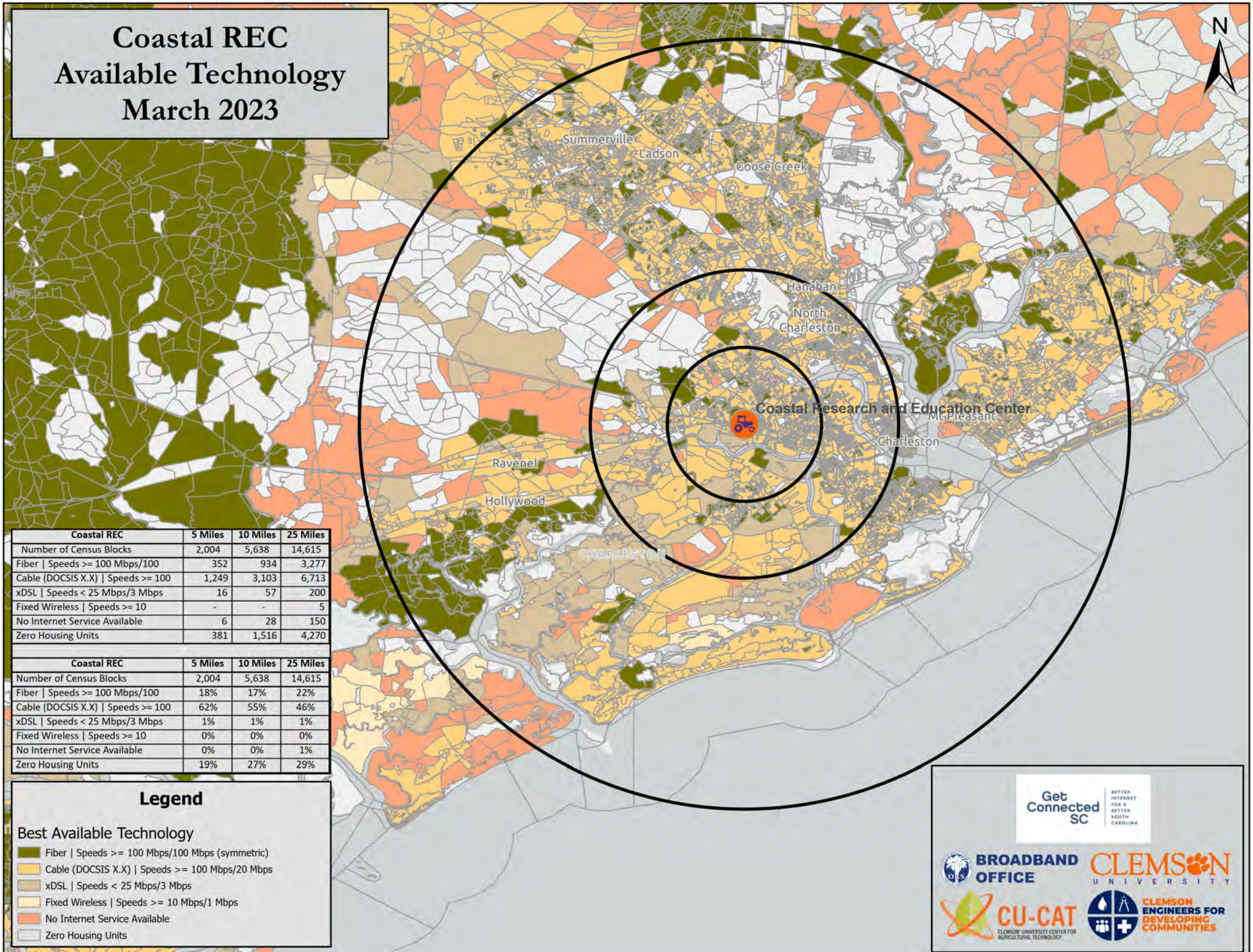
CLEMSON UNIVERSITY
CU-CAT Clemson University Center for Agricultural Technology
CLEMSON ENGINEERS FOR DEVELOPING COMMUNITIES

Coastal REC Available Technology March 2023



Coastal REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	2,004	5,638	14,615
Fiber | Speeds >= 100 Mbps/100	352	934	3,277
Cable (DOCSIS X.X) | Speeds >= 100	1,249	3,103	6,713
xDSL | Speeds < 25 Mbps/3 Mbps	16	57	200
Fixed Wireless | Speeds >= 10	-	-	5
No Internet Service Available	6	28	150
Zero Housing Units	381	1,516	4,270

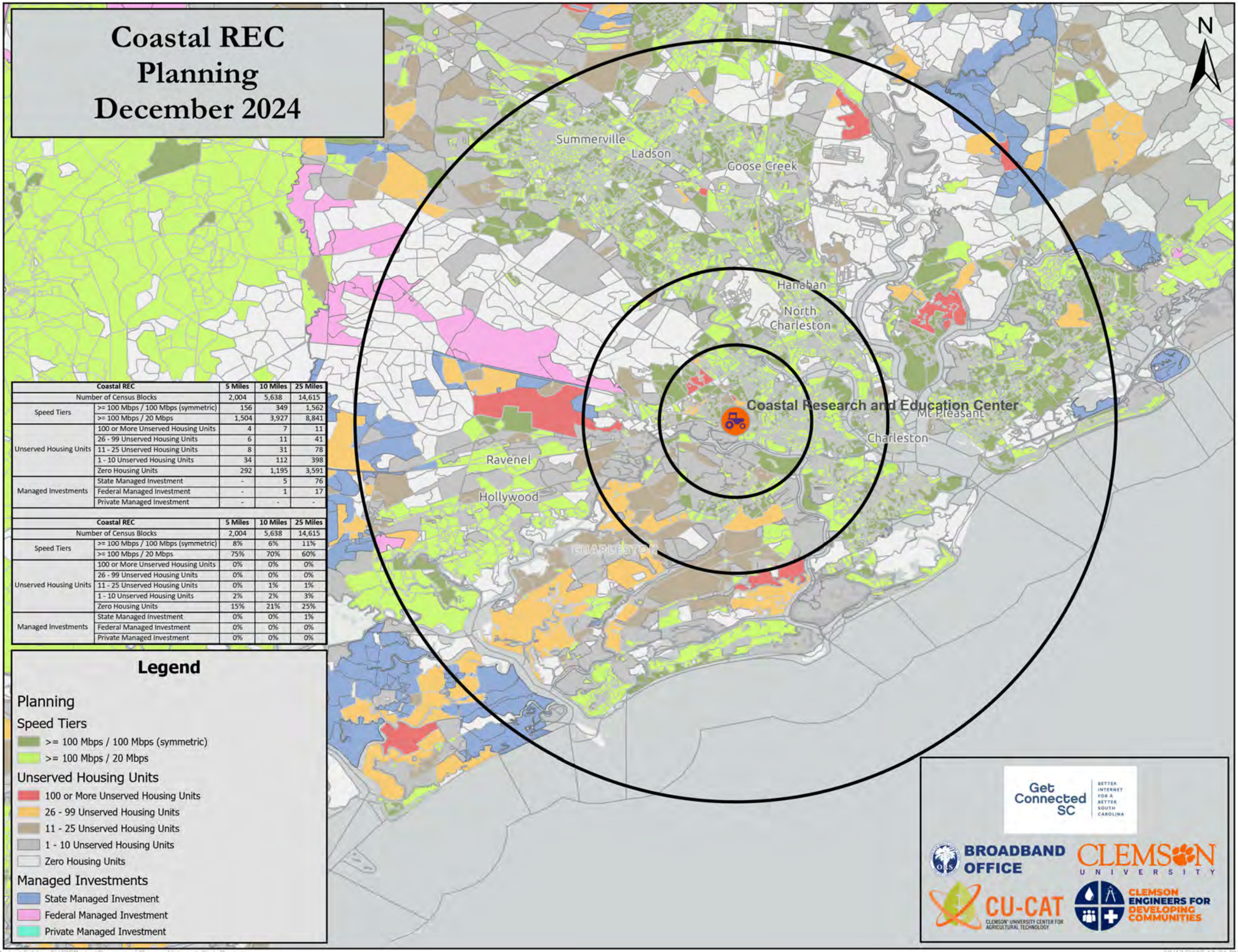
Coastal REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	2,004	5,638	14,615
Fiber | Speeds >= 100 Mbps/100	18%	17%	22%
Cable (DOCSIS X.X) | Speeds >= 100	62%	55%	46%
xDSL | Speeds < 25 Mbps/3 Mbps	1%	1%	1%
Fixed Wireless | Speeds >= 10	0%	0%	0%
No Internet Service Available	0%	0%	1%
Zero Housing Units	19%	27%	29%

Legend

Best Available Technology

- Fiber | Speeds >= 100 Mbps/100 Mbps (symmetric)
- Cable (DOCSIS X.X) | Speeds >= 100 Mbps/20 Mbps
- xDSL | Speeds < 25 Mbps/3 Mbps
- Fixed Wireless | Speeds >= 10 Mbps/1 Mbps
- No Internet Service Available
- Zero Housing Units

Coastal REC Planning December 2024



Coastal REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		2,004	5,638	14,615
Speed Tiers	>= 100 Mbps / 100 Mbps (symmetric)	156	349	1,562
	>= 100 Mbps / 20 Mbps	1,504	3,927	8,841
Unserved Housing Units	100 or More Unserved Housing Units	4	7	11
	26 - 99 Unserved Housing Units	6	11	41
	11 - 25 Unserved Housing Units	8	31	78
	1 - 10 Unserved Housing Units	34	112	398
	Zero Housing Units	292	1,195	3,591
Managed Investments	State Managed Investment	-	5	76
	Federal Managed Investment	-	1	17
	Private Managed Investment	-	-	-

Coastal REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		2,004	5,638	14,615
Speed Tiers	>= 100 Mbps / 100 Mbps (symmetric)	8%	6%	11%
	>= 100 Mbps / 20 Mbps	75%	70%	60%
Unserved Housing Units	100 or More Unserved Housing Units	0%	0%	0%
	26 - 99 Unserved Housing Units	0%	0%	0%
	11 - 25 Unserved Housing Units	0%	1%	1%
	1 - 10 Unserved Housing Units	2%	2%	3%
	Zero Housing Units	15%	21%	25%
Managed Investments	State Managed Investment	0%	0%	1%
	Federal Managed Investment	0%	0%	0%
	Private Managed Investment	0%	0%	0%

Legend

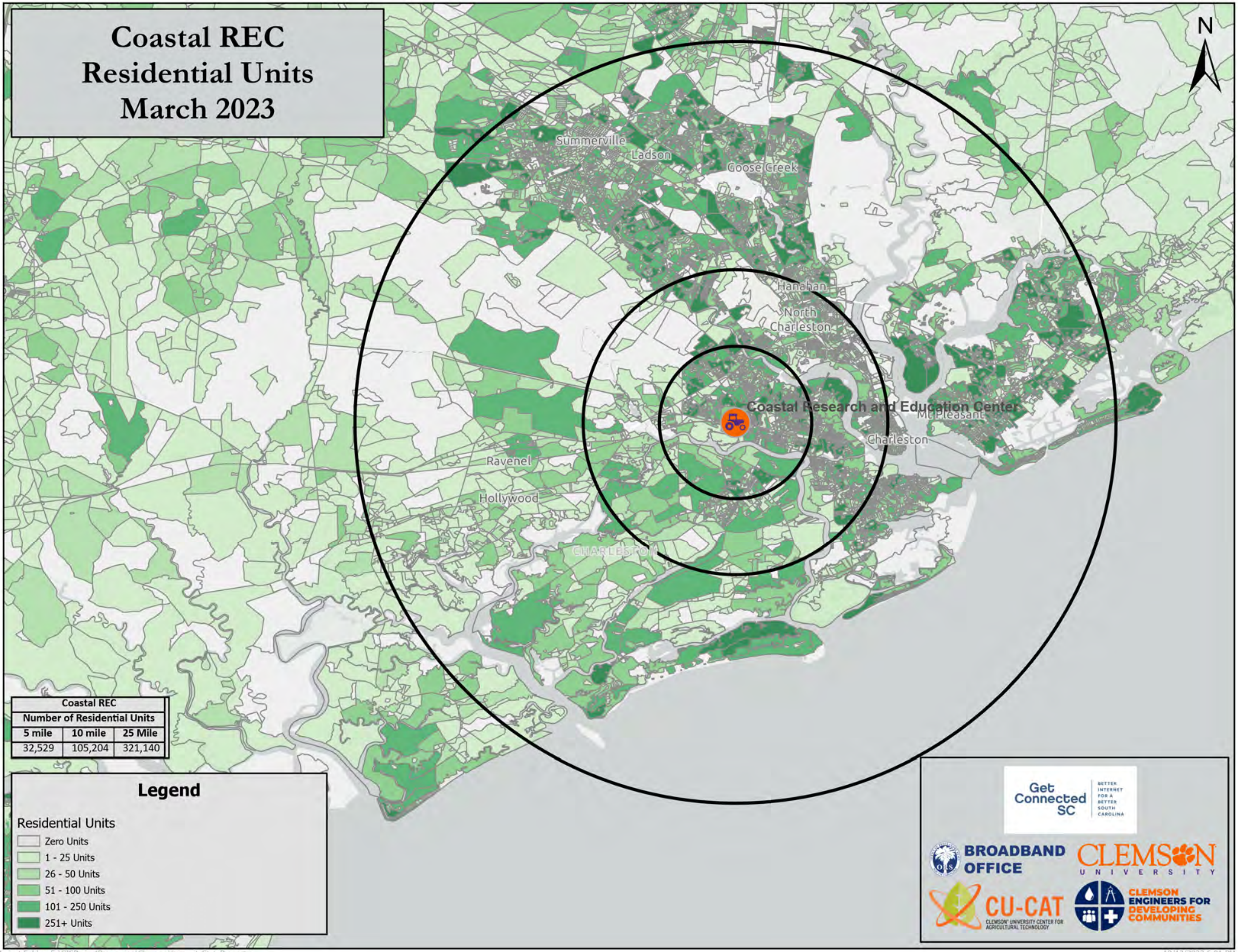
Planning

Speed Tiers
- >= 100 Mbps / 100 Mbps (symmetric)
- >= 100 Mbps / 20 Mbps

Unserved Housing Units
- 100 or More Unserved Housing Units
- 26 - 99 Unserved Housing Units
- 11 - 25 Unserved Housing Units
- 1 - 10 Unserved Housing Units
- Zero Housing Units

Managed Investments
- State Managed Investment
- Federal Managed Investment
- Private Managed Investment

Coastal REC Residential Units March 2023



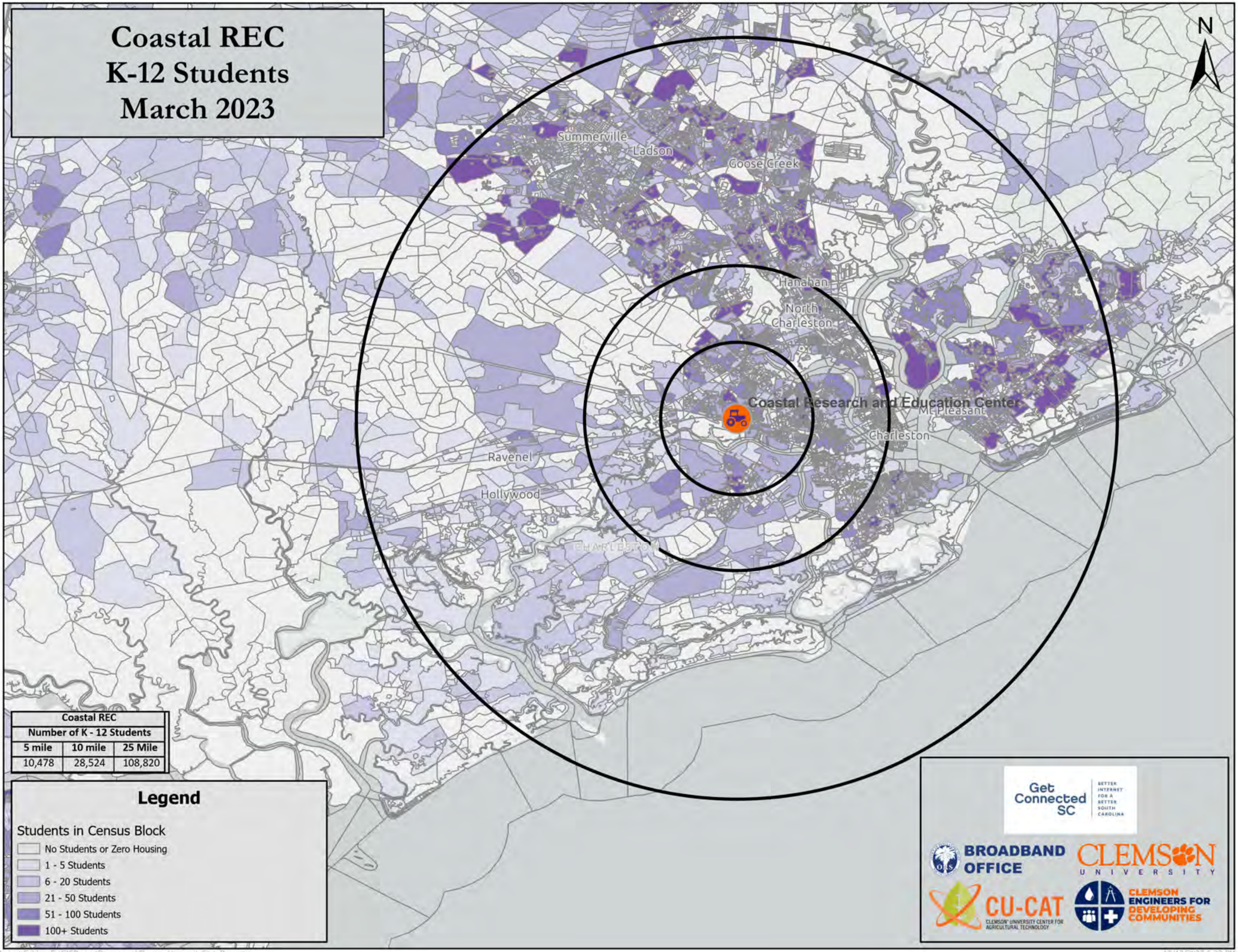
Coastal REC		
Number of Residential Units		
5 mile	10 mile	25 Mile
32,529	105,204	321,140

Legend

Residential Units

- Zero Units
- 1 - 25 Units
- 26 - 50 Units
- 51 - 100 Units
- 101 - 250 Units
- 251+ Units

Coastal REC
K-12 Students
March 2023



Coastal REC		
Number of K - 12 Students		
5 mile	10 mile	25 Mile
10,478	28,524	108,820

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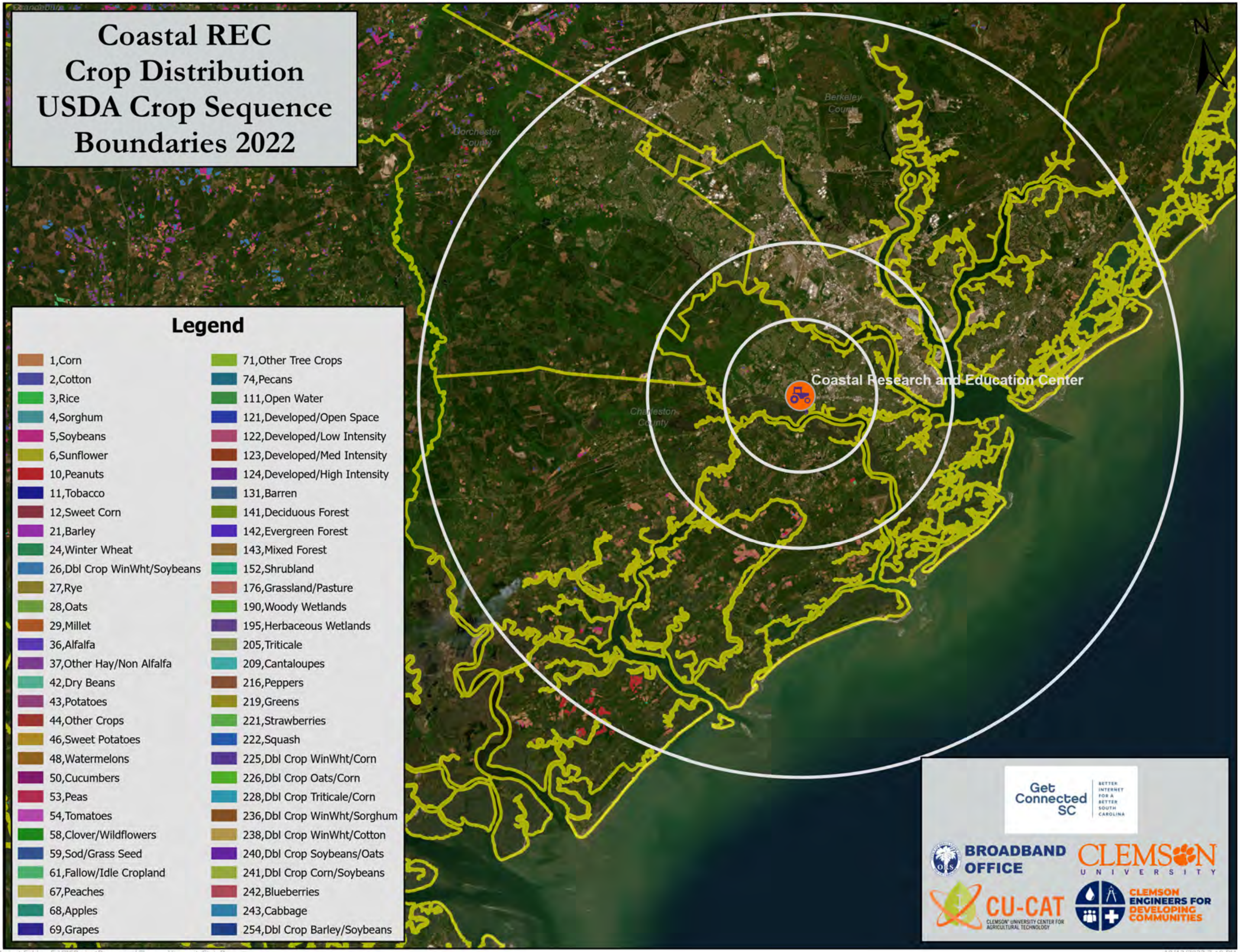

Coastal REC
Crop Distribution
USDA Crop Sequence
Boundaries 2022
Legend
1,Corn
2,Cotton
3,Rice
4,Sorghum
5,Soybeans
6,Sunflower
10,Peanuts
11,Tobacco
12,Sweet Corn
21,Barley
24,Winter Wheat
26,Dbl Crop WinWht/Soybeans
27,Rye
28,Oats
29,Millet
36,Alfalfa
37,Other Hay/Non Alfalfa
42,Dry Beans
43,Potatoes
44,Other Crops
46,Sweet Potatoes
48,Watermelons
50,Cucumbers
53,Peas
54,Tomatoes
58,Clover/Wildflowers
59,Sod/Grass Seed
61,Fallow/Idle Cropland
67,Peaches
68,Apples
69,Grapes
71,Other Tree Crops
74,Pecans
111,Open Water
121,Developed/Open Space
122,Developed/Low Intensity
123,Developed/Med Intensity
124,Developed/High Intensity
131,Barren
141,Deciduous Forest
142,Evergreen Forest
143,Mixed Forest
152,Shrubland
176,Grassland/Pasture
190,Woody Wetlands
195,Herbaceous Wetlands
205,Triticale
209,Cantaloupes
216,Peppers
219,Greens
221,Strawberries
222,Squash
225,Dbl Crop WinWht/Corn
226,Dbl Crop Oats/Corn
228,Dbl Crop Triticale/Corn
236,Dbl Crop WinWht/Sorghum
238,Dbl Crop WinWht/Cotton
240,Dbl Crop Soybeans/Oats
241,Dbl Crop Corn/Soybeans
242,Blueberries
243,Cabbage
254,Dbl Crop Barley/Soybeans
N
Berkeley County
Dorchester County
Charleston County
Coastal Research and Education Center
Get Connected SC
BETTER INTERNET FOR A BETTER SOUTH CAROLINA
BROADBAND OFFICE
CLEMSON UNIVERSITY
CU-CAT
CLEMSON UNIVERSITY CENTER FOR AGRICULTURAL TECHNOLOGY
CLEMSON ENGINEERS FOR DEVELOPING COMMUNITIES

Coastal REC
5 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	24
Total Acreage of Bounderies	96.75
Percent Crop Acreage in Buffer	0.19%

2015

Crop	Total Acres	Percent Acreage
Corn	35.86	37.07%
Soybeans	34.56	35.73%
Fallow/Idle Cropland	13.54	14.00%
Cotton	6.57	6.79%
Other Hay/Non Alfalfa	6.21	6.42%

2016

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	46.46	48.02%
Corn	28.23	29.18%
Soybeans	6.96	7.19%
Grassland/Pasture	6.21	6.42%
Peanuts	5.80	6.00%
Dbl Crop WinWht/Sorghum	3.09	3.19%

2017

Crop	Total Acres	Percent Acreage
Corn	44.23	45.72%
Soybeans	26.83	27.73%
Fallow/Idle Cropland	19.49	20.14%
Other Hay/Non Alfalfa	6.21	6.42%

2018

Crop	Total Acres	Percent Acreage
Soybeans	70.34	72.71%
Other Hay/Non Alfalfa	13.46	13.92%
Corn	9.26	9.57%
Fallow/Idle Cropland	3.69	3.81%

2019

Crop	Total Acres	Percent Acreage
Corn	32.74	33.84%
Cotton	26.34	27.23%
Soybeans	20.95	21.66%
Grassland/Pasture	10.51	10.86%
Other Hay/Non Alfalfa	6.21	6.42%

2020

Crop	Total Acres	Percent Acreage
Corn	40.21	41.56%
Grassland/Pasture	24.21	25.03%
Barren	16.31	16.86%
Other Hay/Non Alfalfa	6.21	6.42%
Soybeans	6.08	6.28%
Fallow/Idle Cropland	3.73	3.86%

2021

Crop	Total Acres	Percent Acreage
Corn	49.71	51.37%
Grassland/Pasture	32.61	33.70%
Barren	9.17	9.48%
Soybeans	5.27	5.45%

2022

Crop	Total Acres	Percent Acreage
Grassland/Pasture	57.86	59.81%
Corn	14.16	14.63%
Soybeans	11.39	11.78%
Cotton	7.26	7.50%
Barren	6.08	6.28%

Coastal REC
10 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	113
Total Acreage of Bounderies	745.80
Percent Crop Acreage in Buffer	0.37%

2015

Crop	Total Acres	Percent Acreage
Corn	453.49	60.81%
Soybeans	118.04	15.83%
Fallow/Idle Cropland	87.37	11.71%
Oats	19.42	2.60%
Winter Wheat	18.75	2.51%
Grassland/Pasture	18.67	2.50%
Cotton	18.38	2.46%
Other Hay/Non Alfalfa	6.21	0.83%
Developed/Open Space	2.79	0.37%
Shrubland	2.69	0.36%

2016

Crop	Total Acres	Percent Acreage
Corn	442.65	59.35%
Fallow/Idle Cropland	210.17	28.18%
Soybeans	49.45	6.63%
Shrubland	13.87	1.86%
Grassland/Pasture	11.40	1.53%
Other Hay/Non Alfalfa	6.57	0.88%
Peanuts	5.80	0.78%
Dbl Crop WinWht/Sorghum	3.09	0.41%
Developed/Open Space	2.79	0.37%

2017

Crop	Total Acres	Percent Acreage
Corn	623.21	83.56%
Fallow/Idle Cropland	51.42	6.90%
Soybeans	35.73	4.79%
Grassland/Pasture	21.19	2.84%
Other Hay/Non Alfalfa	6.21	0.83%
Developed/Open Space	2.79	0.37%
Shrubland	2.69	0.36%
Cotton	2.56	0.34%

2018

Crop	Total Acres	Percent Acreage
Corn	450.18	60.36%
Soybeans	243.80	32.69%
Other Hay/Non Alfalfa	13.46	1.81%
Cotton	8.38	1.12%
Grassland/Pasture	8.22	1.10%
Oats	6.69	0.90%
Peanuts	5.90	0.79%
Fallow/Idle Cropland	3.69	0.49%
Developed/Open Space	2.79	0.37%
Shrubland	2.69	0.36%

2019

Crop	Total Acres	Percent Acreage
Corn	477.88	64.08%
Soybeans	108.98	14.61%
Grassland/Pasture	81.62	10.94%
Cotton	45.49	6.10%
Open Water	12.57	1.69%
Other Hay/Non Alfalfa	9.07	1.22%
Developed/Open Space	4.20	0.56%
Fallow/Idle Cropland	3.02	0.41%
Shrubland	2.95	0.40%

2020

Crop	Total Acres	Percent Acreage
Corn	438.81	58.84%
Grassland/Pasture	171.06	22.94%
Soybeans	46.60	6.25%
Fallow/Idle Cropland	40.76	5.47%
Barren	22.73	3.05%
Open Water	12.57	1.69%
Other Hay/Non Alfalfa	9.07	1.22%
Developed/Open Space	4.20	0.56%

2021

Crop	Total Acres	Percent Acreage
Corn	333.08	44.66%
Grassland/Pasture	224.68	30.13%
Soybeans	111.43	14.94%
Dbl Crop WinWht/Soybeans	33.95	4.55%
Open Water	12.49	1.68%
Cotton	11.31	1.52%
Barren	9.17	1.23%
Developed/Open Space	4.20	0.56%
Shrubland	2.88	0.39%
Evergreen Forest	2.59	0.35%

2022

Crop	Total Acres	Percent Acreage
Grassland/Pasture	352.81	47.31%
Corn	243.74	32.68%
Peanuts	66.09	8.86%
Soybeans	28.59	3.83%
Fallow/Idle Cropland	16.41	2.20%
Barren	9.91	1.33%
Dbl Crop WinWht/Soybeans	7.50	1.01%
Cotton	7.26	0.97%
Open Water	6.69	0.90%
Developed/Open Space	4.20	0.56%
Evergreen Forest	2.59	0.35%

Coastal REC
25 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	728
Total Acreage of Bounderies	4,551.95
Percent Crop Acreage in Buffer	0.36%

