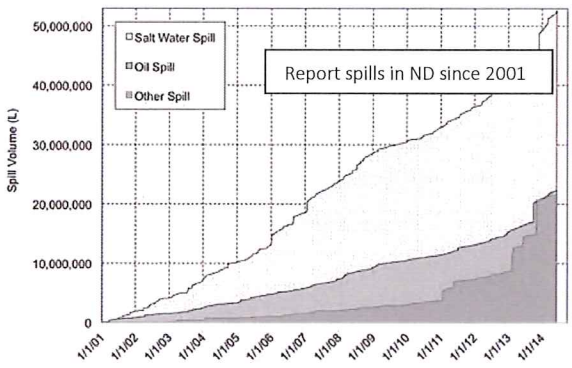
Needs

1. **Big Data: ND Ag Weather Network Data Management, Interpretation, Modeling, and Utilization**
   - **Request:** Additional personnel to completely rewrite and recode procedures for data collection, processing, modeling, and delivery (e.g., scab predictions, irrigation timing, thermal inversions).
   - **Justification:** NDAWN generates data every 3 seconds from each its 130 weather stations. Currently, all NDAWN data is sent to the High Plains Regional Climate Center for QC prior to any interpretation. This out-of-state data processing presents numerous problems for data usability, accessibility, and interpretation. There is an imminent need to transition all data processes in-house. Also, the NDAWN webpage must be completely rewritten and recoded as a result of security issues and incompatibility with mobile devices. Furthermore, there is major need to refine agricultural model applications to make them more accurate (e.g., scab prediction) and to develop new models (e.g., cattle comfort).

     All programming and physical maintenance of NDAWN is provided entirely by four full time employees. By comparison, SD has two dedicated programmers and two maintenance personnel for their agricultural weather network of 27 stations. Additionally, the Oklahoma Mesonet (App available for Android and Apple) has approximately 40 employees maintaining and programming data from their 120 stations.
2. **Reclaiming/Restoring Agricultural and Native Lands:**
   - **Request:** Research personnel and operating funds.
   - **Justification:** Land owners need objective research and education on agricultural lands impacted by oil/brine spills, well pads, pipelines, and dust. ND is now the second largest oil producing state in the country. Since 2012 over 12,000 miles of pipeline have been installed in ND (Dept of Mineral Resources), resulting in ~146,200 ac (~228 mi^2) of disturbed soils. Furthermore, oil and brine spills have increased dramatically over the past 20 years.



     From October 1, 2018 to September 30, 2019 there were 1,315 total reported spills (435 Brine, 516 Oil) with 61,856 barrels of brine spilled (~142 barrels/spill). Recent Keystone release by Edinburg was 9,120 barrels (10 tanker cars). By comparison the pipeline spill in Tioga was 24,000 barrels (30 tanker cars, impacted 18 acres x 60 ft deep- actual impact was 56 acres).
3. **Field Labs facility**
   - **Request:** (i) Soil & water testing laboratories, (ii) field sample processing laboratory, (iii) field storage and preparation areas, (iv) field sample processing, and (v) walk-in driers.

NDSU | SCHOOL OF NATURAL RESOURCE SCIENCES

Entomology | Range | Soils | Natural Resources Management

"Discovering and implementing solutions for healthy agriculture and natural resources."

Updates from the School

1. **Current personnel**
   - 23 Faculty - 17.75 AES | 3.55 EXT | 4.70 Teaching
     - Lost L. Brueggeman – 1 teaching FTE
   - 25 Staff - 17 state appropriated | 8 grant supported
     - NDAWN – 4 staff
     - Soil Testing Lab – 2 staff (100% soft money)

For comparison, in 2016 the SNRS had 28.5 Staff - 23.5 state appropriated

2. **Current areas of focus: 70 active grants from commodity, federal, state, industrial, and charitable sources for >$6.3M funding research on:**
   - *Soil Fertility:* IDC, N-cycling, mineralization, sulfur (**SOIL**)
   - *Soil Health:* no-till, cover crops, rotations, salinity, sodicity, demonstration (**SOIL**)
   - *Natural and agricultural land reclamation/restoration:* Oil spills, brine spills, pipelines, coal, well pads, dust, prairie (**SOIL/RNG/NRM**)
   - *Soil management and survey:* Tillage, drainage, residue management (**SOIL**)
   - *NDAWN:* Expanding & improving weather network capabilities
   - *Insect pests:* Sugarbeet, soybean, corn, wheat, grapes (**ENT**)
   - *Insect survey:* Endangered species, pollinators (**ENT/RNG**)
   - *Grasslands:* Vegetation, invasive species, patch-burn grazing, grazing management (**RNG/ENT/SOIL**)
   - *Wildlife surveys:* Birds, bats, small mammals (**RNG**)
   - *Water:* Quantity, quality, tile drainage, wetlands (**NRM/SOIL**)
   - *Land management and survey:* Trees, riparian, prairies (**NRM/RNG/SOIL**)

3. **Current challenges**
   - Potential retirements in the next two year: e.g., Jay Goos announced 2020
   - Enrollment declines at graduate and undergraduate levels:
     - 10% teaching budget reduction, Voluntary Separation Incentive Program, and Indirect impacts to the missions of AES and Extensions