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Kevin S. White, P.E. Via electronic mail
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PADEP Northeast Regional Office
Waterways and Wetlands Program
2 Public Square
Wilkes-Barre, Pennsylvania 18701-1915

In re: PADEP Regulatory Jurisdiction at Green Pond/Traditions of America Site
Bethlehem Township, Northampton County

Dear Mr. White:

This letter is a followup to a telephone conversation that Stephen Kunz of my office had with you on 30 September 2014. As Mr. Kunz mentioned at that time, Schmid and Company has been retained by certain residents of Bethlehem Township who are concerned about potential adverse impacts from a proposed development on an area known as Green Pond Marsh. One of their main concerns is that the full extent of regulated wetlands and waters at this site has not been adequately identified. We have determined that as much as 7.64 acres of regulated Waters of the Commonwealth are at risk and already are undergoing encroachment unauthorized by any permit from the Department. This letter is to provide your office with information about the full extent of water resources at this site so that the appropriate level of State regulation can be applied.

A Radnor PA-based developer, Traditions of America, currently wants to build a 265-home subdivision on the 119-acre property in the southeast quadrant at the intersection of Green Pond Road and Farmersville Road (Figure 1). An area known locally as Green Pond Marsh is located in the northwestern part of the project site. It is connected hydrologically with the permanently inundated Green Pond on the west side of the road via a culvert and via surface overflow during periods of high water (Figure 2, Photos A and B). It also appears to connect with permanently and temporarily ponded areas to the north of Green Pond Road. The pond complex occupies ponded depressions in the limestone valley of Northampton County.

Bird enthusiasts from throughout the Lehigh Valley and from other states regularly visit this area. More than 160 species of birds have been recorded here, including several species currently listed as threatened or endangered in PA. Green Pond Marsh has been formally designated as an IBA (Important Bird Area) by the Audubon Society. The IBA includes a 35-acre "core" area and a 105-acre "buffer" area (Figure 3). More than half of the Core IBA (18 acres), plus 44 acres of the IBA buffer extend onto the TOA project site. The quote below, excerpted from Audubon's Site Information form for this site (enclosed as Attachment A), describes some of the key characteristics of

the Green Pond Marsh IBA:

> Green Pond Marsh is best qualified as a shorebird and waterfowl stopover site in spring and fall migration. It is also used during winter months for resting and feeding by waterfowl and waders. The wetland habitat of shallow pools with adjacent open field habitat is a rare and unique habitat. Many wetlands designated as IBAs in Pennsylvania are forested wetlands or shrub thicket habitats, but few are wetlands in open fields as seen at this site. These "pothole" open-field, shallow pools are rare particularly in eastern Pennsylvania. They may occur more in the northwest corner of the state but in the southeast region, Green Pond Marsh may be one of the few remaining sites characterized by such habitat. [Note: Migratory waterfowl are visible in Photos C, D, E, F, and G, taken on various dates].

ARMY CORPS OF ENGINEERS JURISDICTIONAL DETERMINATION

It typically is prudent for a project developer to obtain a formal Army Corps of Engineers JD (jurisdictional determination) confirming the limits of regulated wetlands and other waters of the United States on a property. That was done at the Green Pond project site, but for the reasons discussed extensively below, the 2012 Corps JD does not accurately or completely identify the extent of the Department's jurisdiction at this property.

During December 2010, Pennoni Associates, Inc., conducted a partial wetland delineation at the site. During January 2011, that delineation was submitted to the Philadelphia District, Army Corps of Engineers, with a request for a Jurisdictional Determination (JD). An inspection of the site was conducted by the Corps on 4 March 2011, and an "approved jurisdictional determination" was issued for the site on 10 February 2012 [CENAP-OP-R-2011-00069(72)]. The JD identified two areas of wetlands: the western one is 0.59 acre and is characterized by woody vegetation near the road intersection; the eastern one is 0.32 acre and is the lowest section of a large depression in a farmed field. These two small areas are considerably smaller than the area in the northwestern corner of this property that ponds for long periods during most years (Figure 4). **The 2012 Corps JD determined that these two wetlands are not regulated "waters of the United States" because they are isolated from the surface water network over which federal jurisdiction currently extends, but both likely "are waters of the Commonwealth".**