2015

Crop	Total Acres	Percent Acreage
Corn	2468.74	54.23%
Fallow/Idle Cropland	670.17	14.72%
Soybeans	443.19	9.74%
Cotton	275.95	6.06%
Grassland/Pasture	213.86	4.70%
Peanuts	111.61	2.45%
Oats	102.60	2.25%
Winter Wheat	76.20	1.67%
Shrubland	72.19	1.59%
Other Hay/Non Alfalfa	41.44	0.91%
Barren	30.92	0.68%
Dbl Crop WinWht/Soybeans	12.57	0.28%
Developed/Open Space	11.50	0.25%
Herbaceous Wetlands	7.95	0.17%
Rye	6.42	0.14%
Evergreen Forest	4.02	0.09%
Woody Wetlands	2.64	0.06%

2016

Crop	Total Acres	Percent Acreage
Corn	1991.69	43.75%
Fallow/Idle Cropland	1357.01	29.81%
Soybeans	538.31	11.83%
Grassland/Pasture	229.30	5.04%
Peanuts	123.60	2.72%
Other Hay/Non Alfalfa	78.14	1.72%
Cotton	72.96	1.60%
Dbl Crop WinWht/Soybeans	62.08	1.36%
Shrubland	34.36	0.75%
Barren	23.27	0.51%
Dbl Crop WinWht/Sorghum	16.28	0.36%
Developed/Open Space	6.23	0.14%
Woody Wetlands	4.05	0.09%
Evergreen Forest	4.02	0.09%
Herbaceous Wetlands	4.00	0.09%
Peas	3.51	0.08%
Sorghum	3.12	0.07%

2017

Crop	Total Acres	Percent Acreage
Corn	2144.79	47.12%
Fallow/Idle Cropland	1623.07	35.66%
Soybeans	208.23	4.57%
Grassland/Pasture	157.97	3.47%
Winter Wheat	140.25	3.08%
Cotton	101.73	2.23%
Other Hay/Non Alfalfa	91.62	2.01%
Shrubland	40.01	0.88%
Sod/Grass Seed	11.54	0.25%
Woody Wetlands	11.50	0.25%
Developed/Open Space	6.23	0.14%
Herbaceous Wetlands	5.51	0.12%
Open Water	5.47	0.12%
Evergreen Forest	4.02	0.09%

2018

Crop	Total Acres	Percent Acreage
Corn	2914.75	64.03%
Soybeans	1148.46	25.23%
Other Hay/Non Alfalfa	138.53	3.04%
Grassland/Pasture	113.53	2.49%
Fallow/Idle Cropland	82.34	1.81%
Cotton	61.91	1.36%
Shrubland	32.57	0.72%
Greens	13.72	0.30%
Dbl Crop WinWht/Soybeans	11.48	0.25%
Winter Wheat	7.17	0.16%
Oats	6.69	0.15%
Developed/Open Space	6.23	0.14%
Peanuts	5.90	0.13%
Peas	3.14	0.07%
Peaches	2.88	0.06%
Herbaceous Wetlands	2.64	0.06%

2019

Crop	Total Acres	Percent Acreage
Corn	2569.62	56.45%
Soybeans	895.09	19.66%
Grassland/Pasture	436.53	9.59%
Cotton	280.78	6.17%
Other Hay/Non Alfalfa	129.91	2.85%
Fallow/Idle Cropland	82.72	1.82%
Shrubland	45.06	0.99%
Dbl Crop WinWht/Soybeans	32.17	0.71%
Open Water	31.43	0.69%
Developed/Open Space	12.51	0.27%
Evergreen Forest	10.75	0.24%
Developed/Med Intensity	9.13	0.20%
Developed/Low Intensity	7.61	0.17%
Dbl Crop Soybeans/Oats	5.52	0.12%
Developed/High Intensity	3.12	0.07%

2020

Crop	Total Acres	Percent Acreage
Corn	2620.99	57.58%
Grassland/Pasture	865.80	19.02%
Soybeans	294.33	6.47%
Dbl Crop WinWht/Soybeans	250.61	5.51%
Fallow/Idle Cropland	157.68	3.46%
Other Hay/Non Alfalfa	132.48	2.91%
Barren	52.88	1.16%
Herbaceous Wetlands	26.44	0.58%
Shrubland	23.62	0.52%
Evergreen Forest	23.48	0.52%
Open Water	19.99	0.44%
Dbl Crop Soybeans/Oats	16.59	0.36%
Cotton	16.23	0.36%
Woody Wetlands	15.95	0.35%
Developed/Open Space	12.51	0.27%
Developed/Med Intensity	9.13	0.20%
Developed/Low Intensity	7.61	0.17%
Developed/High Intensity	3.12	0.07%
Oats	2.53	0.06%

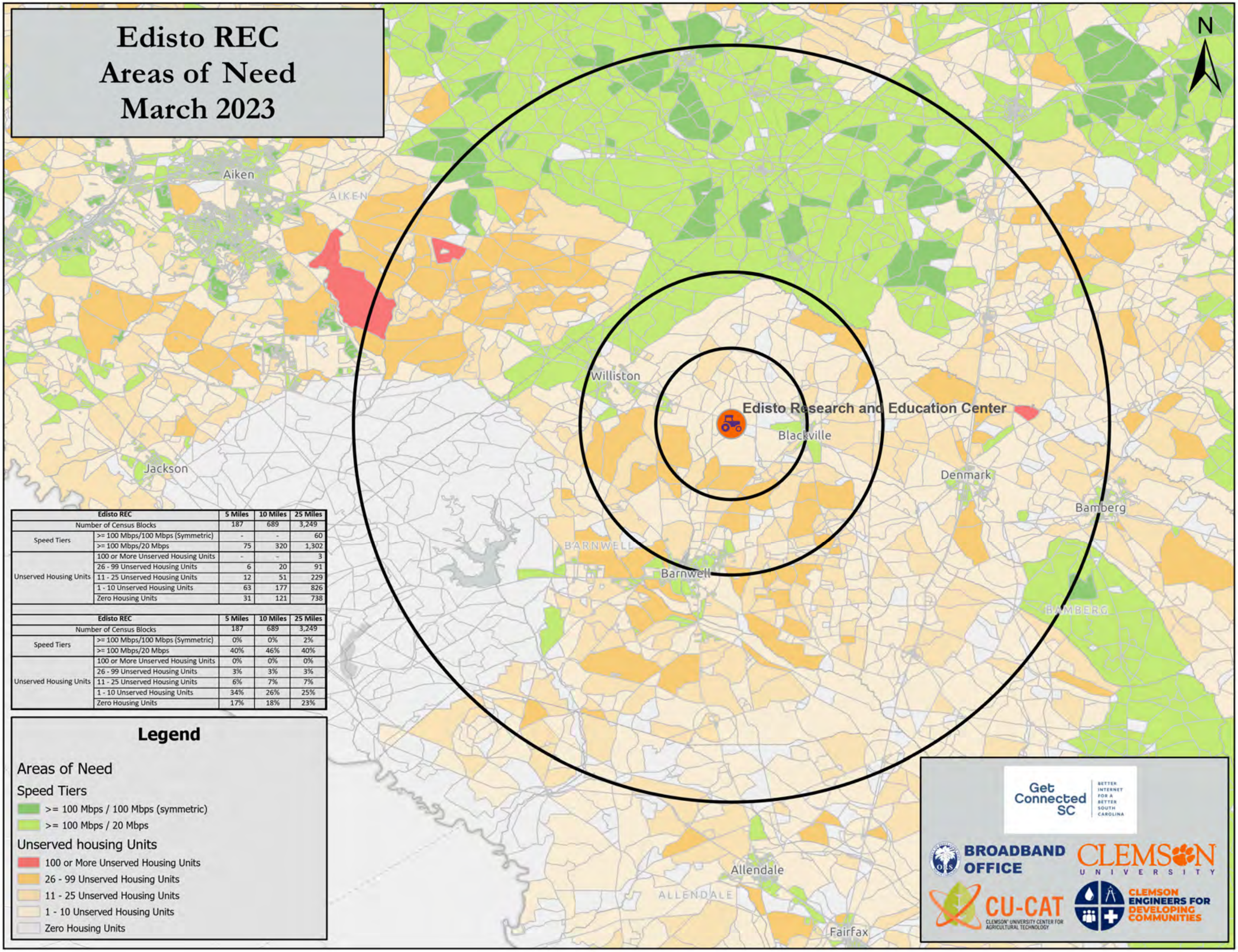
2021

Crop	Total Acres	Percent Acreage
Corn	2410.37	52.95%
Grassland/Pasture	1065.94	23.42%
Soybeans	686.47	15.08%
Other Hay/Non Alfalfa	100.24	2.20%
Dbl Crop WinWht/Soybeans	39.93	0.88%
Developed/Med Intensity	35.56	0.78%
Evergreen Forest	29.49	0.65%
Dbl Crop Soybeans/Oats	28.43	0.62%
Cotton	21.28	0.47%
Shrubland	19.95	0.44%
Developed/Open Space	19.88	0.44%
Barren	17.77	0.39%
Open Water	16.68	0.37%
Peanuts	15.46	0.34%
Herbaceous Wetlands	14.67	0.32%
Winter Wheat	12.16	0.27%
Woody Wetlands	11.05	0.24%
Developed/High Intensity	6.62	0.15%

2022

Crop	Total Acres	Percent Acreage
Grassland/Pasture	1830.00	40.20%
Corn	1492.73	32.79%
Peanuts	563.86	12.39%
Soybeans	272.77	5.99%
Cotton	80.08	1.76%
Other Hay/Non Alfalfa	75.18	1.65%
Evergreen Forest	44.27	0.97%
Dbl Crop WinWht/Soybeans	35.94	0.79%
Developed/Med Intensity	35.56	0.78%
Open Water	25.54	0.56%
Developed/Open Space	19.88	0.44%
Shrubland	18.80	0.41%
Fallow/Idle Cropland	16.41	0.36%
Barren	15.77	0.35%
Herbaceous Wetlands	9.59	0.21%
Woody Wetlands	8.95	0.20%
Developed/High Intensity	6.62	0.15%

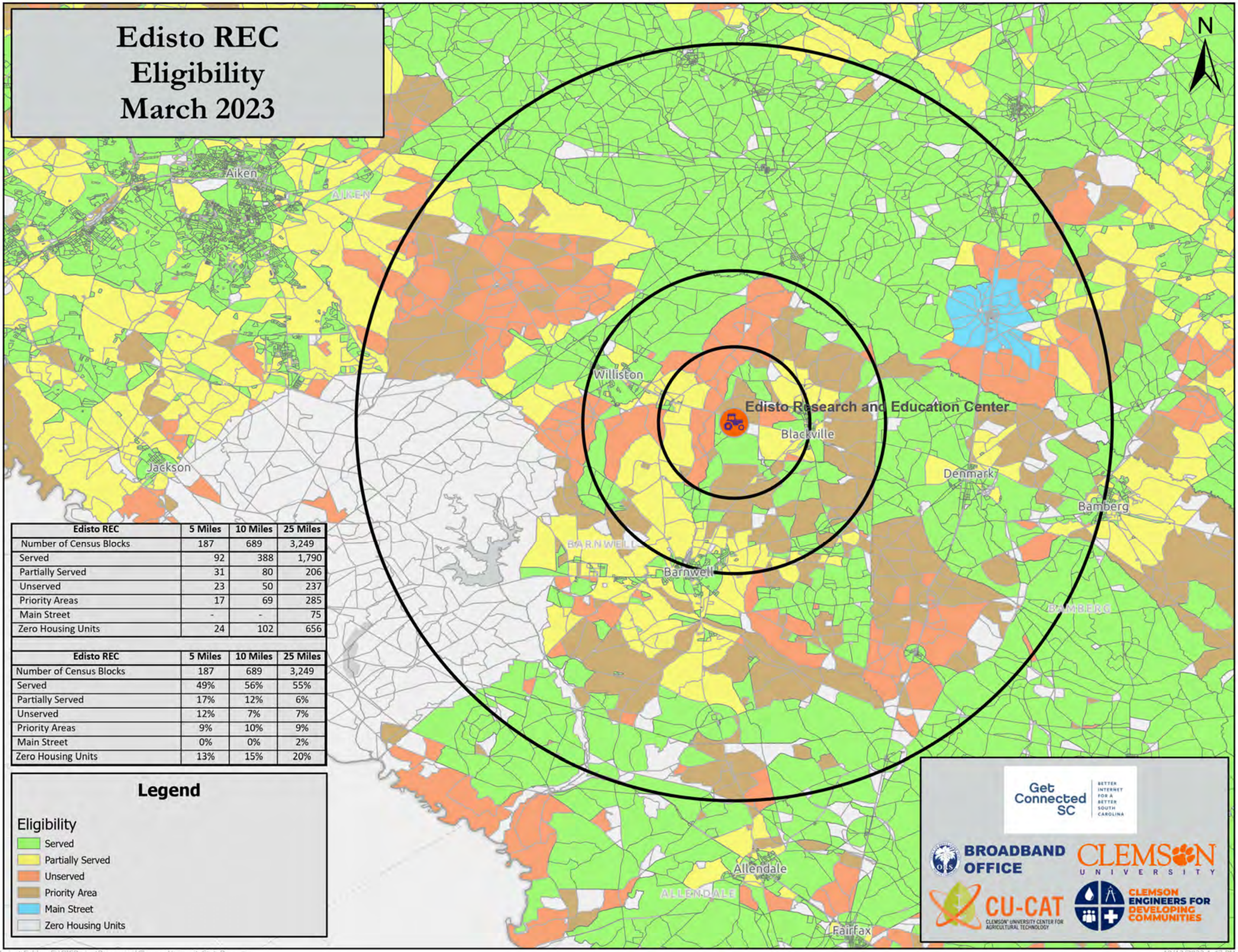
Edisto REC Areas of Need March 2023



Edisto REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		187	689	3,249
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	-	-	60
	>= 100 Mbps/20 Mbps	75	320	1,302
Unserved Housing Units	100 or More Unserved Housing Units	-	-	3
	26 - 99 Unserved Housing Units	6	20	91
	11 - 25 Unserved Housing Units	12	51	229
	1 - 10 Unserved Housing Units	63	177	826
	Zero Housing Units	31	121	738

Edisto REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		187	689	3,249
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	0%	0%	2%
	>= 100 Mbps/20 Mbps	40%	46%	40%
Unserved Housing Units	100 or More Unserved Housing Units	0%	0%	0%
	26 - 99 Unserved Housing Units	3%	3%	3%
	11 - 25 Unserved Housing Units	6%	7%	7%
	1 - 10 Unserved Housing Units	34%	26%	25%
	Zero Housing Units	17%	18%	23%

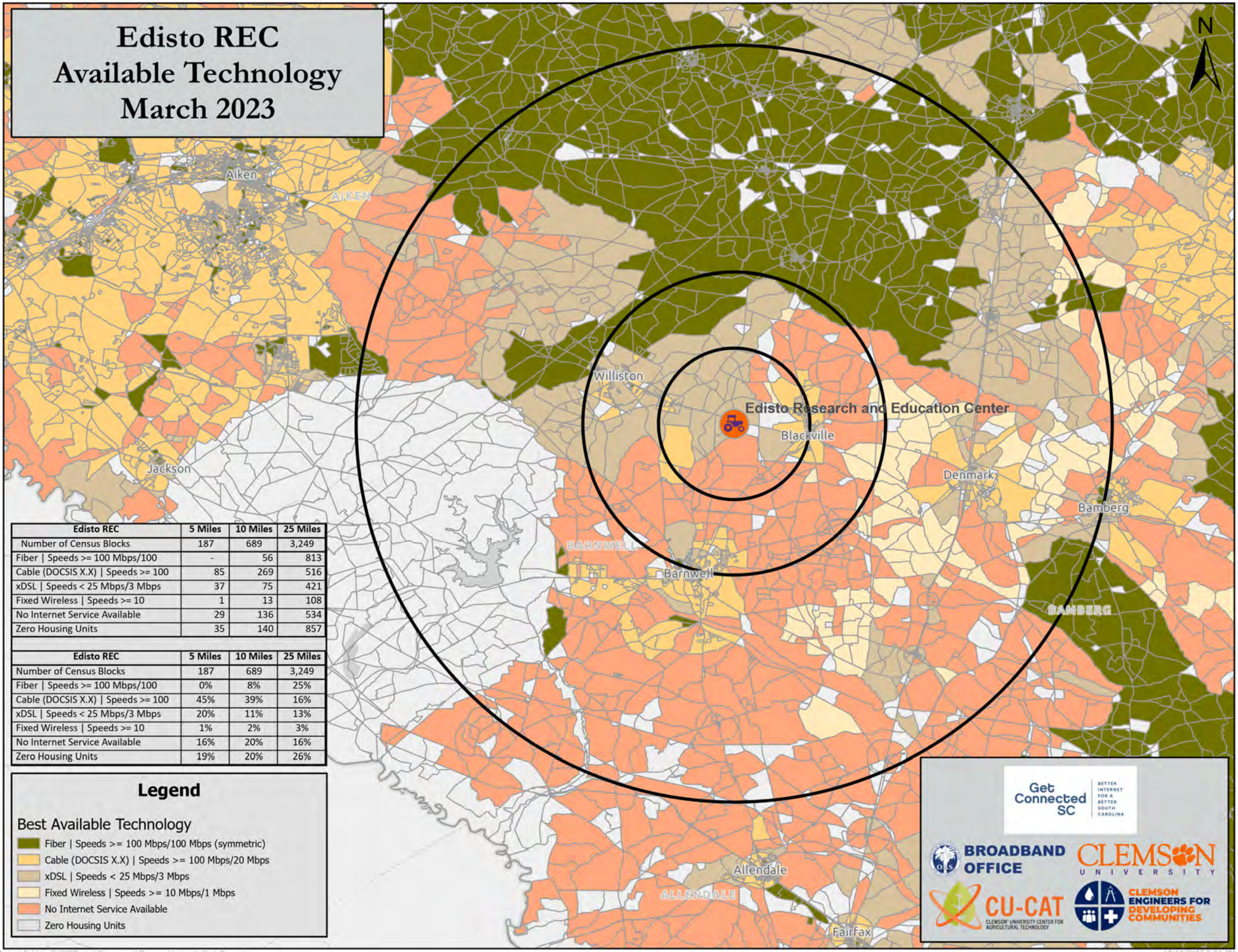
Edisto REC Eligibility March 2023



Edisto REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	187	689	3,249
Served	92	388	1,790
Partially Served	31	80	206
Unserved	23	50	237
Priority Areas	17	69	285
Main Street	-	-	75
Zero Housing Units	24	102	656

Edisto REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	187	689	3,249
Served	49%	56%	55%
Partially Served	17%	12%	6%
Unserved	12%	7%	7%
Priority Areas	9%	10%	9%
Main Street	0%	0%	2%
Zero Housing Units	13%	15%	20%

Edisto REC
Available Technology
March 2023



Edisto REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	187	689	3,249
Fiber | Speeds >= 100 Mbps/100	-	56	813
Cable (DOCSIS X.X) | Speeds >= 100	85	269	516
xDSL | Speeds < 25 Mbps/3 Mbps	37	75	421
Fixed Wireless | Speeds >= 10	1	13	108
No Internet Service Available	29	136	534
Zero Housing Units	35	140	857

Edisto REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	187	689	3,249
Fiber | Speeds >= 100 Mbps/100	0%	8%	25%
Cable (DOCSIS X.X) | Speeds >= 100	45%	39%	16%
xDSL | Speeds < 25 Mbps/3 Mbps	20%	11%	13%
Fixed Wireless | Speeds >= 10	1%	2%	3%
No Internet Service Available	16%	20%	16%
Zero Housing Units	19%	20%	26%

Legend

Best Available Technology

- Fiber | Speeds >= 100 Mbps/100 Mbps (symmetric)
- Cable (DOCSIS X.X) | Speeds >= 100 Mbps/20 Mbps
- xDSL | Speeds < 25 Mbps/3 Mbps
- Fixed Wireless | Speeds >= 10 Mbps/1 Mbps
- No Internet Service Available
- Zero Housing Units

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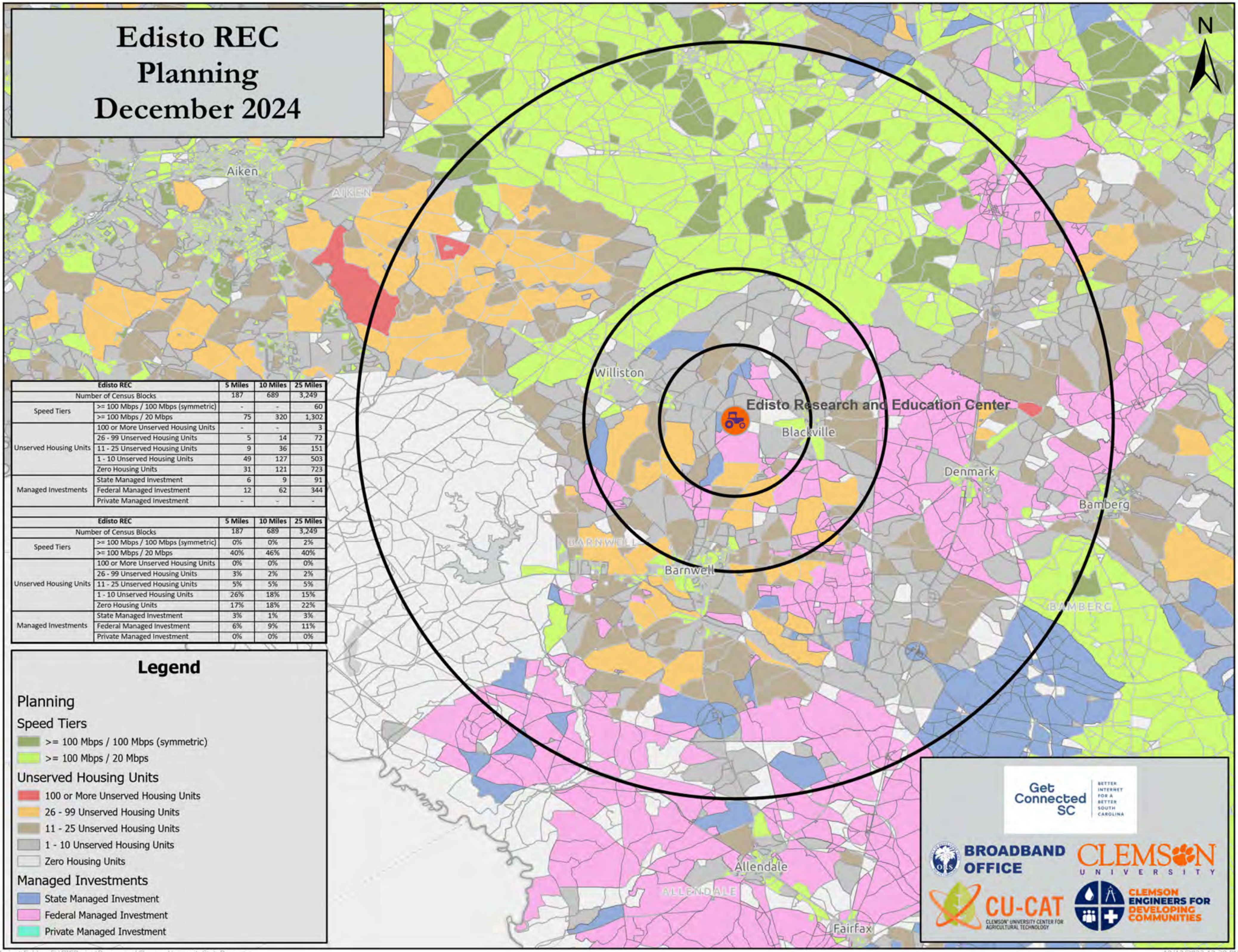
Edisto REC Planning December 2024



Edisto REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		187	689	3,249
Speed Tiers	>= 100 Mbps / 100 Mbps (symmetric)	-	-	60
	>= 100 Mbps / 20 Mbps	75	320	1,302
Unserved Housing Units	100 or More Unserved Housing Units	-	-	3
	26 - 99 Unserved Housing Units	5	14	72
	11 - 25 Unserved Housing Units	9	36	151
	1 - 10 Unserved Housing Units	49	127	503
	Zero Housing Units	31	121	723
Managed Investments	State Managed Investment	6	9	91
	Federal Managed Investment	12	62	344
	Private Managed Investment	-	-	-

Edisto REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		187	689	3,249
Speed Tiers	>= 100 Mbps / 100 Mbps (symmetric)	0%	0%	2%
	>= 100 Mbps / 20 Mbps	40%	46%	40%
Unserved Housing Units	100 or More Unserved Housing Units	0%	0%	0%
	26 - 99 Unserved Housing Units	3%	2%	2%
	11 - 25 Unserved Housing Units	5%	5%	5%
	1 - 10 Unserved Housing Units	26%	18%	15%
	Zero Housing Units	17%	18%	22%
Managed Investments	State Managed Investment	3%	1%	3%
	Federal Managed Investment	6%	9%	11%
	Private Managed Investment	0%	0%	0%

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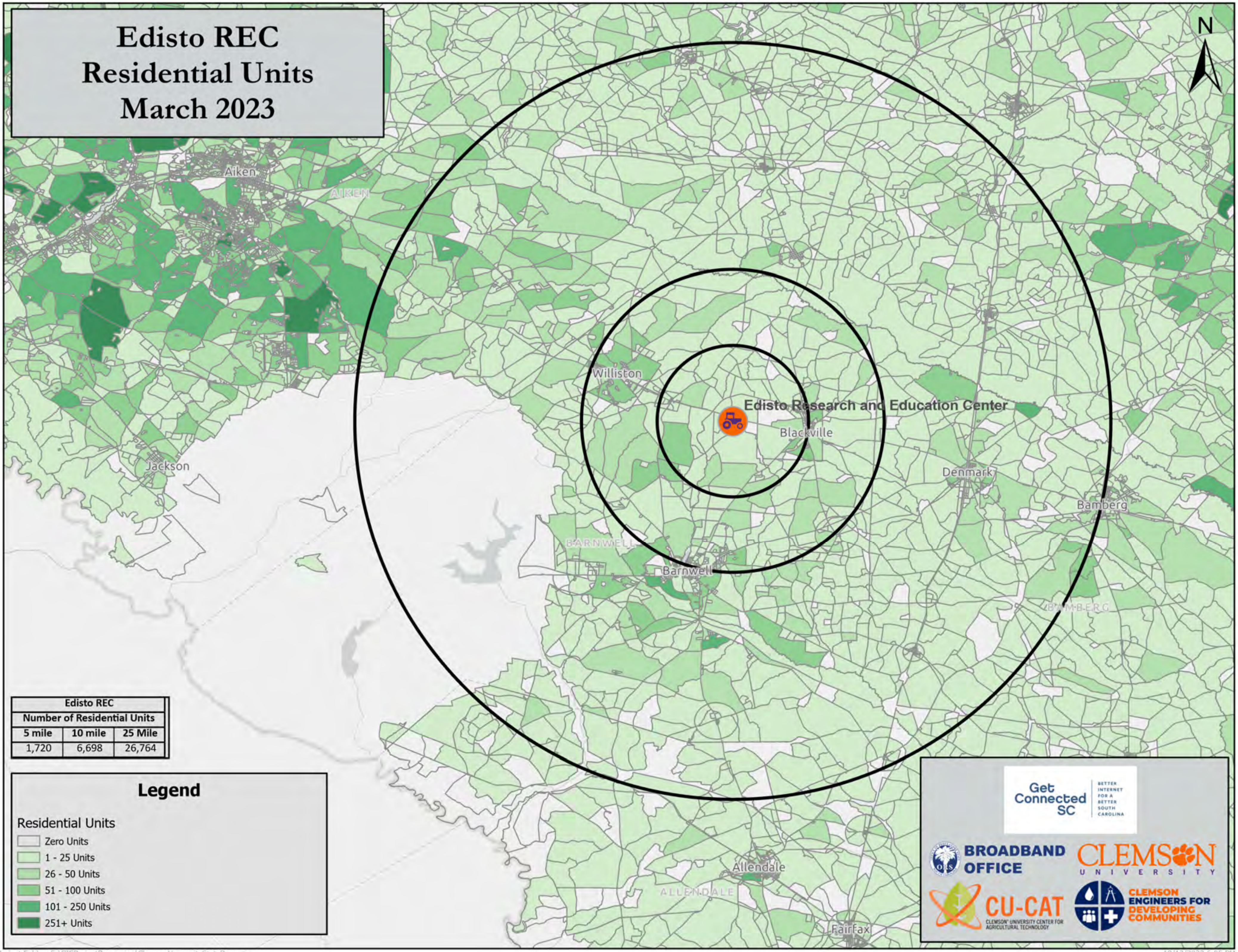
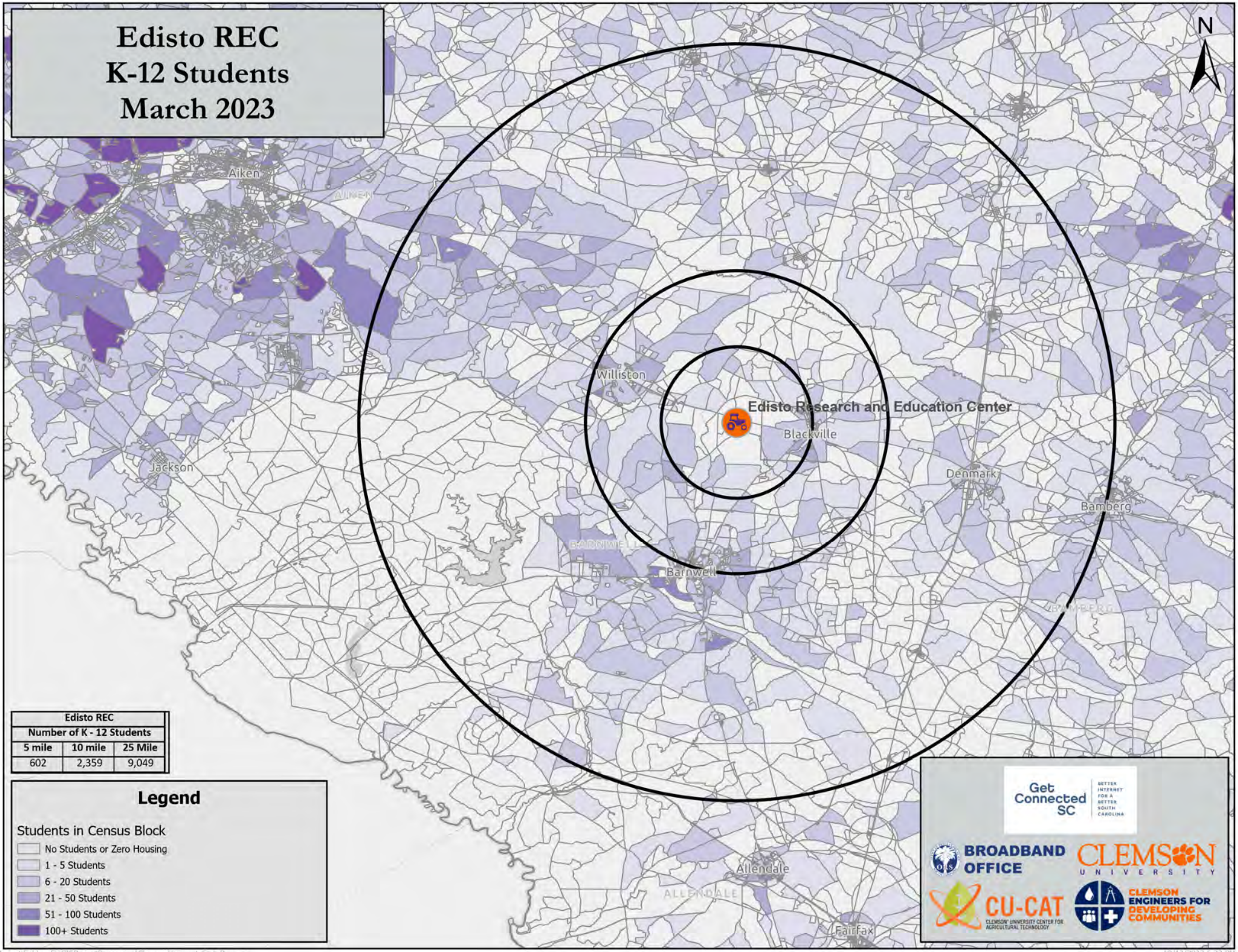
Edisto REC Residential Units March 2023



