

**United States v. Brace et al., 17-cv-06, W.D. Pa.
Expert Report: Rebuttal of “Aerial Photography
Interpretation and Geographic Information System Analysis
of the Marsh Site, Erie County PA” by Peter Stokely**

February 21, 2018

Prepared for:

**The Kogan Law Group, P.C.
100 United Nations Plaza
Suite #14F
New York, NY 10017**

By:

Susan Kagel, M.S. Ph.D.

Kagel Environmental, LLC

Wetlands, Wildlife and Permitting Specialists

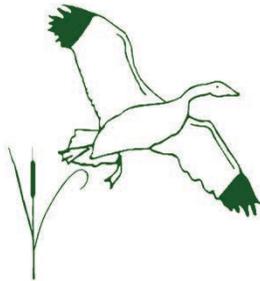
ray@kagelenvironmental.com

PO Box 597

Rigby, Idaho 83442

Phone (208) 745-0076

Cell (208) 313-3890





List of Exhibits

Exhibit #	
1	The Marsh Site as it appeared on May 10, 1975.
1A	Topographic map of the Brace Farm.
2	The Marsh Site as it appeared on May 11, 1983
3	Erie County ASC Committee Documents.
4	The Marsh Site as it appeared on June 4, 1977 compared to a nearby cultivated area.
5	The Marsh Site compared to a nearby cultivated area, 1939-1975.
6	Cultivated field east of the Marsh Site with wetness signature.
7	The Marsh Site as it appeared in April during the years of 1965, 1993, 1994 and 2009.
7A	Map showing the Marsh site has been planted in oats.
8	The Marsh Site as it appeared on November 8, 2012.
9	Elevations of the Marsh Site and surrounding areas as determined by LiDAR in 2007.
10	Elevations of the Marsh Site and surrounding areas as determined by LiDAR in 2015.
11	Mapped soils of the Marsh Site.
12	Flood hazard risk on the Marsh Site according to FEMA.



I. DECLARATION OF SUSAN KAGEL

I, Susan Kagel, have been designated as an expert witness for the defendants in the case of *United States v. Brace et. Al., 17-cv-06, W.D. Pa.* I submit the following declaration on behalf of the Defendants. I submit this report in rebuttal to the expert report prepared and submitted by Peter Stokely of the EPA on behalf of the United States in this matter.

II. INTRODUCTION

1. As set forth in my curriculum vitae, which was provided to government counsel on February 21, 2018, I am a Wetland Scientist, with over ten years of experience in wetland investigation, including extensive experience in wetland delineation using soils, hydrology, and vegetative data as well as historic aerial photography interpretation in connection with (1) the assessment of alleged violations of Section 404 of the Clean Water Act (“CWA”); (2) routine wetland delineations; and (3) problematic and/or challenging wetland delineations. In completing these assessments and delineations, I collect and analyze data to determine the hydrologic properties of various wetlands and wetland systems, as well as their physical, chemical and biological relationships to downstream wetlands and water bodies.
2. I am familiar with basic farming practices from both personal experience and classwork. I was raised on a small farm, spent many hours on farms as a young adult, was actively involved in the Future Farmers of America, and contemplated a career in farming.
3. I received a Bachelor’s of Science in Agriculture from the University of Missouri in 1982 and a Master’s of Science in Animal Science (with an emphasis on pasture management) from the University of Nebraska in 1986. I served as a pasture specialist for 3M in 1985-1986. While at 3M, I oversaw the application of the plant growth regulator mefluidide and collected and analyzed data regarding the effects of mefluidide on forage yield and quality and on the weight gain of animals whose food source consisted of treated pastures.



4. I received my Ph.D. in Veterinary Molecular Biology in 1996 from Montana State University. I completed my four-year postdoctoral fellowship on bacterial toxin metabolism and biology 1996-2000 at Children's Hospital in Boston, which is a Harvard Medical School teaching hospital. Following the postdoctoral fellowship at Harvard, I served as a Senior Scientist, and later as the Director of Pre-Clinical Research in vaccine development for LigoCyte Pharmaceuticals in Bozeman, Montana. All of these experiences developed and refined my ability to scientifically address a variety of biological questions, from interactions between animals and their environment (ecological considerations) to examining man-induced changes on animals and their environment.
5. In 2007, I joined Kagel Environmental, LLC ("KE") and began full-time training as a wetland scientist under former United States Army Corps of Engineers ("USACE") Training Officer Ray Kagel, M.S., P.W.S. In the past ten years, I have participated in over 135 wetland jurisdictional determinations, including more than 30 violation cases. I have personally conducted approximately 70 complete wetland delineations that were submitted to and approved by the USACE.
6. Since 2014, I have been KE's primary wetland delineation report writer.
7. Since approximately 2014, I have been equally responsible for the determination of the wetland/upland boundaries with my business associate, Mr. Ray Kagel. In 2016, I was primarily responsible for boundary determination for a 2,500-acre wetland delineation KE conducted. I utilized a combination of traditionally collected field data (soils, vegetation and hydrology), LiDAR and aerial photography analysis. My work was validated on this large and controversial project by the Utah field office of the Sacramento District of the USACE, when they issued an Approved Jurisdictional Determination of the wetland/upland boundaries I determined with remote sensing. Through this exhaustive study, I developed



considerable experience and knowledge of aerial photographic interpretation, as well as the use of LiDAR to accurately set wetland/upland boundaries.

8. I have completed various online and field courses, including Basic Wetland Identification and Delineation (Wetland Training Institute) and Problematic Wetland Delineations (Wetland Training Institute) where I presented several of the challenging and difficult wetland delineation cases that KE has completed. I also completed a Hydric Soils field course (North Carolina State University). I have spent many hours studying aerial photography analysis over the last several years in order to become familiar with procedures, as well as shortcomings and strengths of the techniques for my own use in large area wetland delineations as well as forensic wetland delineations. Each project that I have engaged in has sharpened my skills and increased my confidence in what remote sensing and photographic information does or does not indicate a wetland.
9. I am very competent using QGIS, an open-source Geographic Information System, photographic analysis, geo-referencing files, and analyzing LiDAR and DEM (Digital Elevation Model) files.
10. We have and utilize stereo-optical equipment to analyze aerial photography where it can provide useful information.
11. I have served as an expert wetland delineator and wetland violation resolution expert for approximately thirty separate violation cases across the country. With KE, I have completed numerous forensic wetland delineations, analyzed wetland functions and values retrospectively as well as currently, and gathered and presented defensible data supporting our conclusions.
12. Nearly all of these cases have been resolved before they went to trial. I believe our success



in avoiding costly trials for our clients has been due in large part to the collection of solid, convincing data by KE that allowed legal counsel to negotiate successfully with the government.

13. I have been designated as an expert for the Defendant in the areas of wetland delineation, jurisdictional determination and aerial photography analysis. Here, I relied on my expert experience to determine that (1) the Marsh site has operated as a farm continuously for the past seventy-nine years, and (2) it is simply impossible for anybody to determine they wetland status of the Marsh Site based upon the aerial photography, remote sensing, and GIS analysis as Mr. Stokely described without at least some rudimentary ground-truthing at or near the date when the individual historical images were collected.
14. My professional environmental consulting rate is \$150/hour and for court testimony, depositions and preparation, my rate is \$200/hour. For this rebuttal report I made a good faith flat fee estimate to Mr. Brace for \$4,750 anticipating that I could complete it in approximately 30 hours. Preparation of the report actually required 66 hours. Since Mr. Brace lacks the financial resources of the United States which can pay Dr. Brooks for all the hours he worked, I have volunteered 36 hours of my time *pro bono*.
15. I have conducted extensive study of historical aerial photography of the area surrounding the Marsh site, soil survey reports, and available weather data from all of the nearest weather stations.
16. I also have analyzed extensively historical and current aerial photography, Google Earth, available maps including the NRCS Soil Survey and National Wetland Inventory, the reports of others including "*Field Investigation – May 24, 1989, May 16-17, 1990 Potential*



*Violation (Robert Brace) Erie County, Pennsylvania*¹, field reports, data forms and photography of government employees and private consultants hired by the government related to the Marsh site and the larger Brace farm. I also have examined weather data from nearby weather stations in order to include weather effects in my analyses.

17. In this rebuttal report, I address the “Aerial Photography Interpretation and Geographic Information System Analysis of the Marsh Site, Erie County, PA” (December, 18, 2017, hereafter referred to as the “Stokely Report”), prepared by Plaintiff’s expert Peter Stokely and conclude that the images Stokely relies upon do not show that the Marsh Site historically has had wetlands over 18+ acres.

III. METHODS

18. In my report and analyses, I reviewed the methodologies and analyses of Plaintiff’s expert’s analysis and conclusions on the following issues: (1) the existence and locations of wetlands, tributaries, and connections to downstream waters on the Marsh Site of the Brace farm; (2) to describe any impacts or disturbances to the wetlands.

19. I applied methods and standards generally used by wetland scientists and professionals to determine jurisdictional wetlands, including, but not limited to, the evaluation of soil survey information, aerial photography, GIS analysis, LiDAR analysis, stereoscopic review of historic aerial photographic pairs, and digital elevation analysis. I also obtained aerial photographs using Google Earth Pro, USGS EarthExplorer, Pennsylvania Spatial Data Access, and Penn Pilot². In addition, I obtained weather records from AgACIS.

20. I conducted extensive research of published literature, the plaintiff’s experts’ previous reports, publications and presentations, and publications and presentations of other experts in

¹ Authored by Charles Rhodes Jr., Arthur Spingarn, Peter Stokely, Jeffrey Lapp, and James Butch.

² <http://www.pennpilot.psu.edu>



the relevant fields. These resources are listed as footnotes and/or on the attached list of references.

21. By applying my thorough understanding of the generally accepted methods and techniques of wetland delineation (i.e., the three parameter approach of examining soils, vegetation and hydrology set forth in the 1987 Manual and 2012 Regional Supplement³), aerial photography review, GIS analysis of LiDAR, referencing supporting maps and written materials, and the absolutely critical importance of ground-truthing conclusions based upon aerial analysis, I was able to determine the ways in which the Plaintiff's expert failed to follow correct methods, techniques, and analyses, why his conclusions are unscientific, unsupported and wrong, as well as what should have been done to properly evaluate the issues at hand in this litigation.

22. Below, I discuss my findings, and I refer to maps, diagrams, tables, photographs, and other documentation set forth in the References section, in order to better explain my findings.

IV. THE PLAINTIFF'S INTERPRETATION OF AERIAL PHOTOGRAPHY IS OVERREACHING, FLAWED, SCIENTIFICALLY UNSUPPORTABLE, AND UNRELIABLE.

23. I reviewed Mr. Stokely's written statement "Wetlands are a landscape feature that can be identified from aerial photography based on their shape, size, texture, landscape position, vegetative cover, and evidence of water or high soil moisture. The combination of landscape position (depressions, low gradient drainage areas, flood plains, adjacency to lakes, estuaries, streams or other water features), with characteristic vegetation cover (emergent, shrub or forested vegetation) and indications of water (standing water, wetland drainage patterns, persistent ground moisture conditions and dark photographic tones) form an identifiable

³ Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0, January 2012.



“signature” of a wetland area on aerial photography.” Stokely report at 2. Mr. Stokely is wrong in stating that wetlands can be accurately identified via aerial photography.

Jurisdictional wetlands, i.e., those subject to Section 404 of the Clean Water Act (CWA), can only be legally and positively identified using the 3-Parameter Approach, promulgated in the 1987 Corps of Engineers Wetland Identification Manual (“87 Manual”) and the relevant supplement.⁴ The 3-Parameter Approach requires the examination and documentation of a hydrophytic vegetative community, hydric soils, and wetland hydrology. In fact, the National Research Council in their 1995 report stated “*Delineation of wetlands by offsite methods is subject to errors that do not affect delineation by use of data collected directly from the field. Offsite methods should be used only when their inherent limitations are recognized*”⁵

24. I also reviewed Mr. Stokely’s statement: “Disturbances to wetlands **generally have a distinct signature** (emphasis added)... Disturbances to wetlands include, but are not limited to, mechanical land clearing, grading, plowing, and the presence of man-made structures (including construction of roads, houses, commercial buildings, dams, levees, dikes, and ditches). Each of these disturbances exhibit unique combinations of size, shape, photographic tone, texture and association that make them identifiable on aerial photographs.” Stokely at 2. These signatures that Mr. Stokely describes clearly apply to non-wetlands (uplands) also, so they actually have NO usefulness for identifying disturbances unique to wetlands.

25. It is intuitively impossible to document the three wetland parameters required for

⁴ Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0, January 2012.

⁵ Wetlands: Characteristics and Boundaries. Committee on Characterization of Wetlands, National Research Council. 1995. <http://www.nap.edu/catalog/4766.html>. Page 190.



determination of jurisdiction with even a reasonable degree of certainty from aerial photography. Contemporary ground-truthing, i.e., comparison of on-the-ground conditions in a similar time period to what is being observed in an aerial photograph is required for calibration of aerial signatures to wetland characteristics. In addition, it must be shown that the wetland signatures used are unique to wetlands or wetland conditions. In my experience, gathering actual soils, vegetative and hydrology data of the site in question, and then correlating them with aerial photography is of paramount importance. Without utilizing the pertinent associated ground data such as vegetation present, soil saturation and edaphic characteristics to verify photographic interpretation, any observations of “wetlands” on historic photographs can, at best, be only suggestive. Mr. Stokely does not report any such verification of historical signatures because such data is extremely rare or simply not in existence. However, Mr. Stokely does not report any data supporting the differentiation of wetlands from uplands even using more modern high-resolution photography. Without the demonstration that the boots-on-the-ground data are correlated with clearly defined signatures unique to regulated wetlands, concluding what is a jurisdictional wetland and what is not, is simply not supportable scientifically.

