PARADOX SOIL AMENDMENT RECOMMENDATIONS

HIGHPOINT RESOURCES

July 9, 2020

Prepared by

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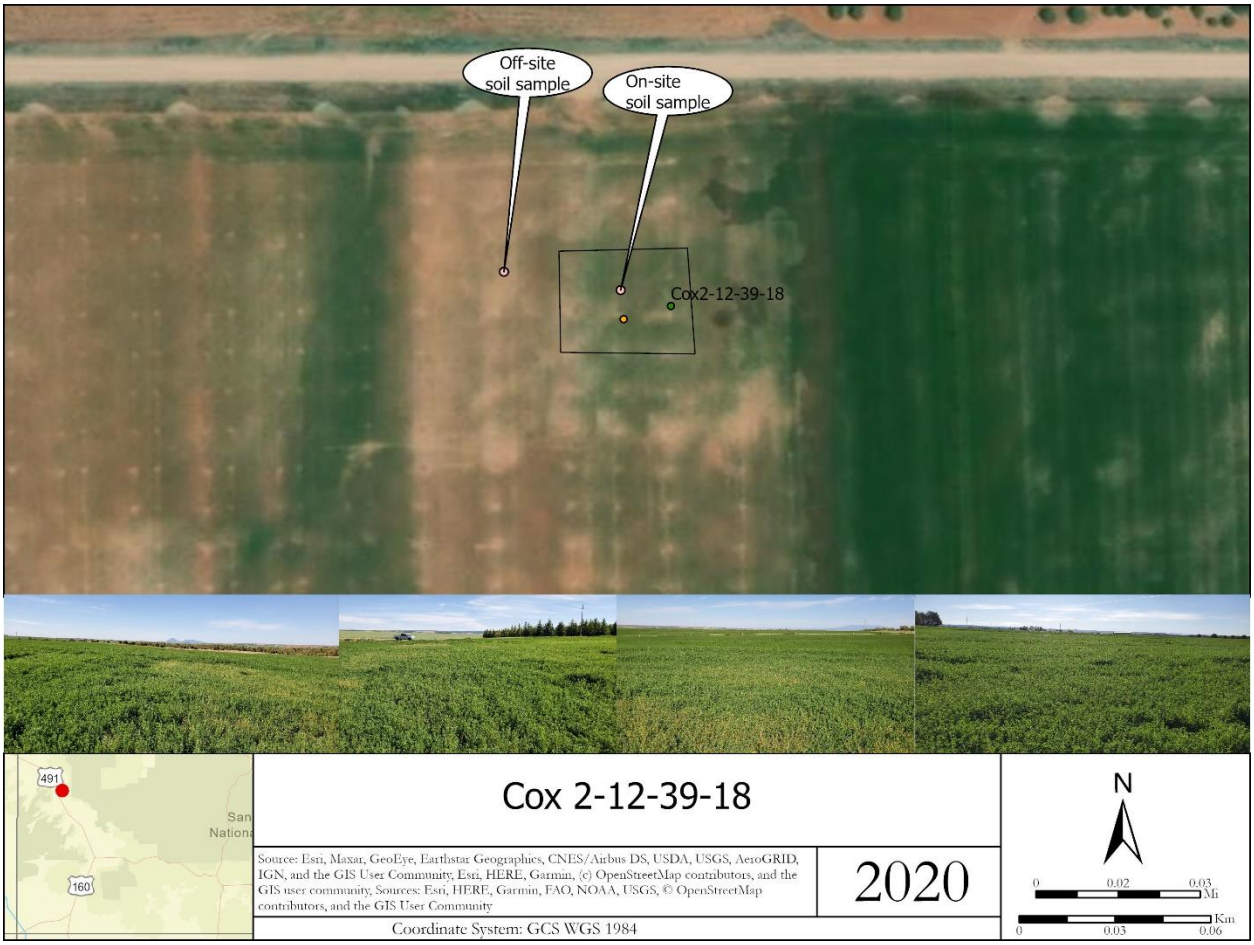
Contents

Soil samples were collected June 6, 2020 from on and off-site locations for each surface disturbance in this report. All locations are in active alfalfa production. Soil analytics were conducted by Stukenholtz Laboratory in Twin Falls, Idaho. Tests were specifically designed for alfalfa production.