Edisto REC		
Number of Residential Units		
5 mile	10 mile	25 Mile
1,720	6,698	26,764



Edisto REC		
Number of K - 12 Students		
5 mile	10 mile	25 Mile
602	2,359	9,049

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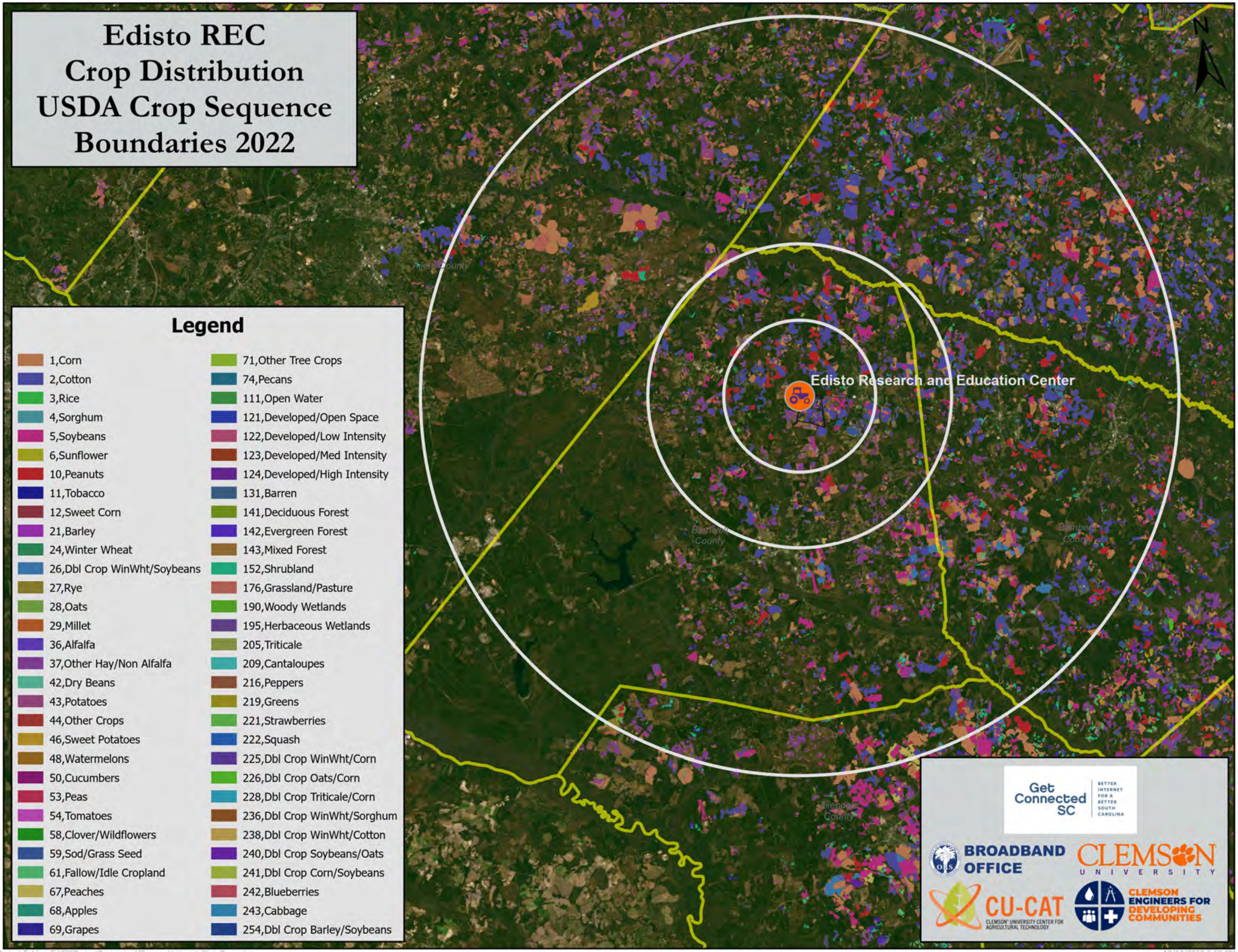

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Edisto REC
5 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	920
Total Acreage of Bounderies	9582.61
Percent Crop Acreage in Buffer	19.06%

2015

Crop	Total Acres	Percent Acreage
Cotton	4158.88	43.40%
Soybeans	1180.45	12.32%
Corn	995.09	10.38%
Fallow/Idle Cropland	881.57	9.20%
Peanuts	770.50	8.04%
Other Hay/Non Alfalfa	668.77	6.98%
Grassland/Pasture	509.53	5.32%
Shrubland	115.34	1.20%
Sod/Grass Seed	86.65	0.90%
Millet	69.08	0.72%
Barren	42.73	0.45%
Evergreen Forest	41.72	0.44%
Rye	24.61	0.26%
Dbl Crop WinWht/Soybeans	14.92	0.16%
Developed/Open Space	12.56	0.13%
Woody Wetlands	6.18	0.06%
Sorghum	4.01	0.04%

2016

Crop	Total Acres	Percent Acreage
Cotton	3341.11	34.87%
Fallow/Idle Cropland	1431.84	14.94%
Peanuts	1161.03	12.12%
Corn	1095.68	11.43%
Soybeans	870.66	9.09%
Other Hay/Non Alfalfa	643.62	6.72%
Grassland/Pasture	469.43	4.90%
Sod/Grass Seed	179.56	1.87%
Shrubland	173.17	1.81%
Millet	92.23	0.96%
Evergreen Forest	45.44	0.47%
Peaches	32.28	0.34%
Rye	19.36	0.20%
Oats	9.44	0.10%
Sorghum	7.21	0.08%
Developed/Open Space	7.18	0.07%
Woody Wetlands	3.38	0.04%

2017

Crop	Total Acres	Percent Acreage
Cotton	4630.65	48.32%
Other Hay/Non Alfalfa	1263.94	13.19%
Peanuts	1014.11	10.58%
Soybeans	807.44	8.43%
Fallow/Idle Cropland	672.44	7.02%
Corn	625.84	6.53%
Rye	152.82	1.59%
Grassland/Pasture	88.76	0.93%
Sod/Grass Seed	73.36	0.77%
Shrubland	68.69	0.72%
Developed/Open Space	68.16	0.71%
Millet	55.42	0.58%
Evergreen Forest	35.68	0.37%
Woody Wetlands	25.29	0.26%

2018

Crop	Total Acres	Percent Acreage
Cotton	5251.82	54.81%
Other Hay/Non Alfalfa	1272.20	13.28%
Peanuts	1124.10	11.73%
Soybeans	588.20	6.14%
Corn	549.09	5.73%
Fallow/Idle Cropland	435.97	4.55%
Millet	145.85	1.52%
Shrubland	74.34	0.78%
Grassland/Pasture	62.97	0.66%
Evergreen Forest	24.53	0.26%
Sod/Grass Seed	18.76	0.20%
Watermelons	13.40	0.14%
Developed/Open Space	7.18	0.07%
Barren	6.99	0.07%
Clover/Wildflowers	3.85	0.04%
Rye	3.36	0.04%

2019

Crop	Total Acres	Percent Acreage
Cotton	5574.02	58.17%
Other Hay/Non Alfalfa	1246.25	13.01%
Peanuts	884.00	9.23%
Corn	611.68	6.38%
Sod/Grass Seed	602.60	6.29%
Millet	188.87	1.97%
Grassland/Pasture	109.51	1.14%
Shrubland	103.37	1.08%
Fallow/Idle Cropland	101.55	1.06%
Herbaceous Wetlands	37.34	0.39%
Developed/Low Intensity	37.31	0.39%
Soybeans	31.72	0.33%
Evergreen Forest	28.72	0.30%
Developed/Open Space	14.91	0.16%
Developed/Med Intensity	8.10	0.08%
Open Water	2.66	0.03%

2020

Crop	Total Acres	Percent Acreage
Cotton	4568.44	47.67%
Other Hay/Non Alfalfa	1275.09	13.31%
Peanuts	1272.71	13.28%
Corn	701.50	7.32%
Soybeans	662.90	6.92%
Sod/Grass Seed	350.38	3.66%
Grassland/Pasture	229.02	2.39%
Millet	223.21	2.33%
Fallow/Idle Cropland	81.03	0.85%
Shrubland	51.97	0.54%
Rye	37.49	0.39%
Developed/Low Intensity	37.31	0.39%
Herbaceous Wetlands	21.90	0.23%
Oats	19.88	0.21%
Developed/Open Space	14.11	0.15%
Woody Wetlands	11.26	0.12%
Dbl Crop WinWht/Soybeans	9.47	0.10%
Developed/Med Intensity	8.10	0.08%
Barren	4.18	0.04%
Open Water	2.66	0.03%

2021

Crop	Total Acres	Percent Acreage
Cotton	4577.42	47.77%
Corn	1375.91	14.36%
Peanuts	1114.44	11.63%
Other Hay/Non Alfalfa	1077.62	11.25%
Soybeans	518.41	5.41%
Grassland/Pasture	490.31	5.12%
Millet	173.11	1.81%
Shrubland	40.15	0.42%
Dbl Crop WinWht/Soybeans	38.55	0.40%
Sod/Grass Seed	38.47	0.40%
Herbaceous Wetlands	37.49	0.39%
Developed/Low Intensity	37.31	0.39%
Winter Wheat	16.90	0.18%
Evergreen Forest	16.11	0.17%
Developed/Open Space	8.24	0.09%
Developed/Med Intensity	8.10	0.08%
Rye	4.43	0.05%
Oats	3.98	0.04%
Developed/High Intensity	3.01	0.03%
Open Water	2.66	0.03%

2022

Crop	Total Acres	Percent Acreage
Cotton	4635.97	48.38%
Peanuts	1296.31	13.53%
Other Hay/Non Alfalfa	1141.99	11.92%
Corn	801.98	8.37%
Grassland/Pasture	541.79	5.65%
Soybeans	417.67	4.36%
Sod/Grass Seed	280.45	2.93%
Millet	154.23	1.61%
Winter Wheat	53.11	0.55%
Shrubland	49.49	0.52%
Developed/Low Intensity	37.31	0.39%
Rye	34.80	0.36%
Woody Wetlands	33.16	0.35%
Sorghum	30.63	0.32%
Evergreen Forest	24.05	0.25%
Dbl Crop WinWht/Soybeans	20.44	0.21%
Developed/Open Space	15.47	0.16%
Developed/Med Intensity	8.10	0.08%
Developed/High Intensity	3.01	0.03%
Open Water	2.66	0.03%

Edisto REC
10 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	2656
Total Acreage of Bounderies	26,261.86
Percent Crop Acreage in Buffer	13.06%

2015

Crop	Total Acres	Percent Acreage
Cotton	8082.67	30.78%
Soybeans	4537.16	17.28%
Fallow/Idle Cropland	3533.81	13.46%
Corn	3117.15	11.87%
Other Hay/Non Alfalfa	2046.42	7.79%
Peanuts	1710.37	6.51%
Grassland/Pasture	882.83	3.36%
Evergreen Forest	697.52	2.66%
Shrubland	444.47	1.69%
Sod/Grass Seed	281.33	1.07%
Dbl Crop WinWht/Soybeans	228.42	0.87%
Sorghum	198.04	0.75%
Millet	147.38	0.56%
Watermelons	129.45	0.49%
Rye	75.94	0.29%
Barren	42.73	0.16%
Winter Wheat	38.63	0.15%
Oats	30.58	0.12%
Developed/Open Space	20.26	0.08%
Woody Wetlands	6.18	0.02%
Peaches	4.05	0.02%
Pecans	3.68	0.01%
Developed/Low Intensity	2.80	0.01%

2016

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	6343.02	24.15%
Cotton	5974.31	22.75%
Corn	3581.73	13.64%
Soybeans	3158.57	12.03%
Peanuts	2750.80	10.47%
Other Hay/Non Alfalfa	1977.02	7.53%
Grassland/Pasture	764.14	2.91%
Evergreen Forest	759.57	2.89%
Shrubland	406.95	1.55%
Sod/Grass Seed	212.21	0.81%
Millet	115.88	0.44%
Peaches	77.24	0.29%
Dbl Crop WinWht/Soybeans	58.46	0.22%
Oats	31.13	0.12%
Rye	22.57	0.09%
Developed/Open Space	14.87	0.06%
Sorghum	7.21	0.03%
Woody Wetlands	3.38	0.01%
Developed/Low Intensity	2.80	0.01%

2017

Crop	Total Acres	Percent Acreage
Cotton	8994.50	34.25%
Other Hay/Non Alfalfa	4643.90	17.68%
Soybeans	3246.61	12.36%
Corn	2835.71	10.80%
Peanuts	2787.68	10.61%
Fallow/Idle Cropland	2113.78	8.05%
Evergreen Forest	443.30	1.69%
Shrubland	227.87	0.87%
Rye	197.69	0.75%
Grassland/Pasture	166.93	0.64%
Watermelons	144.67	0.55%
Sod/Grass Seed	102.37	0.39%
Millet	91.01	0.35%
Developed/Open Space	75.86	0.29%
Sorghum	63.74	0.24%
Dbl Crop WinWht/Soybeans	37.72	0.14%
Sunflower	30.94	0.12%
Woody Wetlands	25.29	0.10%
Winter Wheat	11.65	0.04%
Sweet Potatoes	9.90	0.04%
Alfalfa	4.26	0.02%
Peaches	3.68	0.01%
Developed/Low Intensity	2.80	0.01%

2018

Crop	Total Acres	Percent Acreage
Cotton	11224.10	42.74%
Other Hay/Non Alfalfa	4804.90	18.30%
Soybeans	2799.82	10.66%
Corn	2605.69	9.92%
Peanuts	1972.35	7.51%
Fallow/Idle Cropland	787.47	3.00%
Evergreen Forest	638.06	2.43%
Watermelons	367.82	1.40%
Shrubland	264.59	1.01%
Cantaloupes	230.07	0.88%
Millet	184.61	0.70%
Grassland/Pasture	155.27	0.59%
Dbl Crop WinWht/Cotton	61.12	0.23%
Dbl Crop WinWht/Soybeans	46.36	0.18%
Sod/Grass Seed	34.16	0.13%
Barren	24.72	0.09%
Triticale	18.83	0.07%
Developed/Open Space	14.87	0.06%
Rye	14.05	0.05%
Clover/Wildflowers	3.85	0.01%
Peaches	3.68	0.01%
Developed/Low Intensity	2.80	0.01%
Dbl Crop Soybeans/Oats	2.67	0.01%

2019

Crop	Total Acres	Percent Acreage
Cotton	13016.48	49.56%
Other Hay/Non Alfalfa	4830.62	18.39%
Corn	2579.40	9.82%
Peanuts	1863.56	7.10%
Sod/Grass Seed	904.66	3.44%
Fallow/Idle Cropland	809.05	3.08%
Shrubland	484.90	1.85%
Soybeans	395.53	1.51%
Evergreen Forest	347.93	1.32%
Grassland/Pasture	291.31	1.11%
Millet	235.87	0.90%
Watermelons	127.95	0.49%
Deciduous Forest	123.42	0.47%
Developed/Low Intensity	78.61	0.30%
Dbl Crop WinWht/Soybeans	53.16	0.20%
Developed/Open Space	44.53	0.17%
Herbaceous Wetlands	42.96	0.16%
Developed/Med Intensity	12.37	0.05%
Mixed Forest	9.69	0.04%
Sweet Corn	7.21	0.03%
Open Water	2.66	0.01%

2020

Crop	Total Acres	Percent Acreage
Cotton	8209.00	31.26%
Corn	4881.31	18.59%
Other Hay/Non Alfalfa	4793.09	18.25%
Peanuts	2805.56	10.68%
Soybeans	2360.30	8.99%
Grassland/Pasture	466.38	1.78%
Fallow/Idle Cropland	433.22	1.65%
Shrubland	420.33	1.60%
Sod/Grass Seed	402.30	1.53%
Millet	248.23	0.95%
Oats	246.85	0.94%
Deciduous Forest	244.48	0.93%
Evergreen Forest	186.46	0.71%
Rye	128.01	0.49%
Watermelons	119.71	0.46%
Dbl Crop WinWht/Soybeans	69.17	0.26%
Developed/Low Intensity	67.79	0.26%
Developed/Open Space	63.14	0.24%
Cantaloupes	45.44	0.17%
Herbaceous Wetlands	31.59	0.12%
Developed/Med Intensity	12.37	0.05%
Woody Wetlands	11.26	0.04%
Winter Wheat	9.03	0.03%
Barren	4.18	0.02%
Open Water	2.66	0.01%

2021

Crop	Total Acres	Percent Acreage
Cotton	9479.01	36.09%
Corn	6182.71	23.54%
Other Hay/Non Alfalfa	4229.60	16.11%
Soybeans	2014.67	7.67%
Peanuts	1902.19	7.24%
Grassland/Pasture	1083.26	4.12%
Millet	244.33	0.93%
Evergreen Forest	222.62	0.85%
Dbl Crop WinWht/Soybeans	198.18	0.75%
Shrubland	156.03	0.59%
Potatoes	142.82	0.54%
Winter Wheat	74.41	0.28%
Developed/Low Intensity	70.81	0.27%
Dbl Crop WinWht/Cotton	50.77	0.19%
Sod/Grass Seed	46.97	0.18%
Herbaceous Wetlands	44.64	0.17%
Developed/Open Space	39.79	0.15%
Developed/Med Intensity	25.40	0.10%
Pecans	20.09	0.08%
Oats	17.09	0.07%
Rye	10.79	0.04%
Developed/High Intensity	3.01	0.01%
Open Water	2.66	0.01%

2022

Crop	Total Acres	Percent Acreage
Cotton	10475.49	39.89%
Other Hay/Non Alfalfa	4229.21	16.10%
Corn	3600.57	13.71%
Soybeans	2244.81	8.55%
Peanuts	2106.30	8.02%
Grassland/Pasture	1391.48	5.30%
Potatoes	445.67	1.70%
Evergreen Forest	298.31	1.14%
Sod/Grass Seed	288.96	1.10%
Millet	236.47	0.90%
Shrubland	236.27	0.90%
Dbl Crop WinWht/Cotton	154.01	0.59%
Dbl Crop WinWht/Soybeans	97.32	0.37%
Sorghum	89.92	0.34%
Winter Wheat	80.24	0.31%
Developed/Low Intensity	70.81	0.27%
Developed/Open Space	47.02	0.18%
Rye	39.15	0.15%
Woody Wetlands	33.16	0.13%
Developed/Med Intensity	25.40	0.10%
Cantaloupes	23.25	0.09%
Oats	22.31	0.08%
Pecans	20.09	0.08%
Developed/High Intensity	3.01	0.01%
Open Water	2.66	0.01%

Edisto REC
25 Mile Buffer

Crop Acreage by Year

Number of Crop Bounderies	13,087
Total Acreage of Bounderies	138,465.61
Percent Crop Acreage in Buffer	11.02%

2015

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	31482.38	22.74%
Cotton	30183.27	21.80%
Corn	19451.89	14.05%
Soybeans	15370.87	11.10%
Other Hay/Non Alfalfa	13988.22	10.10%
Peanuts	10544.99	7.62%
Evergreen Forest	4744.18	3.43%
Shrubland	2901.16	2.10%
Dbl Crop WinWht/Soybeans	2291.97	1.66%
Grassland/Pasture	2220.19	1.60%
Rye	1362.32	0.98%
Sod/Grass Seed	1357.04	0.98%
Winter Wheat	522.42	0.38%
Sorghum	512.60	0.37%
Watermelons	303.07	0.22%
Millet	285.12	0.21%
Developed/Open Space	202.78	0.15%
Oats	174.25	0.13%
Dbl Crop Soybeans/Oats	130.97	0.09%
Peaches	112.38	0.08%
Dbl Crop Corn/Soybeans	50.93	0.04%
Deciduous Forest	45.55	0.03%
Barren	45.41	0.03%
Dbl Crop WinWht/Cotton	41.65	0.03%
Pecans	35.83	0.03%
Woody Wetlands	33.90	0.02%
Sweet Potatoes	19.46	0.01%
Dbl Crop WinWht/Corn	14.91	0.01%
Grapes	12.06	0.01%
Honeydew Melons	11.59	0.01%
Mixed Forest	6.91	0.00%
Developed/Low Intensity	5.32	0.00%

2016

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	43213.78	31.21%
Corn	22458.60	16.22%
Cotton	21880.14	15.80%
Other Hay/Non Alfalfa	13005.53	9.39%
Peanuts	12883.04	9.30%
Soybeans	12184.03	8.80%
Evergreen Forest	3429.90	2.48%
Shrubland	2694.67	1.95%
Grassland/Pasture	1845.83	1.33%
Rye	909.38	0.66%
Sod/Grass Seed	870.98	0.63%
Peaches	802.88	0.58%
Potatoes	454.34	0.33%
Sorghum	342.09	0.25%
Millet	317.90	0.23%
Dbl Crop WinWht/Soybeans	254.44	0.18%
Oats	200.46	0.14%
Dbl Crop Oats/Corn	173.59	0.13%
Developed/Open Space	166.81	0.12%
Winter Wheat	88.47	0.06%
Peas	83.51	0.06%
Woody Wetlands	66.29	0.05%
Watermelons	25.16	0.02%
Dbl Crop Soybeans/Oats	25.16	0.02%
Pecans	19.87	0.01%
Cantaloupes	13.94	0.01%
Sunflower	12.18	0.01%
Grapes	12.06	0.01%
Dbl Crop WinWht/Corn	9.66	0.01%
Deciduous Forest	8.90	0.01%
Developed/Low Intensity	6.45	0.00%
Mixed Forest	2.91	0.00%
Barren	2.68	0.00%

2017

Crop	Total Acres	Percent Acreage
Cotton	32780.92	23.67%
Other Hay/Non Alfalfa	22321.92	16.12%
Fallow/Idle Cropland	21610.44	15.61%
Corn	19718.79	14.24%
Peanuts	17630.82	12.73%
Soybeans	11802.57	8.52%
Potatoes	2006.79	1.45%
Rye	1927.62	1.39%
Evergreen Forest	1631.45	1.18%
Sod/Grass Seed	1555.34	1.12%
Shrubland	1062.03	0.77%
Grassland/Pasture	939.74	0.68%
Watermelons	728.45	0.53%
Peaches	546.22	0.39%
Sorghum	407.49	0.29%
Deciduous Forest	366.98	0.27%
Dbl Crop WinWht/Cotton	260.74	0.19%
Developed/Open Space	208.45	0.15%
Millet	177.61	0.13%
Winter Wheat	128.36	0.09%
Dbl Crop WinWht/Soybeans	116.76	0.08%
Alfalfa	114.06	0.08%
Mixed Forest	96.44	0.07%
Woody Wetlands	79.25	0.06%
Oats	55.93	0.04%
Sunflower	49.92	0.04%
Sweet Potatoes	43.81	0.03%
Pecans	31.93	0.02%
Dbl Crop Oats/Corn	16.41	0.01%
Barren	13.39	0.01%
Peas	10.15	0.01%
Developed/Low Intensity	6.48	0.00%
Dbl Crop Soybeans/Oats	5.17	0.00%
Dbl Crop WinWht/Sorghum	5.16	0.00%
Herbaceous Wetlands	4.96	0.00%
Blueberries	3.02	0.00%

2018

Crop	Total Acres	Percent Acreage
Cotton	44840.11	32.38%
Other Hay/Non Alfalfa	28714.31	20.74%
Corn	24815.04	17.92%
Soybeans	11218.44	8.10%
Peanuts	10304.90	7.44%
Fallow/Idle Cropland	7283.35	5.26%
Potatoes	1634.92	1.18%
Sod/Grass Seed	1543.10	1.11%
Evergreen Forest	1533.39	1.11%
Rye	1327.20	0.96%
Shrubland	947.43	0.68%
Grassland/Pasture	631.52	0.46%
Dbl Crop WinWht/Cotton	563.88	0.41%
Peaches	559.12	0.40%
Watermelons	555.82	0.40%
Winter Wheat	413.33	0.30%
Dbl Crop WinWht/Soybeans	282.46	0.20%
Cantaloupes	281.68	0.20%
Millet	239.55	0.17%
Pecans	143.00	0.10%
Developed/Open Space	135.53	0.10%
Mixed Forest	98.44	0.07%
Dbl Crop Soybeans/Oats	93.35	0.07%
Oats	69.51	0.05%
Sorghum	55.17	0.04%
Squash	52.47	0.04%
Sweet Potatoes	39.67	0.03%
Barren	27.37	0.02%
Peas	19.09	0.01%
Triticale	18.83	0.01%
Woody Wetlands	9.01	0.01%
Herbaceous Wetlands	4.96	0.00%
Clover/Wildflowers	3.85	0.00%
Blueberries	3.02	0.00%
Developed/Low Intensity	2.80	0.00%

2019

Crop	Total Acres	Percent Acreage
Cotton	45675.46	32.99%
Other Hay/Non Alfalfa	29005.91	20.95%
Corn	26211.37	18.93%
Peanuts	9135.18	6.60%
Soybeans	6886.90	4.97%
Shrubland	4713.84	3.40%
Fallow/Idle Cropland	4565.55	3.30%
Sod/Grass Seed	3440.09	2.48%
Grassland/Pasture	2173.42	1.57%
Evergreen Forest	1140.11	0.82%
Potatoes	946.60	0.68%
Rye	698.58	0.50%
Dbl Crop WinWht/Soybeans	681.64	0.49%
Millet	605.01	0.44%
Peaches	551.82	0.40%
Oats	321.48	0.23%
Deciduous Forest	293.81	0.21%
Sweet Potatoes	237.07	0.17%
Watermelons	180.64	0.13%
Developed/Low Intensity	149.43	0.11%
Developed/Open Space	130.58	0.09%
Dbl Crop Soybeans/Oats	103.43	0.07%
Developed/Med Intensity	91.35	0.07%
Sweet Corn	90.63	0.07%
Sorghum	72.98	0.05%
Pecans	61.28	0.04%
Open Water	56.34	0.04%
Barley	47.45	0.03%
Herbaceous Wetlands	46.42	0.03%
Dbl Crop Oats/Corn	30.48	0.02%
Developed/High Intensity	27.70	0.02%
Winter Wheat	21.88	0.02%
Peas	21.26	0.02%
Sunflower	15.61	0.01%
Other Crops	12.91	0.01%
Mixed Forest	9.69	0.01%
Barren	7.56	0.01%
Blueberries	4.14	0.00%

2020

Crop	Total Acres	Percent Acreage
Corn	31067.78	22.44%
Other Hay/Non Alfalfa	29516.19	21.32%
Cotton	29450.95	21.27%
Peanuts	14452.82	10.44%
Soybeans	10498.73	7.58%
Shrubland	4844.42	3.50%
Fallow/Idle Cropland	3689.86	2.66%
Grassland/Pasture	3430.15	2.48%
Sod/Grass Seed	2569.64	1.86%
Potatoes	1792.40	1.29%
Evergreen Forest	1353.73	0.98%
Rye	906.20	0.65%
Dbl Crop WinWht/Soybeans	814.49	0.59%
Millet	634.54	0.46%
Peaches	569.48	0.41%
Oats	555.00	0.40%
Deciduous Forest	537.74	0.39%
Watermelons	336.93	0.24%
Dbl Crop WinWht/Cotton	202.10	0.15%
Developed/Open Space	183.69	0.13%
Winter Wheat	175.11	0.13%
Cantaloupes	133.79	0.10%
Developed/Low Intensity	131.28	0.09%
Developed/Med Intensity	99.42	0.07%
Woody Wetlands	80.54	0.06%
Dbl Crop Soybeans/Oats	70.89	0.05%
Pecans	62.47	0.05%
Sorghum	58.69	0.04%
Herbaceous Wetlands	53.66	0.04%
Dbl Crop Oats/Corn	49.00	0.04%
Open Water	41.91	0.03%
Developed/High Intensity	27.70	0.02%
Other Crops	27.18	0.02%
Sweet Potatoes	19.46	0.01%
Sunflower	15.61	0.01%
Squash	7.88	0.01%
Barren	4.18	0.00%

