

1:44,000 taken September 8, 1978, with identification numbers S5L-3R2-7902-306 (hereafter “photo 306”) and S5L-1R1-7902-291 (hereafter “photo 291”).

5. In addition, solely to the extent that these three documents/photographs further inform my understanding of other exhibits and testimony presented in this hearing, or similarly that other exhibits and testimony informs my understanding of these three documents/photographs, this affidavit provides further clarifying testimony on other exhibits and testimony as well.

6. The Reclamation Division’s Alluvial Valley Floor (“AVF”) determination was geographically broken into two parts, as noted on Coyote Creek Mining Company’s AVF study area map.

7. The first portion of the Reclamation Division’s AVF determination for permit NACC-1302 was a determination previously made for Revision 22 of Permit KRSB-8603 for the Dakota Westmoreland Mine in 2009. Due to geographic overlap between this prior AVF determination and Coyote Creek’s proposed NACC-1302 permit, the PSC incorporated this prior AVF determination for the eastern portion of NACC-1302. This determination included Section 31 of Township 143N, Range 88W, which contains Mr. Voigt’s alfalfa fields, as well as a large portion of Coyote Creek.

8. The second portion of Reclamation Division’s AVF determination for permit NACC-1302 was a determination made for the remainder of Coyote Creek Mining Company’s AVF study area (*i.e.*, the area not included in PSC’s 2009 Dakota Westmoreland AVF determination).

9. The PSC’s two determinations and the studies informing these two determinations, although made at different times, are intended to be treated together.

Together, they comprise the PSC's complete AVF determination for NACC-1302. Thus, they can only be understood together, and one necessarily informs the other.

10. Photos 291 and 306 appear to be high-resolution, near-infrared aerial images of the areas in question for both the 2009 and 2013 AVF determinations. Near-infrared imagery depicts growing vegetation (*i.e.*, water bearing) in colors of red. The photographs coincide in time (September 8, 1978) and the photographs show features consistent with OSMRE's discussion of Landsat satellite imagery in its 1985 Reconnaissance Study (Voigt Exhibit #2, page 5).

11. OSMRE's 1985 Reconnaissance Study (Voigt Exhibit #2, page 5) characterizes the Landsat imagery it used, stating that "Subirrigation was interpreted from Landsat imagery taken during the moisture-stress period of the late growing season in 5 different years [including 1978] ... Near-infrared color composites and black-and-white images of Landsat's Band 5 were used because these bands indicate the relative moisture content of vegetation." The areas of interest with respect to subirrigation – those with relatively higher moisture content in vegetation – are identified with deepening concentrations of red on these two photographs.

12. OSMRE's July 26th, 1983 Alluvial Valley Floor Identification and Study Guidelines further explain the importance of these photographs, stating that "identification [of subirrigation] at the initial study stage is usually dependent on color infrared air photo interpretation." (Voigt Exhibit 15, pgs. II-17 – II-18). The report goes on to say that "Color infrared photography is the most useful method for reconnaissance identification and mapping of subirrigated areas." (Voigt Exhibit 15, pg. C-39).

13. Landsat images, analogous to the photographs from 1978, were used by OSMRE in its determination that Coyote Creek “likely” was an AVF. (Voigt Exhibit #2, pgs. 1, 5, and attached Exhibit B containing map). Based upon precipitation data for Beulah, 1978 was slightly below the climatic average of 16 inches per year. September 8 would represent a late season condition, long removed from spring snowmelt and rain and early summer precipitation, and is, therefore, a time when areas with subirrigation might be identifiable and recognizable via both aerial and Landsat imagery.

14. Photograph 306 covers the reach of the Knife River from Beulah to the southwest and to the east. The center of the southwest quarter of the photograph is approximately the location of inspection site No. 1 of the 2013 AVF site investigation. The point at which the Knife River leaves photograph 306 in the southwest corner is just downstream of the 2013 site No. 2. The most notable displays of red on this photograph are the Knife River itself, areas within Beulah, and lesser streams in the area. There are few other areas that indicate significant moisture-bearing vegetation.