26. “Delineation of wetlands by offsite methods is subject to errors that do not affect delineation by use of data collected directly from the field. Offsite methods should be used only when their inherent limitations are recognized”.⁶
27. It also is not possible to make reliable conclusions of the vegetative species present in historic photographs, unless they have a very unique signature that has been rigorously documented, such as has been done for certain forestry applications utilizing Color Infrared (CIR) photography. Mr. Stokely does not even utilize any of the available CIR photographs

⁶ Wetlands: Characteristics and Boundaries. Committee on Characterization of Wetlands, National Research Council. 1995. <http://www.nap.edu/catalog/4766.html>. Page 66.



which are informative as to where rapidly growing vegetation is present and where it is not.

28. The most ambitious and substantiated mapping of wetlands has been done by the U.S. Fish and Wildlife Service (FWS) National Wetland Inventory (NWI) website. The purpose of the NWI is to define where potential wetlands might occur via extensive mapping utilizing aerial photography, often with stereoscopic analysis. The NWI does offer a rather robust statement of data limitations, exclusions and precautions. The NWI National Wetlands Mapper states in its data limitations: “Accuracy of image interpretation is dependent on the quality of the imagery, experience of the analyst, quality of collateral data and the *amount of ground truth verification work conducted.*”⁷ (Emphasis added.) The implication is that without sufficient ground truth verification, the image interpretation is not necessarily accurate.
29. To further highlight the lack of accuracy and reliability of determining wetland presence and extent through the analysis of aerial photography, the NWI Wetlands Mapper requires users to accept the following as a term and condition before use: “The map displays at this site show wetland type and extent using a biological definition of wetlands. **There is no attempt to define the limits of proprietary jurisdiction of any Federal, state, or local government, or to establish the geographical scope of the regulatory programs of government agencies.**”⁸ (Their emphasis.) The implication is that aerial photography and NWI findings should not be used to determine extent and location of regulated wetlands. KE has personally been on a number of sites where the NWI indicated wetlands and none actually were there, as well as the opposite; i.e., there actually are wetlands present but they are not mapped.
30. I examined all of the photography and GIS data that Mr. Stokely reported that he relied upon

⁷ <https://www.fws.gov/wetlands/data/Limitations.html>

⁸ <https://www.fws.gov/wetlands/data/Mapper.html>



to form his opinions, except where I could not find the information even after extensive searching of the sources named in his report. Most of these photographs were easily obtained by KE from the USGS or PASDA.

31. In general, I agree with Mr. Stokely's conclusions that photography through 1965 shows that at least some of the Marsh site was under active cultivation. Stokely at 3. However, Mr. Stokely's implication that cultivation of the Marsh site ceased by 1977 (Stokely at 3) cannot be determined by the 1977 aerial photographs presented (Figures 5 and 5a, Stokely at 18 and 19), and is not supported by the provided data. The NRCS defines cropland as "areas used for the production of adapted crops for harvest. Two subcategories of cropland are recognized: cultivated and non-cultivated. Cultivated cropland comprises land in row crops or close-grown crops and also other cultivated cropland, for example, hay land or pastureland that is in a rotation with row or close-grown crops. Non-cultivated cropland includes permanent hay land and horticultural cropland."⁹ Looking at a single photograph from 1977 does not impart any information as to the history of the site between 1965 and 1977 (a gap of 12 years), such as rotational cropping, or permanent hay production. Similarly, the next evidence of site usage Mr. Stokely provided is shown by an aerial photograph obtained in April of 1993, after a gap of 16 years. An aerial photograph shows a snapshot of what is present at the time of collection, but cannot infer anything substantial about the past or future. Any opinions of Mr. Stokely of the history of the Marsh site between 1965 and 1993, based upon the provided data, is simply speculation and should be represented as such.
32. Although Mr. Stokely infers that there is no cultivation of the Marsh Site in 1977, based upon the June 4, 1977 aerial photograph. (Stokely at 3) KE has examined the original photograph (based upon the listed file name) from USGS, and the resolution simply does not allow much

⁹ <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/landuse/crops/>. Accessed 1/30/2018.



conclusion of anything other than where roads are, intermittent parts of Elk Creek (based at least partially upon where it appears on other photographs), and potential clumps of trees. There is no way to pick up anything other than very different signatures using this photograph, or even the location of individual trees. To ensure that more information cannot be obtained from this photograph, I manipulated sharpness, contrast and exposure in Adobe Photoshop Elements (Version 14), and there simply was not sufficient resolution to pick up even individual trees clearly, much less crop rows. Also, by June of 1977, any crops planted in April or May would likely have enough foliage produced to make it difficult to tell if there was active cultivation earlier in the year.

33. I found a USGS photograph covering the site from May 10, 1975 that Mr. Stokely did not report reviewing, although it was easily obtained from the EarthExplorer site. The photograph can be seen at Exhibit 1. More than ½ of the Marsh Site (located on Parcel ID# 31-016-063.0-002.00) (Exhibit 1A) appears very similar in tone, texture, etc. to nearby areas that are consistently cultivated and presumed upland, and thus it is reasonable to think that there is not a significant difference in the factors affecting “signature” in the light areas of the Marsh Site and the cultivated farm fields nearby.
34. I found a CIR photograph from May 11, 1983 (Exhibit 2) via the web-based Pennsylvania Imagery Navigator (PIN)¹⁰. Mr. Stokely did not report reviewing this image, although he did obtain other images from the same database. This image is significant as it is relatively close in time (Sept. 1988) to when Mr. Brace received written confirmation from the U.S. Department of Agriculture’s Agricultural Stabilization and Conservation Service (ASCS) (now part of the Farm Service Agency) that a portion of the site (Field 15, located on Parcel ID# 47-011.-004-0-003.00) (Exhibit 1A) had been granted the designation of “commenced

¹⁰ <http://maps.psice.psu.edu/ImageryNavigator/>, PIN referenced the USDA Farm Service Agency as the original source of the photograph.



conversion” – i.e., that it had actively begun being converted to cropland on or before December 23, 1985 (Exhibit 3).

35. CIR photography is useful in agricultural and ecological monitoring because it captures green, red and reflected infrared light reflectance¹¹. The result is false color prints, where vegetation shows up as darker red when healthy and growing vigorously, but can vary considerably by plant species, phenology or stress. The USGS states¹² “As plant vigor decreases, the vegetation will show as lighter shades of red and pink, various shades of greens, and possible tans. Dead vegetation, wheat stubble as an example, will often be shades of greens or tans.” Exhibit 2 shows that in May, 1983, the Brace site did not exhibit signs of vigorously growing vegetation anywhere in the upper half of the property, despite the growing season being well underway. The lower part of the property does exhibit a signature typical of faster growing vegetation, as well as dark, rough spots that probably represent slow-growing shrubs or saplings, although their heights are not easily determined without a stereoscopic view of a higher resolution photograph than was available. In fact, the Marsh Site features in May of 1983 appear to be very similar to those apparent in the May, 1975 photograph (Exhibit 1), where, based upon Mr. Stokely’s criteria of having a smooth-texture and angular features (Stokely at 3), there appears to be cultivation on the Marsh Site.

36. Mr. Stokely states “No cultivation was visible on the aerial photography of the Marsh Site after the 1960s” (Stokely at 4), however, he apparently did not examine or chose to ignore the 1975 or/and 1983 photographs. These photographs provide important evidence that the Marsh Site has features associated with cultivation well after the time that Mr. Stokely asserts that cultivation had ceased.

¹¹ <http://casde.unl.edu/activities/cir-uses/vegetative-response.php>

¹² https://www.usgs.gov/faqs/what-do-different-colors-a-cir-aerial-photograph-represent?qt-news_science_products=7#qt-news_science_products



37. Mr. Stokely based his conclusion that cultivation had ceased in the 1960's on a 1977 aerial photograph of poor resolution (Stokely Figures 5 and 5a). However, much of the Marsh Site actually looked very similar to a nearby area (Exhibit 4) that was clearly cultivated regularly until at least 1993 (Exhibit 5). An important factor to also consider is that the 1977 photograph was taken in June, after the growing season was well underway and some cropped areas could exhibit considerable vegetative growth, which would obscure the "smooth texture" that Mr. Stokely states is a signature of cultivated areas. Based upon the 1977 photograph's poor resolution, the similarity of the Marsh Site to Area 1 on the 1977 photograph, and the time of year that the 1977 photograph was captured, it is my opinion that the 1977 photograph by itself does not prove or disprove cultivation that year.
38. Mr. Stokely's conclusion that cultivation had ceased in the 1960's based upon a 1977 aerial photograph of poor resolution (Stokely Figures 5 and 5a) is even less scientifically defensible and credible, considering Mr. Robert Brace's actual activities on the Marsh farm tract from 1976 through at least 1984. It is my understanding that, during 1976, Mr. Brace had acquired the legal right per handshake agreement with Mr. Marsh to farm the two tax parcels comprising the Marsh tract (para. 31-32, above), which continued until sometime in 1994. It also is my understanding that, during 1977, Mr. Brace worked to clear beaver dams and create and maintain drainage ditches integrated with the drainage ditches of the other contiguous and/or adjacent farm tracts to facilitate the irrigation of croplands he intended to establish on those tracts as part of the expansion of an USDA Soil Conservation Service-authorized Soil and Water Conservation Plan Mr. Brace had originally acquired from his father, Charles Brace. Furthermore, it is my understanding that, during 1984, Mr. Brace entered into a written agreement with the former owner of the property immediately to the north of the Marsh tract bordering on the intersection of Sharp and Greenlee Roads (Parcel ID# 31-016-063.0-002.00) which authorized Mr. Brace "to keep the drainage ditch located



along Sharp Road running south from Greenly Road to James E. Marsh property, clear of all debris and/or beaver dams so long as it is in agreement with the proper authorities. This agreement being made to keep adjoining property, including that of Robert Brace, from becoming flooded or damaged from high water.” It is my understanding, moreover, that this agreement continued until sometime in 1994. Lastly, it is my understanding that in July 2012, shortly following Mr. Brace’s acquisition of the Marsh property in May 2012, he secured an easement from the new absentee (NY) owner of the property immediately north of the Marsh tract that authorized him to “clean and the drainage ditch located on [his] property.” The aerial photographic images set forth in Exhibit 7, if nothing else, would appear to corroborate that the activities Mr. Brace had been authorized in 1976, 1977 and 1984 to undertake on the two tax parcels comprising the Marsh site had actually taken place during the period spanning from 1976 to 1994, and thus, significantly undermine Mr. Stokely’s conclusion that cultivation had ceased in the 1960’s.

39. Mr. Stokely simply did not consider all the available evidence in his analysis. Although I understand that he was a witness in the case, Mr. Stokely did not consider a hand-drawn map that was a legal exhibit in previous litigation that shows the Marsh Site as being planted with oats. This map is presented here as Exhibit 7A. This map was created circa mid-1980’s, and is further support that cultivation continued at least decades past when Mr. Stokely claimed it ceased based upon his analysis of aerial photography.
40. Mr. Stokely infers that the “overgrown condition” on his Figures 8 and 8a, as evidenced “by the widespread rough textures of tall herbaceous and shrubby vegetation and scattered trees” is equivalent to a “wetland condition”. (Stokely at 4.) If all “overgrown” areas with “tall herbaceous and shrubby vegetation and scattered trees” evidence a “wetland condition”, there are huge swaths of previously unidentified wetlands surrounding the Marsh Site as shown on aerial photography, including those areas not identified by the NWI, where the soils are



clearly not hydric, and in areas where there is no source of wetland hydrology due to being of high elevation well removed from the water table, any creeks or other water conveyances. In an area of relatively high rainfall (>40 inches annually), “overgrown” and “wetland” are of spurious relationship.

41. Mr. Stokely concluded that the Marsh Site had reverted to “wetland conditions over the majority of the site” after the 1960s. Stokely at 4. He also states that he concluded the wetlands “mapped in 2009” existed over most of the site historically as well. He states “Based on the review of the entire aerial photographic record and collateral information described in the next section I conclude the wetlands mapped in 2009 existed over most of the site historically as well.” Stokely at 4. Mr. Stokely apparently expects the reader to rely upon his stated “expertise” as evidence, and he does not provide any scientific basis or data for his conclusions.

42. Mr. Stokely does not mention the effect of precipitation, weather and growing season on photographic signatures, which clearly would affect soil moisture signatures. In fact, the National Research Council states “As with any hydrologic interpretation, soil moisture and antecedent precipitation must be considered”¹³ For example, Exhibit 6 shows that on October 6, 2011, the cultivated field to the east of the Marsh Site has darker areas with diffuse edges that could be interpreted as having high soil moisture. However, precipitation in 2011 was above normal (140%+ of average), and in the previous five days, more than 1.4 inches of rain had fallen in the area¹⁴ which had certainly affected the soil moisture signature. Without taking antecedent rainfall into consideration, areas of those fields are easily concluded falsely to have wetland hydrology.

¹³ Wetlands: Characteristics and Boundaries. Committee on Characterization of Wetlands, National Research Council. 1995. <http://www.nap.edu/catalog/4766.html>. Page 191.