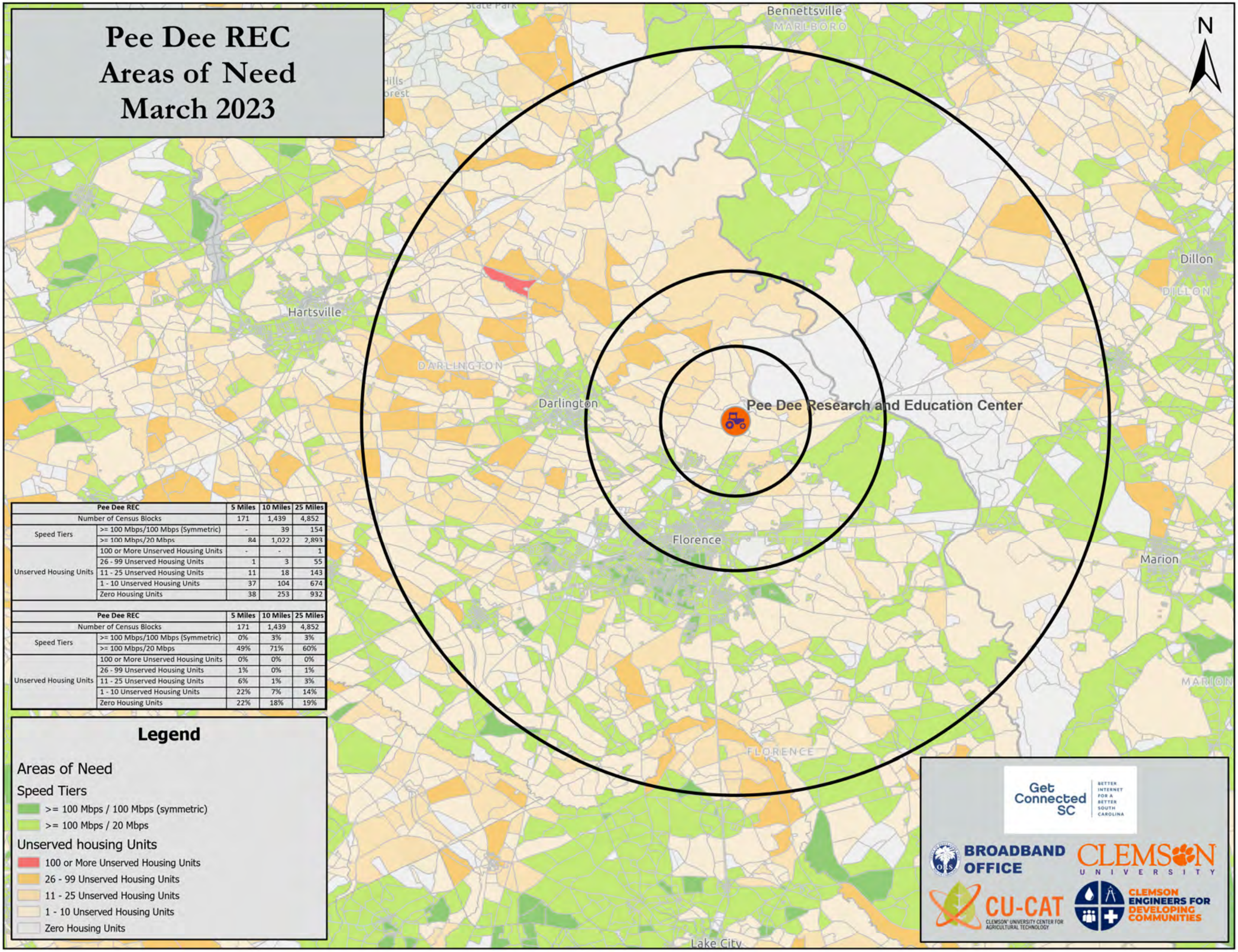
2021

Crop	Total Acres	Percent Acreage
Cotton	34551.51	24.95%
Corn	33951.43	24.52%
Other Hay/Non Alfalfa	27032.44	19.52%
Peanuts	11173.54	8.07%
Soybeans	9947.15	7.18%
Grassland/Pasture	6012.63	4.34%
Evergreen Forest	2666.15	1.93%
Dbl Crop WinWht/Soybeans	2511.17	1.81%
Sod/Grass Seed	2114.77	1.53%
Shrubland	1937.06	1.40%
Potatoes	1929.07	1.39%
Rye	944.16	0.68%
Millet	625.21	0.45%
Peaches	566.29	0.41%
Sweet Potatoes	448.43	0.32%
Watermelons	306.74	0.22%
Winter Wheat	305.30	0.22%
Developed/Open Space	177.08	0.13%
Oats	168.35	0.12%
Developed/Med Intensity	151.95	0.11%
Sorghum	98.71	0.07%
Developed/Low Intensity	98.30	0.07%
Woody Wetlands	94.23	0.07%
Dbl Crop Soybeans/Oats	93.15	0.07%
Pecans	92.99	0.07%
Sweet Corn	82.85	0.06%
Herbaceous Wetlands	80.02	0.06%
Fallow/Idle Cropland	63.67	0.05%
Dbl Crop WinWht/Cotton	50.77	0.04%
Sunflower	47.09	0.03%
Open Water	35.94	0.03%
Developed/High Intensity	29.74	0.02%
Dbl Crop Oats/Corn	28.06	0.02%
Peas	20.50	0.01%
Triticale	9.48	0.01%
Cucumbers	8.01	0.01%
Deciduous Forest	7.29	0.01%
Other Crops	4.40	0.00%

2022

Crop	Total Acres	Percent Acreage
Cotton	43128.06	31.15%
Corn	24612.07	17.77%
Other Hay/Non Alfalfa	23770.27	17.17%
Soybeans	10626.52	7.67%
Peanuts	9931.21	7.17%
Grassland/Pasture	9747.94	7.04%
Evergreen Forest	2827.59	2.04%
Shrubland	2396.76	1.73%
Dbl Crop WinWht/Soybeans	2389.48	1.73%
Sod/Grass Seed	2356.22	1.70%
Potatoes	1649.38	1.19%
Rye	678.06	0.49%
Millet	591.67	0.43%
Peaches	526.08	0.38%
Oats	499.15	0.36%
Sweet Potatoes	423.13	0.31%
Winter Wheat	297.71	0.22%
Watermelons	292.47	0.21%
Fallow/Idle Cropland	266.79	0.19%
Sorghum	197.26	0.14%
Developed/Open Space	195.86	0.14%
Developed/Med Intensity	184.26	0.13%
Dbl Crop WinWht/Cotton	161.93	0.12%
Woody Wetlands	142.58	0.10%
Developed/Low Intensity	90.08	0.07%
Dbl Crop Oats/Corn	89.75	0.06%
Cantaloupes	81.02	0.06%
Pecans	56.39	0.04%
Dbl Crop WinWht/Sorghum	51.02	0.04%
Herbaceous Wetlands	42.62	0.03%
Peas	39.51	0.03%
Dbl Crop Soybeans/Oats	37.80	0.03%
Open Water	36.99	0.03%
Developed/High Intensity	26.68	0.02%
Sunflower	10.54	0.01%
Deciduous Forest	6.74	0.00%
Cucumbers	4.04	0.00%

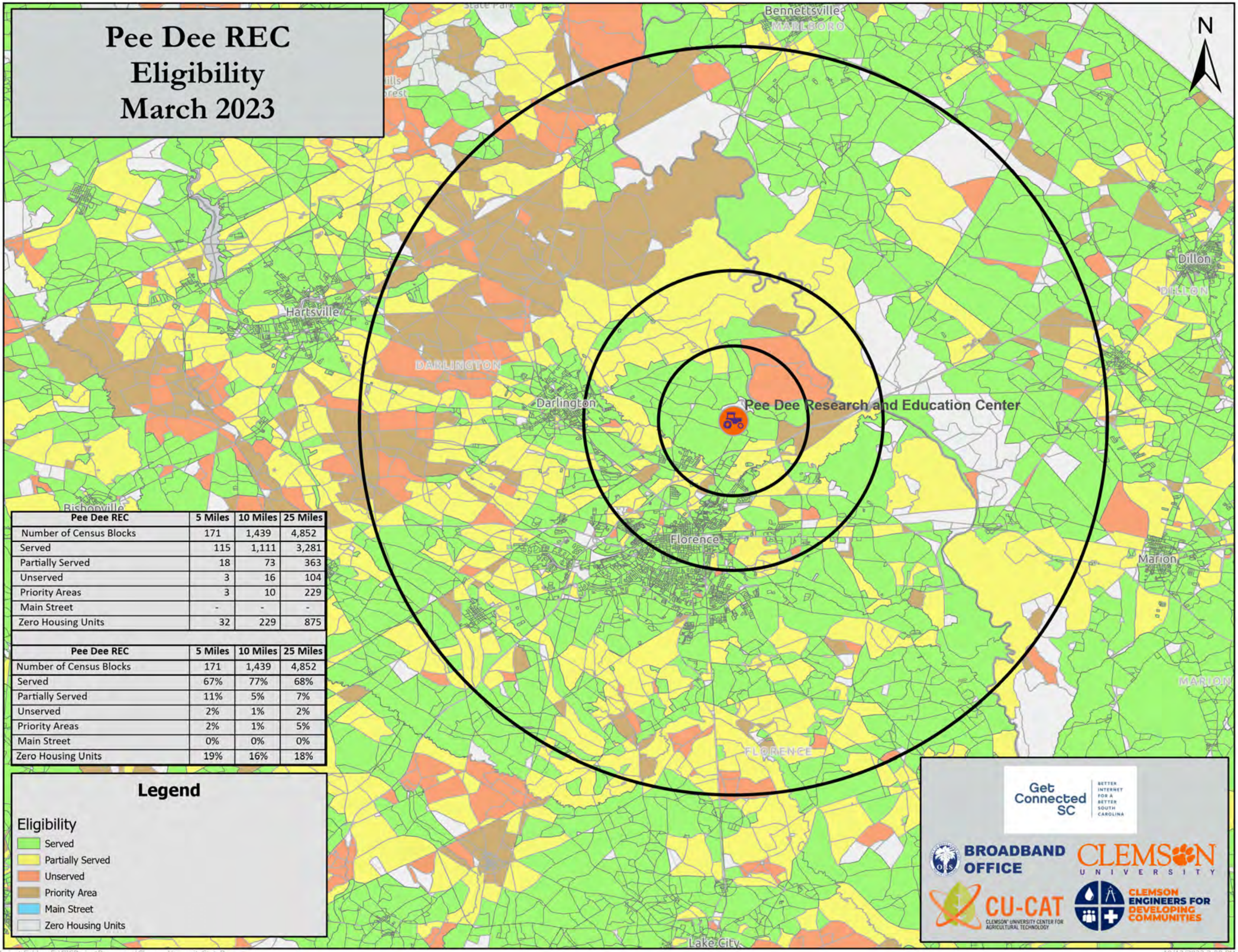
Pee Dee REC Areas of Need March 2023



Pee Dee REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		171	1,439	4,852
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	-	39	154
	>= 100 Mbps/20 Mbps	84	1,022	2,893
Unserved Housing Units	100 or More Unserved Housing Units	-	-	1
	26 - 99 Unserved Housing Units	1	3	55
	11 - 25 Unserved Housing Units	11	18	143
	1 - 10 Unserved Housing Units	37	104	674
	Zero Housing Units	38	253	932

Pee Dee REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		171	1,439	4,852
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	0%	3%	3%
	>= 100 Mbps/20 Mbps	49%	71%	60%
Unserved Housing Units	100 or More Unserved Housing Units	0%	0%	0%
	26 - 99 Unserved Housing Units	1%	0%	1%
	11 - 25 Unserved Housing Units	6%	1%	3%
	1 - 10 Unserved Housing Units	22%	7%	14%
	Zero Housing Units	22%	18%	19%

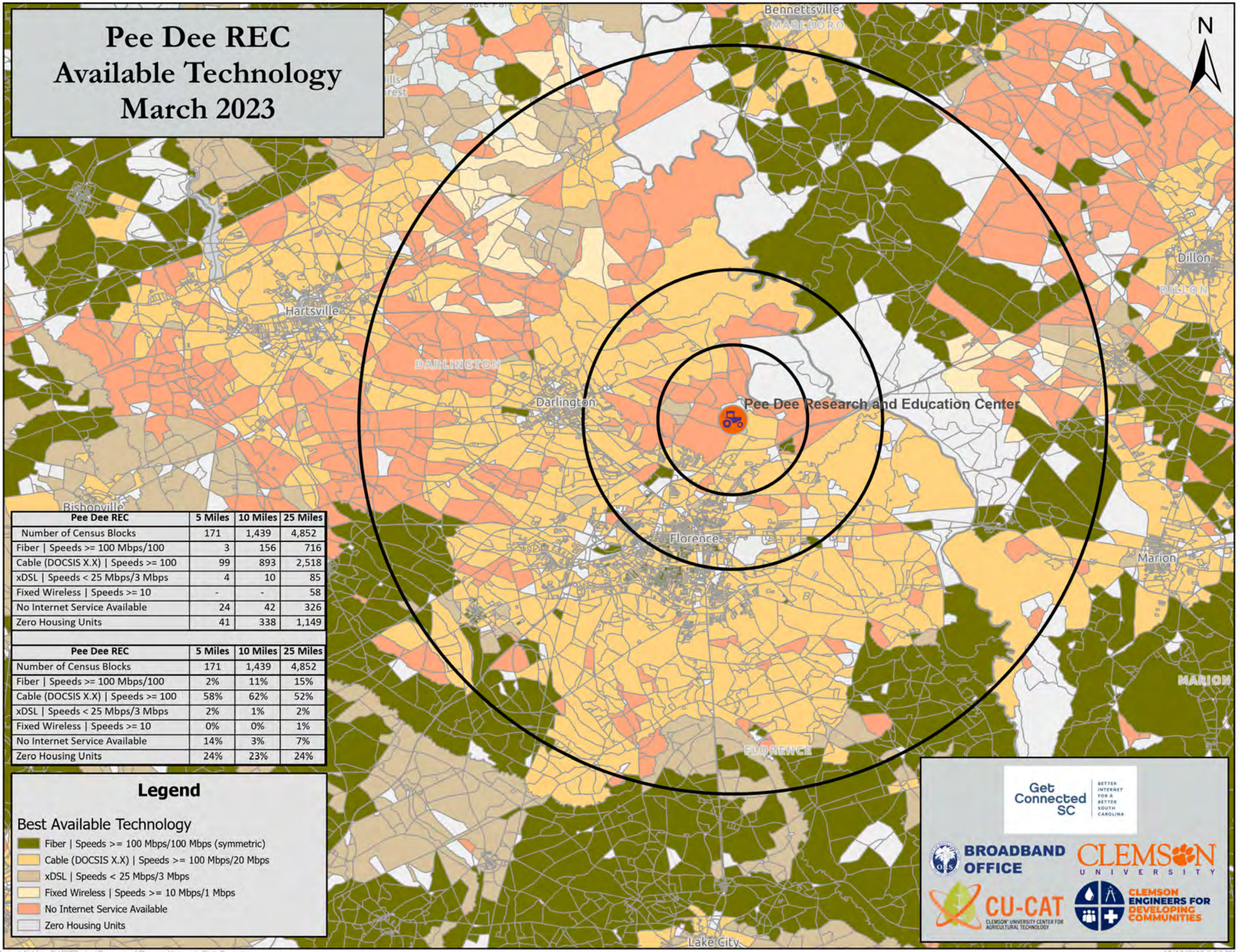
Pee Dee REC Eligibility March 2023



Pee Dee REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	171	1,439	4,852
Served	115	1,111	3,281
Partially Served	18	73	363
Unserved	3	16	104
Priority Areas	3	10	229
Main Street	-	-	-
Zero Housing Units	32	229	875

Pee Dee REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	171	1,439	4,852
Served	67%	77%	68%
Partially Served	11%	5%	7%
Unserved	2%	1%	2%
Priority Areas	2%	1%	5%
Main Street	0%	0%	0%
Zero Housing Units	19%	16%	18%

Pee Dee REC Available Technology March 2023



Pee Dee REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	171	1,439	4,852
Fiber | Speeds >= 100 Mbps/100	3	156	716
Cable (DOCSIS X.X) | Speeds >= 100	99	893	2,518
xDSL | Speeds < 25 Mbps/3 Mbps	4	10	85
Fixed Wireless | Speeds >= 10	-	-	58
No Internet Service Available	24	42	326
Zero Housing Units	41	338	1,149

Pee Dee REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	171	1,439	4,852
Fiber | Speeds >= 100 Mbps/100	2%	11%	15%
Cable (DOCSIS X.X) | Speeds >= 100	58%	62%	52%
xDSL | Speeds < 25 Mbps/3 Mbps	2%	1%	2%
Fixed Wireless | Speeds >= 10	0%	0%	1%
No Internet Service Available	14%	3%	7%
Zero Housing Units	24%	23%	24%

Legend

Best Available Technology

- Fiber | Speeds >= 100 Mbps/100 Mbps (symmetric)
- Cable (DOCSIS X.X) | Speeds >= 100 Mbps/20 Mbps
- xDSL | Speeds < 25 Mbps/3 Mbps
- Fixed Wireless | Speeds >= 10 Mbps/1 Mbps
- No Internet Service Available
- Zero Housing Units

Get Connected SC — Better Internet for a Better South Carolina
Broadband Office
Clemson University
CU-CAT Clemson University Center for Agricultural Technology
Clemson Engineers for Developing Communities

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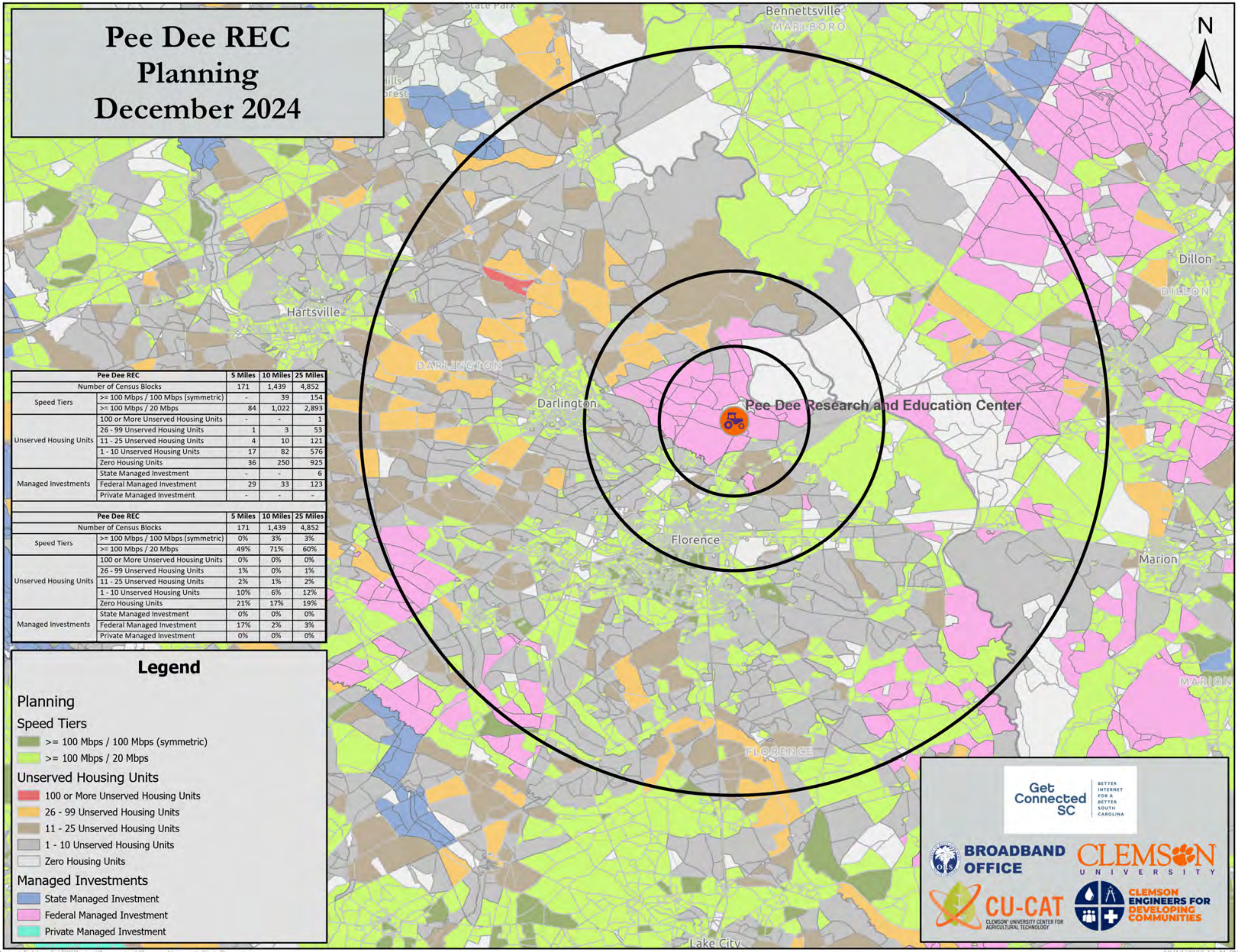
Pee Dee REC Planning December 2024



Pee Dee REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		171	1,439	4,852
Speed Tiers	>= 100 Mbps / 100 Mbps (symmetric)	-	39	154
	>= 100 Mbps / 20 Mbps	84	1,022	2,893
Unserved Housing Units	100 or More Unserved Housing Units	-	-	1
	26 - 99 Unserved Housing Units	1	3	53
	11 - 25 Unserved Housing Units	4	10	121
	1 - 10 Unserved Housing Units	17	82	576
	Zero Housing Units	36	250	925
Managed Investments	State Managed Investment	-	-	6
	Federal Managed Investment	29	33	123
	Private Managed Investment	-	-	-

Pee Dee REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		171	1,439	4,852
Speed Tiers	>= 100 Mbps / 100 Mbps (symmetric)	0%	3%	3%
	>= 100 Mbps / 20 Mbps	49%	71%	60%
Unserved Housing Units	100 or More Unserved Housing Units	0%	0%	0%
	26 - 99 Unserved Housing Units	1%	0%	1%
	11 - 25 Unserved Housing Units	2%	1%	2%
	1 - 10 Unserved Housing Units	10%	6%	12%
	Zero Housing Units	21%	17%	19%
Managed Investments	State Managed Investment	0%	0%	0%
	Federal Managed Investment	17%	2%	3%
	Private Managed Investment	0%	0%	0%

Legend

Planning

Speed Tiers
- >= 100 Mbps / 100 Mbps (symmetric)
- >= 100 Mbps / 20 Mbps

Unserved Housing Units
- 100 or More Unserved Housing Units
- 26 - 99 Unserved Housing Units
- 11 - 25 Unserved Housing Units
- 1 - 10 Unserved Housing Units
- Zero Housing Units

Managed Investments
- State Managed Investment
- Federal Managed Investment
- Private Managed Investment

Get Connected SC — Better Internet for a Better South Carolina

Broadband Office | Clemson University | CU-CAT Clemson University Center for Agricultural Technology | Clemson Engineers for Developing Communities

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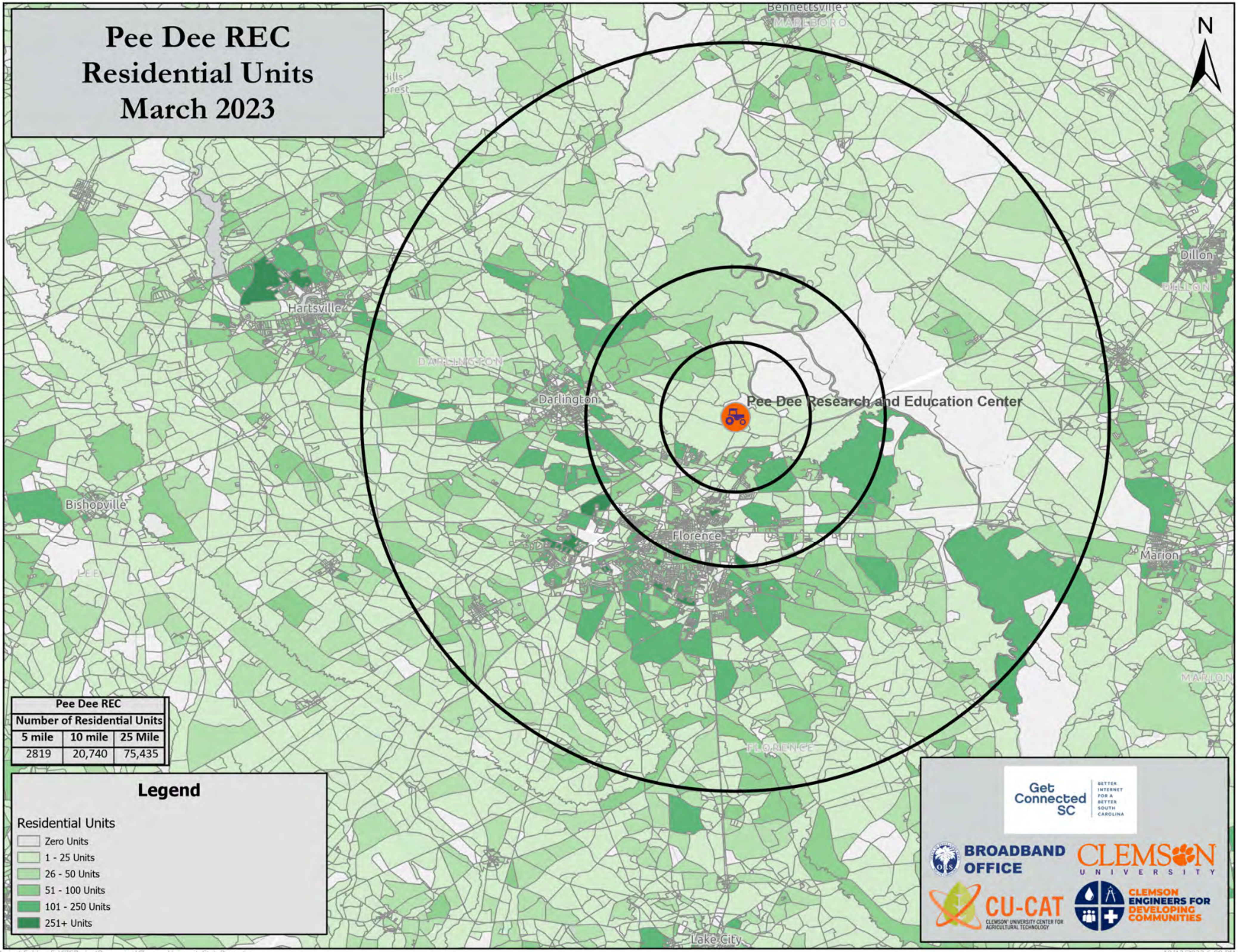
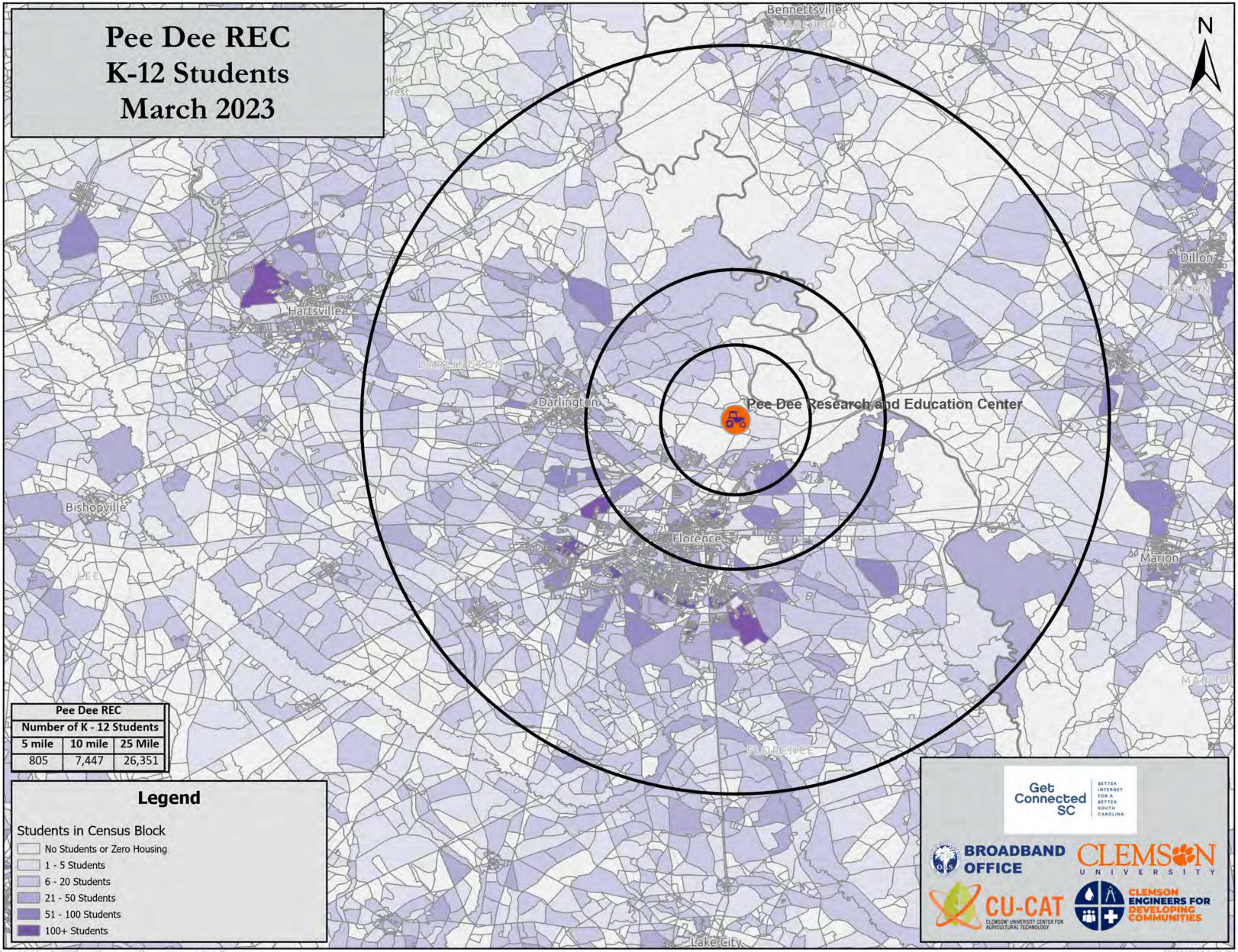
Pee Dee REC Residential Units March 2023



Pee Dee REC		
Number of Residential Units		
5 mile	10 mile	25 Mile
2819	20,740	75,435

Pee Dee REC
K-12 Students
March 2023



Pee Dee REC		
Number of K - 12 Students		
5 mile	10 mile	25 Mile
805	7,447	26,351