Cox 2-12-39-18

Location ID 418076



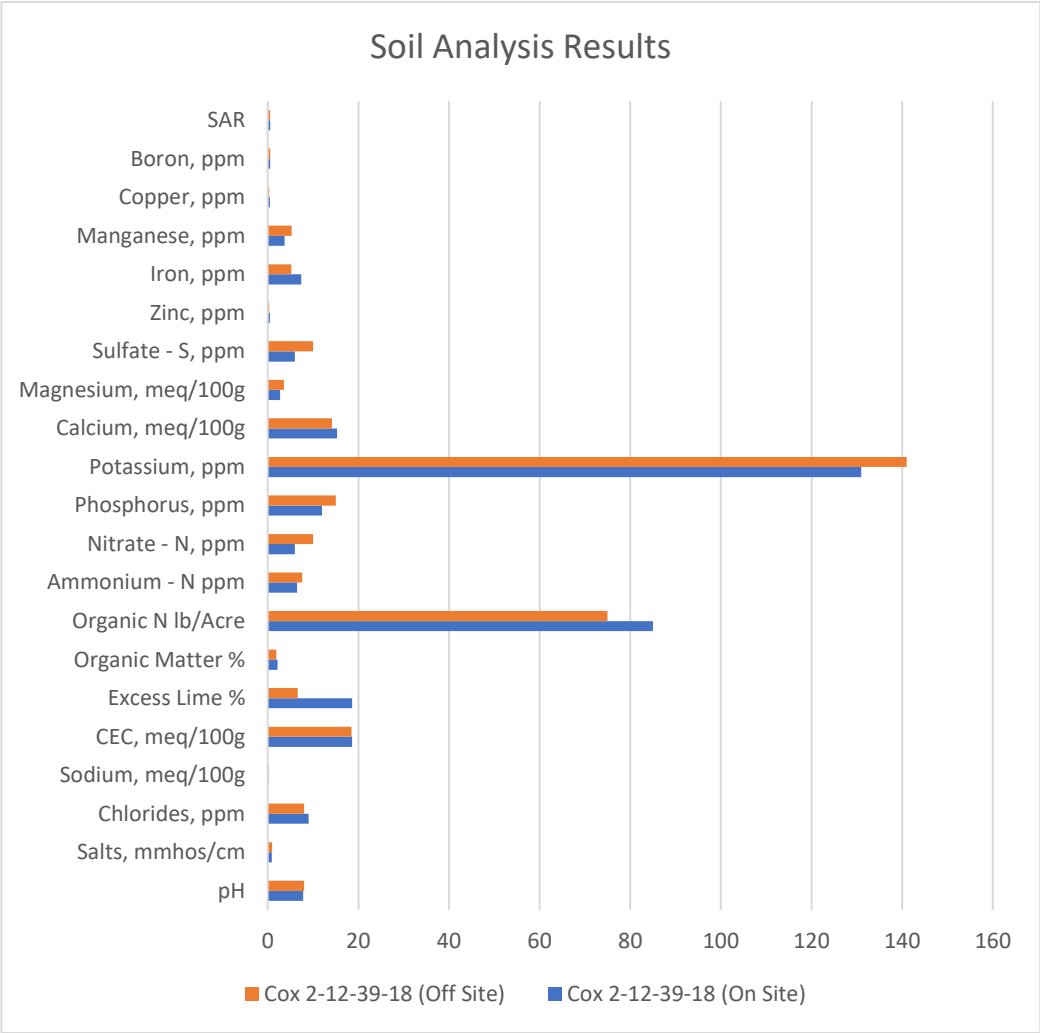
Reclamation Observations:

Reclamation area appears to be in good condition, with high vegetative cover of alfalfa very similar to off-site, maybe just slightly less. COGCC has requested reclamation plan due to lower vegetation cover on-site. Soil samples collected and will be sent for analysis. It seems that doing any major intervention could damage reclamation as there is good progress relative to some of the other sites in the area. No discernable differences in soils when collecting samples. Cheatgrass is present on field rows and sparsely in field. Talked to Bob Neeley who farms this field, and he is mostly unsatisfied with the height of the hay, but unsure of what to do because bringing equipment in could set back progress.

Discussion:

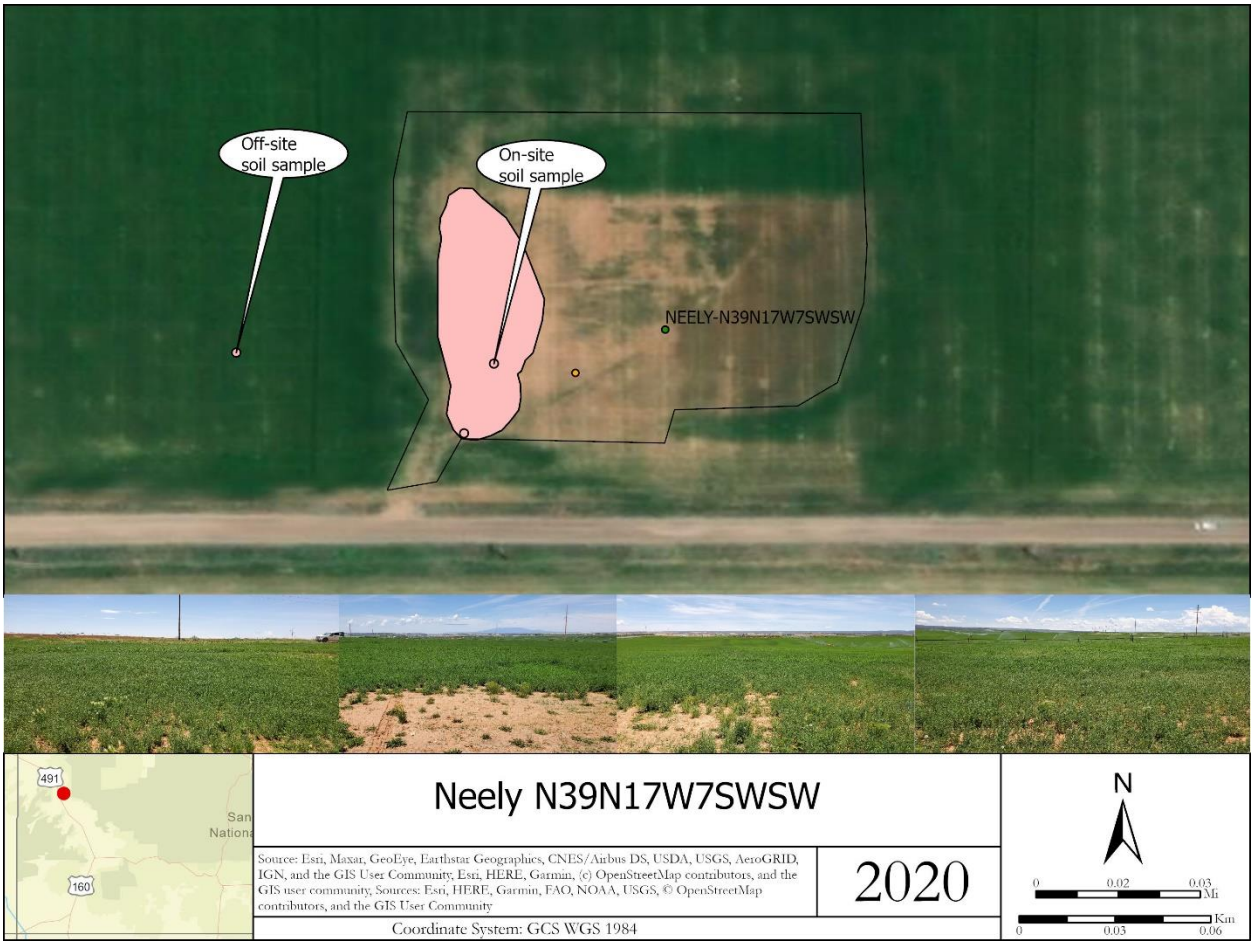
On-site and off-site conditions are very similar. The affected on-site area is approximately 0.26 acres and is much smaller than the original pad size demonstrating significant progress in reclamation success. The sample results comparison shows that on-site and off-site do not vary significantly. Soil pH, Salts, Chlorides and Sodium all are within allowable ranges for agricultural production of alfalfa. There appears to be no negative accumulations of elements toxic to plants, rather plant growth is limited by nutrient availability.

Recommendations:
Recommend application of Phosphate at a rate of 120 pounds/acre. A total of approximately 40 pounds of Phosphate should be applied in late fall 2020. All other core nutrients are available on site. Plant growth should be examined in fall 2020 to determine if a foliar treatment of copper at a rate of 1.0 pound per acre is required for a spring 2021 application.



Neely N39N17W7SWSW

Location ID 322139



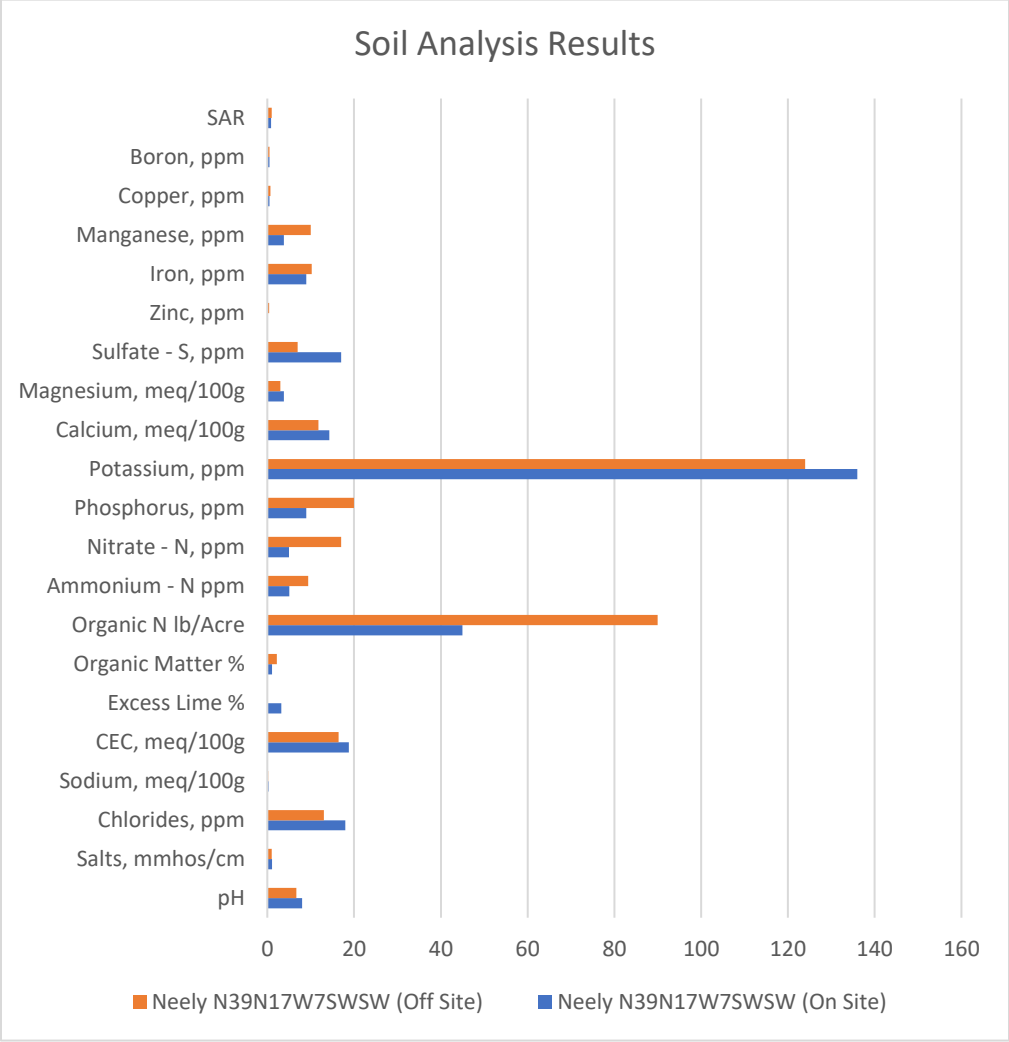
Reclamation Observations:

There are still bare areas present however much of the alfalfa appears improved compared to 2019. On and off-site soil samples collected. Texture of off-site soil appears to contain higher clay and higher moisture content due to better vegetative cover. No apparent restrictive layer to on-site or off-site soils. Talked to Bob Neeley and he believes salt could be an issue as previous fertilizer applications have not really improved things to his liking. Develop and amend or remove and replace soil per soil test result. One individual Canada thistle removed from disturbance area and another on roadside near former pad entrance, no more individuals detected.

Discussion:

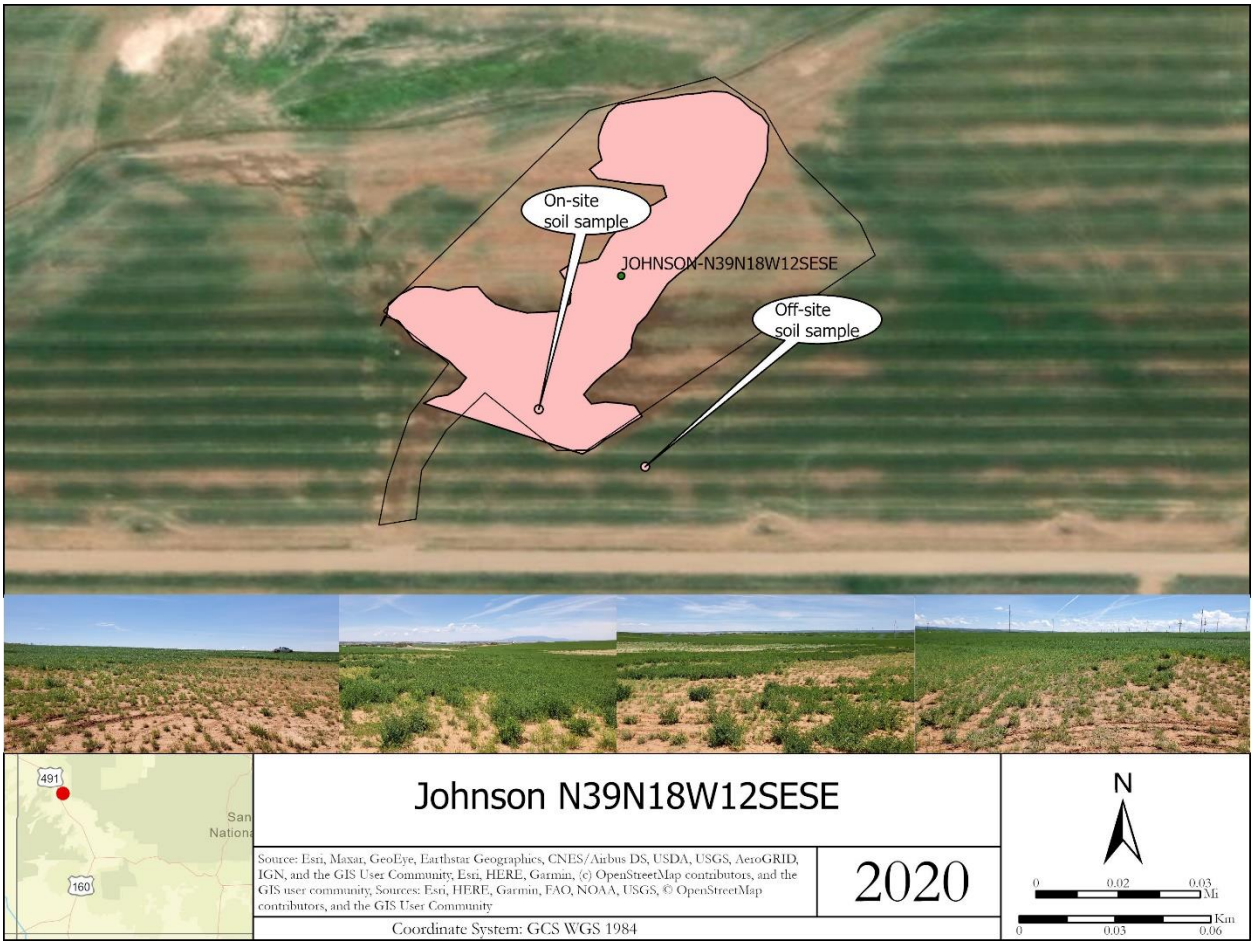
On-site and off-site conditions are very similar. The most noticeable difference between on site and off-site soil conditions are the amount of available plant nutrients. Organic nitrogen is nearly 50% less onsite compared to offsite. This is likely due to historic decreased plant production. Organic nitrogen can be supplemented using nitrogen fertilizer. There appears to be no negative accumulations of elements toxic to plants, rather plant growth is limited by nutrient availability.

