**Data and Mapping Working Group Interim Report**

**10/28/2020**

The working group identified the following gaps during the investigation of current state of mapping and data availability for agricultural lands. The first gap identified was the current FCC 477 database does not contain data that can be used to accurately map production agricultural locations for possible broadband access. If the intent is to include all agricultural lands, a second gap identified was the need to enhance the locational data on pasture and range land.

The working group also identified the need when crowd sourcing/ground truthing to verify access /availability cultural deference needs to be addressed when collecting information on native lands and work with native land owners and tribal governments to identify gaps.

Two overarching themes were identified as the working group listened to various subject matter specialists. The first is that data that could help improve the mapping of agricultural land broadband coverage, or the lack of, was held in separate databases by different agencies in the federal government, but due to privacy related issues could not be shared or it's availability was unknown. The second identified issue was a lack of a standardized data cookbook that was available to the public and contained definitions and details about the metadata concerning the data. The use of the well-known within agency acronyms was not helpful in identifying to the public, what was contained in the database and what was meant by their use.

Another identified issue with the current 477 database in agricultural areas was the lack of verification of actual usable available coverage. The working group heard from many subject matter specialists who were working in their respective states or across select regions to identify usability gaps or actual coverage gaps. The Data/Mapping working group concluded that a need to "ground truth" usability and coverage availability will be critical moving forward if production agricultural broadband is to be realized.

By having a program that addresses the need for "ground truth", a secondary issue can also be addressed and that is some agriculturalist will need field to field or pasture to pasture coverage and others with the onboard technology in their equipment will be successful with only strong broadband coverage at their main operational location.

As identified previously, the working group strongly feels that with all the discussions from the subject matter specialists, that there is a need for special efforts from both the USDA, BIA, and FCC to work within native tribes cultural context. The native members taking the lead in collecting data and streamlining the permitting process (established by BIA and USDA) will be critical to the success of agricultural native lands broadband connectivity.

From the information collected by the working group, the following preliminary recommendations are respectfully submitted to the Chair of the Task Force.

Preliminary Recommendations:

1. The NASS Cultivated Land data should be used to determine the base map extent for determining cultivated land area. The USGS National Land Cover Data should be used to determine the agricultural coverage areas for pasture/grazing, hay from grassland, and cultivated alfalfa hay land.
2. Use the Broadband Serviceable Location Fabric ML/AI approach to augment mapping of address location identification and agricultural outbuildings/infrastructure.
3. Ensure the FCC's Digital Opportunity Data Collection (DODC) program takes into account the needs of Precision Agriculture and rural communities and the data is made publicly available.
4. We recommend planned sampling/drive testing to get data relevant to agriculture and for results to be compared over time.
5. Ground truthing efforts should be made in collaboration with or led by Native American communities to obtain accurate data on native lands where agricultural enterprises are located, Streamline the permitting process, and to provide federal resources where necessary.

Supporting considerations:

1. Create a federal agency working group from USDA and FCC as well as FAA, BIA and other relevant agencies.
2. Create a data cookbook that is public facing describing the metadata in terms that can be understood by non-agency users.
3. Working with each State and Tribal Extension Service to understand the agricultural broadband needs
4. Need to provide funding support for DODC to collect the needed agricultural related data.
5. Identify all structures used for radio broadcast, the frequencies in use, and whether such frequencies are being used for last-mile Internet connectivity.
6. Work to provide private data holders with relevant information to sharing the data while protecting sources.

Additional supportive information for our recommendations from subgroups addressing specific focused areas:

**Preliminary recommendation one**

1) To identify the cultivated land, we used the 2019 NASS Cultivated Layer. The NASS Cultivated Layer is based on the most recent five years of Cropland Data Layers (CDL) and assigns each pixel as either cultivated or not cultivated depending on if it was classified as cultivated more than twice in the past five years or if it is only cultivated in the most recent year.
2) To identify pasture, we used a combination of historical CDLs and the USGS 2016 National Land Cover Database (NLCD2016).