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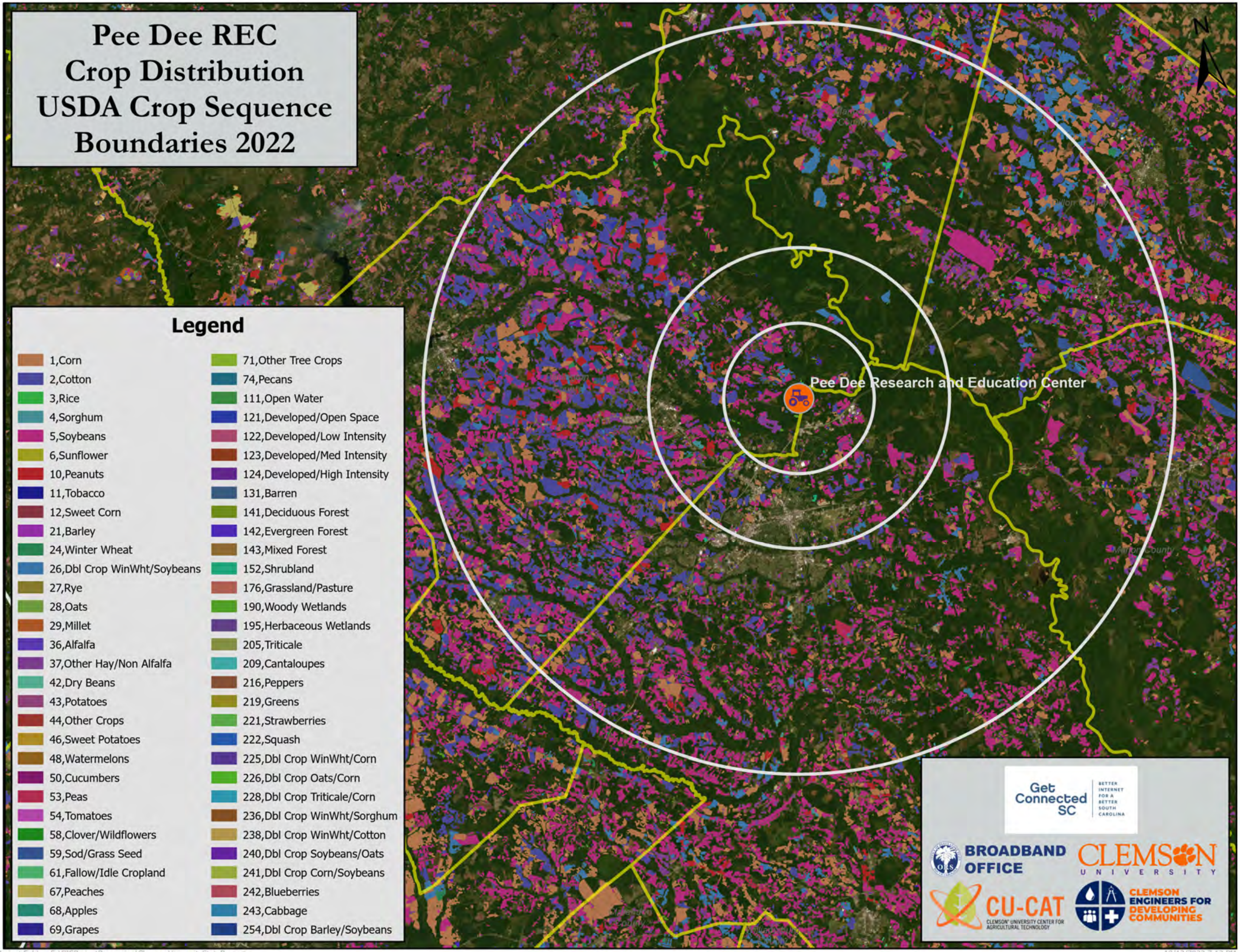

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Pee Dee REC
5 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	735
Total Acreage of Bounderies	7,710.30
Percent Crop Acreage in Buffer	15.34%

2015

Crop	Total Acres	Percent Acreage
Soybeans	2544.51	33.00%
Fallow/Idle Cropland	1774.22	23.01%
Cotton	1316.56	17.08%
Corn	1030.06	13.36%
Sorghum	487.20	6.32%
Dbl Crop WinWht/Soybeans	186.41	2.42%
Other Hay/Non Alfalfa	120.55	1.56%
Peanuts	109.67	1.42%
Tobacco	77.11	1.00%
Developed/Open Space	29.86	0.39%
Woody Wetlands	27.45	0.36%
Shrubland	6.70	0.09%

2016

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	2421.76	31.41%
Soybeans	2410.99	31.27%
Corn	1406.55	18.24%
Cotton	1005.91	13.05%
Other Hay/Non Alfalfa	173.75	2.25%
Sorghum	139.00	1.80%
Peanuts	56.87	0.74%
Dbl Crop WinWht/Soybeans	25.98	0.34%
Herbaceous Wetlands	18.39	0.24%
Developed/Open Space	18.22	0.24%
Shrubland	12.96	0.17%
Millet	6.70	0.09%
Woody Wetlands	6.20	0.08%
Sod/Grass Seed	3.62	0.05%
Sweet Potatoes	3.41	0.04%

2017

Crop	Total Acres	Percent Acreage
Soybeans	2838.76	36.82%
Other Hay/Non Alfalfa	1548.80	20.09%
Corn	1485.20	19.26%
Cotton	1163.85	15.09%
Peanuts	260.46	3.38%
Fallow/Idle Cropland	154.89	2.01%
Dbl Crop WinWht/Soybeans	113.29	1.47%
Sod/Grass Seed	71.38	0.93%
Developed/Open Space	38.69	0.50%
Shrubland	25.92	0.34%
Woody Wetlands	9.06	0.12%

2018

Crop	Total Acres	Percent Acreage
Soybeans	3138.33	40.70%
Corn	1458.67	18.92%
Other Hay/Non Alfalfa	1343.26	17.42%
Cotton	1205.24	15.63%
Dbl Crop WinWht/Soybeans	165.76	2.15%
Sod/Grass Seed	154.33	2.00%
Sorghum	89.49	1.16%
Peanuts	63.88	0.83%
Fallow/Idle Cropland	39.32	0.51%
Developed/Open Space	20.99	0.27%
Dry Beans	17.94	0.23%
Shrubland	6.89	0.09%
Woody Wetlands	6.20	0.08%

2019

Crop	Total Acres	Percent Acreage
Soybeans	3060.68	39.70%
Corn	1396.64	18.11%
Other Hay/Non Alfalfa	1206.96	15.65%
Cotton	1110.56	14.40%
Peanuts	300.00	3.89%
Sod/Grass Seed	169.51	2.20%
Woody Wetlands	153.96	2.00%
Fallow/Idle Cropland	113.24	1.47%
Developed/Open Space	63.66	0.83%
Developed/Low Intensity	41.30	0.54%
Evergreen Forest	37.14	0.48%
Sweet Potatoes	22.32	0.29%
Developed/Med Intensity	22.22	0.29%
Developed/High Intensity	8.29	0.11%
Sorghum	3.80	0.05%

2020

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	2276.43	29.52%
Cotton	1429.26	18.54%
Other Hay/Non Alfalfa	1224.12	15.88%
Corn	1150.33	14.92%
Soybeans	800.38	10.38%
Peanuts	230.92	2.99%
Sod/Grass Seed	182.57	2.37%
Dbl Crop WinWht/Soybeans	139.03	1.80%
Woody Wetlands	81.44	1.06%
Developed/Open Space	49.64	0.64%
Shrubland	39.98	0.52%
Evergreen Forest	38.54	0.50%
Developed/Low Intensity	38.42	0.50%
Developed/Med Intensity	20.93	0.27%
Developed/High Intensity	8.29	0.11%

2021

Crop	Total Acres	Percent Acreage
Soybeans	3145.63	40.80%
Corn	1424.58	18.48%
Other Hay/Non Alfalfa	1191.19	15.45%
Cotton	952.66	12.36%
Dbl Crop WinWht/Soybeans	222.80	2.89%
Peanuts	163.06	2.11%
Sod/Grass Seed	162.32	2.11%
Woody Wetlands	147.11	1.91%
Evergreen Forest	132.06	1.71%
Developed/Open Space	76.85	1.00%
Developed/Med Intensity	48.47	0.63%
Developed/High Intensity	17.14	0.22%
Developed/Low Intensity	14.32	0.19%
Shrubland	8.21	0.11%
Peas	3.89	0.05%

2022

Crop	Total Acres	Percent Acreage
Soybeans	3773.52	48.94%
Other Hay/Non Alfalfa	1162.52	15.08%
Cotton	1092.15	14.16%
Corn	791.18	10.26%
Dbl Crop WinWht/Soybeans	215.63	2.80%
Sod/Grass Seed	199.04	2.58%
Evergreen Forest	152.98	1.98%
Woody Wetlands	95.64	1.24%
Developed/Open Space	84.40	1.09%
Developed/Med Intensity	48.47	0.63%
Winter Wheat	30.37	0.39%
Shrubland	28.09	0.36%
Developed/High Intensity	17.14	0.22%
Developed/Low Intensity	14.32	0.19%
Barren	4.84	0.06%

Pee Dee REC
10 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	2,208
Total Acreage of Bounderies	24,342.15
Percent Crop Acreage in Buffer	12.11%

2015		
Crop	Total Acres	Percent Acreage
Soybeans	7394.79	30.38%
Cotton	4944.49	20.31%
Fallow/Idle Cropland	4823.71	19.82%
Corn	3327.58	13.67%
Dbl Crop WinWht/Soybeans	1377.15	5.66%
Sorghum	833.85	3.43%
Peanuts	720.79	2.96%
Other Hay/Non Alfalfa	494.06	2.03%
Tobacco	86.54	0.36%
Dbl Crop Soybeans/Oats	67.58	0.28%
Evergreen Forest	63.97	0.26%
Developed/Open Space	59.12	0.24%
Woody Wetlands	58.02	0.24%
Rye	30.77	0.13%
Grassland/Pasture	24.28	0.10%
Shrubland	20.13	0.08%
Sod/Grass Seed	4.75	0.02%
Developed/Low Intensity	4.56	0.02%
Winter Wheat	3.48	0.01%
Herbaceous Wetlands	2.54	0.01%

2016		
Crop	Total Acres	Percent Acreage
Soybeans	8000.78	32.87%
Fallow/Idle Cropland	5921.05	24.32%
Corn	4209.62	17.29%
Cotton	3402.80	13.98%
Other Hay/Non Alfalfa	1055.81	4.34%
Peanuts	602.75	2.48%
Sorghum	387.16	1.59%
Dbl Crop WinWht/Soybeans	350.24	1.44%
Rye	124.74	0.51%
Evergreen Forest	67.10	0.28%
Grassland/Pasture	41.21	0.17%
Developed/Open Space	41.00	0.17%
Woody Wetlands	37.76	0.16%
Dbl Crop Soybeans/Oats	32.64	0.13%
Shrubland	29.13	0.12%
Herbaceous Wetlands	20.93	0.09%
Sod/Grass Seed	7.31	0.03%
Millet	6.70	0.03%
Sweet Potatoes	3.41	0.01%

2017		
Crop	Total Acres	Percent Acreage
Soybeans	9057.25	37.21%
Corn	4619.73	18.98%
Other Hay/Non Alfalfa	4382.96	18.01%
Cotton	4035.65	16.58%
Dbl Crop WinWht/Soybeans	877.74	3.61%
Peanuts	741.06	3.04%
Fallow/Idle Cropland	334.94	1.38%
Sod/Grass Seed	73.89	0.30%
Developed/Open Space	67.87	0.28%
Winter Wheat	59.04	0.24%
Shrubland	38.61	0.16%
Woody Wetlands	33.33	0.14%
Grassland/Pasture	10.91	0.04%
Evergreen Forest	6.64	0.03%
Herbaceous Wetlands	2.54	0.01%

2018		
Crop	Total Acres	Percent Acreage
Soybeans	9552.62	39.24%
Cotton	4900.25	20.13%
Corn	4376.51	17.98%
Other Hay/Non Alfalfa	3970.39	16.31%
Peanuts	551.36	2.27%
Dbl Crop WinWht/Soybeans	430.81	1.77%
Sorghum	212.85	0.87%
Sod/Grass Seed	156.84	0.64%
Fallow/Idle Cropland	62.62	0.26%
Shrubland	43.84	0.18%
Developed/Open Space	41.01	0.17%
Dry Beans	17.94	0.07%
Winter Wheat	13.14	0.05%
Woody Wetlands	6.20	0.03%
Grassland/Pasture	3.24	0.01%
Herbaceous Wetlands	2.54	0.01%

2019		
Crop	Total Acres	Percent Acreage
Soybeans	9439.30	38.78%
Cotton	4625.36	19.00%
Corn	4188.66	17.21%
Other Hay/Non Alfalfa	3814.50	15.67%
Peanuts	680.15	2.79%
Fallow/Idle Cropland	480.36	1.97%
Developed/Open Space	201.59	0.83%
Sod/Grass Seed	187.21	0.77%
Developed/Low Intensity	183.75	0.75%
Woody Wetlands	181.44	0.75%
Sorghum	160.56	0.66%
Developed/Med Intensity	93.67	0.38%
Evergreen Forest	48.99	0.20%
Developed/High Intensity	31.51	0.13%
Sweet Potatoes	22.32	0.09%
Shrubland	2.77	0.01%

2020		
Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	8935.38	36.71%
Cotton	3990.41	16.39%
Other Hay/Non Alfalfa	3766.09	15.47%
Corn	3415.74	14.03%
Soybeans	1964.27	8.07%
Peanuts	796.99	3.27%
Dbl Crop WinWht/Soybeans	528.11	2.17%
Developed/Open Space	190.83	0.78%
Sod/Grass Seed	187.96	0.77%
Developed/Low Intensity	155.90	0.64%
Woody Wetlands	129.97	0.53%
Shrubland	115.42	0.47%
Developed/Med Intensity	92.39	0.38%
Evergreen Forest	41.18	0.17%
Developed/High Intensity	31.51	0.13%

2021		
Crop	Total Acres	Percent Acreage
Soybeans	10332.58	42.45%
Other Hay/Non Alfalfa	3629.16	14.91%
Corn	3581.59	14.71%
Cotton	3396.57	13.95%
Dbl Crop WinWht/Soybeans	1011.17	4.15%
Peanuts	792.15	3.25%
Woody Wetlands	326.02	1.34%
Developed/Open Space	245.43	1.01%
Developed/Med Intensity	233.70	0.96%
Evergreen Forest	175.83	0.72%
Sod/Grass Seed	170.26	0.70%
Sorghum	120.55	0.50%
Developed/Low Intensity	118.10	0.49%
Shrubland	85.51	0.35%
Fallow/Idle Cropland	73.97	0.30%
Developed/High Intensity	43.14	0.18%
Peas	3.89	0.02%
Oats	2.54	0.01%

2022		
Crop	Total Acres	Percent Acreage
Soybeans	10049.73	41.29%
Cotton	4695.46	19.29%
Other Hay/Non Alfalfa	3639.67	14.95%
Corn	2735.35	11.24%
Dbl Crop WinWht/Soybeans	1136.21	4.67%
Peanuts	461.52	1.90%
Developed/Open Space	277.09	1.14%
Evergreen Forest	265.73	1.09%
Developed/Med Intensity	233.70	0.96%
Sod/Grass Seed	201.92	0.83%
Woody Wetlands	192.16	0.79%
Shrubland	119.03	0.49%
Developed/Low Intensity	108.46	0.45%
Sorghum	97.30	0.40%
Winter Wheat	80.84	0.33%
Developed/High Intensity	43.14	0.18%
Barren	4.84	0.02%

Pee Dee REC
25 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	18,785
Total Acreage of Bounderies	230,473.01
Percent Crop Acreage in Buffer	18.34%

2015

Crop	Total Acres	Percent Acreage
Soybeans	67711.76	29.38%
Cotton	42439.19	18.41%
Fallow/Idle Cropland	39055.31	16.95%
Corn	33432.67	14.51%
Dbl Crop WinWht/Soybeans	25161.12	10.92%
Peanuts	7414.30	3.22%
Other Hay/Non Alfalfa	7187.14	3.12%
Sorghum	2466.08	1.07%
Winter Wheat	1634.78	0.71%
Rye	920.14	0.40%
Grassland/Pasture	370.94	0.16%
Developed/Open Space	345.39	0.15%
Woody Wetlands	336.75	0.15%
Dbl Crop WinWht/Sorghum	316.84	0.14%
Dbl Crop Soybeans/Oats	309.33	0.13%
Peas	236.80	0.10%
Shrubland	222.01	0.10%
Evergreen Forest	184.52	0.08%
Sweet Potatoes	158.38	0.07%
Sod/Grass Seed	125.22	0.05%
Tobacco	101.60	0.04%
Millet	91.11	0.04%
Rice	52.83	0.02%
Dbl Crop WinWht/Cotton	49.76	0.02%
Herbaceous Wetlands	44.15	0.02%
Oats	28.59	0.01%
Barley	25.39	0.01%
Triticale	16.02	0.01%
Sunflower	13.70	0.01%
Developed/Low Intensity	13.47	0.01%
Barren	5.07	0.00%
Deciduous Forest	2.63	0.00%

2016

Crop	Total Acres	Percent Acreage
Soybeans	76351.19	33.13%
Fallow/Idle Cropland	48643.46	21.11%
Corn	43337.01	18.80%
Cotton	32143.80	13.95%
Other Hay/Non Alfalfa	11535.56	5.01%
Peanuts	8370.29	3.63%
Dbl Crop WinWht/Soybeans	5831.44	2.53%
Sorghum	1204.16	0.52%
Grassland/Pasture	657.46	0.29%
Developed/Open Space	345.10	0.15%
Woody Wetlands	334.66	0.15%
Sod/Grass Seed	296.84	0.13%
Shrubland	234.28	0.10%
Dbl Crop Soybeans/Oats	177.05	0.08%
Evergreen Forest	167.83	0.07%
Rye	166.01	0.07%
Rape Seed	145.89	0.06%
Dbl Crop WinWht/Corn	117.75	0.05%
Sweet Potatoes	98.91	0.04%
Dbl Crop WinWht/Sorghum	72.89	0.03%
Winter Wheat	72.55	0.03%
Oats	45.69	0.02%
Herbaceous Wetlands	41.42	0.02%
Peas	39.10	0.02%
Deciduous Forest	14.63	0.01%
Rice	9.15	0.00%
Tobacco	8.57	0.00%
Millet	6.70	0.00%
Developed/Low Intensity	3.60	0.00%

2017

Crop	Total Acres	Percent Acreage
Soybeans	78114.60	33.89%
Corn	50271.06	21.81%
Cotton	38628.44	16.76%
Other Hay/Non Alfalfa	30465.77	13.22%
Dbl Crop WinWht/Soybeans	10516.50	4.56%
Fallow/Idle Cropland	9636.61	4.18%
Peanuts	9560.37	4.15%
Sod/Grass Seed	476.29	0.21%
Developed/Open Space	404.42	0.18%
Peas	400.00	0.17%
Shrubland	336.55	0.15%
Winter Wheat	334.95	0.15%
Rye	250.36	0.11%
Sorghum	228.48	0.10%
Woody Wetlands	178.80	0.08%
Sweet Potatoes	141.25	0.06%
Grassland/Pasture	134.07	0.06%
Dbl Crop Soybeans/Oats	123.56	0.05%
Canola	102.33	0.04%
Evergreen Forest	81.59	0.04%
Oats	31.66	0.01%
Millet	27.38	0.01%
Herbaceous Wetlands	15.22	0.01%
Rice	9.15	0.00%
Developed/Low Intensity	3.60	0.00%

2018

Crop	Total Acres	Percent Acreage
Soybeans	86943.94	37.72%
Corn	45090.60	19.56%
Cotton	44123.31	19.14%
Other Hay/Non Alfalfa	29814.21	12.94%
Dbl Crop WinWht/Soybeans	10230.91	4.44%
Peanuts	8137.08	3.53%
Fallow/Idle Cropland	1967.74	0.85%
Sod/Grass Seed	904.09	0.39%
Peas	633.68	0.27%
Sorghum	453.16	0.20%
Winter Wheat	364.13	0.16%
Developed/Open Space	278.67	0.12%
Shrubland	262.80	0.11%
Dry Beans	231.96	0.10%
Rye	208.43	0.09%
Grassland/Pasture	174.10	0.08%
Woody Wetlands	121.90	0.05%
Dbl Crop Soybeans/Oats	104.99	0.05%
Rice	96.50	0.04%
Evergreen Forest	95.44	0.04%
Millet	81.62	0.04%
Oats	67.51	0.03%
Sweet Potatoes	23.57	0.01%
Herbaceous Wetlands	18.40	0.01%
Tobacco	16.69	0.01%
Greens	13.85	0.01%
Developed/Low Intensity	8.91	0.00%
Canola	4.81	0.00%

2019

Crop	Total Acres	Percent Acreage
Soybeans	74701.02	32.41%
Corn	49069.81	21.29%
Cotton	47878.35	20.77%
Other Hay/Non Alfalfa	31082.31	13.49%
Fallow/Idle Cropland	11099.56	4.82%
Peanuts	5521.83	2.40%
Dbl Crop WinWht/Soybeans	3150.69	1.37%
Developed/Open Space	1192.21	0.52%
Sod/Grass Seed	1048.94	0.46%
Evergreen Forest	1022.53	0.44%
Peas	848.75	0.37%
Shrubland	706.16	0.31%
Woody Wetlands	671.78	0.29%
Sorghum	562.71	0.24%
Developed/Low Intensity	409.55	0.18%
Developed/Med Intensity	350.73	0.15%
Dbl Crop Soybeans/Oats	285.34	0.12%
Sweet Potatoes	278.37	0.12%
Developed/High Intensity	197.34	0.09%
Rye	158.88	0.07%
Rice	78.73	0.03%
Open Water	59.63	0.03%
Dbl Crop WinWht/Cotton	47.79	0.02%
Grassland/Pasture	29.85	0.01%
Winter Wheat	11.34	0.00%
Greens	6.18	0.00%
Herbaceous Wetlands	2.62	0.00%

2020

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	71104.27	30.85%
Corn	42180.45	18.30%
Cotton	33381.98	14.48%
Other Hay/Non Alfalfa	29836.51	12.95%
Soybeans	28409.45	12.33%
Dbl Crop WinWht/Soybeans	11596.07	5.03%
Peanuts	5923.74	2.57%
Developed/Open Space	1152.62	0.50%
Sod/Grass Seed	1072.87	0.47%
Woody Wetlands	1048.92	0.46%
Evergreen Forest	913.52	0.40%
Shrubland	811.03	0.35%
Peas	715.98	0.31%
Developed/Low Intensity	423.58	0.18%
Developed/Med Intensity	314.89	0.14%
Rye	281.99	0.12%
Winter Wheat	203.22	0.09%
Developed/High Intensity	198.01	0.09%
Dry Beans	158.70	0.07%
Dbl Crop Soybeans/Oats	143.82	0.06%
Dbl Crop WinWht/Sorghum	139.26	0.06%
Sorghum	93.05	0.04%
Cucumbers	90.57	0.04%
Oats	73.83	0.03%
Open Water	73.16	0.03%
Sweet Potatoes	50.39	0.02%
Barren	30.00	0.01%
Grassland/Pasture	25.43	0.01%
Triticale	16.02	0.01%
Millet	9.65	0.00%

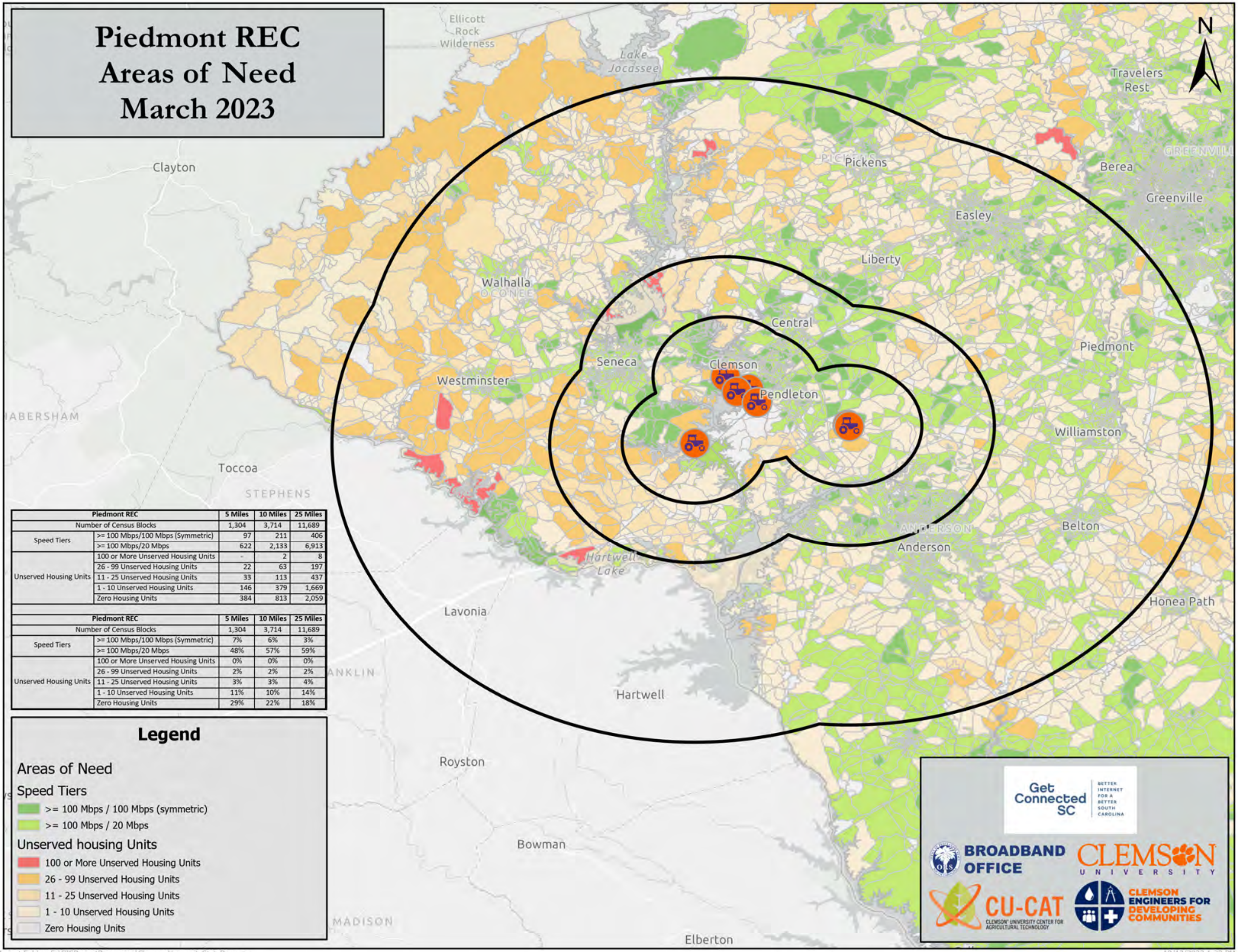
2021

Crop	Total Acres	Percent Acreage
Soybeans	75983.04	32.97%
Corn	52827.26	22.92%
Cotton	36186.29	15.70%
Other Hay/Non Alfalfa	30801.50	13.36%
Dbl Crop WinWht/Soybeans	14090.30	6.11%
Peanuts	6559.03	2.85%
Evergreen Forest	2639.54	1.15%
Developed/Open Space	1478.16	0.64%
Woody Wetlands	1458.37	0.63%
Sod/Grass Seed	1326.39	0.58%
Winter Wheat	1249.30	0.54%
Peas	1139.47	0.49%
Shrubland	867.90	0.38%
Developed/Med Intensity	658.29	0.29%
Sorghum	536.18	0.23%
Developed/Low Intensity	499.21	0.22%
Fallow/Idle Cropland	417.79	0.18%
Developed/High Intensity	346.89	0.15%
Dbl Crop Soybeans/Oats	233.61	0.10%
Rye	212.18	0.09%
Barley	202.14	0.09%
Dbl Crop WinWht/Sorghum	196.85	0.09%
Herbaceous Wetlands	137.09	0.06%
Cucumbers	121.85	0.05%
Open Water	66.16	0.03%
Grassland/Pasture	61.11	0.03%
Barren	58.56	0.03%
Millet	52.11	0.02%
Rice	51.53	0.02%
Cabbage	6.42	0.00%
Sweet Potatoes	5.93	0.00%
Oats	2.54	0.00%

2022

Crop	Total Acres	Percent Acreage
Soybeans	80895.67	35.10%
Cotton	48838.00	21.19%
Corn	38773.46	16.82%
Other Hay/Non Alfalfa	30473.75	13.22%
Dbl Crop WinWht/Soybeans	13136.66	5.70%
Peanuts	6662.28	2.89%
Evergreen Forest	2709.99	1.18%
Developed/Open Space	1640.75	0.71%
Woody Wetlands	1320.18	0.57%
Sod/Grass Seed	1266.32	0.55%
Shrubland	723.79	0.31%
Peas	653.13	0.28%
Developed/Med Intensity	652.32	0.28%
Sorghum	563.66	0.24%
Developed/Low Intensity	482.84	0.21%
Winter Wheat	375.75	0.16%
Developed/High Intensity	364.76	0.16%
Dbl Crop Soybeans/Oats	309.25	0.13%
Millet	127.65	0.06%
Dbl Crop WinWht/Sorghum	107.09	0.05%
Rye	82.72	0.04%
Open Water	76.80	0.03%
Grassland/Pasture	67.48	0.03%
Barren	63.41	0.03%
Rice	51.53	0.02%
Triticale	16.02	0.01%
Herbaceous Wetlands	13.30	0.01%
Fallow/Idle Cropland	12.81	0.01%
Dbl Crop WinWht/Corn	11.62	0.01%