¹⁴ weather reference



43. Mr. Stokely states that he reviewed “historical and recent aerial photography for signature of wetlands and wetland boundaries”. Stokely at 4. He does not describe any other signatures that he considers typical of wetlands in addition to being “overgrown”. He also does not describe how he determines “wetland boundaries”. His mapping of wetlands by aerial photography does not appear to be based upon clear features that a neutral party with reasonable training could replicate.
44. Mr. Stokely reported using photographs of seasonal, leaf-off aerial photography to identify ground surface and soil moisture. The photographs taken in April appear to have some, but not all trees that are “leaf-off”, but Mr. Stokely does not show any other leaf-off photos.
45. Exhibit 7 shows the available April photographs by year. April is a time that would normally be considered of peak wetland hydrology. It should be noted that each of the years represented had normal precipitation¹¹. In my opinion, the black and white photographs of 1965 and 1993 are not of sufficient resolution to tell with any assurance what soils are wet (darker with diffuse boundaries, my interpretation) and what are not. In fact, in the 1965 photograph, the cultivated (upland) field immediately south of the Marsh Site appears to exhibit more dark, moisture-like patterns than the actual Site. Exhibit 8 shows a November 8, 2012 aerial photograph of the Site, during a time that is normally leaf-off. Although there does appear to be a slight dusting of snow, most of the Marsh Site surface looks exactly like most of the surrounding upland cultivated areas. There are some darker areas associated with Elk Creek along the east side of the site, which could potentially be associated with higher ground moisture. An on-the-ground examination of soil moisture and soil characteristics in and out of the darker areas would be necessary to confirm the association of color with moisture before using the photograph for wetland mapping. Mr. Stokely does not report examining this photograph, which is available via the USGS EarthExplorer.



46. Mr. Stokely reports that he considered topographic relief in association with aerial photography to form his opinions. However, he does not explain or show what topographic information he used, how he considered it or how it affected his conclusions.
47. Exhibit 9 shows a DEM¹⁵ model which reveals topography as measured by LiDAR in 2007. Elevation differences are broken into 2 foot categories, and colored from very dark blue-black (1216 feet) to white (1232 feet)¹⁶. Exhibit 10 shows a DEM model as measured by LiDAR in 2015¹⁷, where the results are very similar and confirm that the data is repeatable. Exhibits 9 and 10 show that the property is highest in the southwest corner, with elevations being 1230-1232 feet. The property slopes north and east, with the lowest elevations being along the northern part of Elk Creek in the vicinity of the Marsh Site, which are approximately 1218 feet in elevation. What is most noteworthy is that the elevation drops approximately 14 feet across the property, with the majority of the Site being at least four feet above the level of Elk Creek's channel. This significant change in elevation has important implications as to site hydrology and location of any wetlands. The definition of wetland hydrology requires at least 14 consecutive days, within the growing season, where the ground surface is inundated, ponded or saturated to the soil surface ('87 Manual), or a water table being within 12" of the soil surface for the same length of time (Regional Supplement). The water table will typically be at the same elevation as the water level in any nearby water features, such as Elk Creek. Unless the site is flooded by the Creek for a significant stretch of time in five out of ten years, it does not appear that Elk Creek is a significant source of hydrology to support wetlands for most of the Site.

¹⁵ http://www.pamap.dcnr.state.pa.us/pamap/data_source.aspx

¹⁶ EPSG:102728, NAD_1983_StatePlane_Pennsylvania_North_FIPS_3701_Feet

¹⁷ <ftp://ftp.pasda.psu.edu/pub/pasda/seagrant/2015/LiDAR/dem/>



48. Photographs I have examined of Elk Creek¹⁸ in the vicinity of the Marsh Site appear to show Ordinary High Water Mark (OHWM) as being significantly (>12”) lower than the nearby bank tops and surrounding fields. Official soil descriptions of the major components of the soil types mapped to the Marsh Site do not mention a high water table during the conventional growing season (April to October), so groundwater does not appear to be a major influence. Because the site is generally sloped towards Elk Creek, the majority of precipitation reaching the site would be expected to become runoff into Elk Creek. In short, there are no hydrological resources apparent that could support wetlands across the Marsh Site. To conclude otherwise without direct data, such as could easily be provided by groundwater monitoring wells (which there was ample time to utilize since the alleged violation in 2012), is not scientifically supported and is actually speculation.
49. Mr. Stokely does not explain or even hypothesize what the hydrology source is to support the 18.5 acres of wetlands he mapped on the Marsh Site. There are no mentions of precipitation, ground water, water table, runoff, or flooding specifically as a source of hydrology to the Site. In my opinion, any conclusion that wetland hydrology exists must include some understanding of the source. Without a source of hydrology, wetlands cannot exist.
50. Mr. Stokely states that the wetlands he mapped correspond to “wet soils mapping”. Stokely at 6. I believe that Mr. Stokely actually means “hydric soils mapping”. As any good wetland scientist knows, hydric soils are not necessarily wetland soils, as hydric features formed decades to centuries earlier persist until pedogenic processes evolve sufficiently to reflect current conditions¹⁹. A Google search for “wet soil maps” produces no results, and there are

¹⁸ United States v. Brace et al., 17-cv-06, W.D. Pa. Expert Report: Ecological Functions and Connections of Wetlands and Waters at the Marsh Site, Waterford, Erie County, Pennsylvania. Robert P. Brooks, December 18, 2017. Figures 15,16.

¹⁹ Wetland Soils: Genesis, Hydrology, Landscapes and Classification, Second Edition. 2016. M.J. Vepraskas and C.B. Craft, Editors, p. 342.



no existing “wet soil” maps of which I am aware.

51. Exhibit 12 shows the soil types mapped to the Marsh Site by the NRCS. Map Unit Cc is Canandaigua Mucky Silt Loam and makes up the majority of the Site. Mr. Stokely describes the Canandaigua Mucky Silt Loam as being “frequently ponded”. Stokely at 5. It is unclear how Mr. Stokely came up with being “frequently ponded” as a characteristic for this soil type, as the Official Soil Description (OSD) for the Canandaigua series²⁰ only mentions ponding in relation to surface runoff, and certainly does not cite ponding as a “frequent” event. The Mill series is listed as a 10% inclusion, and “frequent *brief* ponding” (emphasis added) during periods of heavy rainfall and snowmelt is cited in the OSD²¹. The other inclusion (5%) is the Carlisle series, and ponding is not listed as a characteristic in the OSD²². Also, no ponding is visible in the area mapped as Canandaigua Mucky Silt Loam in any of the aerial photographs I reviewed or that Mr. Stokely presented. Clearly, frequent, extended ponding that would be needed to support wetland hydrology is not a recognized characteristic of these soil types.

Map Unit RhB is Red Hook Silt Loam, 3 to 8 percent slopes, and is mapped as underlying a relatively narrow strip along the southern end of Sharp Road. RhB is a somewhat poorly drained soil. Map Unit PtB is Pompton Silt Loam, 3 to 8 percent slopes and overlaps a very small strip along the southern edge of the Site. PtB is a moderately well drained soil.

Map Unit Wc is Wick Silt Loam and is mapped as lying on either side of Elk Creek within the flood plain. This major component of this particular soil, the Wick series, is described as being subject to frequent flooding for brief to long duration²³, as well as having a water table approximately 1 foot from the surface from November to June (mostly outside the growing

²⁰ https://soilseries.sc.egov.usda.gov/OSD_Docs/C/CANANDAIGUA.html

²¹ https://soilseries.sc.egov.usda.gov/OSD_Docs/M/MILL.html

²² https://soilseries.sc.egov.usda.gov/OSD_Docs/C/CARLISLE.html

²³ https://soilseries.sc.egov.usda.gov/OSD_Docs/W/WICK.html



season) during normal years. Again, ponding does not appear to be a factor *under normal conditions*.

52. It is my conclusion that Mr. Stokely did not actually examine the official soil descriptions, or he misrepresented them based upon the incorrect statements he made in his report concerning the soils mapped to the Marsh Site.
53. Exhibit 11 shows the FEMA flood hazard risk for the Marsh Site. The zone where FEMA estimates that there is 1% chance of flood annually zone (Zone A) is shown in green. This zone correlates well with the 1222 ft elevation contour as it was determined by 2015 LiDAR (Exhibit 9). A flood to the extents of the area shown in green would be considered a “100-year flood”, which is certainly not of great frequency. Based upon this map, and *under normal conditions*, I would not expect the Marsh Site hydrology to be dependent on flooding.
54. It is my understanding that in the mid-1980’s, a culvert was installed/replaced under Sharp Road where Elk Creek exits the Brace properties. The culvert was apparently installed incorrectly, as the bottom elevation is 1.75 feet higher than the bottom elevation of the culvert under Lane Road where Elk Creek passes onto the Marsh Site. This would definitely affect hydrology, and raise the water table in the immediate area approximately 1.75 feet, which would account for surface water visible in the Elk Creek flood plain in some of the aerial photos captured during between August, 2008 and October, 2011. The surface water can be distinguished by the dark blue/black (or dark brown/green in 2009) toned areas with multiple fingerlike projections where the color begins to fade out. There are some areas appearing completely smooth and flat in the areas of flooding. This particular signature does not appear where surface water is not present.
55. The effects of flooding from an improperly installed culvert should be taken into consideration when trying to correlate ground conditions before and after the installation.



Post-installation, it will be “wetter” upstream, i.e. have hydrology more likely to meet wetland requirements, for at least 1.75 feet higher in elevation. In my opinion, the Marsh Site, particularly along the east side along Elk Creek was likely much drier prior to the culvert installation.

56. Mr. Stokely states that other collateral information included field work that confirmed the presence of wetlands on the Marsh Site. He does not specifically say what field work, but presumably it is not the work of Dr. Robert Brooks, as Mr. Stokely’s wetland boundaries do not coincide with those put forth by Dr. Brooks²⁴. Mr. Stokely also does not report any field work that he personally performed on the actual Site, nor does he provide any data forms or allude to any data collected on-the-ground in his possession. In my opinion, even if he had relied upon Dr. Brooks’ field work, that would not have been valid collateral information. My partner, Ray Kagel, PWS #2234, reviewed Dr. Brooks’ report in great detail. I also reviewed Dr. Brooks’ report, although not to the detailed level that Mr. Kagel did. However, we both concluded that Dr. Brooks’ clearly did not understand hydric soil evaluation, including correct identification of soil texture. It is also not clear that Dr. Brooks applied hydrology indicators properly. In short, Dr. Brooks’ field work was not useful (based upon his pictures and data forms) for Mr. Stokely, or anyone else, to determine the presence or absence of jurisdictional wetlands.

57. Mr. Stokely concluded that there were 18.5 acres of wetlands on the Marsh Site prior to the litigation related disturbances. The evidence he cites for this conclusion is primarily based upon the abundance of vegetation visible in historical aerial photographs, which he refers to as a “wetland signature”. Since vegetative abundance is not exclusive to wetlands, and in

²⁴ United States v. Brace et al., 17-cv-06, W.D. Pa. Expert Report: Ecological Functions and Connections of Wetlands and Waters at the Marsh Site, Waterford, Erie County, Pennsylvania. Robert P. Brooks, December 18, 2017. Appendix A, Figure 2, page 47.



fact can be seen in many surrounding upland areas, this is neither a reasonable nor scientifically defensible conclusion.

V. CONCLUSION

58. In summary, it is my professional opinion that Mr. Stokely's conclusion that the Marsh site was agriculturally abandoned by 1977 is simply not supported by the photographic record. Mr. Stokely also cites "collateral information" that actually does not support his conclusions that there are 18.5 acres of wetlands on the Marsh Site for several reasons. First, the U.S. Fish and Wildlife Service, which is responsible for the National Wetland Inventory, specifically warns against using any of the NWI information for determining the limits of jurisdictional wetlands, which Mr. Stokely has done. NWI information is for providing "reconnaissance level information" concerning the possible location, type and size of wetlands²⁵. Next, Mr. Stokely demonstrates his lack of understanding of the proper use of the National Soil Survey and the differences between soils mapped as hydric and actual wetland soils. The National Soil Survey also provides reconnaissance level information, not actual site-specific soils data. "Wetland soils" and "hydric soils" are not synonymous. Mr. Stokely also does not demonstrate that data exists correlating with what he describes as "wet" signatures in aerial photographs that allows identification of wetlands and their boundaries, without falsely identifying uplands as wetlands. These failures, in my opinion, show a lack of scientific rigor. *This is an extremely important consideration where so much is at risk for the defendants*. In addition, Mr. Stokely otherwise failed to consider the entire gamut of data that were available to him including additional, easily obtainable aerial photographs from 1975 and 1983, as well as publically available elevation data derived from LiDAR. The existence of these ignored multiple additional resources lends considerable doubt to the

²⁵ <https://www.fws.gov/wetlands/data/Limitations.html>



scientific credibility of Mr. Stokely's conclusions.



Kagel Environmental, LLC
Nationwide Wetlands, Waters & Wildlife Consulting

VI. REFERENCES USED AND SOURCES OF AERIAL PHOTOGRAPHY

Corps of Engineers Wetlands Delineation Manual, 1987. Wetlands Research Program Technical Report Y-87-1 (on-line edition).

Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region. Version 2.0, January, 2012.

Wetlands: Characteristics and Boundaries. Committee on Characterization of Wetlands, National Research Council. 1995. <http://www.nap.edu/catalog/4766.html>.

<https://www.fws.gov/wetlands/data/Mapper.html>

<https://www.fws.gov/wetlands/data/Limitations.html>

[https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/landuse/crops/.](https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/landuse/crops/)

<http://maps.psiee.psu.edu/ImageryNavigator/>

Field Investigation – May 24, 1989, May 16-17, 1990, Potential Violation (Robert Brace), Erie County, Pennsylvania. (Report.)

<http://casde.unl.edu/activities/cir-uses/vegetative-response.php>

https://www.usgs.gov/faqs/what-do-different-colors-a-cir-aerial-photograph-represent?qt-news_science_products=7#qt-news_science_products

http://www.pamap.dcnr.state.pa.us/pamap/data_source.aspx

<ftp://ftp.pasda.psu.edu/pub/pasda/seagrant/2015/LiDAR/dem/>

United States v. Brace et al., 17-cv-06, W.D. Pa. Expert Report: Ecological Functions and Connections of Wetlands and Waters at the Marsh Site, Waterford, Erie County, Pennsylvania. Robert P. Brooks, December 18, 2017.