Recommendations:
Bare areas should be reseeded in Spring 2021. Directly preceding seeding, Nitrogen and Phosphate should be applied to the affected areas at a rate of 30 pounds per acre of Nitrogen (55 pounds in total) and Phosphate at a rate of 145 pounds per acre (total of 270 pounds). Plant growth should be examined in fall 2020 to determine if a foliar treatment of copper is required for a spring 2021 application at a rate of 1.0 pound per acre.



Johnson N39N18W12SESE

Location ID 322138



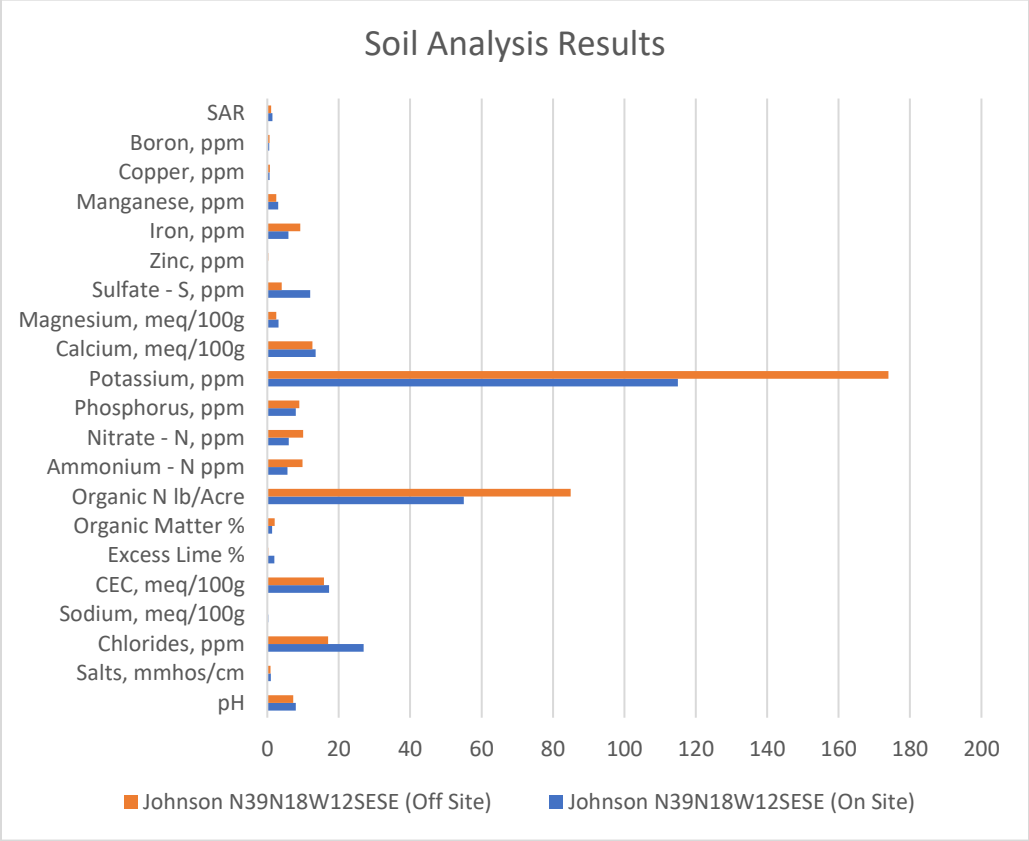
Reclamation Observations:

Area is showing significantly lower production than adjacent areas across most of disturbance. Soil samples taken, soil off-site seemed slightly more clay and organic matter. On site has a slight hard layer on top that could impede growth. Spoke with Bob Neeley who farms this plot and he believes salt could be an issue. Soil should be amended or removed pending soil test results, and then reseeded.