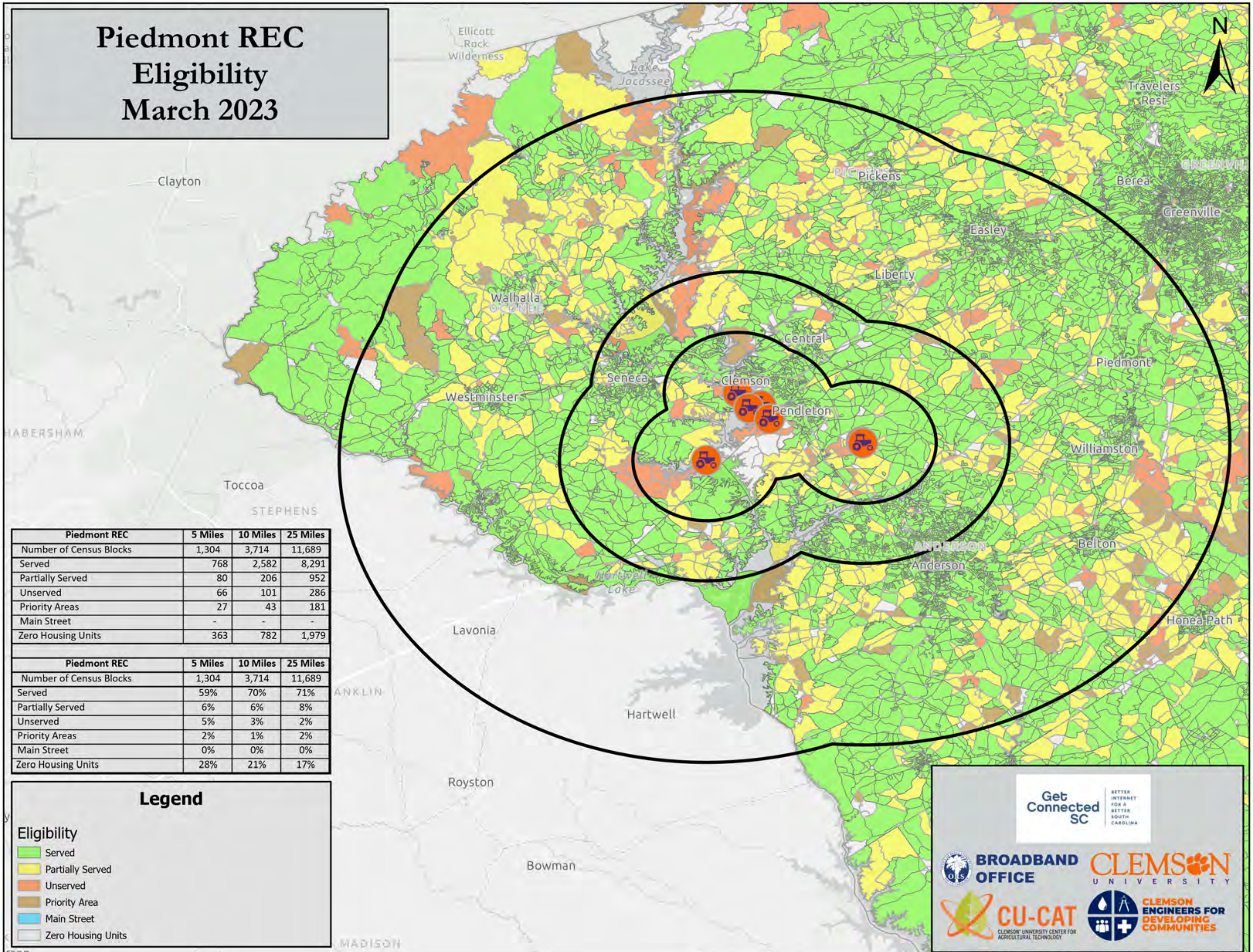
Piedmont REC Areas of Need March 2023



Piedmont REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		1,304	3,714	11,689
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	97	211	406
	>= 100 Mbps/20 Mbps	622	2,133	6,913
Unserved Housing Units	100 or More Unserved Housing Units	-	2	8
	26 - 99 Unserved Housing Units	22	63	197
	11 - 25 Unserved Housing Units	33	113	437
	1 - 10 Unserved Housing Units	146	379	1,669
	Zero Housing Units	384	813	2,059

Piedmont REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		1,304	3,714	11,689
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	7%	6%	3%
	>= 100 Mbps/20 Mbps	48%	57%	59%
Unserved Housing Units	100 or More Unserved Housing Units	0%	0%	0%
	26 - 99 Unserved Housing Units	2%	2%	2%
	11 - 25 Unserved Housing Units	3%	3%	4%
	1 - 10 Unserved Housing Units	11%	10%	14%
	Zero Housing Units	29%	22%	18%

Piedmont REC Eligibility March 2023



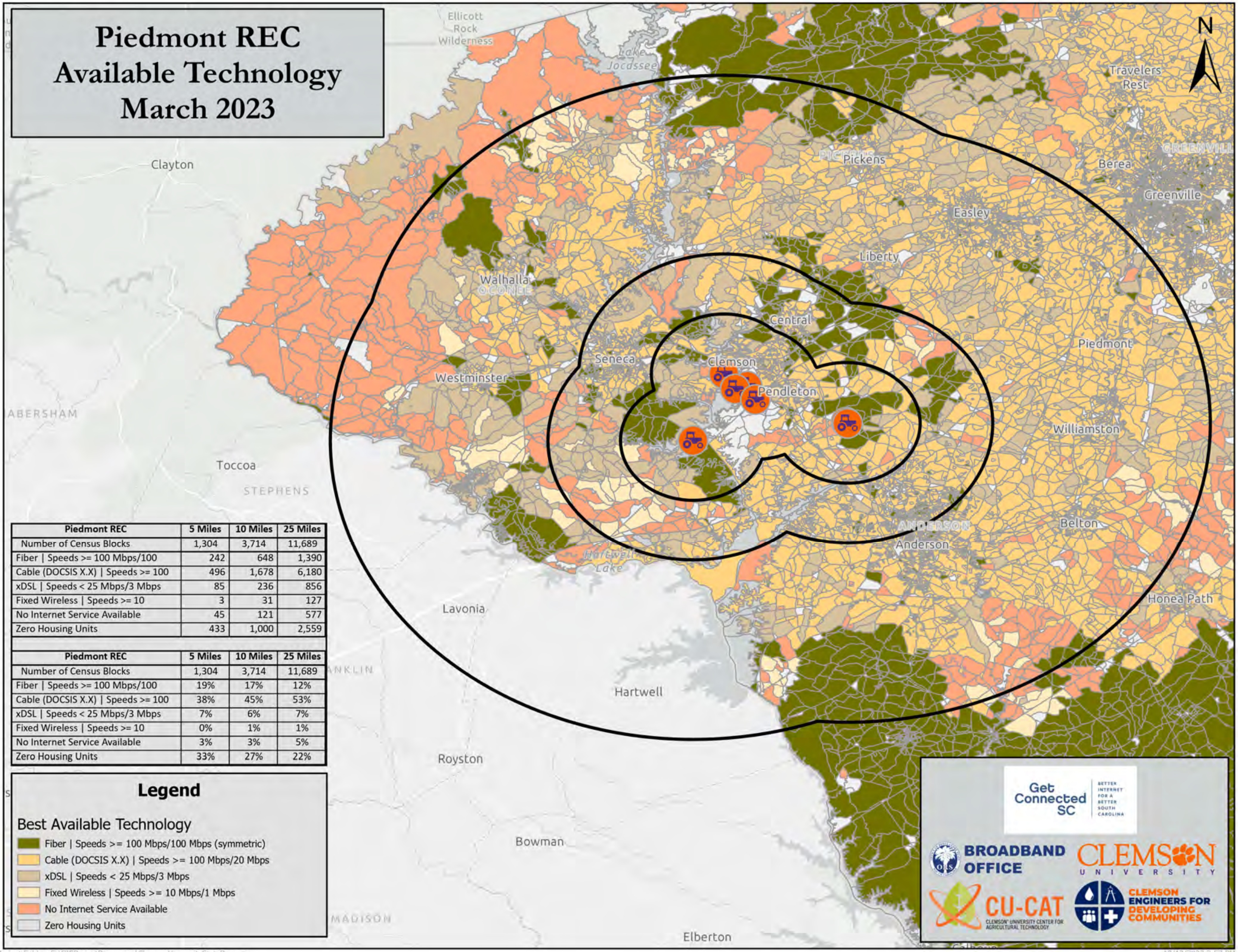
Piedmont REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	1,304	3,714	11,689
Served	768	2,582	8,291
Partially Served	80	206	952
Unserved	66	101	286
Priority Areas	27	43	181
Main Street	-	-	-
Zero Housing Units	363	782	1,979

Piedmont REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	1,304	3,714	11,689
Served	59%	70%	71%
Partially Served	6%	6%	8%
Unserved	5%	3%	2%
Priority Areas	2%	1%	2%
Main Street	0%	0%	0%
Zero Housing Units	28%	21%	17%

Legend

Eligibility
- Served
- Partially Served
- Unserved
- Priority Area
- Main Street
- Zero Housing Units

Piedmont REC Available Technology March 2023



Piedmont REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	1,304	3,714	11,689
Fiber | Speeds >= 100 Mbps/100	242	648	1,390
Cable (DOCSIS X.X) | Speeds >= 100	496	1,678	6,180
xDSL | Speeds < 25 Mbps/3 Mbps	85	236	856
Fixed Wireless | Speeds >= 10	3	31	127
No Internet Service Available	45	121	577
Zero Housing Units	433	1,000	2,559

Piedmont REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	1,304	3,714	11,689
Fiber | Speeds >= 100 Mbps/100	19%	17%	12%
Cable (DOCSIS X.X) | Speeds >= 100	38%	45%	53%
xDSL | Speeds < 25 Mbps/3 Mbps	7%	6%	7%
Fixed Wireless | Speeds >= 10	0%	1%	1%
No Internet Service Available	3%	3%	5%
Zero Housing Units	33%	27%	22%

Legend

Best Available Technology

- Fiber | Speeds >= 100 Mbps/100 Mbps (symmetric)
- Cable (DOCSIS X.X) | Speeds >= 100 Mbps/20 Mbps
- xDSL | Speeds < 25 Mbps/3 Mbps
- Fixed Wireless | Speeds >= 10 Mbps/1 Mbps
- No Internet Service Available
- Zero Housing Units

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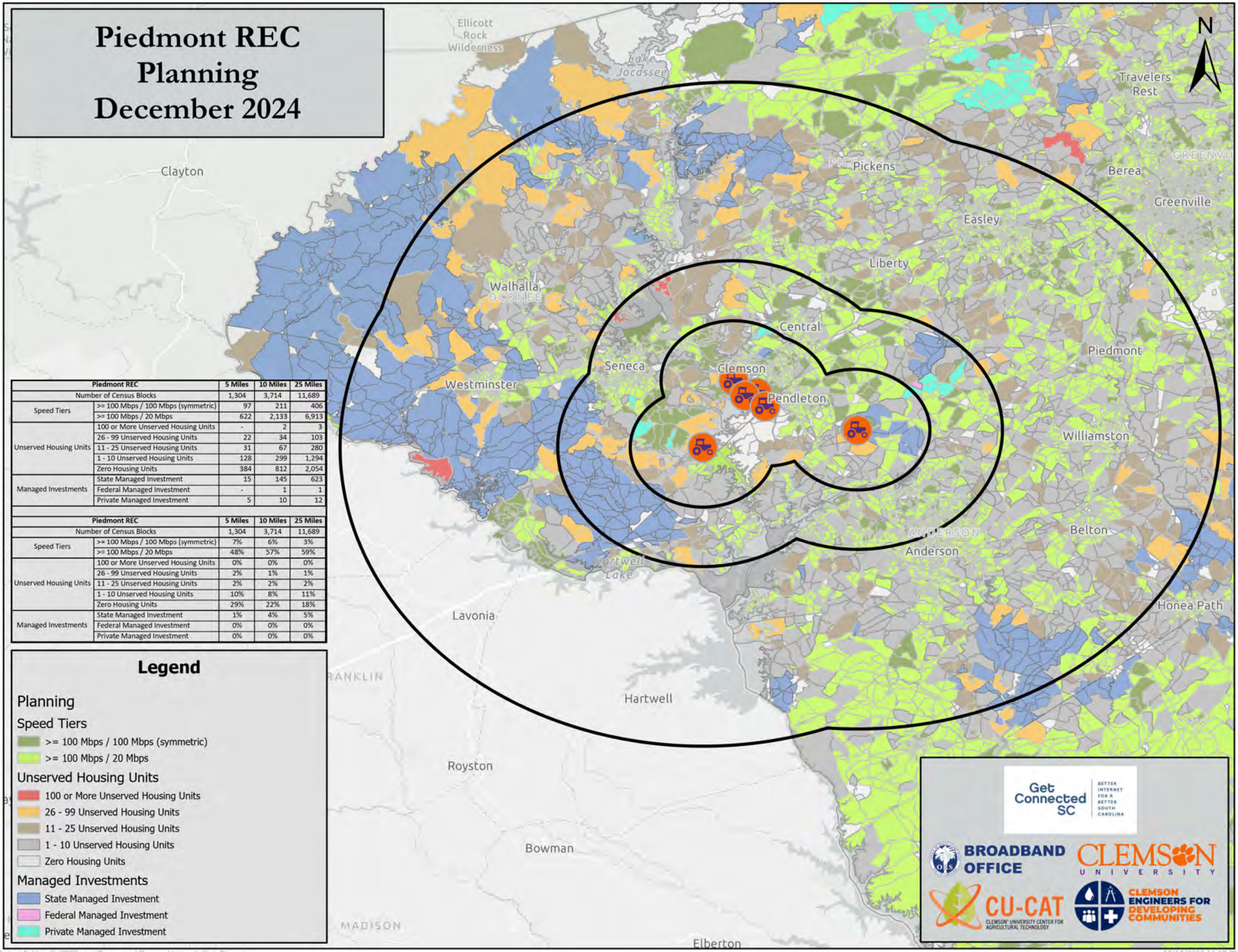
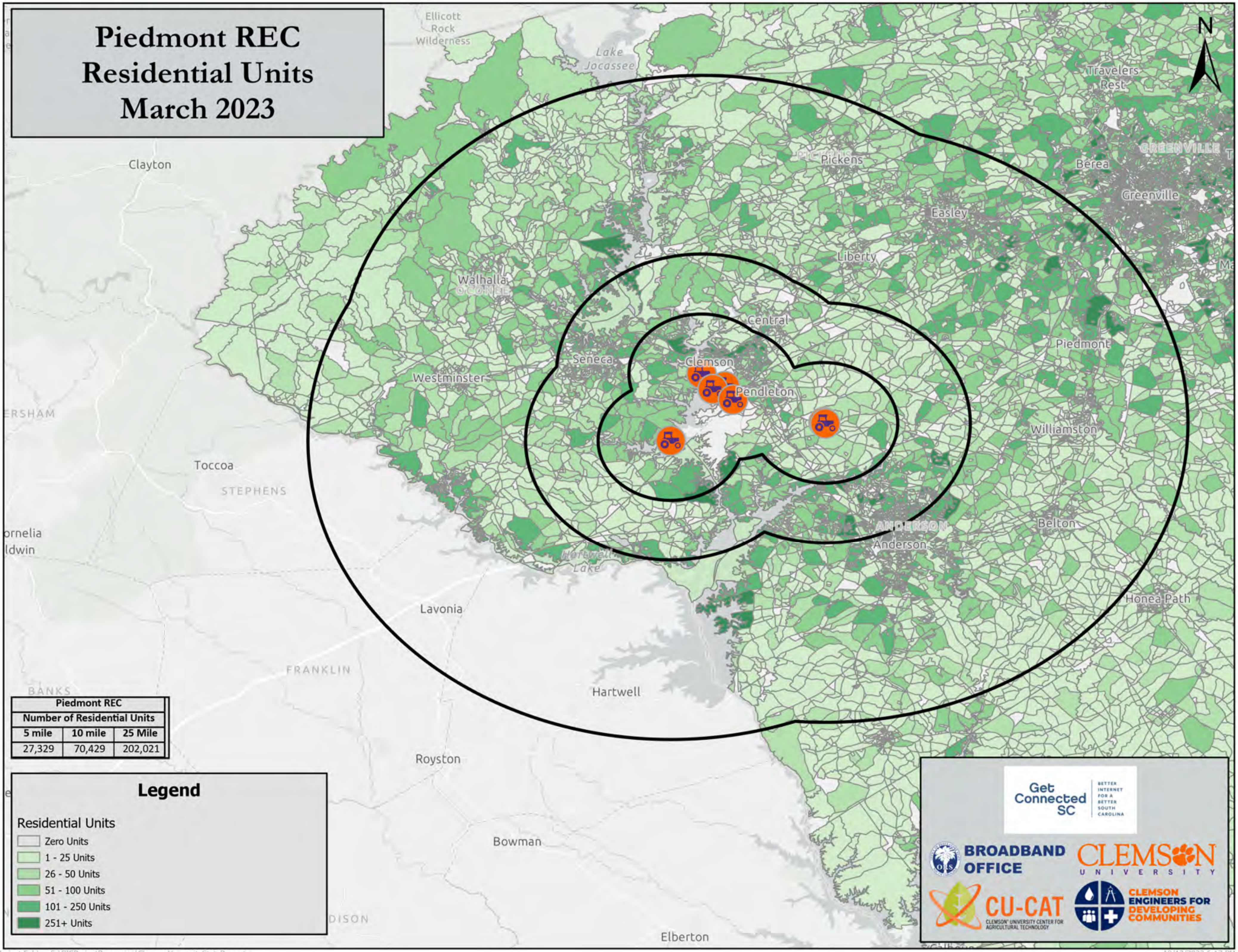
Piedmont REC Planning December 2024



Piedmont REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		1,304	3,714	11,689
Speed Tiers	>= 100 Mbps / 100 Mbps (symmetric)	97	211	406
	>= 100 Mbps / 20 Mbps	622	2,133	6,913
Unserved Housing Units	100 or More Unserved Housing Units	-	2	3
	26 - 99 Unserved Housing Units	22	34	103
	11 - 25 Unserved Housing Units	31	67	280
	1 - 10 Unserved Housing Units	128	299	1,294
	Zero Housing Units	384	812	2,054
Managed Investments	State Managed Investment	15	145	623
	Federal Managed Investment	-	1	1
	Private Managed Investment	5	10	12

Piedmont REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		1,304	3,714	11,689
Speed Tiers	>= 100 Mbps / 100 Mbps (symmetric)	7%	6%	3%
	>= 100 Mbps / 20 Mbps	48%	57%	59%
Unserved Housing Units	100 or More Unserved Housing Units	0%	0%	0%
	26 - 99 Unserved Housing Units	2%	1%	1%
	11 - 25 Unserved Housing Units	2%	2%	2%
	1 - 10 Unserved Housing Units	10%	8%	11%
	Zero Housing Units	29%	22%	18%
Managed Investments	State Managed Investment	1%	4%	5%
	Federal Managed Investment	0%	0%	0%
	Private Managed Investment	0%	0%	0%

Piedmont REC
Residential Units
March 2023



Piedmont REC		
Number of Residential Units		
5 mile	10 mile	25 Mile
27,329	70,429	202,021

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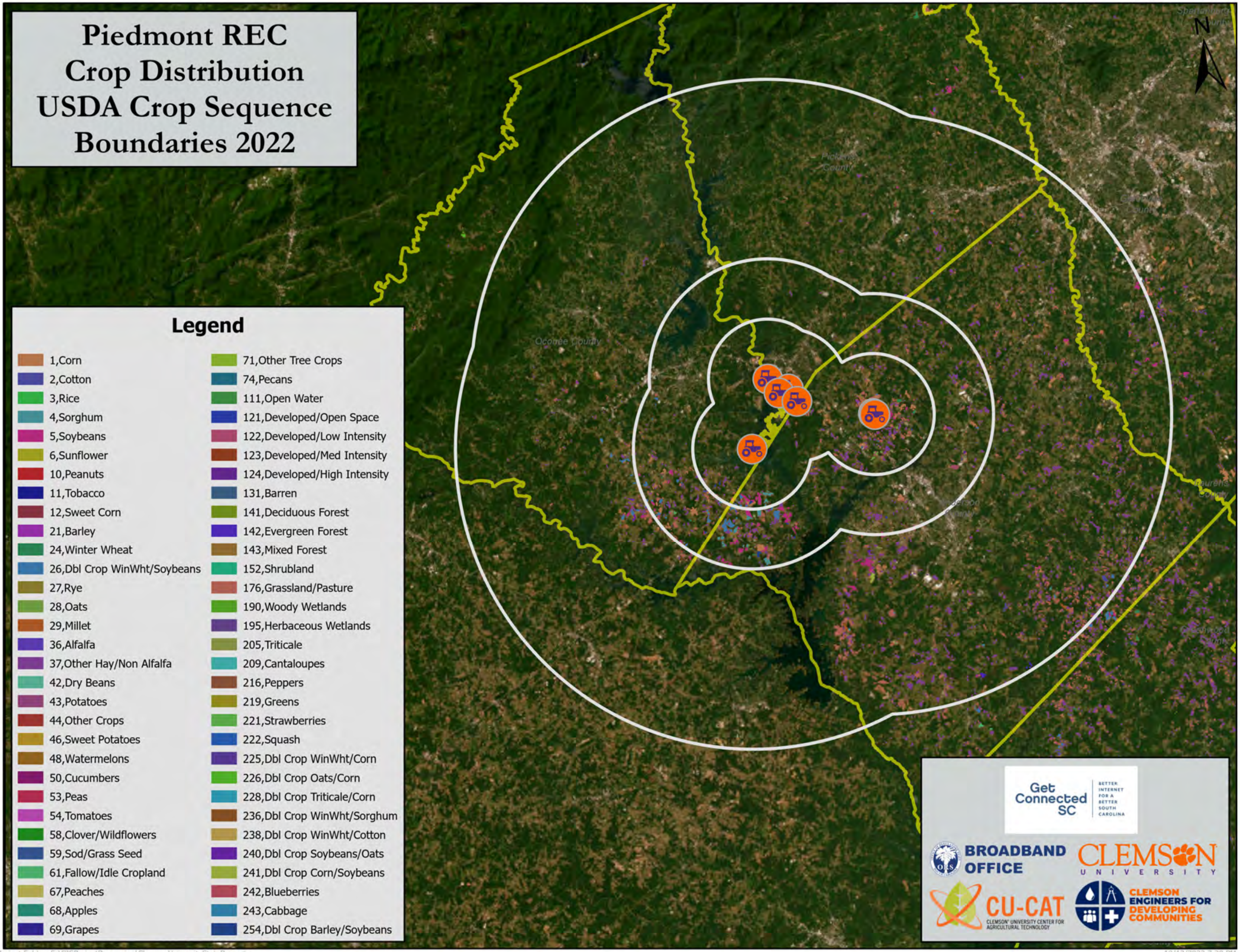

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Piedmont REC
5 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	547
Total Acreage of Bounderies	4838.8
Percent Crop Acreage in Buffer	5.11%

2015

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	1403.51	29.01%
Fallow/Idle Cropland	1252.28	25.88%
Grassland/Pasture	570.86	11.80%
Corn	519.05	10.73%
Soybeans	504.59	10.43%
Dbl Crop WinWht/Soybeans	337.71	6.98%
Winter Wheat	131.68	2.72%
Developed/Open Space	51.71	1.07%
Dbl Crop Barley/Soybeans	45.70	0.94%
Dbl Crop Soybeans/Oats	13.55	0.28%
Oats	7.85	0.16%

2016

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	1448.55	29.94%
Fallow/Idle Cropland	1027.14	21.23%
Soybeans	819.85	16.94%
Grassland/Pasture	611.23	12.63%
Corn	519.44	10.73%
Sorghum	182.37	3.77%
Winter Wheat	69.59	1.44%
Dbl Crop WinWht/Soybeans	66.28	1.37%
Developed/Open Space	56.72	1.17%
Millet	37.35	0.77%

2017

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	1831.62	37.85%
Fallow/Idle Cropland	949.26	19.62%
Soybeans	860.33	17.78%
Corn	396.42	8.19%
Grassland/Pasture	393.84	8.14%
Winter Wheat	180.69	3.73%
Dbl Crop WinWht/Soybeans	164.02	3.39%
Developed/Open Space	38.81	0.80%
Dbl Crop Barley/Soybeans	13.94	0.29%
Developed/Low Intensity	6.35	0.13%
Dbl Crop Barley/Corn	3.21	0.07%

2018

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	2152.49	44.48%
Corn	718.14	14.84%
Soybeans	589.36	12.18%
Fallow/Idle Cropland	482.87	9.98%
Dbl Crop WinWht/Soybeans	288.47	5.96%
Grassland/Pasture	256.03	5.29%
Winter Wheat	157.01	3.24%
Dbl Crop Barley/Soybeans	89.29	1.85%
Developed/Open Space	46.70	0.97%
Oats	40.27	0.83%
Sod/Grass Seed	8.00	0.17%
Barley	5.99	0.12%
Sorghum	3.87	0.08%

2019

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	2105.73	43.52%
Soybeans	943.02	19.49%
Grassland/Pasture	805.87	16.65%
Corn	628.25	12.98%
Fallow/Idle Cropland	162.76	3.36%
Dbl Crop WinWht/Soybeans	61.48	1.27%
Oats	44.58	0.92%
Sorghum	21.93	0.45%
Developed/Low Intensity	20.98	0.43%
Winter Wheat	16.44	0.34%
Developed/Open Space	14.55	0.30%
Developed/Med Intensity	7.15	0.15%
Dbl Crop WinWht/Sorghum	5.76	0.12%

2020

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	2175.34	44.96%
Grassland/Pasture	836.10	17.28%
Soybeans	514.99	10.64%
Corn	387.32	8.00%
Dbl Crop WinWht/Soybeans	302.64	6.25%
Sorghum	143.06	2.96%
Fallow/Idle Cropland	142.07	2.94%
Dbl Crop Barley/Soybeans	89.67	1.85%
Dbl Crop Oats/Corn	65.45	1.35%
Winter Wheat	62.15	1.28%
Oats	61.78	1.28%
Developed/Low Intensity	29.77	0.62%
Developed/Open Space	9.70	0.20%
Dbl Crop Soybeans/Oats	8.16	0.17%
Developed/Med Intensity	7.15	0.15%
Sod/Grass Seed	3.15	0.07%

2021

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	1761.54	36.40%
Grassland/Pasture	1047.00	21.64%
Corn	706.66	14.60%
Soybeans	499.70	10.33%
Sorghum	284.45	5.88%
Dbl Crop WinWht/Soybeans	188.14	3.89%
Developed/Low Intensity	82.14	1.70%
Winter Wheat	65.13	1.35%
Dbl Crop Soybeans/Oats	50.70	1.05%
Oats	34.99	0.72%
Sunflower	31.72	0.66%
Cotton	24.26	0.50%
Dbl Crop Oats/Corn	19.73	0.41%
Developed/Open Space	14.84	0.31%
Millet	11.21	0.23%
Developed/Med Intensity	7.09	0.15%
Developed/High Intensity	3.20	0.07%
Sod/Grass Seed	3.15	0.07%
Deciduous Forest	2.84	0.06%

2022

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	1698.21	35.10%
Grassland/Pasture	1370.61	28.33%
Corn	543.05	11.22%
Soybeans	500.58	10.35%
Sorghum	187.47	3.87%
Dbl Crop WinWht/Soybeans	124.59	2.57%
Oats	81.36	1.68%
Developed/Low Intensity	80.29	1.66%
Dbl Crop Barley/Soybeans	65.58	1.36%
Winter Wheat	60.69	1.25%
Rye	45.15	0.93%
Cotton	28.13	0.58%
Developed/Open Space	14.84	0.31%
Barren	13.80	0.29%
Alfalfa	10.71	0.22%
Developed/Med Intensity	7.09	0.15%
Developed/High Intensity	3.20	0.07%
Sod/Grass Seed	3.15	0.07%

Piedmont REC
10 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	1,444
Total Acreage of Bounderies	12,483.39
Percent Crop Acreage in Buffer	4.85%

2015		
Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	3967.89	31.79%
Fallow/Idle Cropland	2066.62	16.55%
Grassland/Pasture	1968.79	15.77%
Dbl Crop WinWht/Soybeans	1603.78	12.85%
Soybeans	1073.52	8.60%
Corn	985.77	7.90%
Dbl Crop Barley/Soybeans	286.66	2.30%
Developed/Open Space	171.92	1.38%
Winter Wheat	167.31	1.34%
Deciduous Forest	55.55	0.44%
Dbl Crop WinWht/Corn	52.09	0.42%
Barley	20.67	0.17%
Canola	15.27	0.12%
Dbl Crop Soybeans/Oats	13.55	0.11%
Developed/Low Intensity	12.32	0.10%
Oats	7.85	0.06%
Evergreen Forest	7.13	0.06%
Shrubland	6.70	0.05%

2016		
Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	4238.33	33.95%
Soybeans	2271.30	18.19%
Grassland/Pasture	1824.75	14.62%
Fallow/Idle Cropland	1612.28	12.92%
Corn	1078.98	8.64%
Dbl Crop WinWht/Soybeans	389.50	3.12%
Winter Wheat	365.46	2.93%
Sorghum	204.39	1.64%
Developed/Open Space	176.73	1.42%
Dbl Crop Barley/Soybeans	112.29	0.90%
Deciduous Forest	54.31	0.44%
Dbl Crop WinWht/Corn	39.33	0.32%
Millet	37.35	0.30%
Sunflower	33.26	0.27%
Barley	22.12	0.18%
Developed/Low Intensity	9.65	0.08%
Dbl Crop Soybeans/Oats	8.89	0.07%
Evergreen Forest	4.47	0.04%

2017		
Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	4946.97	39.63%
Soybeans	2509.90	20.11%
Fallow/Idle Cropland	1518.39	12.16%
Grassland/Pasture	1163.62	9.32%
Dbl Crop WinWht/Soybeans	828.55	6.64%
Corn	531.29	4.26%
Dbl Crop Barley/Soybeans	380.65	3.05%
Winter Wheat	303.48	2.43%
Developed/Open Space	129.72	1.04%
Dbl Crop Barley/Corn	80.63	0.65%
Deciduous Forest	40.91	0.33%
Dbl Crop WinWht/Corn	20.78	0.17%
Developed/Low Intensity	18.78	0.15%
Evergreen Forest	9.72	0.08%

2018		
Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	5989.76	47.98%
Soybeans	1772.65	14.20%
Corn	1306.02	10.46%
Dbl Crop WinWht/Soybeans	1148.02	9.20%
Fallow/Idle Cropland	876.95	7.02%
Grassland/Pasture	704.15	5.64%
Winter Wheat	284.85	2.28%
Dbl Crop Barley/Soybeans	144.30	1.16%
Developed/Open Space	106.87	0.86%
Deciduous Forest	43.60	0.35%
Oats	40.27	0.32%
Dbl Crop WinWht/Corn	20.78	0.17%
Evergreen Forest	20.45	0.16%
Sod/Grass Seed	8.00	0.06%
Developed/Low Intensity	6.87	0.06%
Barley	5.99	0.05%
Sorghum	3.87	0.03%