15. Photograph 291 is centered on farmland east of Coyote Creek. Coyote Creek runs approximately north-south through the approximate center of the west half of the photo. Sections 31, 30, and 19 of T143N R88W occupy the central third of the northwest quarter of the photograph. As is the Knife River in Photograph 306, Coyote Creek is readily visible in deep red through the northwest quarter of photograph 291. Tributaries to Coyote Creek in this area are also easily seen. Unlike the Knife River, however, there are significant fields of red and pink along Coyote Creek, filling in areas along and between the easily seen meanders of the creek. These are fields that still contain plants with significant moisture content, even on September 8, at the end of summer in a drier than

normal year. Artificial irrigation is not used in this valley. The water that supports this late-season vegetation, vegetation levels not seen on the surrounding uplands, can only be coming from naturally occurring subirrigation.

16. Two of the fields located in Section 31 of T143N R88W in Photograph 291 containing deep red coloring are at the same location as Mr. Voigt's present day alfalfa fields.

17. The comparison of these two photographs establishes why OSMRE in 1985 considered it likely that Coyote Creek held AVF lands and why the Knife River near Beulah likely did not. First, the photographs were taken in late summer, a time of year when vegetative evidence of subirrigation is most readily apparent. Second, Photograph 306 shows limited subirrigated lands along the Knife River in the eastern portion of the Coyote Creek AVF Study area based upon limited red coloration of fields along the Knife River, whereas photograph 291, containing Coyote Creek, shows much more substantial areas of fields with deep red coloration.

18. The primary purpose of OSMRE's 1985 Reconnaissance Survey, which was informed by Landsat photography analogous to the photos described above, was to identify areas that are "likely" to meet SMCRA's definition of an alluvial valley floor. (Voigt Exhibit 2, page 1). OSM mapped Coyote Creek as "likely" to meet SMCRA's definition of AVF (Voigt Exhibit #2, attached Exhibit B containing map). To evaluate the OSMRE assessment, the PSC should have studied the Coyote Creek valley closely, in particular the reddened areas of photos 291 and 306, and done so at the appropriate time of year, prior to making its two AVF determinations.

19. The PSC's April 30, 2013, AVF site inspection did not evaluate or visit the Voigt hay fields along Coyote Creek in Section 31, T143N R88W. The 2013 inspection visited 5 sites along the Knife River north of the Voigt alfalfa fields and one site along Coyote Creek south of the Voigt alfalfa fields. The site south of Section 31 was more than three miles south-by-southeast of the center of the section, and the closest site visited along the Knife River was more than three miles north.

20. As in 2013, the PSC's site inspection of June 11, 2009, did not extend onto the Voigt hay fields along Coyote Creek in Section 31, T143N R88W from fields to the north.

21. Taken together, the PSC had no "boots on the ground" at the Voigt alfalfa fields, the land principally at issue in this appeal, in either its 2009 site inspection or its 2013 AVF site inspection. Therefore, PSC's final AVF determination for NACC-1302 was not based on any in-person observations by PSC staff at the location most likely to contain AVF for permit NACC-1302.

22. Additionally, like PSC's June 11, 2009, AVF field inspection, the April 30, 2013 PSC field investigation was not conducted at a time of year that subirrigation is discernible. Rather, subirrigation is typically discernible during periods of moisture stress, which occur in late summer.

23. Coyote Creek Mining Company's 2013 AVF Study by Bickel (Voigt Exhibit 5) quoted from baseline information collected by Kelly Krabbenhoft in his 2012 field work. Krabbenhoft discussed the pattern of haying observed in 2012 (p. 20), a year with a wet spring but an unusually warm and dry summer. As described, the hay production began as usual and continued throughout the summer. However, by mid-July, prime hay land

was no longer productive due to moisture stress and late summer hay harvest was from road ditches and ancillary areas not usually harvested. In stark contrast, Krabbenhoft is quoted, “The only observed second cutting [of hay], to date, came from the SE4 Section 31, 143-88 near the Casey Voigt ranch.” This represents the quintessential manifestation of subirrigation; there is sufficient groundwater in excess of precipitation to enhance agricultural production during dry times of the year. Two cuttings of hay from Section 31 in 2012 confirm expectations from the photo 291: the fields in Section 31 of 143-88 near the Voigt ranch highlighted in red have greater productivity due to subirrigation.