Wetland Soils: Genesis, Hydrology, Landscapes and Classification, Second Edition. 2016. M.J. Vepraskas and C.B. Craft, Editors

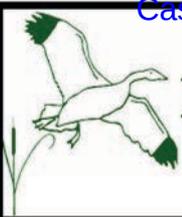
https://soilseries.sc.egov.usda.gov/OSD_Docs/C/CANANDAIGUA.html

https://soilseries.sc.egov.usda.gov/OSD_Docs/M/MILL.html

https://soilseries.sc.egov.usda.gov/OSD_Docs/C/CARLISLE.html

https://soilseries.sc.egov.usda.gov/OSD_Docs/W/WICK.html

<http://www.pennpilot.psu.edu>



Kagel Environmental, LLC

Wetlands, Waters & Wildlife Consulting

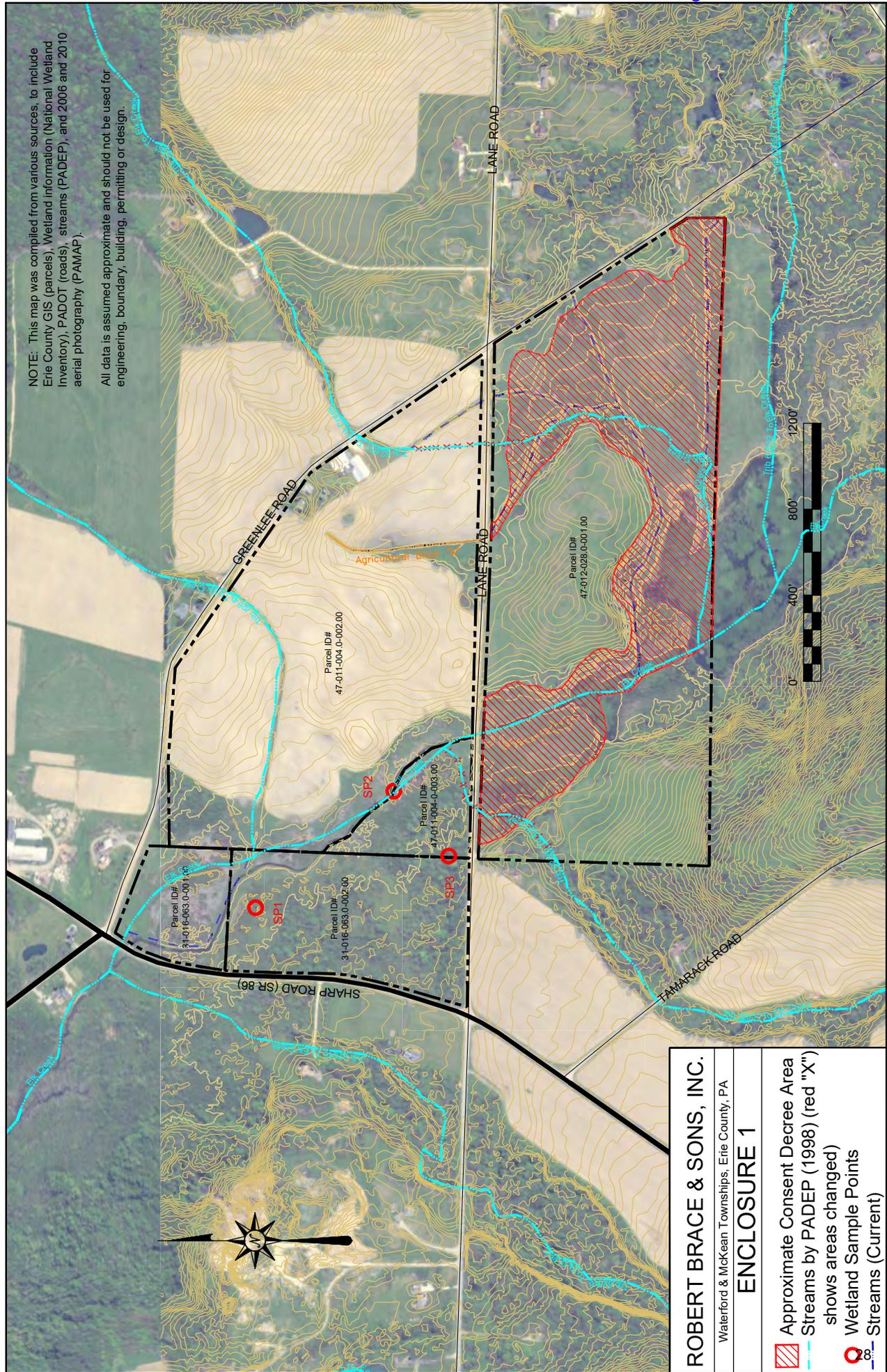


□ Marsh Site
— Elk Creek



Exhibit 1. The Marsh Site as it appeared on March 10, 1975. More than 50% of the property appears to be cleared.

Exhibit 1A





Kagel Environmental, LLC

Wetlands, Waters & Wildlife Consulting



□ Marsh Site
— Elk Creek



Exhibit 2. The Marsh Site as it appeared on March 11, 1983 using Color Infrared (CIR) photography.

Exhibit 3

Erie County ASCS Office
R.D.#5 Route 19
Waterford, PA 16441
Telephone 796-6760

September 21, 1988

Robert H. Brace
Box 338
Waterford, PA 16441

Dear Mr. Brace:

The Erie County ASC Committee, at their regular meeting on September 14, 1988, reviewed your request for Swampbuster Commenced for your farm, serial number 826, tract 1356.

After reviewing invoices that you submitted and concurrence with Lew Steckler, District Conservationist, SCS, the County Committee determined that conversion of the wetlands began before December 23, 1985, and will enable you to complete the conversion and produce an agricultural commodity on the converted wetlands without losing USDA benefits.

The County Committee determination is based on the following criteria (1) construction activities were actively started prior to December 23, 1985 as supported by invoices; (2) substantial funds have been expended in the wetlands for the direct purpose of converting the wetlands prior to December 23, 1985, as supported by invoices.

Please contact this office if you have further questions.

Sincerely,



Joseph Burawa, County Executive Director
For: Erie County ASC Committee

Enclosure

CC: Lew Steckler, D.C., SCS

U.S. DEPARTMENT OF AGRICULTURE
Agricultural Stabilization and Conservation Service

STATE	COUNTY NAME
PA	Erie
FARM NUMBER	
826	

DATA NEEDED FOR SWAMPBUSTER COMMENCED AND THIRD-PARTY DETERMINATIONS

4. AND ADDRESS OF PRODUCER

Robert H. Brace
Box 338
Waterford, PA 16441

5. TELEPHONE NUMBER (Area Code)
814-796-2529

6. GIVE LEGAL DESCRIPTION OF AREAS (Attach a photo copy and identify areas)

Erie County, Waterford Township, on South Hill Rd., east of Sharp Rd. ASCS tract 1356

	YES	NO
7. Has a wetland determination been completed by SCS? (If no, a wetland determination is needed to consider a commencement request.) (If yes, are the areas in question determined to be wetlands.)	X	
8. Has any action (dirt moved) been taken to convert the wetland(s)? (If yes, what date <u>4-28-77</u> and what action was taken to convert the wetland(s) <u>ditching, tile, dozing</u>)	X	
8. What information is available to document the action to convert the wetland and the date? (For example, ASCS photos, canceled checks, contracts, who completed the work, etc.)	X	
10. Have you spent or legally committed substantial funds for "supplies or materials for the primary and direct purpose of converting the wetland" prior to December 23, 1985? Equipment purchases, such as tractors or scrapers, do not apply. Expenses for planning, such as attorney's fees, mileage, telephone calls, or surveying, do not apply. Date materials were purchased <u>4-28-77</u> thru <u>5-8-87</u> and the amount <u>28524.00</u>	X	

11. Provide copies of documentation; such as canceled checks, invoices, etc. Date a contract to move dirt was entered into _____ provide a copy of the contract. Breakdown, by amount to whom the funds were committed and the purpose of each.

NAME OF INDIVIDUAL(S) FUNDS COMMITTED TO AND PURPOSE OF EACH	AMOUNT	TOTAL PROJECT COSTS	FUNDS COMMITTED TO DATE
A	B	C	D
Statements attached	28524.00		28524.00

12. Explain what has been done to establish the fact that you have actively pursued the completion of the project.

Purchased home farm in 1976. Work is continuous, substantiated by invoices

13. Has a crop been planted in the wetland in the current year? (If yes, what date May 1987.)

14. Is the request within the boundary of a drainage district? (If yes, a detailed plan must be submitted.)

No.

15. Is this a request for an exemption because of a third-party drainage? (If yes, provide full details of why and how you were not involved, in any way, with the drainage of the wetland.)

YES NO

16. SIGNATURE OF PRODUCER Robert H. Brace DATE Aug 31, 1988

NOTE: The granting of a commencement or third-party request does not remove other legal requirements that may be required under State or Federal water laws.

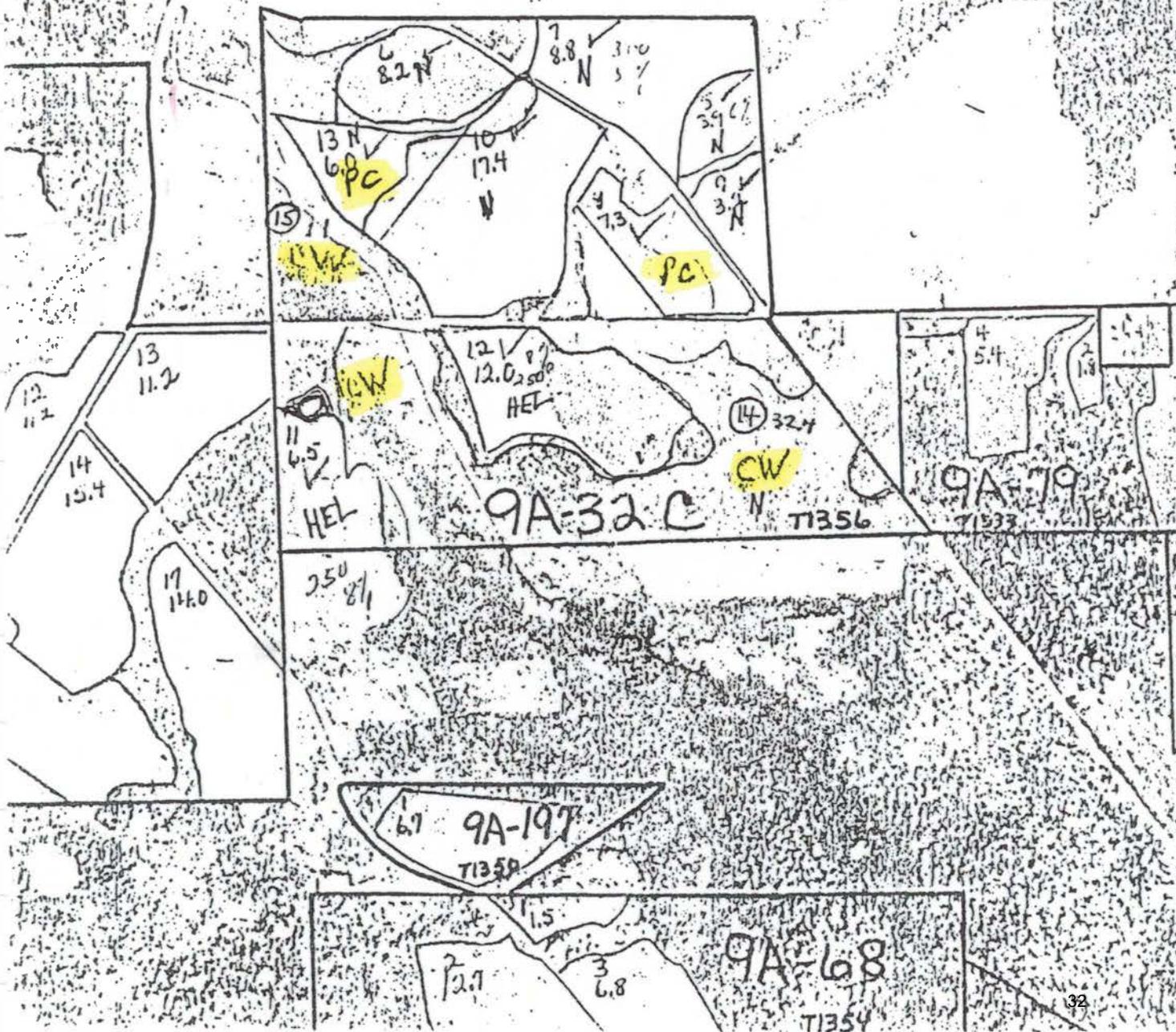
Appraisal cost meeting 7-14-88

This form must be filed no later than September 19, 1988. No commencement requests will be considered after this date.

This program or activity will be conducted on a nondiscriminatory basis without regard to race, color, religion, national origin, age, sex, marital status, or handicap.

32 Robert H. Brace
9A (c) M-11
(826) A

NOT TO SCALE



S.D.A.
Soil Conservation Service

SCS-CPA-026
(1-88)

1. Name and Address of Person

Robert H. Brose
Box 338
Waterford, Pa. 16444

2. Date of Request

9-7-88

3. County

Eric

HIGHLY ERODIBLE LAND AND WETLAND
CONSERVATION DETERMINATION

of USDA Agency or Person Requesting Determination
ASCS

5. Farm No. and Tract No.

826 T 1356

SECTION I - HIGHLY ERODIBLE LAND

6. Is soil survey now available for making a highly erodible land determination?	Yes	No	Field No.(s)	Total Acres
	X			
7. Are there highly erodible soil map units on this farm?	X			
8. List highly erodible fields that, according to ASCS records, were used to produce an agricultural commodity in any crop year during 1981-1985.			11, 12	18.5
9. List highly erodible fields that have been or will be converted for the production of agricultural commodities and, according to ASCS records, were not used for this purpose in any crop year during 1981-1985; and were not enrolled in a USDA set-aside or diversion program.				