2019		
Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	5495.38	44.02%
Soybeans	2762.13	22.13%
Grassland/Pasture	1707.73	13.68%
Corn	1078.17	8.64%
Fallow/Idle Cropland	358.86	2.87%
Dbl Crop WinWht/Soybeans	262.81	2.11%
Sorghum	250.21	2.00%
Winter Wheat	136.17	1.09%
Dbl Crop Barley/Soybeans	131.96	1.06%
Developed/Open Space	68.55	0.55%
Developed/Low Intensity	54.98	0.44%
Oats	44.58	0.36%
Dbl Crop WinWht/Sorghum	39.53	0.32%
Sunflower	33.26	0.27%
Dbl Crop WinWht/Corn	29.31	0.23%
Alfalfa	13.62	0.11%
Developed/Med Intensity	7.15	0.06%
Developed/High Intensity	4.53	0.04%
Evergreen Forest	4.47	0.04%

2020		
Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	5815.33	46.58%
Soybeans	1555.97	12.46%
Grassland/Pasture	1519.74	12.17%
Corn	1126.71	9.03%
Dbl Crop WinWht/Soybeans	793.84	6.36%
Sorghum	420.79	3.37%
Fallow/Idle Cropland	357.43	2.86%
Winter Wheat	276.94	2.22%
Dbl Crop Barley/Soybeans	208.80	1.67%
Oats	110.57	0.89%
Dbl Crop WinWht/Sorghum	70.23	0.56%
Dbl Crop Oats/Corn	65.45	0.52%
Developed/Low Intensity	48.95	0.39%
Developed/Open Space	42.01	0.34%
Developed/Med Intensity	23.44	0.19%
Dbl Crop Soybeans/Oats	18.86	0.15%
Dbl Crop WinWht/Corn	16.08	0.13%
Millet	4.58	0.04%
Developed/High Intensity	4.53	0.04%
Sod/Grass Seed	3.15	0.03%

2021		
Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	4985.94	39.94%
Grassland/Pasture	2211.44	17.72%
Corn	1794.05	14.37%
Dbl Crop WinWht/Soybeans	1005.10	8.05%
Soybeans	984.80	7.89%
Sorghum	649.76	5.21%
Dbl Crop Barley/Soybeans	183.85	1.47%
Developed/Low Intensity	167.61	1.34%
Winter Wheat	166.57	1.33%
Developed/Open Space	66.77	0.53%
Dbl Crop Soybeans/Oats	50.70	0.41%
Oats	37.91	0.30%
Sunflower	31.72	0.25%
Fallow/Idle Cropland	24.70	0.20%
Cotton	24.26	0.19%
Developed/High Intensity	24.02	0.19%
Millet	20.86	0.17%
Dbl Crop Oats/Corn	19.73	0.16%
Alfalfa	13.62	0.11%
Developed/Med Intensity	10.30	0.08%
Dbl Crop WinWht/Sorghum	3.69	0.03%
Sod/Grass Seed	3.15	0.03%
Deciduous Forest	2.84	0.02%

2022		
Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	4666.08	37.38%
Grassland/Pasture	2783.77	22.30%
Soybeans	1384.23	11.09%
Corn	1310.11	10.49%
Dbl Crop WinWht/Soybeans	887.14	7.11%
Sorghum	597.01	4.78%
Developed/Low Intensity	165.76	1.33%
Dbl Crop Barley/Soybeans	140.29	1.12%
Oats	115.15	0.92%
Winter Wheat	108.95	0.87%
Rye	87.15	0.70%
Developed/Open Space	69.99	0.56%
Cotton	64.71	0.52%
Developed/High Intensity	24.02	0.19%
Fallow/Idle Cropland	19.80	0.16%
Barren	16.88	0.14%
Barley	11.35	0.09%
Alfalfa	10.71	0.09%
Developed/Med Intensity	10.30	0.08%
Dbl Crop WinWht/Corn	6.85	0.05%
Sod/Grass Seed	3.15	0.03%

Piedmont REC
25 Mile Buffer

Crop Acreage by Year

Number of Crop Bounderies	3,856
Total Acreage of Bounderies	31,099.43
Percent Crop Acreage in Buffer	2.72%

2015

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	12444.24	40.01%
Grassland/Pasture	6579.79	21.16%
Fallow/Idle Cropland	4385.36	14.10%
Dbl Crop WinWht/Soybeans	2514.01	8.08%
Soybeans	1398.28	4.50%
Corn	1282.30	4.12%
Winter Wheat	1144.65	3.68%
Dbl Crop Barley/Soybeans	364.56	1.17%
Developed/Open Space	361.77	1.16%
Deciduous Forest	185.77	0.60%
Cotton	82.41	0.27%
Dbl Crop WinWht/Corn	80.80	0.26%
Evergreen Forest	75.23	0.24%
Barren	64.08	0.21%
Developed/Low Intensity	34.57	0.11%
Barley	20.67	0.07%
Sorghum	20.60	0.07%
Canola	15.27	0.05%
Dbl Crop Soybeans/Oats	13.55	0.04%
Shrubland	10.99	0.04%
Oats	7.85	0.03%
Dbl Crop WinWht/Sorghum	4.80	0.02%
Sod/Grass Seed	4.72	0.02%
Millet	3.15	0.01%

2016

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	13552.71	43.58%
Grassland/Pasture	5840.08	18.78%
Fallow/Idle Cropland	4194.58	13.49%
Soybeans	2843.23	9.14%
Corn	1373.89	4.42%
Winter Wheat	1151.15	3.70%
Dbl Crop WinWht/Soybeans	836.62	2.69%
Developed/Open Space	349.89	1.13%
Sorghum	230.15	0.74%
Evergreen Forest	149.98	0.48%
Dbl Crop Barley/Soybeans	133.28	0.43%
Dbl Crop WinWht/Sorghum	105.22	0.34%
Deciduous Forest	87.41	0.28%
Dbl Crop WinWht/Corn	73.53	0.24%
Developed/Low Intensity	40.84	0.13%
Millet	37.35	0.12%
Sunflower	33.26	0.11%
Barley	29.94	0.10%
Shrubland	18.16	0.06%
Dbl Crop Soybeans/Oats	8.89	0.03%
Barren	5.99	0.02%
Cotton	3.30	0.01%

2017

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	16513.22	53.10%
Soybeans	3824.16	12.30%
Fallow/Idle Cropland	3469.74	11.16%
Grassland/Pasture	3097.57	9.96%
Dbl Crop WinWht/Soybeans	1497.91	4.82%
Corn	814.93	2.62%
Winter Wheat	536.38	1.72%
Dbl Crop Barley/Soybeans	408.83	1.31%
Developed/Open Space	286.99	0.92%
Evergreen Forest	167.42	0.54%
Dbl Crop WinWht/Sorghum	117.67	0.38%
Sorghum	103.05	0.33%
Dbl Crop Barley/Corn	80.63	0.26%
Deciduous Forest	71.35	0.23%
Cotton	39.19	0.13%
Developed/Low Intensity	35.03	0.11%
Dbl Crop WinWht/Corn	20.78	0.07%
Barren	9.92	0.03%
Alfalfa	4.67	0.02%

2018

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	18382.62	59.11%
Soybeans	3433.92	11.04%
Fallow/Idle Cropland	2624.40	8.44%
Grassland/Pasture	1816.42	5.84%
Dbl Crop WinWht/Soybeans	1568.45	5.04%
Corn	1472.15	4.73%
Winter Wheat	661.64	2.13%
Sorghum	270.60	0.87%
Developed/Open Space	250.17	0.80%
Deciduous Forest	168.45	0.54%
Dbl Crop Barley/Soybeans	144.30	0.46%
Evergreen Forest	86.96	0.28%
Dbl Crop WinWht/Sorghum	68.18	0.22%
Oats	54.72	0.18%
Barren	37.16	0.12%
Dbl Crop WinWht/Corn	20.78	0.07%
Developed/Low Intensity	15.14	0.05%
Sod/Grass Seed	12.72	0.04%
Barley	5.99	0.02%
Alfalfa	4.67	0.02%

2019

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	17420.81	56.02%
Soybeans	4370.14	14.05%
Grassland/Pasture	3767.64	12.11%
Fallow/Idle Cropland	1783.20	5.73%
Corn	1357.29	4.36%
Dbl Crop WinWht/Soybeans	560.66	1.80%
Sorghum	468.77	1.51%
Winter Wheat	289.66	0.93%
Dbl Crop WinWht/Sorghum	202.33	0.65%
Evergreen Forest	176.33	0.57%
Developed/Open Space	143.32	0.46%
Dbl Crop Barley/Soybeans	131.96	0.42%
Developed/Low Intensity	91.83	0.30%
Oats	88.84	0.29%
Deciduous Forest	85.73	0.28%
Sunflower	33.26	0.11%
Dbl Crop Soybeans/Oats	33.25	0.11%
Dbl Crop WinWht/Corn	29.31	0.09%
Developed/Med Intensity	20.82	0.07%
Alfalfa	18.29	0.06%
Developed/High Intensity	16.76	0.05%
Apples	6.18	0.02%
Barren	3.07	0.01%

2020

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	18757.41	60.31%
Grassland/Pasture	3233.86	10.40%
Soybeans	2118.22	6.81%
Corn	1573.66	5.06%
Dbl Crop WinWht/Soybeans	1459.66	4.69%
Fallow/Idle Cropland	1159.44	3.73%
Sorghum	654.97	2.11%
Winter Wheat	399.33	1.28%
Dbl Crop WinWht/Sorghum	324.46	1.04%
Dbl Crop Barley/Soybeans	272.32	0.88%
Oats	179.34	0.58%
Millet	167.28	0.54%
Developed/Low Intensity	125.93	0.40%
Developed/Open Space	105.34	0.34%
Evergreen Forest	86.60	0.28%
Deciduous Forest	75.87	0.24%
Dbl Crop Soybeans/Oats	70.62	0.23%
Rye	65.59	0.21%
Dbl Crop Oats/Corn	65.45	0.21%
Mixed Forest	59.14	0.19%
Cotton	47.70	0.15%
Developed/Med Intensity	37.11	0.12%
Developed/High Intensity	16.76	0.05%
Dbl Crop WinWht/Corn	16.08	0.05%
Alfalfa	13.23	0.04%
Sod/Grass Seed	7.87	0.03%
Apples	6.18	0.02%

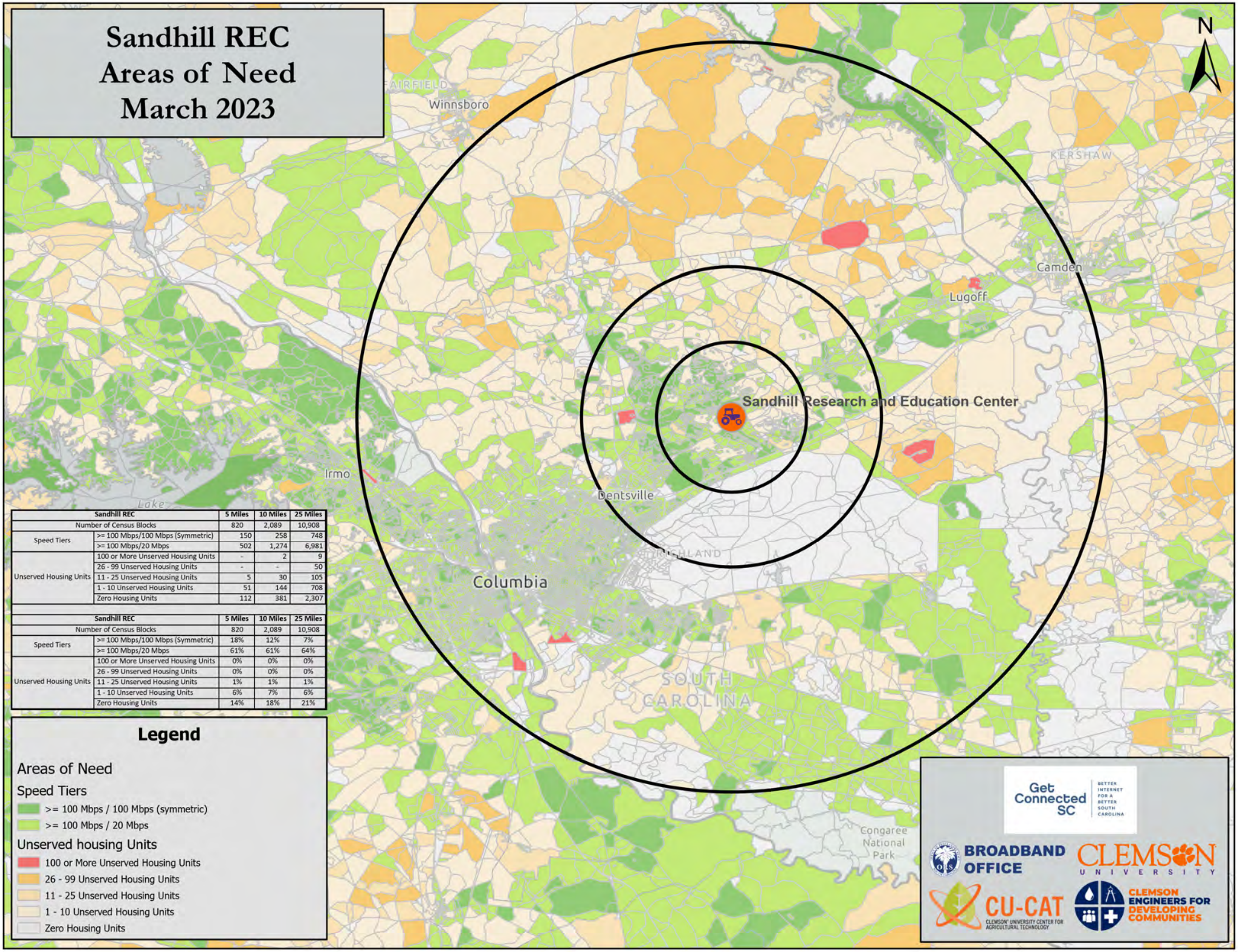
2021

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	15550.01	50.00%
Grassland/Pasture	6788.97	21.83%
Corn	2453.85	7.89%
Soybeans	1851.01	5.95%
Dbl Crop WinWht/Soybeans	1791.35	5.76%
Sorghum	686.77	2.21%
Triticale	474.27	1.52%
Developed/Low Intensity	256.16	0.82%
Winter Wheat	224.39	0.72%
Dbl Crop Barley/Soybeans	186.72	0.60%
Developed/Open Space	143.54	0.46%
Evergreen Forest	129.06	0.41%
Dbl Crop Soybeans/Oats	98.62	0.32%
Oats	54.43	0.18%
Deciduous Forest	53.69	0.17%
Fallow/Idle Cropland	46.69	0.15%
Developed/High Intensity	45.98	0.15%
Rye	40.13	0.13%
Dbl Crop WinWht/Sorghum	37.72	0.12%
Developed/Med Intensity	32.96	0.11%
Sunflower	31.72	0.10%
Millet	27.96	0.09%
Cotton	24.26	0.08%
Mixed Forest	23.29	0.07%
Dbl Crop Oats/Corn	19.73	0.06%
Alfalfa	18.29	0.06%
Sod/Grass Seed	7.87	0.03%

2022

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	14898.45	47.91%
Grassland/Pasture	8601.48	27.66%
Soybeans	2161.54	6.95%
Corn	1753.04	5.64%
Dbl Crop WinWht/Soybeans	1210.97	3.89%
Sorghum	633.26	2.04%
Developed/Low Intensity	250.73	0.81%
Cotton	194.37	0.62%
Oats	161.24	0.52%
Dbl Crop Barley/Soybeans	140.29	0.45%
Developed/Open Space	135.99	0.44%
Evergreen Forest	135.52	0.44%
Winter Wheat	134.72	0.43%
Dbl Crop Soybeans/Oats	121.57	0.39%
Millet	110.44	0.36%
Dbl Crop Corn/Soybeans	90.70	0.29%
Rye	87.15	0.28%
Dbl Crop WinWht/Sorghum	50.72	0.16%
Developed/High Intensity	45.98	0.15%
Deciduous Forest	44.57	0.14%
Developed/Med Intensity	32.96	0.11%
Fallow/Idle Cropland	25.92	0.08%
Barren	16.88	0.05%
Alfalfa	13.62	0.04%
Dbl Crop Triticale/Corn	12.16	0.04%
Barley	11.35	0.04%
Mixed Forest	9.07	0.03%
Sod/Grass Seed	7.87	0.03%
Dbl Crop WinWht/Corn	6.85	0.02%

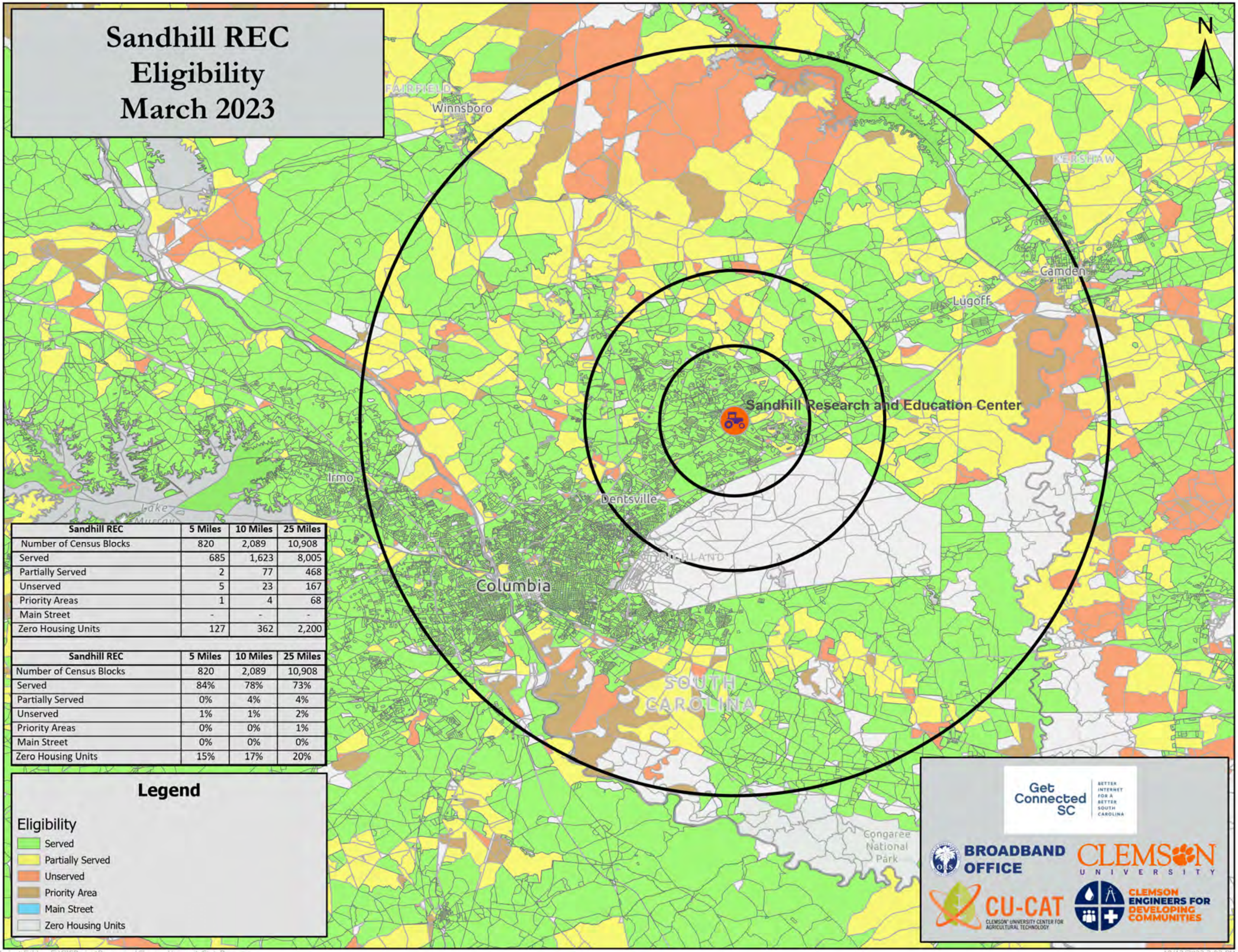
Sandhill REC
Areas of Need
March 2023



Sandhill REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		820	2,089	10,908
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	150	258	748
	>= 100 Mbps/20 Mbps	502	1,274	6,981
Unserved Housing Units	100 or More Unserved Housing Units	-	2	9
	26 - 99 Unserved Housing Units	-	-	50
	11 - 25 Unserved Housing Units	5	30	105
	1 - 10 Unserved Housing Units	51	144	708
	Zero Housing Units	112	381	2,307

Sandhill REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		820	2,089	10,908
Speed Tiers	>= 100 Mbps/100 Mbps (Symmetric)	18%	12%	7%
	>= 100 Mbps/20 Mbps	61%	61%	64%
Unserved Housing Units	100 or More Unserved Housing Units	0%	0%	0%
	26 - 99 Unserved Housing Units	0%	0%	0%
	11 - 25 Unserved Housing Units	1%	1%	1%
	1 - 10 Unserved Housing Units	6%	7%	6%
	Zero Housing Units	14%	18%	21%

Sandhill REC Eligibility March 2023



Sandhill REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	820	2,089	10,908
Served	685	1,623	8,005
Partially Served	2	77	468
Unserved	5	23	167
Priority Areas	1	4	68
Main Street	-	-	-
Zero Housing Units	127	362	2,200

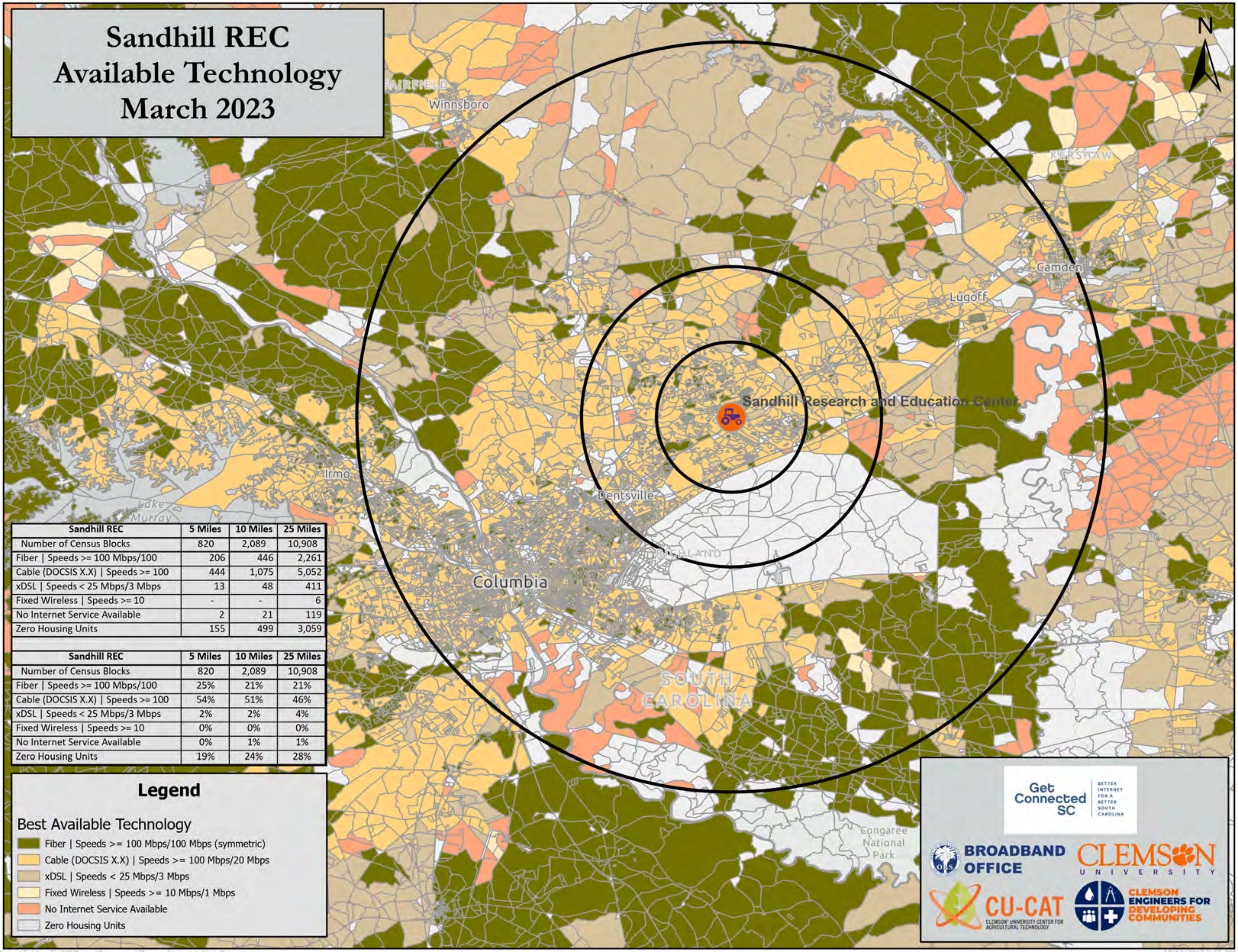
Sandhill REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	820	2,089	10,908
Served	84%	78%	73%
Partially Served	0%	4%	4%
Unserved	1%	1%	2%
Priority Areas	0%	0%	1%
Main Street	0%	0%	0%
Zero Housing Units	15%	17%	20%

Legend

Eligibility

- Served
- Partially Served
- Unserved
- Priority Area
- Main Street
- Zero Housing Units

Sandhill REC
Available Technology
March 2023



Sandhill REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	820	2,089	10,908
Fiber | Speeds >= 100 Mbps/100	206	446	2,261
Cable (DOCSIS X.X) | Speeds >= 100	444	1,075	5,052
xDSL | Speeds < 25 Mbps/3 Mbps	13	48	411
Fixed Wireless | Speeds >= 10	-	-	6
No Internet Service Available	2	21	119
Zero Housing Units	155	499	3,059

Sandhill REC	5 Miles	10 Miles	25 Miles
Number of Census Blocks	820	2,089	10,908
Fiber | Speeds >= 100 Mbps/100	25%	21%	21%
Cable (DOCSIS X.X) | Speeds >= 100	54%	51%	46%
xDSL | Speeds < 25 Mbps/3 Mbps	2%	2%	4%
Fixed Wireless | Speeds >= 10	0%	0%	0%
No Internet Service Available	0%	1%	1%
Zero Housing Units	19%	24%	28%

Legend

Best Available Technology

- Fiber | Speeds >= 100 Mbps/100 Mbps (symmetric)
- Cable (DOCSIS X.X) | Speeds >= 100 Mbps/20 Mbps
- xDSL | Speeds < 25 Mbps/3 Mbps
- Fixed Wireless | Speeds >= 10 Mbps/1 Mbps
- No Internet Service Available
- Zero Housing Units