3) Tribal Lands used a national data layer obtained from Data.Gov that is based on TIGER/2017 Census Bureau data (https://catalog.data.gov/harvest/object/72b2b12b-055b-498e-8939-0b76c0910a43/html). This shapefile was converted to raster and merged with the Cultivated and Cropland Pasture layers. This ensures Tribal Lands are covered in the search for underserved broadband areas.

Supporting materials:

- Presentation by Lynn Follansbee of USTelecom, on the Broadband Serviceable Location Fabric mapping initiative.
- Presentation by Rick Mueller USDA/NASS on the Cropland Data Layer Program.
- USGS NLCD Program: https://www.sciencedirect.com/science/article/pii/S0924271620300587?via%3Dihub

**Preliminary recommendation two**

1. Ensure that agricultural outbuildings/infrastructure (i.e., barns, sheds, shops) are included in the broadband serviceable location fabric.
2. The FNPRM already recognizes that separate maps will be needed for 3G, 4G and 5G services. Additionally, a separate map will also be required for CAT M IoT service, which has a much greater range than traditional 4G / LTE service, on which it is based.
3. FCC should coordinate with USDA to ensure that the underlying mapping can be readily combined with the existing USDA cropland database.
4. The FNPRM envisions the possibility of using the US Postal Service delivery vehicles to verify on-the-ground measurements. Another possibility would be to enlist the aid of local agricultural extension offices, which could train individuals in gathering data for the challenge process.
5. Leveraging the broadband serviceable location fabric using managed crowdsourcing with AI and machine learning methods using both open source and proprietary data provides the capability to improve the accuracy of Census Block location counts and improve upon locational accuracy.
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7. Adopt a standard for improving locational count (i.e., Census Block) accuracy and locational coordinates using methods identified with the broadband serviceable location fabric, which can be augmented with real-world speed test data, anchored on an open source or commercial testing platform to support efforts to verify location and speed based reporting. This can be accomplished by leveraging the potential of the broadband serviceable location fabric, and location based reporting to provide a much richer,

clearer, more granular, publicly available picture of the actual areas of broadband coverage and speeds for true broadband mapping.

8. The locational fabric includes satellite, federal, state, and county government sources, address geolocations as well as public and private data sources to determine service locations and connectivity. It is noted that boots on the ground/verification efforts are cost drivers, but a key component of data quality.

**Preliminary recommendation three**

1. Download Speed: Incoming throughput in megabits per second (Mbps) utilizing three concurrent Transmission Control Protocol (TCP) connections
2. Upload Speed: Outgoing throughput in megabits per second (Mbps) utilizing three concurrent Transmission Control Protocol (TCP) connections
3. UDP Latency: Average round trip time of a series of randomly transmitted User Datagram Protocol (UDP) packets distributed over a long timeframe
4. UDP Packet Loss: Fraction of UDP packets lost during UDP latency test
5. UDP Jitter: Mean round trip time (RTT) of UDP echo requests in microseconds from the app to a target test node

**Preliminary recommendation four**

1. Survey of rural tribal agricultural led by tribal extension agents in partnership with tribal colleges through crowdsourcing methods and funded by federal sources helping tribal communities to understand access to broadband, actual speeds and technologies used.
2. Provide assistance to providers to help understand the Jurisdictional complexities of Tribal sovereignty and Indian Trust Land management.
3. BIA-Bureau of Indian Affairs needs to streamline the easement permitting process and National Environmental Policy Act (NEPA) process to a more reasonable time frame.
4. USDA-NASS data on Native American livestock operations may be under representative. Other agencies may have additional data on land use land cover (LULC) on native lands. Federal agencies such as USDA NASS, FCC and BIA should work together with state, local and tribal governments to establish accurate maps of native agricultural lands, particularly range lands.