Earlier this year, a new request for a Corps JD was submitted to the Philadelphia District for this site by Pennoni Associates, Inc. According to Glenn Weitknecht (Corps of Engineers, telephone conversation 30 September 2014), the stated reasons for doing so were twofold. First, the existing "approved JD" is only valid for 5 years and already is more than halfway through that time period. Second, improvements made to the road between Green Pond and this site may have altered the hydrology of the subject wetlands. The new JD request apparently is for an "approved JD" again (as opposed to a "preliminary JD"), and it reportedly was accompanied by new documentation and new flagging. On 26 September 2014, the Corps field-inspected the flagged limits of the wetlands. According to Mr. Weitknecht, one or two flags were adjusted during the field inspection, but otherwise the flagged extent of the wetlands

was determined to be accurate and also was "similar to" that which had been confirmed in 2012. We have not seen a survey drawing showing the new flagging. The new Corps JD has not yet been issued, but these wetlands are expected again to be determined to be non-jurisdictional for federal regulatory purposes.

FEDERAL AND STATE REGULATION OF WETLANDS AND OTHER WATERS

As you know, wetlands are a special subset of a larger class of surface water resources. For federal purposes, the larger class is known as "Waters of the United States". In Pennsylvania, the larger class is known as "regulated Waters of the Commonwealth[1]".

Wetlands are *defined* similarly for both federal and Pennsylvania regulatory purposes. The same technical criteria and methodologies are used to identify (delineate) the limits of wetlands on a given property by PADEP and by the Corps, by virtue of the Department's having adopted current federal methodology (25 *Pa. Code* 105.451). However, individual wetlands may not be *regulated* the same under federal and state laws. This is an important consideration at the Green Pond Marsh site. Current federal practice is to regulate only those wetlands within reach of the Clean Water Act and the Commerce Clause of the US Constitution.

Under Pennsylvania laws and regulations, as you well know, <u>any</u> area within the Commonwealth that meets the defining criteria for wetland or another "body of water" is regulated. No matter its size or connection to other waters (or lack of such connection), an approval from the PADEP is required before a wetland lawfully can be disturbed by any encroachment or obstruction. According to 25 *Pa. Code* Chapter 105 (§105.17): "***Wetlands are a valuable public natural resource. This chapter* [105] *will be construed broadly to protect this valuable resource.***"

Furthermore, "regulated Waters of the Commonwealth" as defined under Chapter 105 include more than just wetlands. State-regulated waters include "watercourses, streams, and bodies of water". Wetlands are but one feature defined by the term "body of water"; lakes and ponds, whether natural or artificial, also are considered bodies of water, and thus are regulated Waters of the Commonwealth whether or not they are associated with wetlands.

Chapter 105 regulates encroachments and water obstructions into jurisdictional waters including wetlands. An "encroachment" is defined as any "structure or activity which changes, expands, or diminishes the course, current, or cross-section of a watercourse, floodway, or body of water." Thus, any soil regrading conducted in a wetland or pond would be a regulated encroachment. Also, any activity which changes the amount of water normally found in a pond or wetland is an encroachment.

Thus, for the Department's regulatory purposes at the subject site, it is

[1] "Regulated waters of this Commonwealth" are defined in 25 *Pa. Code* Chapter 105 as "Watercourses, streams, or bodies of water and their floodways wholly or partly within or forming part of the boundary of this Commonwealth". The Chapter 105 definition of "Body of water" is "A natural or artificial lake, pond, reservoir, swamp, marsh, or wetland."

important to know the precise limits of any wetlands and any ponds, and then to know what work is proposed to be done in or near them and what effect that work may have on them. The State has independent regulatory authority and is not bound by any determination by the Corps of Engineers.