Discussion:

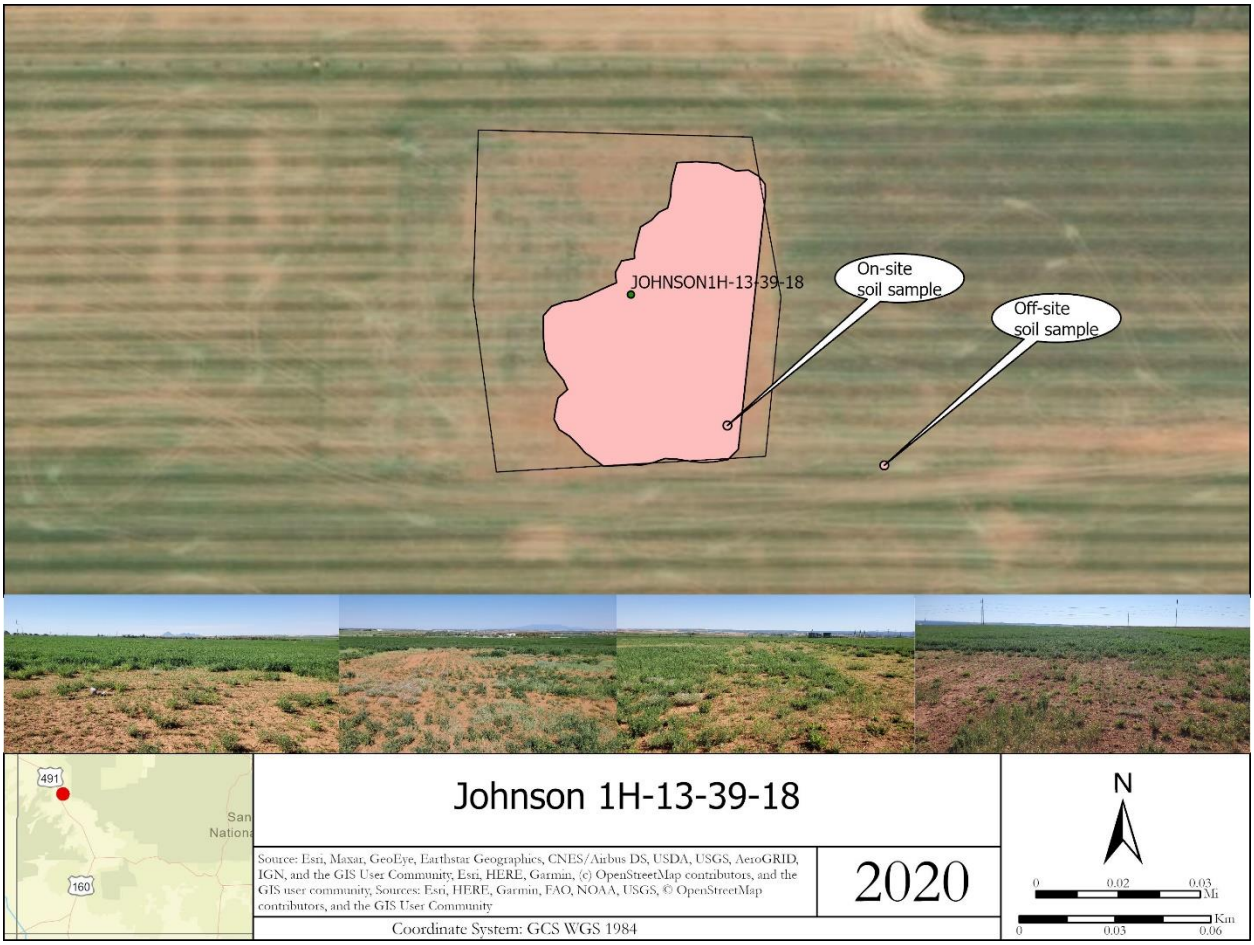
Soil results on the location versus off location do not differ significantly in negative qualities, chlorides are higher on location than off but remain within acceptable limits. Essential plant nutrients do vary between on-site and off-site with potassium and organic nitrogen showing the most significant difference. Phosphorus is low across both on and off location with this field containing some of the lowest phosphorus levels of all fields sampled. It is likely the location is suffering from low nutrient availability. The historic conditions of the location have likely resulted in the reduced plant availability of nutrients. Following the previous year's actions, it appears the soil has binding of nutrients has slowed. Application of fertilizer to make nutrients available for plant up take should result in increased productivity. Disturbed area is 2.09 acres.

Recommendations: Bare areas should be reseeded in Spring 2021. Directly preceding seeding, Nitrogen, Potash, Sulfur and Phosphate should be applied to the affected areas at a rate of 25 pounds per acre of Nitrogen (50 pounds in total), Potash at a rate of 110 pounds per acre (220 pounds in total), Sulfur at a rate of 40 pounds per acre(total of 80 pounds) and Phosphate at a rate of 160 pounds per acre (total of 320 pounds). Sulfur should be applied as an acid forming fertilizer such as 21-0-0 Thio-sul. This should decrease pH and increase plant availability of soil nutrients.