24. Attachment A of this affidavit provides three images of contemporary satellite imagery of Section 31 and surrounding uplands from 2013, the year of the second PSC AVF field investigation. These images, available from www.satshot.com, depict the Section 31 alfalfa fields in the false color of near-infrared spectrum. As with Landsat imagery used by OSMRE and the aerial images in photos 291 and 306, these images depict growing vegetation in shades of red. The denser the vegetation, the deeper the color.

25. Contemporary satellite imagery unambiguously demonstrates the subirrigation impact in the Voigt alfalfa fields over the course of the summer and confirms that the expectations from photo 291—that these fields are subirrigated—still hold true today.

26. The first image (pg. 1 of Attachment A) was taken on June 1, 2013, the image closest to the time of the PSC field investigation. The image shows that, had the investigation been done on this date, thick, actively growing vegetation would have been seen on both the north and the south Voigt alfalfa fields in Section 31. The image also

shows that actively growing vegetation, although less thick, would also have been observed in the uplands on either side of the Coyote Creek alluvial valley.

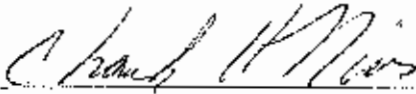
27. The second image (pg. 2 of Attachment A) was taken on June 15, 2013, two weeks later. The image shows that, had the investigation been done on this date, thick actively growing vegetation would have been evident in both Voigt alfalfa fields in Section 31. Although actively growing vegetation would also have been observed in the uplands flanking the valley on either side, growth would be subdued relative to that on the alluvial sediments.

28. The third image (pg. 3 of Attachment A) was taken on September 4, 2013, in late summer and near the end of the growing season. This late in the season, growth in the upland areas has almost ceased based upon the satellite imagery. However, in the Voigt alfalfa fields, significant growth persists even into September, based upon the distinctly darker reds from those fields.

29. Collectively, the contemporary satellite imagery confirms that had the PSC undertaken an AVF field inspection of the Voigt alfalfa fields, and had that inspection been performed in September, as would be appropriate, clear evidence of enhanced production from these fields would have been observed. That is, a field investigation of Section 31, T143N R88W in the late summer of 2013, had it been it been performed, would have verified the 2012 observations of Krabbenhoft, as expressed in the Bickel report.

30. The most defensible determination for AVF presence when one considers all data from 1978 to date is that Sections 19, 30, and 31 all have AVF present.

Dated this 20th day of February, 2015.


Charles Norris

STATE OF Colorado)
) ss
COUNTY OF Denver)

On this 20th day of February, 2015, before me personally appeared Charles Norris, known to me to be the same person who is described in and who executed and swore to the truth of the assertions in the within document, and acknowledged to me that she executed the same.

Ryan Dravitz
NOTARY ID #20144002250
NOTARY PUBLIC
STATE OF COLORADO
My Commission expires Jan 15, 2018