WETLAND IDENTIFICATION

For both federal and Commonwealth purposes, *undisturbed* wetlands normally are defined by three technical parameters:

Hydrophytic Vegetation - There must be a predominance of plants that have adapted to grow in saturated soils and/or ponded conditions, which research and experience have determined are commonly found in wetlands. Native plants have been assigned a "wetland indicator status" indicating the frequency with which each is found growing in wetlands under natural conditions within the region[2]. Those indicator statuses can be relied upon for use where there is incomplete evidence of the prolonged presence of water.

Hydric Soils - These are soils that formed under anaerobic (oxygen-free) conditions as a result of prolonged saturation or inundation. Specific technical indicators have been developed to identify hydric soils in the field by looking for visual, chemical, or hydrologic evidence of past or present anaerobic conditions.

Wetland Hydrology - The presence of prolonged inundation or saturation is necessary for the creation of hydric soils and the development of hydrophytic vegetation under competition with other wild plants. Water is the most important factor driving wetlands, but it also is often the most difficult to recognize or document during brief field inspection. Some people have the mistaken impression that wetlands must be "wet" all or most of the time. In fact, the technical standard for wetland hydrology is 14 or more consecutive days of flooding or ponding, or a water table 12 inches or less below the ground surface, during the growing season at a minimum frequency of 5 years in 10[3]. That amount of wetness typically enables the development of anaerobic conditions in near-surface soils.

Wetlands typically are found alongside waterways, in localized depressions, or in low topographic positions in the landscape. Those are the places most likely to receive inundation (from streams overflowing their banks), runoff (from higher lands nearby), or saturation (from high groundwater tables, direct surface runoff, or both).

When conducting a typical wetland delineation, there often is no clear-cut, site-specific information about the wetland hydrology of a site, so information about the plants and soils often is used to infer the (typically) seasonal presence of water for prolonged periods of time. Even if water happens to be present near a stream or in lower

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[2] OBL - obligate, found in wetlands more than 99% of the time; FACW, facultative wetland, found in wetlands 67% - 99% of the time; FAC, facultative, found in wetlands 34% - 66% of the time, FACU, facultative upland, found in wetlands 1% to 33% of the time; UPL, upland, found in wetlands less than 1% of the time.

[3] US Army Corps of Engineers 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region [Version 2.0, p. 78-79]. Hereinafter this document is cited as 2012 EMP.

elevations on a site when a wetland delineation is being conducted during the growing season, it is not always clear from a brief direct field observation just where that water persists for more than 14 days consecutively as inundation or saturation in more than 5 out of 10 years. Thus the 2012 EMP describes various indicators of wetland hydrology that when encountered, either alone or in combination, enable a confident conclusion that the hydrology threshold for regulation has been met. The 2012 EMP allows the inference of wetland hydrology from indirect evidence when it is not observed directly during an inspection, both in "normal" and in "difficult" situations (p. 112 ff.).

The Green Pond Marsh presents an atypical situation with respect to the three parameters that normally define wetlands. Because most of this marsh has been converted to agricultural use, its vegetation is artificially maintained (its natural vegetation having been removed). Farm crops are planted occasionally when the marsh is not ponded or saturated. Likewise, most of its natural soil profile has been disturbed and mixed by plowing. In contrast, for the third parameter (hydrology), which for many sites is the most difficult to determine, there is an abundance of long-term evidence here showing extensive ponding and saturation.

For disturbed sites (such as the occasionally farmed sections of Green Pond Marsh) the 2012 EMP specifically states that soil of any kind or color is hydric (p. 134) and that vegetation consisting of any species of plants is hydrophytic (p. 124) if found in an area that meets the technical threshold for wetland hydrology: either (a) surface ponding or (b) a water table within 12 inches of the soil surface, that persists for 14 or more consecutive days during the growing season for a minimum of 5 years in 10 (50% or more of the time). Growing season is defined using local climatologic records.