Johnson 1H-13-39-18

Location ID 322121



Reclamation Observations:

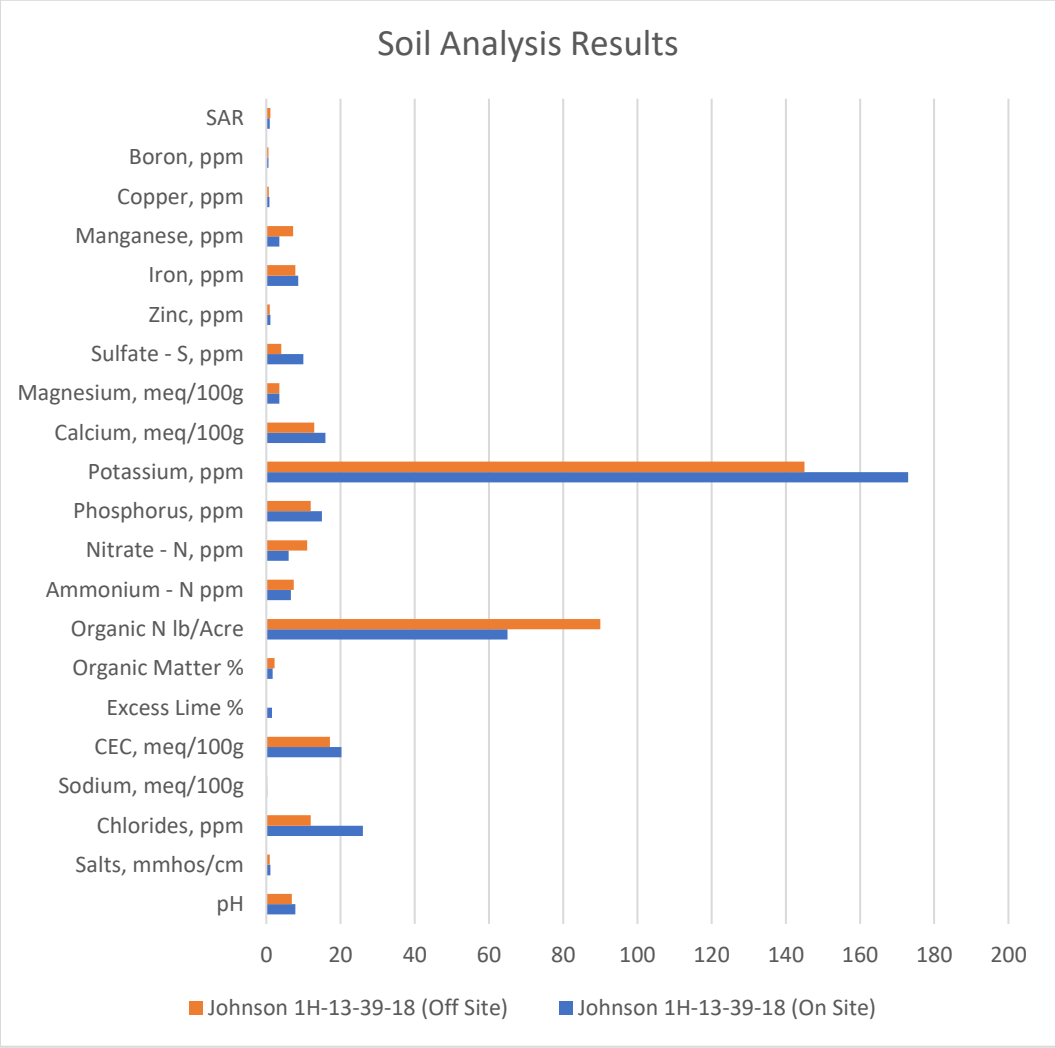
Productivity is much lower on-site than off-site, especially in mapped area. Soil samples were collected. Soil should be amended and reseeded per soil test result. Spoke to Travis Daves and he believes salt could be an issue. Canada thistle is also present throughout, as well as around access road and should be spot sprayed throughout, many individuals present throughout reclaimed area this year.

Discussion:

Productivity on this site is significantly lower than the surrounding portions of the field. This site has the highest Calcareous rating of all locations with the highest amounts of Chlorides. Acid forming sulfur fertilizer will aid in the resolving these issues. Disturbed area is 1.9 acres.