10. This Highly Erodible Land determination was completed in the: Office Field

NOTE: If you have highly erodible cropland fields, you may need to have a conservation plan developed for these fields. For further information, contact the local office of the Soil Conservation Service.

SECTION II - WETLAND

11. Are there hydric soils on this farm?	Yes	No	Field No.(s)	Total Wetland Acres
	X			
12. Wetlands (W), including abandoned wetlands, or Farmed Wetlands (FW). Wetlands may be farmed under natural conditions. Farmed Wetlands may be farmed and maintained in the same manner as they were prior to December 23, 1985, as long as they are not abandoned.				
13. Prior Converted Wetlands (PC) - The use, management, drainage, and alteration of prior converted wetlands (PC) are not subject to FSA unless the area reverts to wetland as a result of abandonment. You should inform SCS of any area to be used to produce an agricultural commodity that has not been cropped, mowed, or maintained for 5 years or more.			1, 4, 6, 8, 10, 13	
14. Artificial Wetlands (AW) - Artificial Wetlands includes irrigation induced wetlands. These Wetlands are not subject to FSA.				
15. Minimal Effect Wetlands (MW) - These wetlands are to be farmed according to the minimal effect agreement signed at the time the minimal effect determination was made.				

NON-EXEMPTED WETLANDS:

16. Converted Wetlands (CW) - In any year that an agricultural commodity is planted on these Converted Wetlands, you will be ineligible for USDA benefits. If you believe that the conversion was commenced before December 23, 1985, or that the conversion was caused by a third party, contact the ASCS office to request a commenced or third party determination.			14, 15	43.4
--	--	--	--------	------

Commenced filed with ASCS

17. The planned alteration measures on wetlands in fields _____ are considered maintenance and are in compliance with FSA.

18. The planned alteration measures on wetlands in fields _____ are not considered to be maintenance and if installed will cause the area to become a Converted Wetland (CW). See Item 16 for information on CW.

19. This wetland determination was completed in the: Office Field

20. This determination was: Delivered Mailed To the Person on Date: 9-30-88

NOTE: If you do not agree with this determination, you may request a reconsideration from the person that signed this form in Block 22 below. The reconsideration is a prerequisite for any further appeal. The request for the reconsideration must be in writing and must state your reasons for the request. The request must be mailed or delivered within 15 days after this determination is mailed to or otherwise made available to you. Please see reverse side of the producer's copy of this form for more information on appeals procedure.

NOTE: If you intend to convert additional land to cropland or alter any wetlands, you must initiate another Form AD-1026 at the local office of ASCS. Abandonment is where land has not been cropped, managed, or maintained for 5 years or more. You should inform SCS if you plan to produce an agricultural commodity on abandoned wetlands.

21. _____

22. Signature of SCS District Conservationist

Teresa L. Stecker

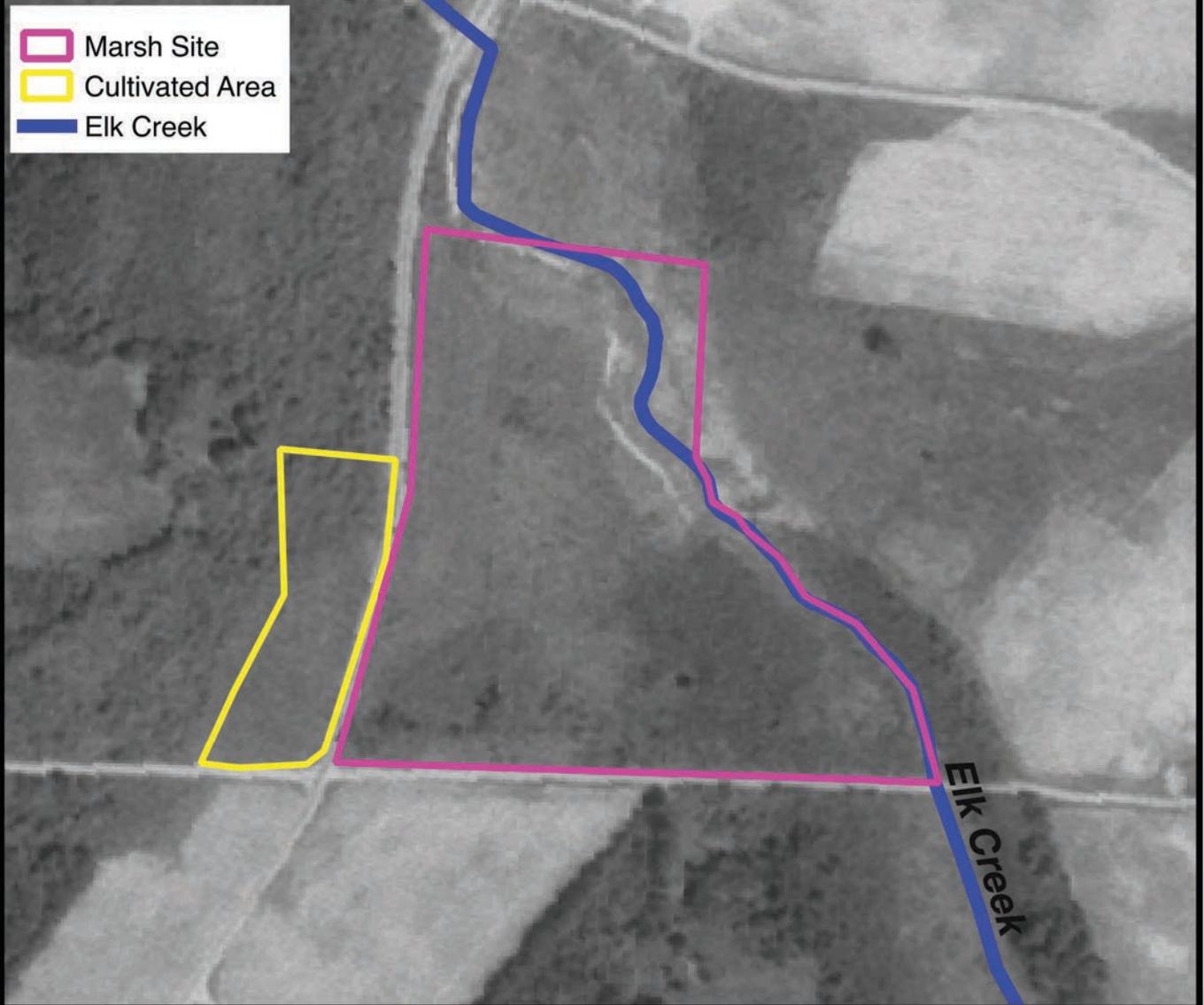
23. Date

9-15-88



Kagel Environmental, LLC

Wetlands, Waters & Wildlife Consulting



0 300 600 900 1200 ft

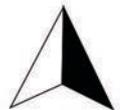
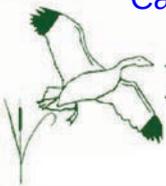
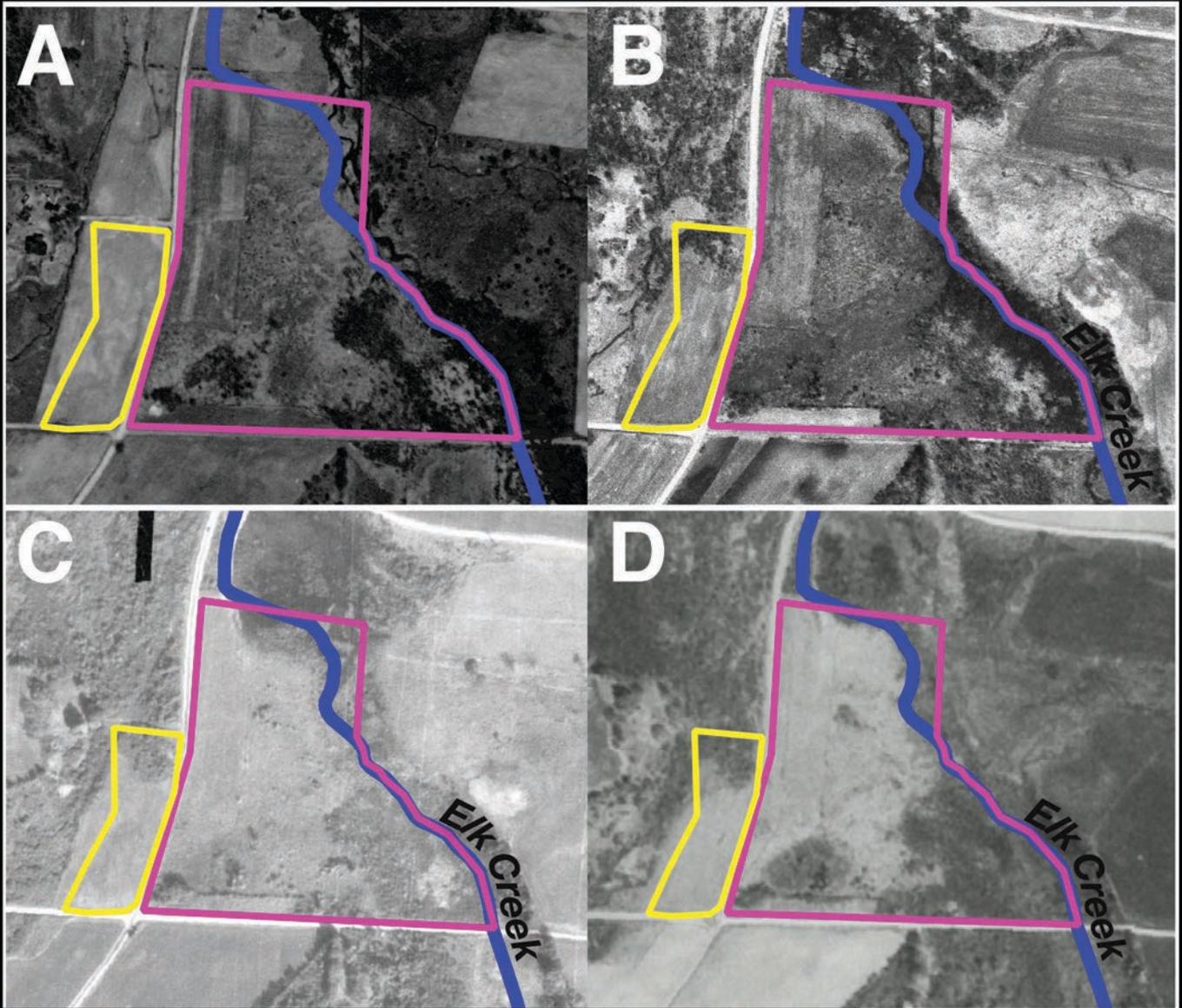


Exhibit 4. The Marsh Site as it appeared on June 4, 1977. The area outlined in yellow shows evidence of being consistently cultivated between 1939 and 1977 (Exhibit 5). The tone and texture of that area is very similar to that found in much of the Marsh Site (pink outline).



Kagel Environmental, LLC

Wetlands, Waters & Wildlife Consulting



0 300 600 900 1200 ft



-  Marsh Site
-  Cultivated Area
-  Elk Creek

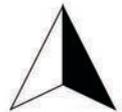
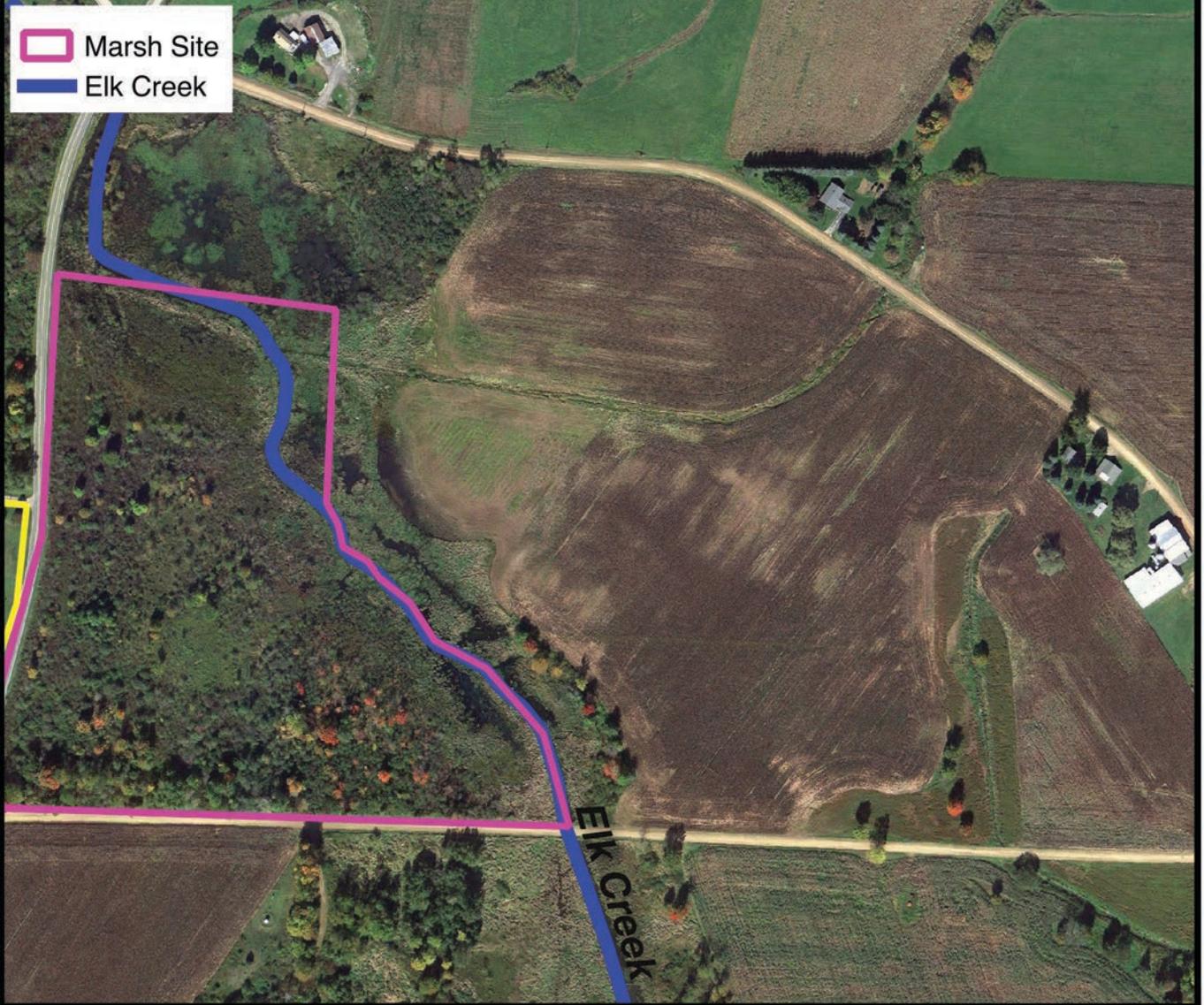


Exhibit 5. The Marsh Site (outlined in pink) and the nearby cultivated area (outlined in yellow) referred to in Exhibit 4, as they appeared on May 1, 1939 (A), April 29, 1965 (B), October 9, 1968 (C) and May 10, 1975 (D). The yellow outlined area appears to be cultivated regularly from 1939 to 1975.