WHY AND HOW THE GREEN POND MARSH BECOMES WET

The Green Pond Marsh could be described as a vernal pool. It occupies a landscape depression that collects water after every precipitation event as surface runoff moves into it from surrounding lands in response to gravity, but is not ponded year-round during most years. LIDAR (light detection and ranging) topographic mapping prepared by the PA Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey for the PAMAP Program is shown in Figure 5 for the northwestern section of the site. The LIDAR mapping depicts contour elevations at two-foot intervals. The lowest elevation locally is highlighted in red, and it coincides well with the areas of Green Pond Marsh that become ponded year after year. Conditions along this boundary must be examined closely by qualified professionals at the proper season for establishing onsite wetland limits. No such investigation has been made, leaving photographic evidence as the most credible data source here.

Following large precipitation events water enters the marsh from Green Pond to the west as the water spreads eastward across the surface of Green Pond Road. Overtopping of Green Pond Road has become a local inconvenience, and during the autumn of 2011, the Road was resurfaced and raised in an effort to reduce the frequency of cartway flooding by water from Green Pond. (As mentioned above, this roadway improvement was cited as one reason a new JD was recently requested from the Corps, inasmuch as the developer thought it might be reducing past wetness in the

marsh.) Green Pond Marsh evidently continues to receive surface runoff from Green Pond following precipitation events (Photos A and B). Local residents recorded overtopping of the Road on at least three occasions during early 2013 (31 January, 11 February, and 20 April) and multiple times in early 2014 (13 January, 24 February, numerous times during both March and April, 5 May, and 16 May).

For land in east-central Pennsylvania, the typical (non-drought) annual water balance shows a surplus of water beginning in December that persists into May. During the wet season (winter and early spring) precipitation exceeds evaporation and water accumulates in the ground and/or in surface reservoirs. Stored water then is drawn down as the season warms until early July. Atmospheric demand for evaporation typically exceeds the available supply from mid July until mid September. During the summer and early autumn dry season water tables drop and wetlands naturally may dry out completely. Homeowners and golf courses water lawns and flowers, some farmers irrigate crops, and reservoirs become shallower. Beginning in mid September a replenishment of storage begins as temperatures drop, lowering atmospheric demand and resulting in a surplus of water for storage once more by early December.

The length of time any part of Green Pond Marsh is saturated is always longer than the duration of surface ponding there. The length of time the marsh is saturated and ponded varies from year to year with weather conditions, unlike nearby permanently ponded lands to the west and north across Green Pond Road. The extent of ponded and/or saturated soil within the marsh can be expected to vary over time, as the lower elevations within the depression experience wetness longer than higher elevations. The geographical extent of wetness is affected by elevation, and is expected to follow the topographic contour (see Figure 5, and Photos G and H). Both ponding and saturation can be observed on aerial photographs, although conditions are clearer on some than others. Available aerial photographs are discussed at length below and in Attachment B.

In most years normal farming in upland fields near the Green Pond Marsh begins with land preparation during late March and April. Farming within Green Pond Marsh itself during most normal years cannot occur until late in the growing season, as indicated by the accompanying aerial photographs (Attachment B), most of which display a visually distinct vegetation change at the edge of the marsh marking the limit of cash crop cultivation that was possible during that year. The higher-elevation adjacent fields obviously dry out more quickly than the marsh which is located at the base of the local slope. More often than not, farmers cannot accomplish spring planting in Green Pond Marsh, and only a few photos show planting within parts of it. As the water evaporates, the extent of standing surface water on the marsh shrinks. Then the saturated soil dries out from the edges toward the centers of low spots, aided by water loss through transpiration when growing plants are present.

The soil of the Green Pond Marsh is mapped in the Northampton County soil survey as Clarksburg silt loam, 0 to 3% slopes, with a wet spot hydrology symbol in the marsh. Ponding in this map unit is described as "*common where areas occur in depressions, and areas in drainageways are subject to flooding during periods of heavy rainfall and spring thaws*." That is an apt description of the Green Pond Marsh. Internal drainage in the Clarksburg series is impaired by a foot-thick fragipan (Bx) layer in the lower subsoil starting

at a depth of about 2.5 feet. **Excavation through this fragipan, as may be occurring in the recent development preparation work onsite, could negatively alter the hydrology of the marsh by accelerating its drainage**.