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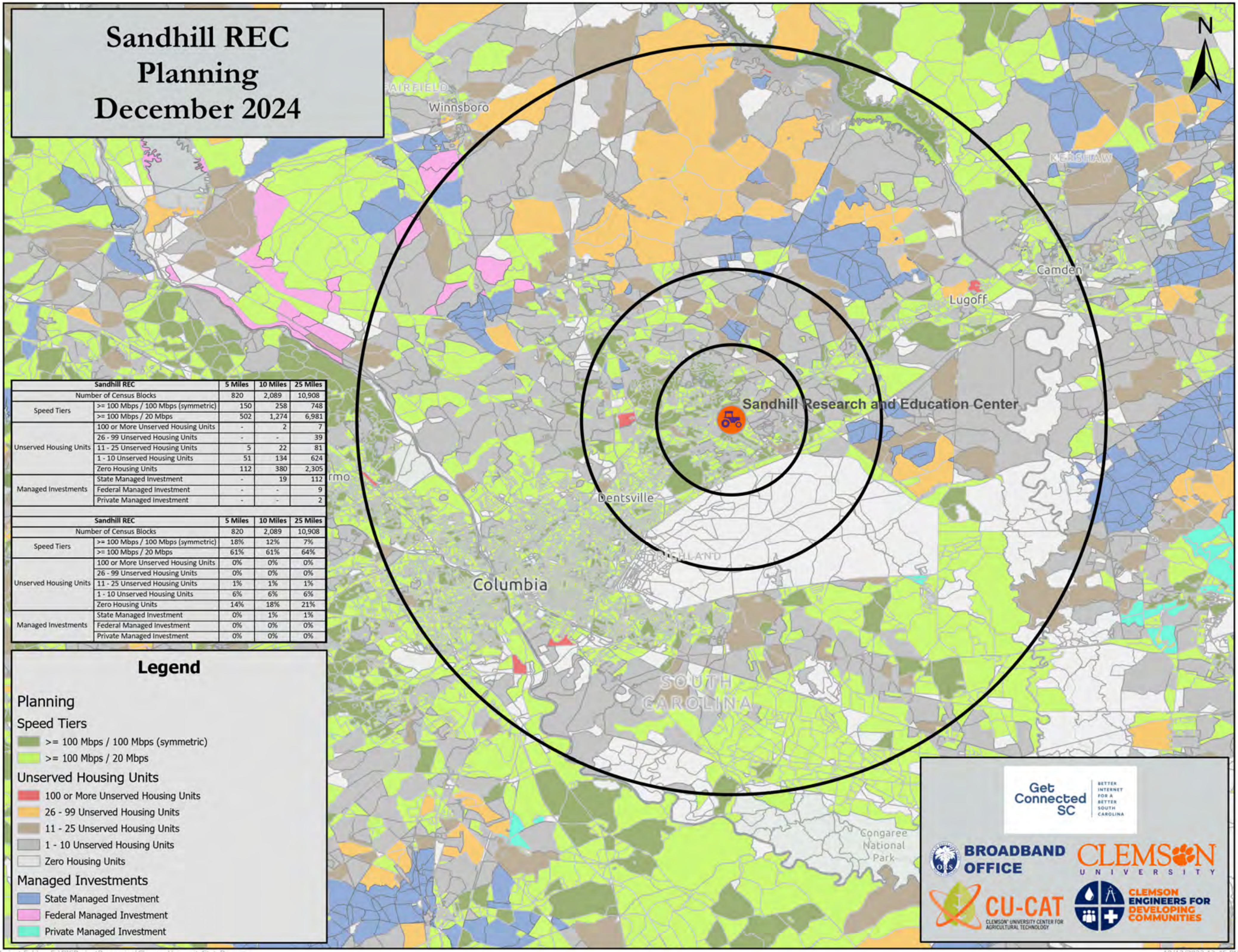
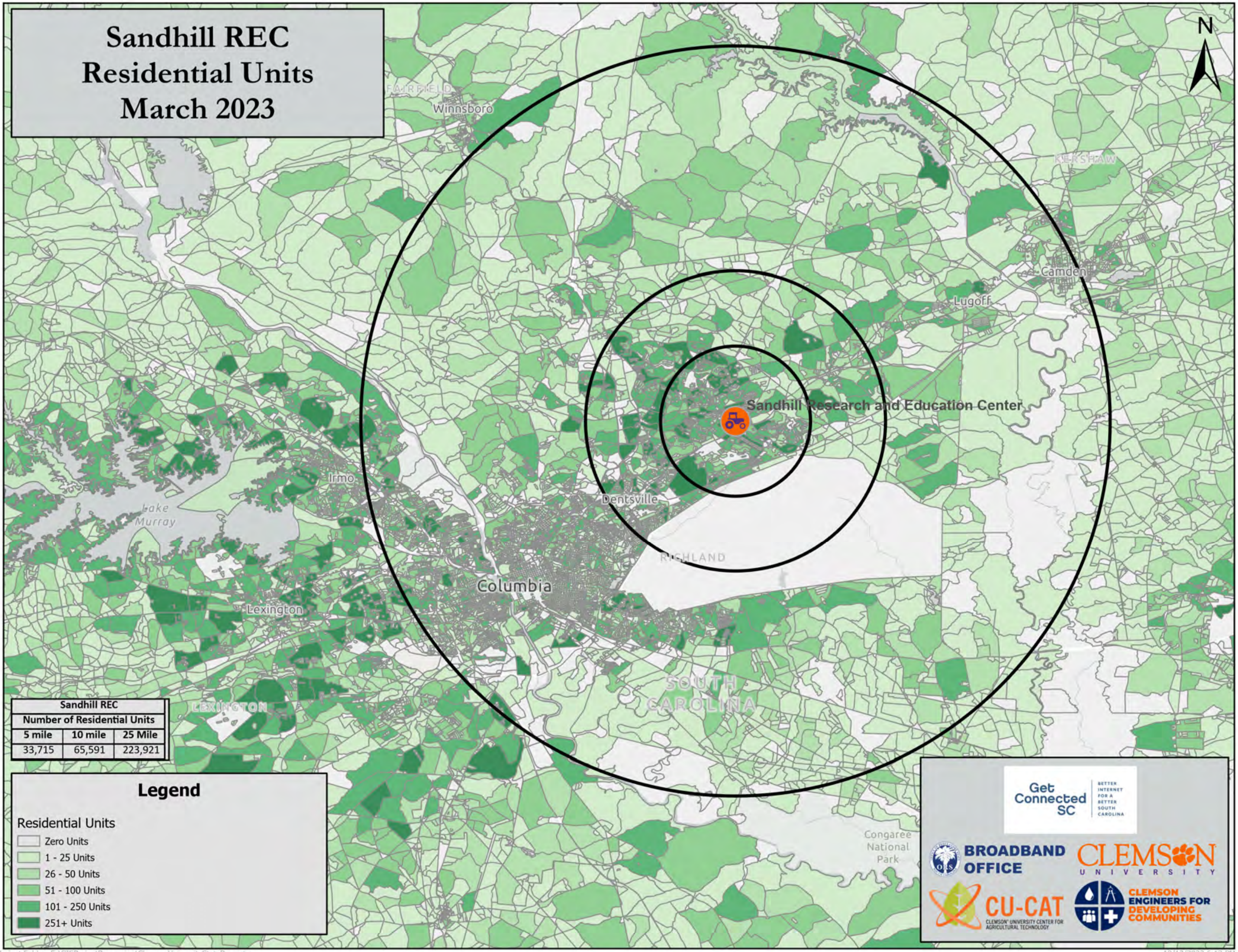
Sandhill REC Planning December 2024



Sandhill REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		820	2,089	10,908
Speed Tiers	>= 100 Mbps / 100 Mbps (symmetric)	150	258	748
	>= 100 Mbps / 20 Mbps	502	1,274	6,981
Unserved Housing Units	100 or More Unserved Housing Units	-	2	7
	26 - 99 Unserved Housing Units	-	-	39
	11 - 25 Unserved Housing Units	5	22	81
	1 - 10 Unserved Housing Units	51	134	624
	Zero Housing Units	112	380	2,305
Managed Investments	State Managed Investment	-	19	112
	Federal Managed Investment	-	-	9
	Private Managed Investment	-	-	2

Sandhill REC		5 Miles	10 Miles	25 Miles
Number of Census Blocks		820	2,089	10,908
Speed Tiers	>= 100 Mbps / 100 Mbps (symmetric)	18%	12%	7%
	>= 100 Mbps / 20 Mbps	61%	61%	64%
Unserved Housing Units	100 or More Unserved Housing Units	0%	0%	0%
	26 - 99 Unserved Housing Units	0%	0%	0%
	11 - 25 Unserved Housing Units	1%	1%	1%
	1 - 10 Unserved Housing Units	6%	6%	6%
	Zero Housing Units	14%	18%	21%
Managed Investments	State Managed Investment	0%	1%	1%
	Federal Managed Investment	0%	0%	0%
	Private Managed Investment	0%	0%	0%



Sandhill REC		
Number of Residential Units		
5 mile	10 mile	25 Mile
33,715	65,591	223,921

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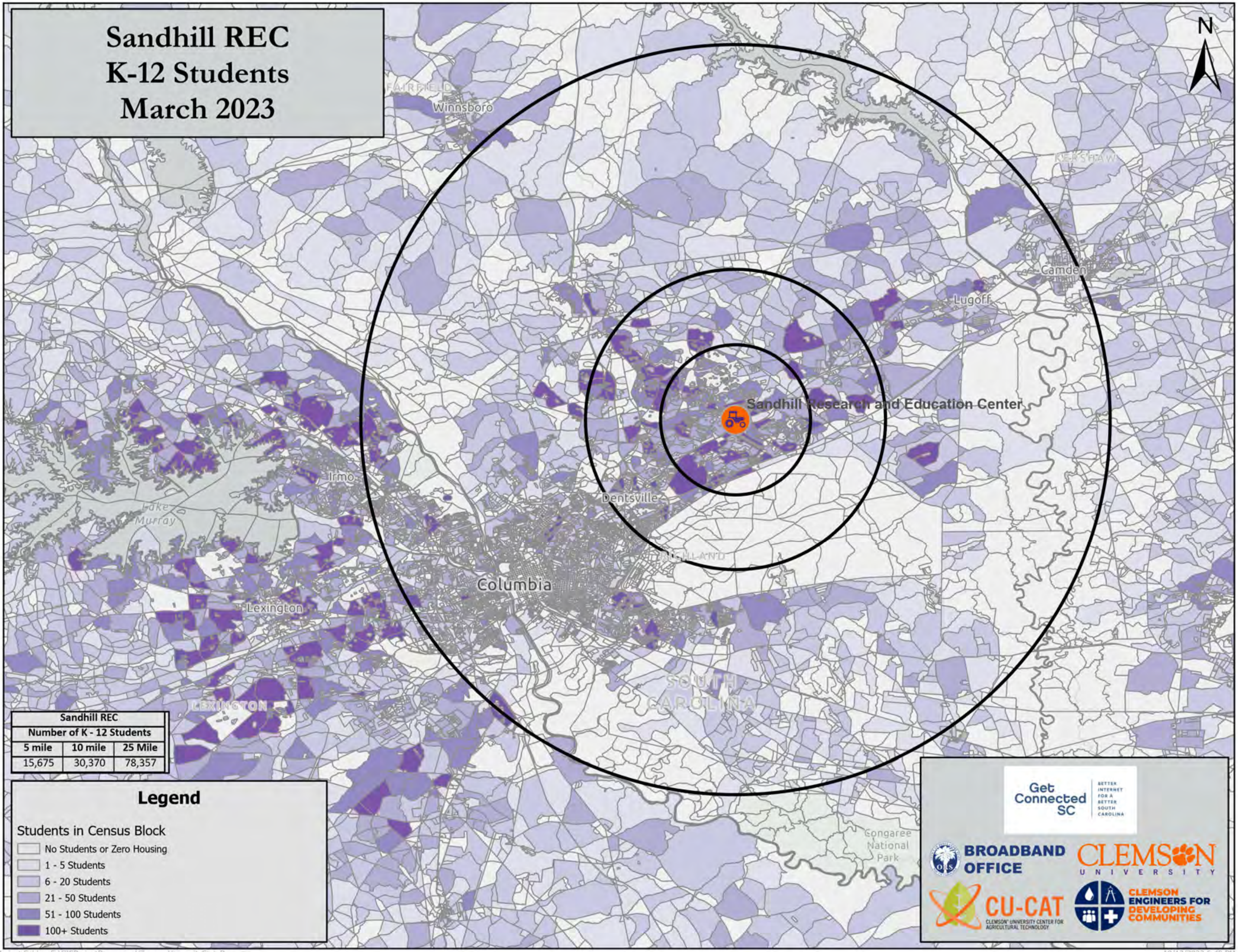
Sandhill REC
K-12 Students
March 2023



Sandhill REC		
Number of K - 12 Students		
5 mile	10 mile	25 Mile
15,675	30,370	78,357

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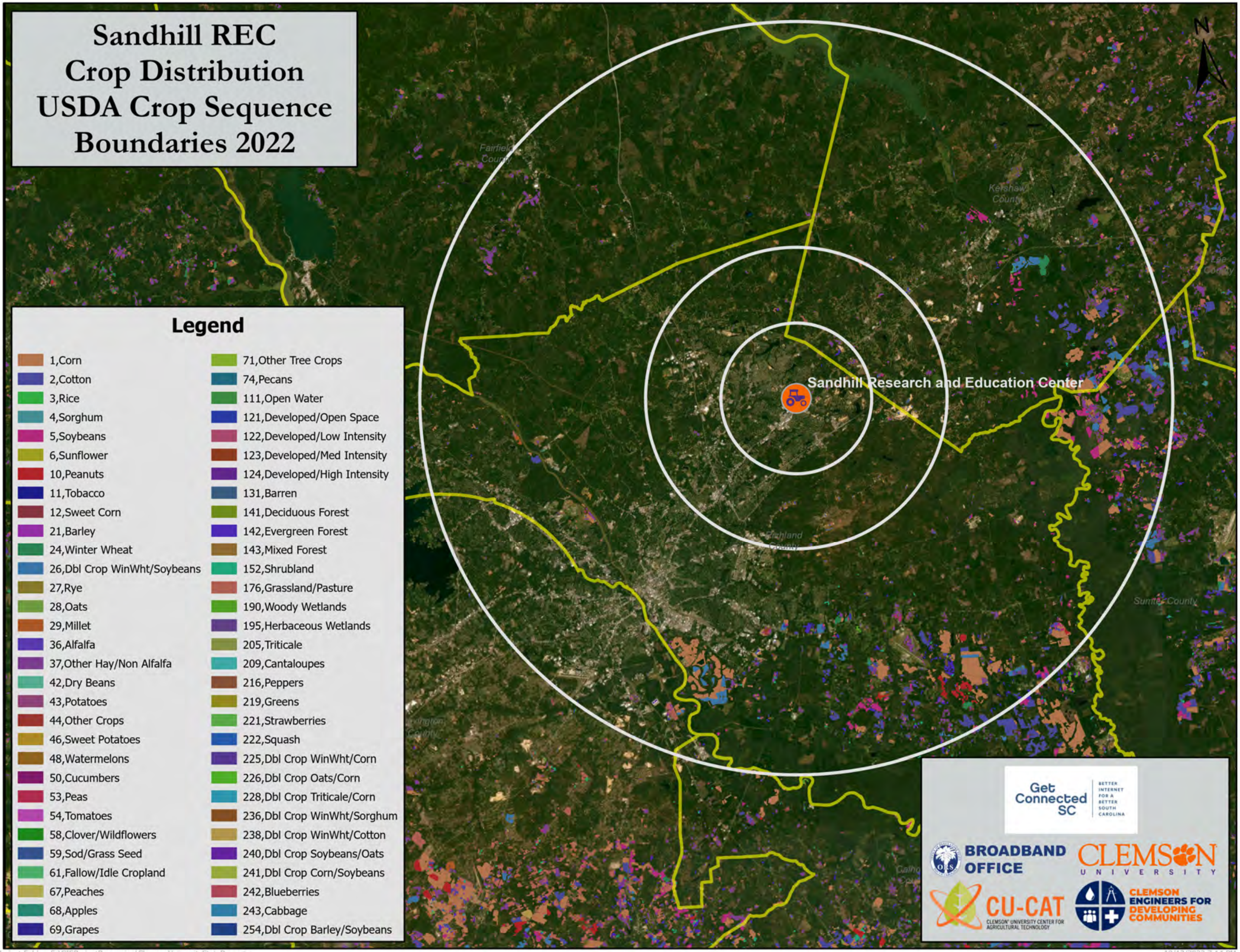

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Sandhill REC
5 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	40
Total Acreage of Bounderies	220.45
Percent Crop Acreage in Buffer	0.44%

2015

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	95.15	43.16%
Other Hay/Non Alfalfa	61.73	28.00%
Grassland/Pasture	16.83	7.64%
Cotton	15.30	6.94%
Soybeans	10.05	4.56%
Corn	8.79	3.99%
Dbl Crop WinWht/Soybeans	8.73	3.96%
Developed/Open Space	3.87	1.75%

2016

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	107.20	48.63%
Grassland/Pasture	49.71	22.55%
Other Hay/Non Alfalfa	34.52	15.66%
Soybeans	11.50	5.22%
Winter Wheat	6.09	2.76%
Cotton	4.91	2.23%
Developed/Open Space	3.87	1.75%
Corn	2.65	1.20%

2017

Crop	Total Acres	Percent Acreage
Corn	65.65	29.78%
Fallow/Idle Cropland	58.39	26.48%
Other Hay/Non Alfalfa	50.92	23.10%
Grassland/Pasture	22.05	10.00%
Cotton	13.65	6.19%
Sod/Grass Seed	7.11	3.23%
Soybeans	2.69	1.22%

2018

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	104.30	47.31%
Corn	56.96	25.84%
Soybeans	29.70	13.47%
Cotton	20.18	9.16%
Dbl Crop WinWht/Cotton	5.05	2.29%
Fallow/Idle Cropland	4.25	1.93%

2019

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	123.33	55.94%
Evergreen Forest	29.59	13.42%
Developed/Low Intensity	13.65	6.19%
Grassland/Pasture	12.40	5.62%
Corn	12.08	5.48%
Developed/Open Space	7.66	3.47%
Sod/Grass Seed	7.11	3.23%
Fallow/Idle Cropland	5.16	2.34%
Shrubland	4.25	1.93%
Cotton	2.69	1.22%
Developed/Med Intensity	2.54	1.15%

2020

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	100.58	45.62%
Grassland/Pasture	40.14	18.21%
Evergreen Forest	21.26	9.64%
Developed/Low Intensity	13.65	6.19%
Corn	12.08	5.48%
Developed/Open Space	10.99	4.99%
Cotton	7.85	3.56%
Sod/Grass Seed	7.11	3.23%
Shrubland	4.25	1.93%
Developed/Med Intensity	2.54	1.15%

2021

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	80.61	36.57%
Grassland/Pasture	60.35	27.38%
Evergreen Forest	21.26	9.64%
Developed/Open Space	13.12	5.95%
Corn	12.08	5.48%
Sod/Grass Seed	7.11	3.23%
Cotton	5.16	2.34%
Developed/Low Intensity	4.91	2.23%
Shrubland	4.25	1.93%
Developed/Med Intensity	3.27	1.48%
Soybeans	3.09	1.40%
Barren	2.69	1.22%
Developed/High Intensity	2.54	1.15%

2022

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	111.86	50.74%
Evergreen Forest	25.51	11.57%
Corn	24.22	10.99%
Grassland/Pasture	23.82	10.80%
Developed/Open Space	16.46	7.47%
Cotton	5.16	2.34%
Developed/Low Intensity	4.91	2.23%
Developed/Med Intensity	3.27	1.48%
Barren	2.69	1.22%
Developed/High Intensity	2.54	1.15%

Sandhill REC
10 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	158
Total Acreage of Bounderies	811.25
Percent Crop Acreage in Buffer	0.40%

2015

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	337.34	41.58%
Other Hay/Non Alfalfa	155.50	19.17%
Grassland/Pasture	108.53	13.38%
Cotton	89.85	11.08%
Corn	62.87	7.75%
Soybeans	28.36	3.50%
Dbl Crop WinWht/Soybeans	11.61	1.43%
Winter Wheat	7.97	0.98%
Sod/Grass Seed	5.35	0.66%
Developed/Open Space	3.87	0.48%

2016

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	412.99	50.91%
Grassland/Pasture	144.00	17.75%
Other Hay/Non Alfalfa	129.61	15.98%
Soybeans	42.88	5.29%
Corn	29.22	3.60%
Peas	19.98	2.46%
Cotton	19.63	2.42%
Winter Wheat	6.09	0.75%
Developed/Open Space	3.87	0.48%
Open Water	2.99	0.37%

2017

Crop	Total Acres	Percent Acreage
Fallow/Idle Cropland	310.33	38.25%
Other Hay/Non Alfalfa	220.08	27.13%
Corn	152.56	18.81%
Grassland/Pasture	50.22	6.19%
Sod/Grass Seed	27.80	3.43%
Cotton	21.51	2.65%
Soybeans	11.23	1.38%
Sorghum	8.73	1.08%
Oats	3.06	0.38%
Shrubland	2.99	0.37%
Dbl Crop WinWht/Soybeans	2.76	0.34%

2018

Crop	Total Acres	Percent Acreage
Corn	341.43	42.09%
Other Hay/Non Alfalfa	338.40	41.71%
Soybeans	39.78	4.90%
Cotton	37.68	4.64%
Grassland/Pasture	27.26	3.36%
Fallow/Idle Cropland	18.30	2.26%
Dbl Crop WinWht/Cotton	5.05	0.62%
Sod/Grass Seed	3.35	0.41%

2019

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	333.40	41.10%
Grassland/Pasture	112.04	13.81%
Soybeans	98.65	12.16%
Cotton	63.01	7.77%
Corn	41.93	5.17%
Barren	34.43	4.24%
Evergreen Forest	29.59	3.65%
Fallow/Idle Cropland	20.66	2.55%
Developed/Low Intensity	17.09	2.11%
Developed/Open Space	16.16	1.99%
Sod/Grass Seed	15.61	1.92%
Shrubland	13.15	1.62%
Millet	7.00	0.86%
Developed/Med Intensity	5.94	0.73%
Oats	2.58	0.32%

2020

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	302.09	37.24%
Grassland/Pasture	185.15	22.82%
Corn	111.37	13.73%
Barren	39.86	4.91%
Cotton	29.49	3.63%
Soybeans	24.03	2.96%
Evergreen Forest	21.26	2.62%
Developed/Open Space	19.49	2.40%
Developed/Low Intensity	17.09	2.11%
Fallow/Idle Cropland	15.69	1.93%
Sod/Grass Seed	15.61	1.92%
Shrubland	13.15	1.62%
Developed/Med Intensity	5.94	0.73%
Sorghum	4.22	0.52%
Other Crops	4.03	0.50%
Millet	2.78	0.34%

2021

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	266.54	32.86%
Grassland/Pasture	226.27	27.89%
Soybeans	61.72	7.61%
Corn	50.46	6.22%
Cotton	49.43	6.09%
Barren	47.84	5.90%
Evergreen Forest	30.16	3.72%
Shrubland	19.32	2.38%
Developed/Low Intensity	13.32	1.64%
Developed/Open Space	13.12	1.62%
Sod/Grass Seed	10.47	1.29%
Developed/Med Intensity	10.21	1.26%
Rye	9.86	1.22%
Developed/High Intensity	2.54	0.31%

2022

Crop	Total Acres	Percent Acreage
Other Hay/Non Alfalfa	297.61	36.69%
Grassland/Pasture	185.11	22.82%
Barren	84.90	10.47%
Corn	76.36	9.41%
Cotton	64.77	7.98%
Evergreen Forest	34.41	4.24%
Developed/Open Space	22.68	2.80%
Developed/Low Intensity	13.32	1.64%
Soybeans	12.72	1.57%
Developed/Med Intensity	10.21	1.26%
Dbl Crop WinWht/Soybeans	4.03	0.50%
Millet	2.60	0.32%
Developed/High Intensity	2.54	0.31%

Sandhill REC
25 Mile Buffer
Crop Acreage by Year

Number of Crop Bounderies	3,204
Total Acreage of Bounderies	31,172.69
Percent Crop Acreage in Buffer	2.48%

2015

Crop	Total Acres	Percent Acreage
Corn	9470.62	30.38%
Fallow/Idle Cropland	7756.64	24.88%
Soybeans	4829.85	15.49%
Dbl Crop WinWht/Soybeans	2677.21	8.59%
Grassland/Pasture	1349.56	4.33%
Cotton	1192.50	3.83%
Other Hay/Non Alfalfa	1173.68	3.77%
Winter Wheat	883.57	2.83%
Peanuts	668.70	2.15%
Dbl Crop WinWht/Corn	504.61	1.62%
Shrubland	127.47	0.41%
Sod/Grass Seed	122.63	0.39%
Evergreen Forest	119.45	0.38%
Dbl Crop Corn/Soybeans	91.87	0.29%
Developed/Open Space	69.74	0.22%
Pecans	27.61	0.09%
Barren	22.23	0.07%
Dbl Crop Soybeans/Oats	19.07	0.06%
Woody Wetlands	18.44	0.06%
Open Water	15.71	0.05%
Deciduous Forest	14.96	0.05%
Mixed Forest	13.87	0.04%
Oats	2.71	0.01%

2016

Crop	Total Acres	Percent Acreage
Corn	11871.30	38.08%
Fallow/Idle Cropland	8782.32	28.17%
Soybeans	4773.27	15.31%
Other Hay/Non Alfalfa	1736.24	5.57%
Dbl Crop WinWht/Soybeans	903.03	2.90%
Cotton	804.48	2.58%
Grassland/Pasture	784.86	2.52%
Winter Wheat	451.36	1.45%
Peanuts	402.47	1.29%
Sod/Grass Seed	164.66	0.53%
Evergreen Forest	156.74	0.50%
Shrubland	96.73	0.31%
Developed/Open Space	69.74	0.22%
Sorghum	46.94	0.15%
Peas	32.89	0.11%
Woody Wetlands	26.60	0.09%
Pecans	17.25	0.06%
Open Water	15.15	0.05%
Barren	12.47	0.04%
Peaches	10.36	0.03%
Rye	8.95	0.03%
Oats	4.88	0.02%

2017

Crop	Total Acres	Percent Acreage
Corn	11858.56	38.04%
Fallow/Idle Cropland	6577.87	21.10%
Soybeans	4449.36	14.27%
Other Hay/Non Alfalfa	2663.74	8.55%
Dbl Crop WinWht/Soybeans	2329.31	7.47%
Cotton	1710.92	5.49%
Grassland/Pasture	395.29	1.27%
Sod/Grass Seed	347.35	1.11%
Peanuts	244.27	0.78%
Oats	119.47	0.38%
Winter Wheat	111.43	0.36%
Sorghum	91.67	0.29%
Developed/Open Space	57.60	0.18%
Dbl Crop WinWht/Cotton	43.31	0.14%
Millet	26.96	0.09%
Evergreen Forest	24.39	0.08%
Woody Wetlands	18.10	0.06%
Shrubland	17.26	0.06%
Peaches	16.36	0.05%
Watermelons	13.87	0.04%
Open Water	12.11	0.04%
Herbaceous Wetlands	11.82	0.04%
Pecans	11.25	0.04%
Alfalfa	6.37	0.02%
Dbl Crop Corn/Soybeans	4.23	0.01%
Barren	3.80	0.01%
Deciduous Forest	3.04	0.01%
Rape Seed	2.99	0.01%

2018

Crop	Total Acres	Percent Acreage
Corn	11384.03	36.52%
Soybeans	4984.21	15.99%
Other Hay/Non Alfalfa	4240.94	13.60%
Cotton	4105.26	13.17%
Dbl Crop WinWht/Soybeans	3463.68	11.11%
Fallow/Idle Cropland	1864.32	5.98%
Sod/Grass Seed	311.34	1.00%
Grassland/Pasture	298.34	0.96%
Evergreen Forest	124.64	0.40%
Shrubland	104.51	0.34%
Winter Wheat	93.47	0.30%
Developed/Open Space	60.08	0.19%
Pecans	27.61	0.09%
Peanuts	26.11	0.08%
Woody Wetlands	25.31	0.08%
Oats	23.35	0.07%
Herbaceous Wetlands	12.34	0.04%
Barren	7.57	0.02%
Rye	6.35	0.02%
Dbl Crop WinWht/Cotton	5.05	0.02%
Open Water	4.20	0.01%

2019

Crop	Total Acres	Percent Acreage
Corn	11931.88	38.28%
Other Hay/Non Alfalfa	4342.83	13.93%
Soybeans	3986.75	12.79%
Cotton	3573.44	11.46%
Fallow/Idle Cropland	3020.07	9.69%
Shrubland	863.73	2.77%
Dbl Crop WinWht/Soybeans	740.47	2.38%
Winter Wheat	729.74	2.34%
Grassland/Pasture	543.04	1.74%
Evergreen Forest	295.94	0.95%
Developed/Open Space	246.02	0.79%
Sod/Grass Seed	224.72	0.72%
Developed/Low Intensity	132.10	0.42%
Dbl Crop WinWht/Corn	116.41	0.37%
Developed/Med Intensity	64.60	0.21%
Woody Wetlands	61.09	0.20%
Barren	60.87	0.20%
Sorghum	42.32	0.14%
Open Water	39.46	0.13%
Other Crops	36.33	0.12%
Dbl Crop WinWht/Sorghum	25.96	0.08%
Developed/High Intensity	22.68	0.07%
Buckwheat	22.51	0.07%
Sunflower	17.16	0.06%
Pecans	8.53	0.03%
Oats	8.08	0.03%
Millet	7.00	0.02%
Blueberries	6.13	0.02%
Mixed Forest	2.83	0.01%

2020

Crop	Total Acres	Percent Acreage
Corn	13359.96	42.86%
Other Hay/Non Alfalfa	4812.43	15.44%
Dbl Crop WinWht/Soybeans	2857.80	9.17%
Cotton	2321.80	7.45%
Fallow/Idle Cropland	2041.90	6.55%
Soybeans	1828.33	5.87%
Shrubland	965.85	3.10%
Grassland/Pasture	785.25	2.52%
Evergreen Forest	440.70	1.41%
Winter Wheat	369.34	1.18%
Peanuts	318.62	1.02%
Developed/Open Space	255.68	0.82%
Sod/Grass Seed	219.05	0.70%
Developed/Low Intensity	130.79	0.42%
Developed/Med Intensity	67.13	0.22%
Woody Wetlands	62.08	0.20%
Sorghum	62.00	0.20%
Barren	58.45	0.19%
Peas	50.55	0.16%
Open Water	41.60	0.13%
Other Crops	32.51	0.10%
Rye	29.09	0.09%
Developed/High Intensity	22.68	0.07%
Sunflower	17.16	0.06%
Millet	10.18	0.03%
Pecans	8.53	0.03%
Oats	3.24	0.01%

2021

Crop	Total Acres	Percent Acreage
Corn	11682.49	37.48%
Other Hay/Non Alfalfa	4627.89	14.85%
Dbl Crop WinWht/Soybeans	3943.77	12.65%
Soybeans	3433.60	11.01%
Cotton	2715.44	8.71%
Evergreen Forest	1171.66	3.76%
Grassland/Pasture	957.10	3.07%
Shrubland	378.92	1.22%
Winter Wheat	358.60	1.15%
Sorghum	357.90	1.15%
Peanuts	259.96	0.83%
Fallow/Idle Cropland	214.90	0.69%
Developed/Open Space	212.44	0.68%
Developed/Med Intensity	148.35	0.48%
Sod/Grass Seed	135.68	0.44%
Developed/Low Intensity	130.66	0.42%
Woody Wetlands	91.98	0.30%
Oats	58.94	0.19%
Barren	57.83	0.19%
Dbl Crop WinWht/Sorghum	54.25	0.17%
Developed/High Intensity	44.07	0.14%
Open Water	41.60	0.13%
Sunflower	37.65	0.12%
Dbl Crop Soybeans/Oats	14.12	0.05%
Rye	9.86	0.03%
Pecans	8.53	0.03%
Millet	7.40	0.02%
Blueberries	6.13	0.02%
Deciduous Forest	5.76	0.02%
Peas	5.19	0.02%

2022

Crop	Total Acres	Percent Acreage
Corn	10589.34	33.97%
Cotton	5343.65	17.14%
Other Hay/Non Alfalfa	4590.51	14.73%
Soybeans	3117.86	10.00%
Dbl Crop WinWht/Soybeans	2473.96	7.94%
Evergreen Forest	1419.60	4.55%
Grassland/Pasture	1124.61	3.61%
Peanuts	654.05	2.10%
Winter Wheat	520.28	1.67%
Developed/Open Space	236.03	0.76%
Shrubland	195.06	0.63%
Developed/Med Intensity	148.35	0.48%
Developed/Low Intensity	127.34	0.41%
Barren	109.31	0.35%
Sorghum	100.81	0.32%
Woody Wetlands	88.63	0.28%
Sod/Grass Seed	77.51	0.25%
Millet	56.54	0.18%
Dbl Crop WinWht/Cotton	44.48	0.14%
Developed/High Intensity	44.07	0.14%
Open Water	41.65	0.13%
Fallow/Idle Cropland	24.22	0.08%
Oats	12.16	0.04%
Pecans	8.53	0.03%
Rye	7.76	0.02%
Dbl Crop WinWht/Corn	7.39	0.02%
Blueberries	6.13	0.02%
Mixed Forest	2.83	0.01%