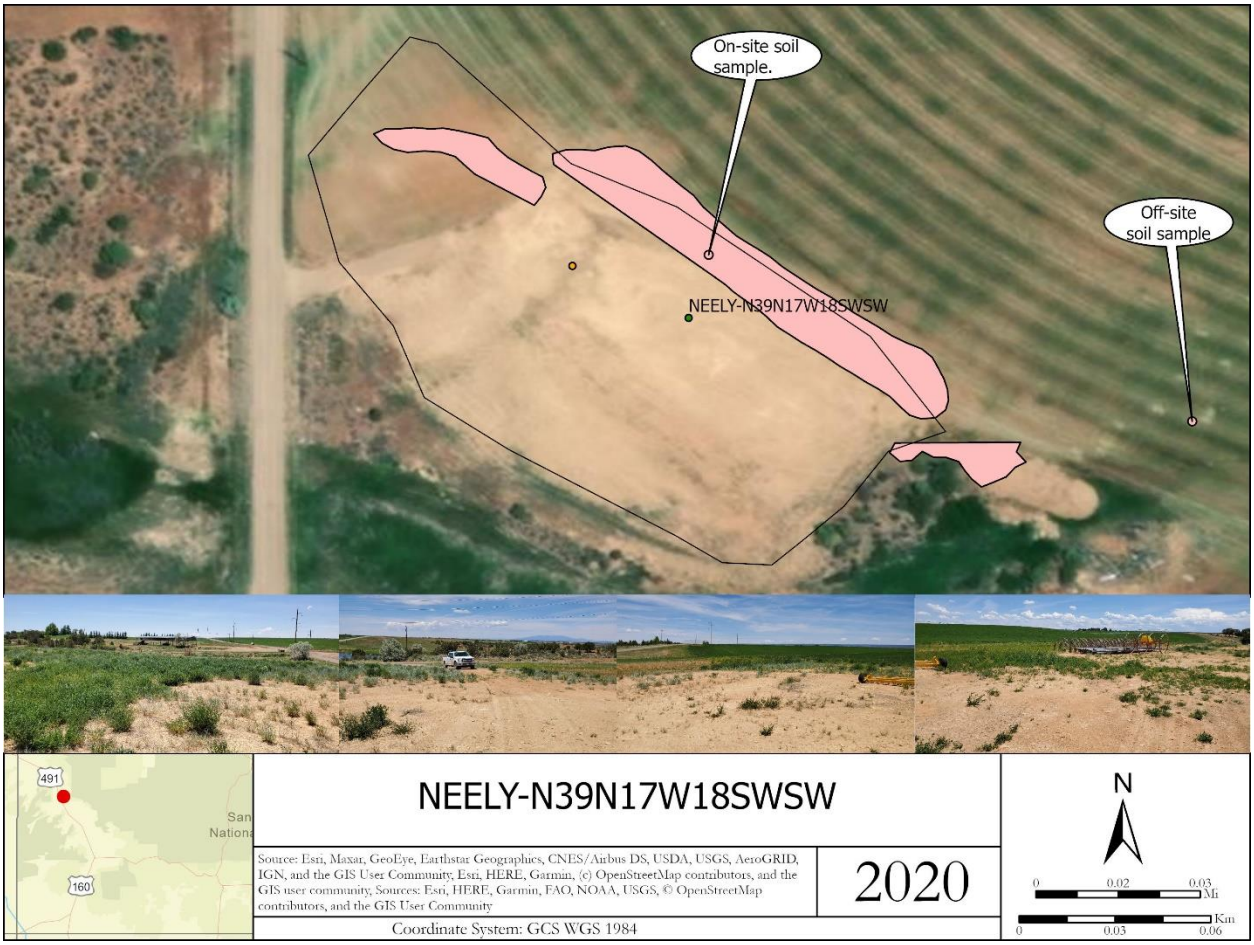
Recommendations

This location should be disked, and fertilizer incorporated into the soil medium at the following rates. Phosphate at 100 pounds an acre (91 pounds total), sulfur at 100 pounds an acre (total of 91 pounds), and nitrogen fertilizer at a rate 0f 20 pounds per acre (20 pounds total). The disking and incorporation of the treatment should occur in fall 2020 to allow for winter moisture to aid in the effectiveness of the treatment. Site should be reseeded in the spring of 2021 with Alfalfa at the appropriate rate. Prior to seeding another soil sample will be collected and analyzed for effectiveness of treatment.


Soil Analysis Results
SAR
Boron, ppm
Copper, ppm
Manganese, ppm
Iron, ppm
Zinc, ppm
Sulfate - S, ppm
Magnesium, meq/100g
Calcium, meq/100g
Potassium, ppm
Phosphorus, ppm
Nitrate - N, ppm
Ammonium - N ppm
Organic N lb/Acre
Organic Matter %
Excess Lime %
CEC, meq/100g
Sodium, meq/100g
Chlorides, ppm
Salts, mmhos/cm
pH
0
20
40
60
80
100
120
140
160
180
200
Johnson 1H-13-39-18 (Off Site)
Johnson 1H-13-39-18 (On Site)

NEELY-N39N17W18SWSW

Location ID 322140



Reclamation Observations:

Visited site with Bob Neely, he indicated the edge of the pivot is the only area he wants to see amended and seeded. He said in the area that will not grow alfalfa, the contractor dumped silt out over basically bare rock. Soil sample was taken matches this description, as the soil was very fine for 6 inches, then hit rock. Soil will need to be added or amended to improve production, amend pending soil test. Bob is satisfied with the rest of the area and says it should continue to improve. Address erosion and Canada thistle in reclamation need areas.

Discussion:

Soil needs to be amended in a small edge of pivot field where Alfalfa will not grow. Soil is extremely fine and silty, essentially turning into muck when irrigated. Nothing grows in this area. Target area for treatment is 0.46 acres.

Recommendations: The on-site location has a significantly high concentration of Chlorides. 4000 pounds of gypsum should be applied to the location and disked in after application. This application should occur as soon as possible. This will allow for the normal crop irrigation to aid in the leeching of the chlorides deeper in the soil profile. A subsequent sample will be taken in the fall to determine efficacy of the treatment. A fall application of manure at a rate of 1 ton per acre should be applied and disked into the soil to increase organic matter and infiltration rates of winter moisture. The following steps are dependent upon the Fall soil sample results. Spring reseeding should occur (if chloride levels warrant) of alfalfa at normal rates. Fertilizer should be applied at the following rate preceding the seeding. Nitrogen at a rate of 30 pounds per acre(15 pounds total). Phosphate at a rate of 150 pounds per acre (75 pounds total). Potash at 110 pounds per acre (total of 55 pounds).