Kagel Environmental, LLC

Wetlands, Waters & Wildlife Consulting



0 300 600 900 1200 ft

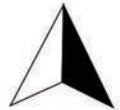
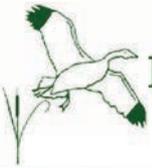
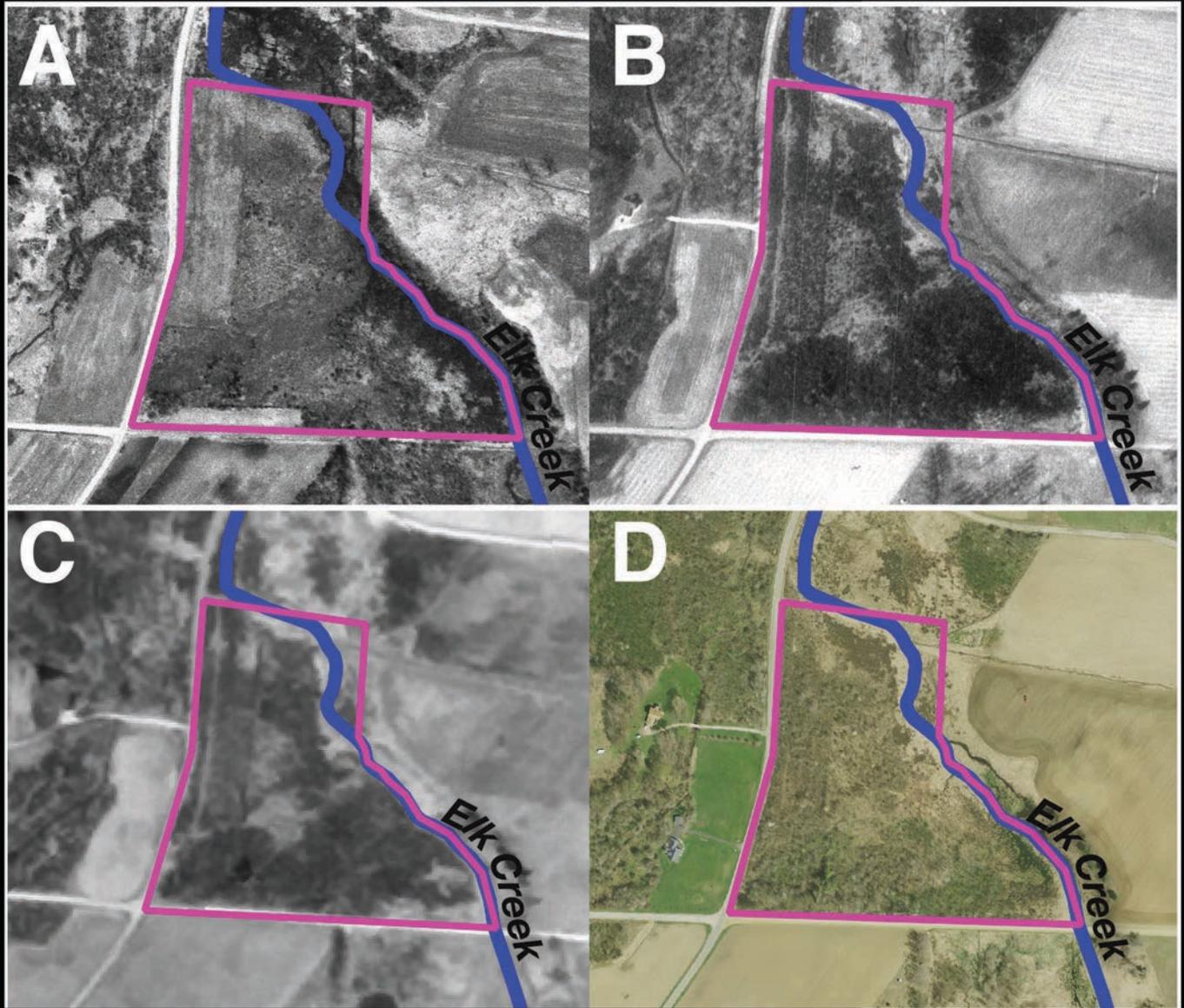


Exhibit 6. The cultivated field to the east of the Marsh Site as it appeared on October 6, 2011. More than 1.4 inches of rain had fallen in the area during the previous 5 days.



Kagel Environmental, LLC

Wetlands, Waters & Wildlife Consulting



0 300 600 900 1200 ft



 Marsh Site
 Elk Creek

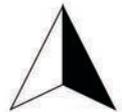


Exhibit 7. The Marsh Site (outlined in pink) as it appeared on (A) April 29, 1965; (B) April 7, 1993; (C) April 21, 1994; and (D) April 15, 2009.



Kagel Environmental, LLC

Wetlands, Waters & Wildlife Consulting



-  Marsh Site
-  Elk Creek
-  Darker Areas

0 100 200 300 400 ft

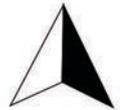


Exhibit 8. The Marsh Site as it appeared on November 8, 2012. Darker areas which could be associated with increased soil moisture are shown as hatched red lines.



Kagel Environmental, LLC

Wetlands, Waters & Wildlife Consulting

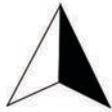
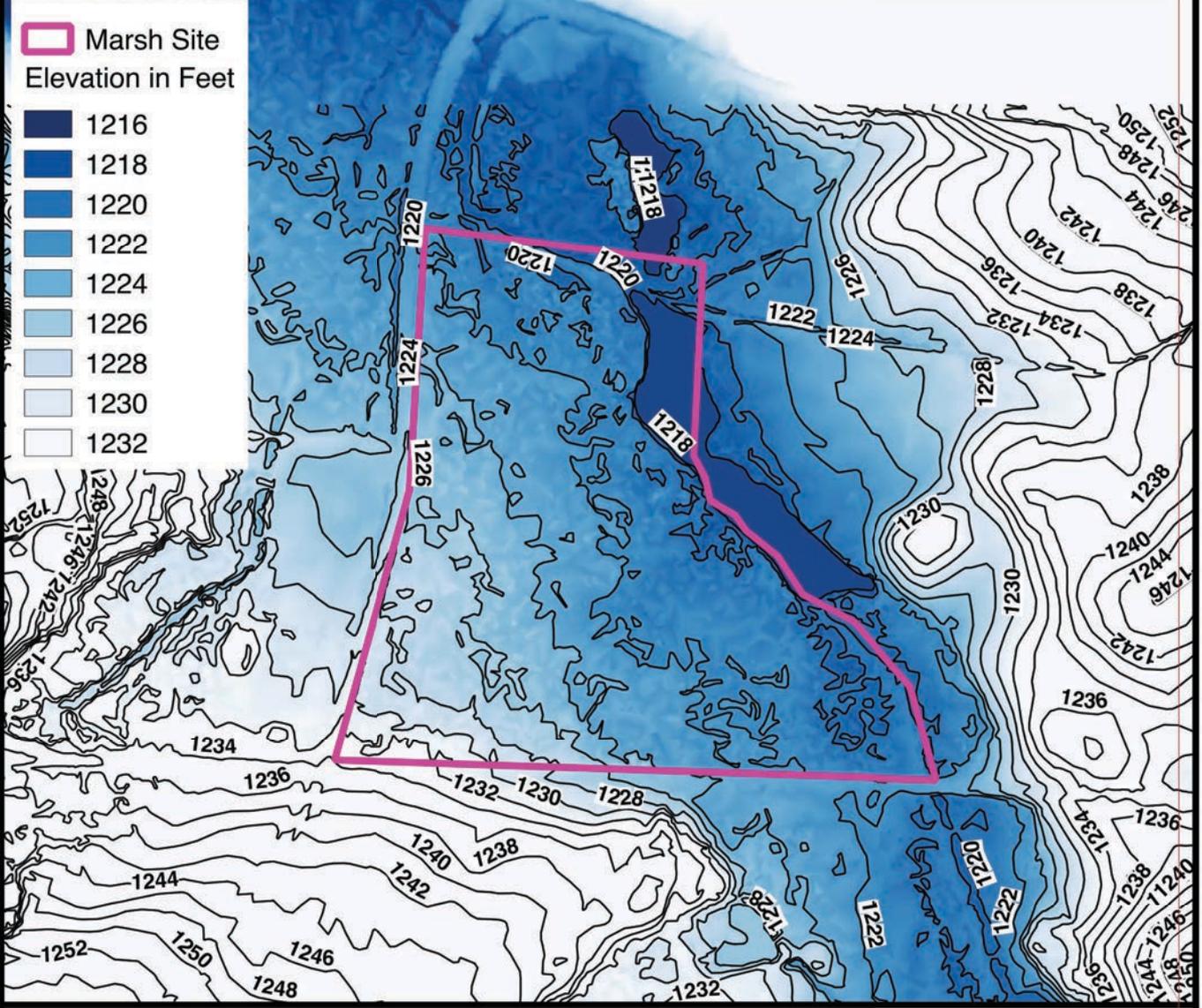


Exhibit 9. Elevations of the Marsh Site and surrounding areas as determined by LiDAR in 2007.