Notary Public

Attachment A

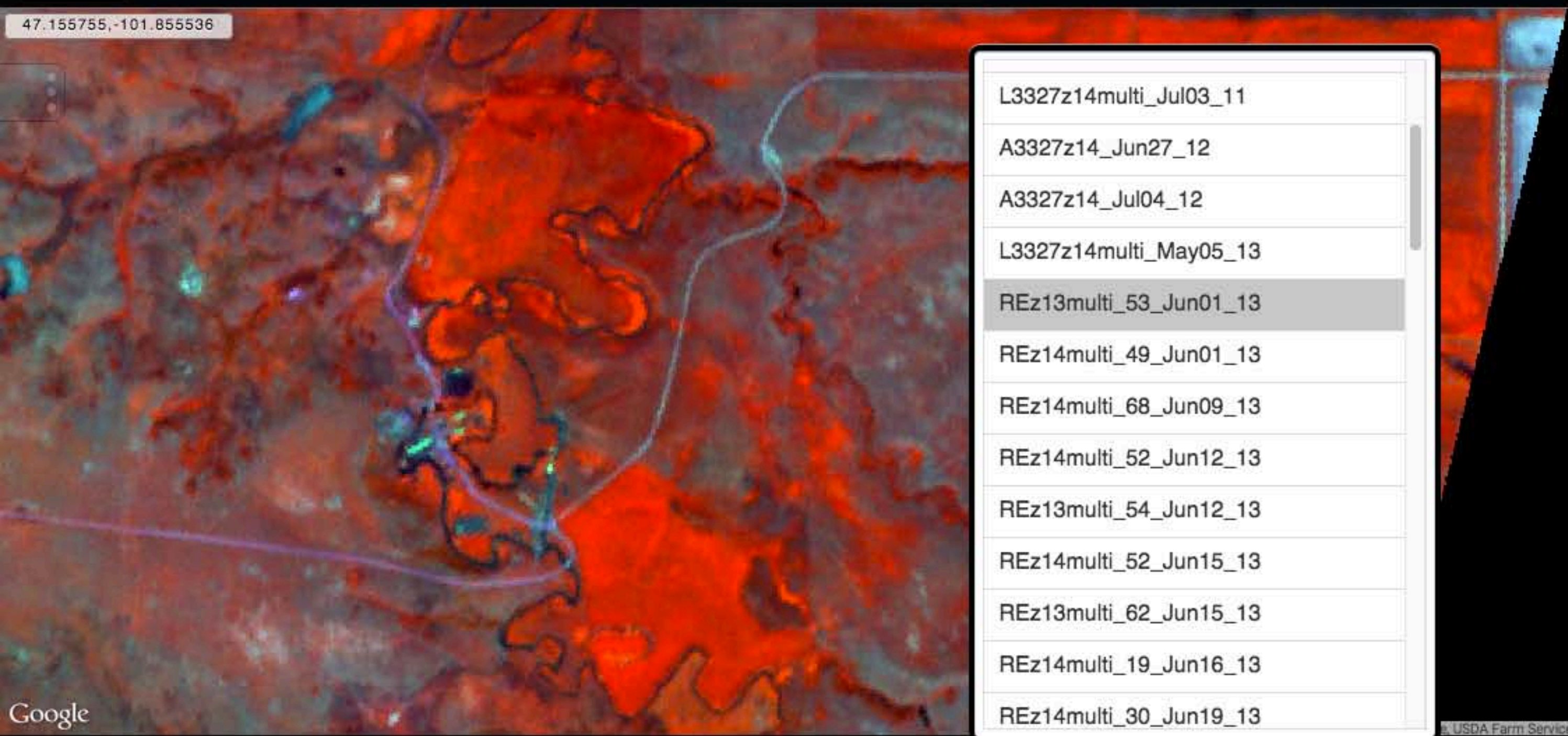
2013 Near-infrared Satellite Images of Section 31