Kagel Environmental, LLC

Wetlands, Waters & Wildlife Consulting

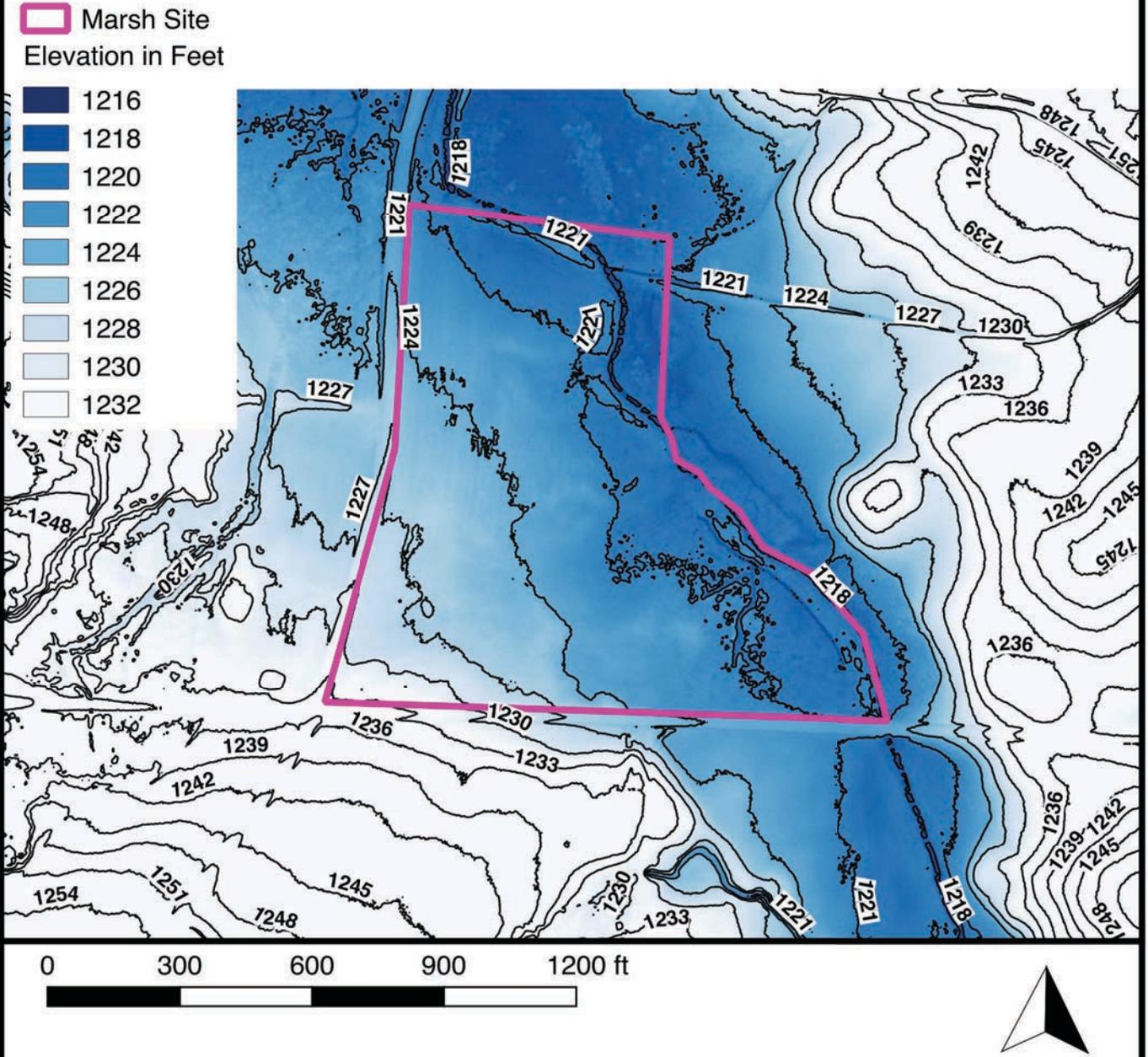
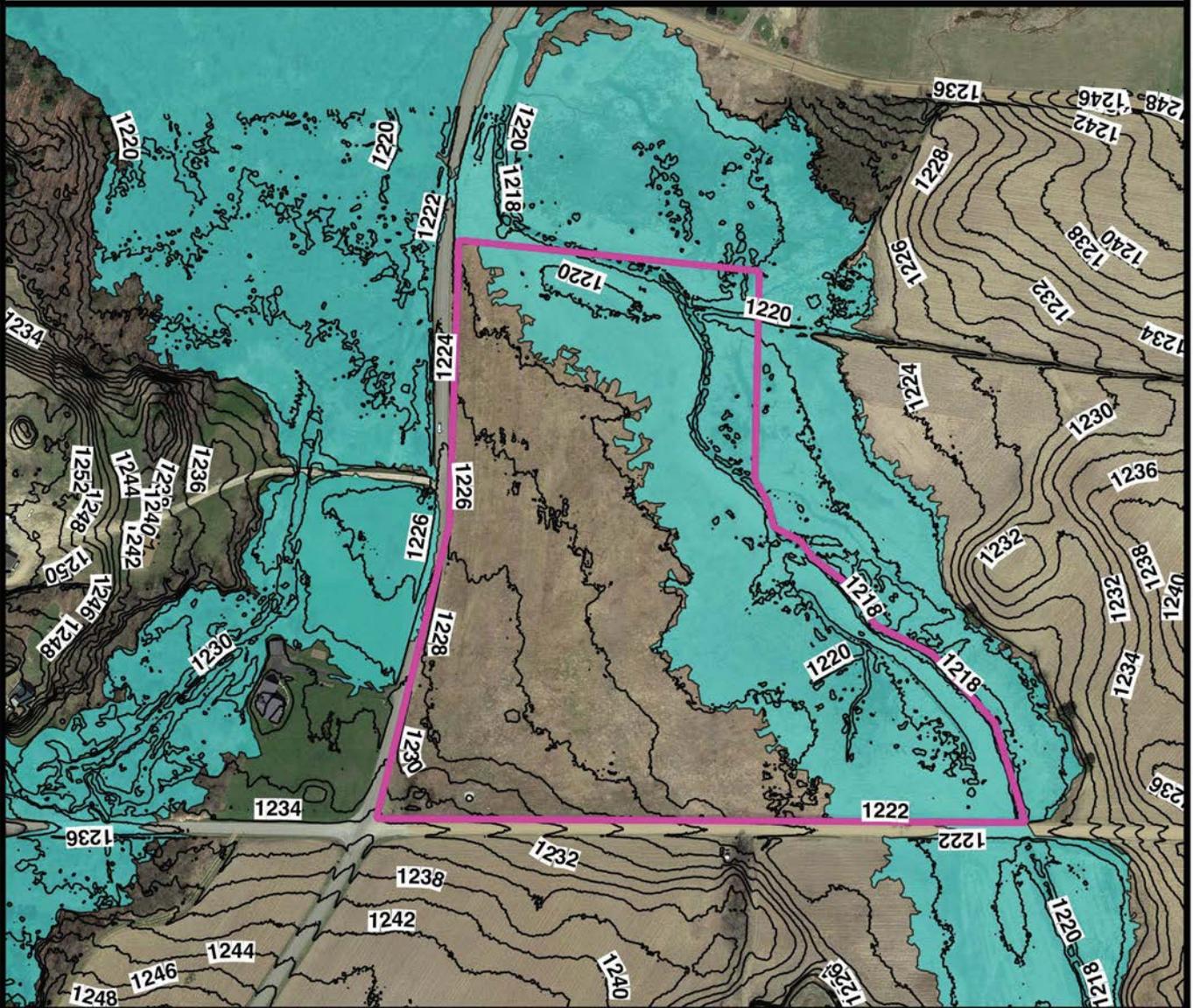


Exhibit 10. Elevations of the Marsh Site and surrounding areas as determined by LiDAR in 2015.



Kagel Environmental, LLC

Wetlands, Waters & Wildlife Consulting



0 300 600 900 1200 ft



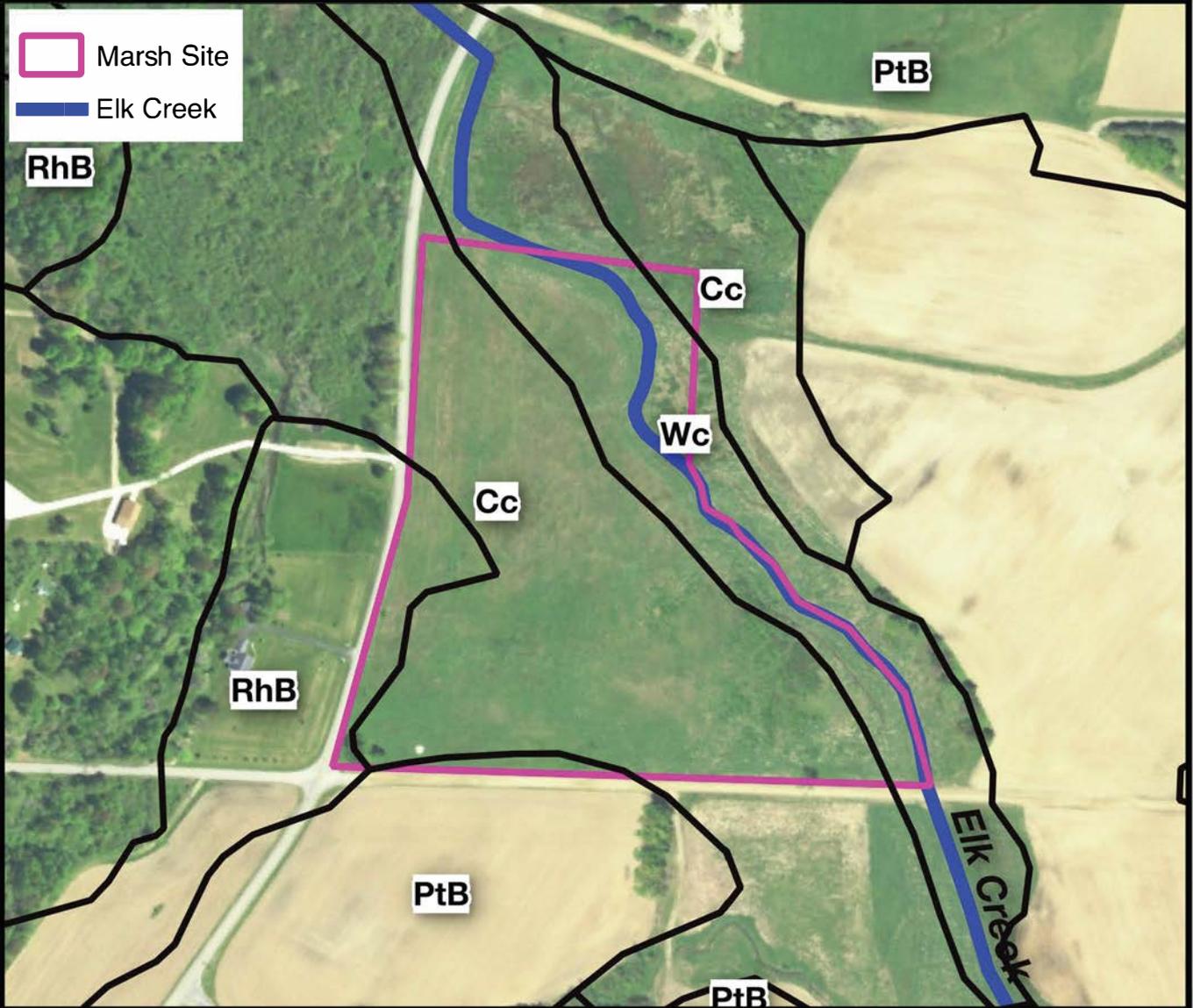
Exhibit 11. Flood hazard risk on the Marsh Site according to FEMA.

-  Marsh Site
-  Elk Creek
-  2 ft Contours
-  1% Flood Hazard



Kagel Environmental, LLC

Wetlands, Waters & Wildlife Consulting



-  Marsh Site
-  Elk Creek

RhB

PtB

Cc

Wc

Cc

RhB

PtB

PtB

Elk Creek



Exhibit 12. Mapped soils of the Marsh Site.

-  Cc = Canandaigua mucky silt loam
-  PtB = Pompton silt loam, 3 to 8 percent slopes
-  RhB = Red Hook silt loam, 3 to 8 percent slopes
-  Wc = Wick silt loam



Kagel Environmental, LLC
Wetlands, Wildlife and Permitting Specialists
susan@kagelenvironmental.com

PO Box 597, 177 E Main St.
Rigby, Idaho 83442
Phone (208) 745-0076
Cell (208) 313-3890
Fax (208) 441-4382

Susan Kagel, B.S., M.S., Ph.D.

Professional Expertise

- Execution of wetland determinations and forensic analysis of alleged wetland violations.
- Preparation and implementation of wetland mitigation and restoration work plans.
- Assistance with comprehension of and compliance with federal Clean Water Act laws and regulations.
- Expert witness testimony in litigation involving wetlands.
- Preparation of Section 404 permit applications and After-The-Fact (ATF) authorizations for discharges in regulated waters and wetlands.
- Extensive experience in literature and web research related to environmental and legal matters.
- Interpretive analysis of aerial photography, soil surveys, LiDAR, EPA MyWATERS, topo surveys, and National Wetland Inventory (NWI) mapping.
- Preparation of detailed technical reports and court exhibits, including graphics.
- Recognized as an Expert Witness in Wetland Science and Regulations in the following jurisdictions: Idaho Federal District Court, Mississippi Federal District Court, New York Federal District Court, Utah Federal District Court

Professional Positions

- | | |
|------------------|---|
| 2007-
Present | Susan Kagel, B.S., M.S., Ph.D., Managing Partner and Consulting Wetland Scientist Case Manager, Kagel Environmental, LLC, Rigby, Idaho. <ul style="list-style-type: none">▪ Primary investigator on 50+ Jurisdictional Determinations (wetland delineations) verified by the U.S. Corps of Engineers, including those requiring remote sensing to complete.▪ Provided key analyses, research, field investigation and support to more than 30 Clean Water Act violation cases. |
| 2009-2012 | Susan Kagel, Ph.D., M.S., B.S., Principal, Alpenglow Environmental Solutions, LLC, Rigby, Idaho. Providing NPDES and NEPA Compliance assistance and market research for environmental matters. |
| 2007 | Wetland Scientist Trainee, Lone Goose Environmental, LLC, Rigby, Idaho. <ul style="list-style-type: none">▪ 300+ hours of field training in wetland delineation, including vegetation, soils and hydrology, regulations, permit application preparation, and report preparation. |
| 2001-2007 | Susan Wimer-Mackin, B.S., M.S., Ph.D. Director of Pre-Clinical Immunology – LigoCyte Pharmaceuticals, Inc., Bozeman, MT. <ul style="list-style-type: none">▪ Directed and supervised a team of scientists in performing pre-clinical research on biodefense vaccines, e.g. anthrax, plague, tularemia.▪ Principal investigator on contracts with U.S. Department of Defense, 2001-2007. |

Susan Kagel, M.S., Ph.D.

- Secured 5 year, \$5,000,000.00 National Institute of Health for Preclinical Development of Non-Invasive Anthrax Vaccine and served as Principal Investigator.
 - Developed comprehensive program (including record keeping, safety protocols, training and security) and secured CDC approval for possession and utilization of the registered agent *Bacillus anthracis* (anthrax).
- 1996-2001 Post-doctoral Fellowship, Cellular Biology, Children's Hospital and Harvard University Medical School, Harvard University, Boston, MA.
 - Secured and successfully completed competitive National Institute of Health Post-Doctoral Fellowship for research on toxin trafficking in mammalian cells.
- 1991-1996 Graduate Research Assistant, Veterinary Molecular Biology, Montana State University, Bozeman.
 - Ph.D. Dissertation project concerned cellular protein trafficking.
- 1989-1991 Susan Wimer, M.S., Research Associate in Animal and Range Science, Montana State University, Bozeman. Trials tested the effects of various forage/nutritional regimens on bovine production and fertility.
 - Responsible for ruminant nutrition trials, including experimental design, data collection, laboratory and statistical analysis.
- 1984-1986 Susan Wimer, M.S., Agricultural Products Specialist, Agricultural Products, 3M, Lincoln, NE. Lincoln, Nebraska.
 - National Expert for cool season pasture management with plant growth regulators.
 - Responsible for identification of suitable candidate pastures, application of plant growth regulators and monitoring of cool season grass pastures.
 - Collected all data including vegetative quality, animal performance and plant response throughout Missouri, Nebraska, Kansas, Iowa and Colorado in support of EPA label submission for use of Embark™ (mefluidide) on cool season grass pastures.
 - Chief Consultant for cattle producers on chemical application, weed control and management of grazing.
- 1982-1986 Susan Wimer, Graduate Research Assistant, University of Nebraska, Lincoln. M.S. Thesis research concerned pasture application of mefluidide and effects on nutritive value of cool season grasses for beef cattle grazing. Title: Mefluidide's Effects on Smooth Brome Quality, Leaf-Stem Composition, and Grazing Cow-Calf Performance.
 - Conducted research into various pasture management and forage usage regimens.
 - Inducted into Gamma Sigma Delta, Honor society of Agriculture.
- 1980-1982 B.S. Undergraduate Research Assistant, Department of Animal Science, University of Missouri, Columbia. Received various College of Agriculture

Susan Kagel, M.S., Ph.D.

scholarships, including the Kansas Bluestem Company Research Scholarship, 1981.

- Responsible for complete management of nutritional metabolism trials in sheep and cattle, including chemical analysis of animal and forage analysis, and statistical analysis of data.
- Received various College of Agriculture scholarships, including the Kansas Bluestem Company Research Scholarship, 1981 for forage research.

Education

Post- Doctoral Fellowship	Four-year post-doctoral training fellowship, including three-year competitive NIH sponsored fellowship at Harvard Medical School teaching hospital, Children’s Hospital, Boston, MA
Ph.D.	Veterinary Molecular Biology, 1996, Montana State University, Bozeman, MT
M.S.	Animal Science, 1986, University of Nebraska, Lincoln, NE
B.S.	Agriculture, 1982, University of Missouri, Columbia, MO

Certifications

2017	40-hr Basic Wetland Delineation, Wetland Training Institute, Idaho Falls, ID
2016	Hydric Soils (Vepraskas), North Carolina State University, Raleigh, NC
2015	Problematic Wetland Delineations, Wetland Training Institute, Portage, WI

Presentations

2012	Basics of Wetland Identification and Section 404 Permitting Requirements, 1-day workshop sponsored by United Seed Co., Des Moines, IA
2012	“Pebble Mining Proposal and EPA 404-C Authority” Seminar sponsored by Iliamna Development Corporation, Lake Iliamna, AK
2012	“Sackett vs. EPA, and Other Violation Cases”, Governor’s Luncheon, Anchorage, AK
2012	“Sackett vs. EPA, and Other Violation Cases”, Heritage Foundation, Washington D.C.
2013	“Update on Pebble Mining Proposal and EPA 404-C Authority”, Lake Iliamna and Dillingham, AK
2013	Oral Comments concerning the Pebble Mine and EPA Public Hearings, Lake Iliamna and Dillingham, AK
2013	“U.S. Army Corps of Engineers Section 404 Wetlands and Section 10 Waters Permit Processing.” Personal Presentation for Senator Charles (Chuck) Grassley, DeWitt IA
2014	“Wetland Identification for Contractors and Section 404 permitting.” One-day workshop at annual Manatt Family of Businesses Best Practices Meeting.
2015	“Challenging Sites in Wetland Identification Encountered by Kagel Environmental.” Wetland Training Institute: Problem Sites in Wetland Identification. Aldo Leopold Foundation Center, Portage, WI

Susan Kagel, M.S., Ph.D.

2016 Wetlands: Current Status & Issues – Wyoming Assoc. Conservation Districts

Selected Consulting Projects

- 2017 Acquest Development, Amherst, NY. Deposed by U.S. DOJ in preparation for trial of client's alleged 100-acre federal Clean Water Act wetlands violation. Deposition answers resulted in the DOJ's decision to enter into settlement talks rather than proceed to trial.
- 2014-2016 Johnson, Andy, Ft. Bridger, WY. KE is expert witness for Mr. Johnson's alleged federal Clean Water Act violation. EPA and DOJ offered our client a settlement with no penalty or fines with a no-fault consent decree, and withdrew the violation, based upon expert analysis and final wetlands consulting report completed by KE.
- 2008-2016 Snell & Wilmer, Salt Lake City, UT. Numerous wetland delineation projects and several cases of isolation determination for developer clients.
- 2015-2016 High-profile 2,500-acre wetland delineation project for proposed new state prison site in Salt Lake County, Utah.
- 2012 Law Office of Raphael M. Scheetz, Cedar Rapids, IA: Following KE's learning of a criminal guilty plea and imposition of a 14-month prison sentence in federal court for an alleged wetland violation, KE helped the client find new counsel (Mr. Scheetz), and then conducted forensic wetland assessment. The federal judge approved withdrawal of the client's guilty plea, and EPA ultimately withdrew all charges against KE's client.
- 2011-2012 Lipsitz Green Scime Cambria, LLP, Buffalo, NY. Snell and Wilmer, Salt Lake City, UT. KE completed Forensic analysis of 95-acre alleged wetland violation, Amherst, NY. All criminal charges related to wetland violations of the Clean Water Act dropped in 2014.
- 2011-2012 Rich and Henderson, P.C., Easton MD: KE performed forensic analysis of 80-acre alleged wetland violation, Federalsburg, MD establishing that alleged violation was significantly less than alleged. Settled in client's favor, September 2012.
- 2011-2012 Session Law Firm, Kansas City, MO. Defense of a VFW post against wetland violation allegations. KE's forensic analysis indicated EPA & COE erred in wetland delineation and no violation occurred. EPA's Administrative Compliance Order terminated, September 2012.
- 2010-2015 Amodio Stanley & Reeves LLC, Anchorage, AK. Defense of client against allegations of filling a wetland. EPA/COE alleged client filled 3.5 acres of wetlands; KE successfully corrected alleged violation calculation to less than 0.3 acre of wetland filled, and penalty reduction from \$117,000 plus restoration of 3.5 acres to just \$22,500 and restoration of only 0.3 acre. EPA accepted KE's restoration plan and work completed in 2013. EPA Administrative Compliance Order terminated, December 2015.
- 2009 – 2010 BHW Law and Jim Seibe Law: Defense witness for federal criminal trial, disputed wetland destruction. Forensic analysis of alleged violation site, data analysis, report and court exhibit preparation. Analysis of prosecution exhibits, extensive document research into application of wetland regulations

Susan Kagel, M.S., Ph.D.

- and provided direction as to best countermeasures of prosecution’s case. Defendant acquitted on all charges, Coeur d’Alene, ID.
- 2009-2012 Chantelle and Mike Sackett (Pacific Legal Foundation), Priest Lake, ID. Forensic analysis in disputed wetland violation. Case was argued in the U.S. Supreme Court January 9, 2012 with a unanimous decision in favor of KE’s clients, the Sacketts, June 2012.
- 2008-2009 Snell & Wilmer, Salt Lake City, UT. Represent developer of a Park City, Utah project in bid to have property’s wetlands determined isolated.
- 2008 – 2009 Thomsen-Stephens Law Offices, PLLC (J. Michael Wheeler). Unpermitted bank protection project. Client was convicted of misdemeanor wetland violation instead of felony, as originally threatened by U.S. Attorney.
- 2006 – 2009 Thomsen-Stephens Law Offices, PLLC (J. Michael Wheeler). Violation of wetland permitting conditions in a manner that could affect Endangered Chinook Salmon. Forensic analysis of alleged violation and prepared expert report detailing that effects of violation on wetlands were minimal. Anaysis of prosecution exhibits and provided opinion as to validity and best countermeasures. Sentence was reduced from 3 years in a federal penitentiary to 6 months house arrest and restoration of the site. Negotiated terms of restoration with federal agencies including USACOE, EPA, NOAA, USFWS and Idaho DNR, then developed restoration plan satisfying all agency requirements.
- 2007-present Forensic analysis other alleged wetland violations in Iowa, Illinois, South Carolina, New York, Arkansas, Missouri, Wyoming, Utah, Alaska and Idaho.

Professional Organizations and Memberships

American Society of Wetland Scientists

American Bar Association

Publications & Presentations

Note: Susan Kagel was formerly known as Susan Wimer and Susan Wimer-Mackin.

Publications:

1. **Wimer-Mackin, S.**, M. Hinchcliffe, C.R. Petrie, S.J. Warwood, W.T. Tino, M.S. Williams, J.P. Stenz, A. Cheff, C. Richardson. 2006. An intranasal vaccine targeting both the *Bacillus anthracis* toxin and bacterium induces robust protection against aerosol anthrax challenge in rabbits. *Vaccine* 24: 3953-3963.
2. **Wimer-Mackin, S.**, R. K. Holmes, A. A. Wolf, W. I. Lencer, and M. G. Jobling. 2001. Characterization of Receptor-Mediated Signal Transduction by *Escherichia coli* Type IIa Heat-Labile Enterotoxin in the Polarized Human Intestinal Cell Line T84. *Infect. Immun.* 69:7205-7212.
3. Mel, S. F., K.J. Fullner, **S. Wimer-Mackin**, W.I. Lencer, J.J.Mekalanos. 2000. Association of protease activity in *Vibrio cholerae* vaccine strains with decreases in transcellular epithelial resistance of polarized T84 intestinal epithelial cells. *Infect. Immun.* 68:6487-6492.
4. Beauregard, K.E., **S. Wimer-Mackin**, R.J. Collier, W.I. Lencer. 1999. Anthrax toxin entry into polarized epithelial cells. *Infect. Immun.* 67:3026-3030.

Susan Kagel, M.S., Ph.D.

5. Mills, J.S., H.M. Miettinen, D. Barnidge, M.J. Vlases, **S. Wimer-Mackin**, E.A. Dratz and A.J. Jesaitis. 1998. Identification of a ligand binding site in the human neutrophil formyl peptide receptor using a site-specific fluorescent photoaffinity label and mass spectrometry. *J. Biol. Chem.* 273: 10428-10435.
6. Wolf, A.A., M.G. Jobling, **S. Wimer-Mackin**, M. Ferguson-Maltzman, J.L. Madara, R.K. Holmes and W.I. Lencer. 1998. Ganglioside structure dictates signal transduction by cholera toxin and association with caveolae-like membrane domains in polarized epithelia. *J. Cell Biol.* 141:917-927.
7. **Wimer-Mackin, S.** and B.L. Granger. 1996. Transmembrane domain effects on the intracellular distribution of lysosomal membrane glycoprotein A (LAMP-1). *Biochem. Biophys. Res.* 229:472-478

Abstracts and Presentations (in chronological order):

1. **Wimer-Mackin, S.**, M. Hinchcliffe, C. Petrie, S. Warwood, A. Cheff, J. Stenz, and C. Richardson. 2005. Robust protection against inhalation anthrax by intranasal immunization with a vaccine targeting both the toxin and bacterium of *Bacillus anthracis*. Platform talk, *Bacillus* ACT05 Conference, Santa Fe, NM.
2. Tino, W.T., P. Mascolo, D. Campbell, M. Williams, C. Richardson, A. Palacanda, **S. Wimer-Mackin**. 2005. Stimulation of innate immune responses by capsule extract antigen of *B. anthracis*. Poster #109, *Bacillus* ACT05 Conference, Santa Fe, NM.
3. Tino, W.T., M. Williams, C. Petrie, D. Campbell, **S. Wimer-Mackin**. 2005. Characterization of murine T-Cell responses to anthrax antigens. Poster #43, *Bacillus* ACT05 Conference, Santa Fe, NM.
4. **S. Wimer-Mackin**, M. Hinchcliffe, C. Petrie, S. Warwood, A. Cheff, J. Stenz and C. Richardson. 2005. Intranasal immunization of rabbits with a powder vaccine containing both toxin and capsule antigens: superior protection against aerosol anthrax challenge. Poster #47, 2005 ASM Biodefense Research Meeting, Baltimore, MD.
5. Olds, Cara, P. Mascolo, C. Petrie, S. Wimer-Mackin and T. Vedvick. Expression and purification of recombinant BclA, a potential anti-terrorism protein. Poster #220, PepTalk 2005, San Diego, CA.
6. **Wimer-Mackin, S.**, S. Warwood, E.V. Oaks. 2004. Intranasal immunization with *B. anthracis* protective antigen and mucosal adjuvants protects BALB/c mice against lethal toxin challenge. Abstract #176, 2004 ASM Biodefense Research Meeting, Baltimore, MD.
7. **Wimer-Mackin, S.** Mucosal Anthrax Vaccines. 2003. Invited Article, *Vaccine Technology & Development News* 2:6.
8. **Wimer-Mackin, S.**, S. Warwood, R. Bargatze. Novel vaccines against anthrax. Invited talk, Detection of Pathogens and Chemical Weapons Special Symposia, Northwest Regional Meeting of the American Chemical Society July 12-14, 2003.
9. **Wimer-Mackin, S.**, A.A. Wolf, M.G. Jobling, M. Ferguson-Maltzman, J.L. Madara, R.K. Holmes and W.I. Lencer. 1998. Ganglioside structure dictates signal transduction by cholera toxin and association with caveolae-like membrane domains in polarized

Susan Kagel, M.S., Ph.D.

epithelia. Plenary session talk, Lipid Modification of Proteins Summer FASEB Conference.

10. **Wimer-Mackin, S.**, J.D. Coffin and B.L. Granger. 1995. Expression of a hamster lysosomal membrane glycoprotein transgene in mice. *Mol. Biol. Cell* 6:S, p. (abstract).
11. **Wimer-Mackin, S.** and B.L. Granger. 1994. Transmembrane domain mutations increase the surface appearance of a lysosomal membrane glycoprotein. *Mol. Biol. Cell* 5:S, p. 115a (abstract).
12. Granger, B.L., S.J. Warwood, S. Uthayakumar and **S.K. Wimer**. 1992. Transport of a lysosomal membrane glycoprotein. *Mol. Biol. Cell* 3(Suppl.):312a (abstract).

Notwithstanding the relatively small amount of testimony in the last four years, Kagel Environmental, LLC has been retained as experts in a number of litigated matters and have provided reports and rendered opinions therein, including but not limited to our work as experts for Michael and Chantell Sackett in the landmark U.S. Supreme Court case of *Sackett v. U.S. Environmental Protection Agency*, 132 S.Ct. 1367 (2012). The majority of matters KE involves itself with are settled before reaching trial.

Extensive References Available Upon Request