Map Layers

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State
North Dakota

County
Burleigh County

Township
T143N88W

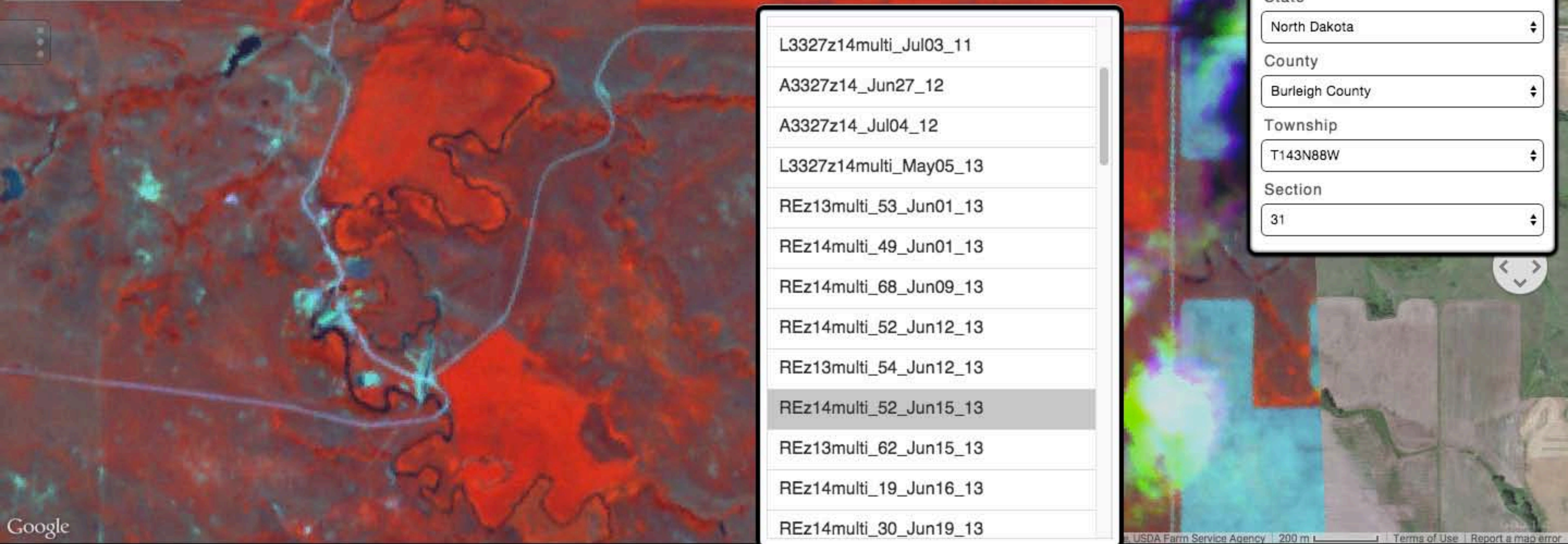
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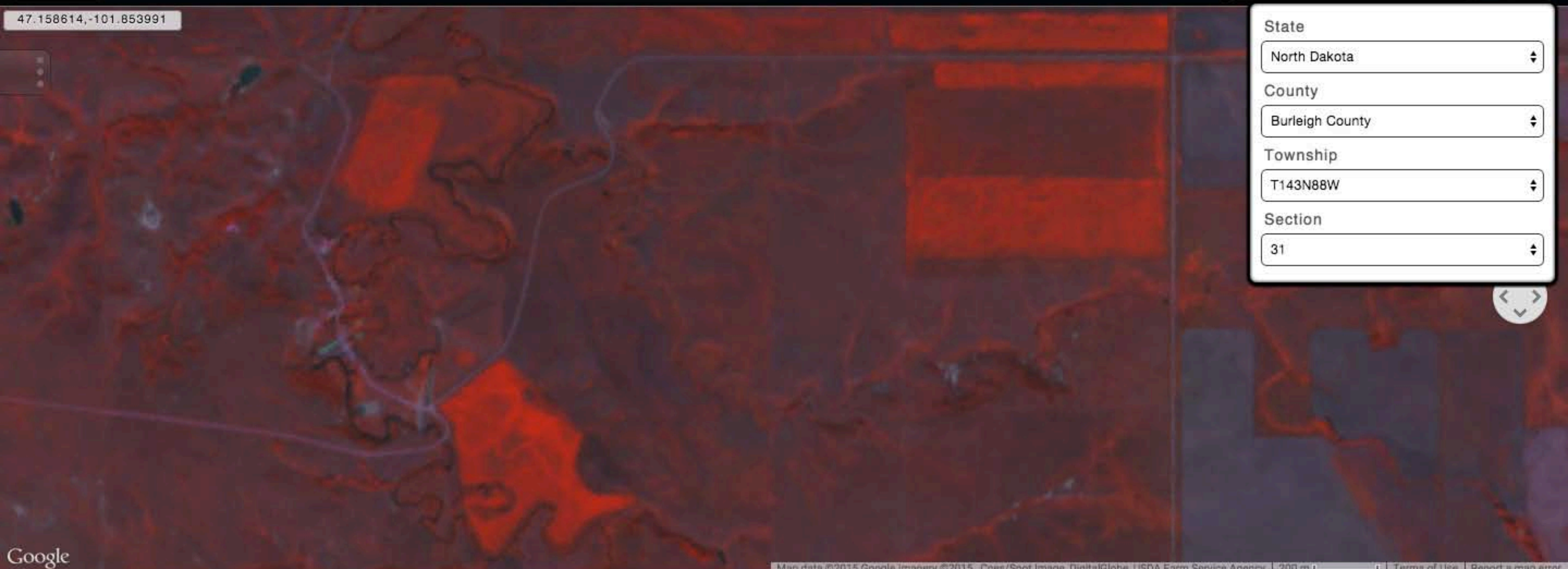
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- DATASETS
- PHOTOS

Map Layers

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State

County

Township

Section

Google

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