Two relatively small sections of the Green Pond Marsh may have been omitted from the Schmid & Company outline of regulated wetlands depicted on several figures accompanying this letter (for example, Figure 11 and the LIDAR map). Both of them are within the Audubon core IBA. The more likely additional wetland is adjacent to Green Pond Road just south of the western limit of delineated forest wetland. This area receives the overflow from Green Pond as it runs eastward toward Green Pond Marsh (Photo A, Figure 6, and aerial photograph taken on 31 March 2005). This area is not well illustrated by the available airphotos, and the PADEP-regulated wetland may need to be extended southward here for about 100 feet or so in a relatively narrow corridor parallel to the road. This area warrants careful inspection, inasmuch as it lies within the proposed footprint of development (Figure 12).

The second area not shown within the Schmid & Company outline of Commonwealth-regulated wetlands is a corridor extending north-south along the eastern margin of Green Pond Marsh south of an existing residential outparcel along Green Pond Road. It, too, is best observed on the 31 March 2005 airphoto (Figure 6), where its dimensions are about 250 feet north-south and 125 feet east-west. During most years this area appears to be farmed and likely is less wet than sections of the marsh farther west. Inasmuch as this area also lies within the footprint of proposed development (Figure 12), it warrants careful investigation on the ground during the proper season.

ISSUES ASSOCIATED WITH THE 2012 ARMY CORPS OF ENGINEERS JD

The Corps JD issued for the Green Pond Marsh property during 2012 [CENAP-OP-R-2011-00069(72)] specifically notes that the two small wetlands delineated there by Pennoni Associates "*have been determined to be isolated, and are therefore not waters of the United States*."

The JD goes on to state that **"*while the wetlands in question are not waters of the United States, it is likely that they are waters of the Commonwealth. It is strongly recommended that* [the applicant] *contact the Pennsylvania Department of Environmental Protection, Northeast Regional Office before performing any work in these isolated wetlands*."**

Schmid and Company professionals have reviewed the JD application submitted by Pennoni Associates for this site, as well as the Corps JD file at the Philadelphia District, Army Corps of Engineers pursuant to a Freedom of Information Act request. **It is our professional opinion that there are numerous irregularities and omissions associated both with the delineation of wetlands at this site and with the Corps review and approval of that delineation, such that the actual extent of regulated waters is much larger than currently acknowledged by the applicant and by the Corps.**

1) In reviewing the JD application for this site, the Corps accepted the applicant's assertion that the wetlands here were "isolated" from the network of

surface streams of the Lehigh and Delaware Rivers, and therefore were not subject to federal regulatory jurisdiction. Consequently, whether the wetlands turned out to be 0.9 acre or 9 acres was immaterial in the final analysis because the Corps would not regulate them in any event. This may have lead to a less than careful review process. We note several obvious mistakes in the 2012 JD that suggest a lack of careful attention by the Corps reviewers.

- The JD letter dated 10 February 2012 makes reference (on page 2) to the Corps site inspection on 4 March 2012 (a Sunday, 23 days *after* the date of the letter). Presumably, that inspection was in 2011, not 2012: Photos taken by the Corps during its site inspection on 4 March *2011* show ponding significantly beyond the two small areas identified as wetlands in the JD drawings.

- The first Corps "Memorandum for Rercord" [*sic*] dated 7 March 2011 (on its second page, Item #5,) incorrectly identifies the smaller of the two wetlands as being 0.36 acre in size (rather than 0.32 acre, the number used every other time its size is mentioned). It also states that the reason the wetland is so much smaller than the area actually observed during field inspection to be inundated "*is probably due to the fact that these areas of inundation do not occur every year and when they do occur it is mostly during the non-growing season*", yet there is no documentation of any kind to support these speculative statements anywhere in the Corps file. In particular, the Corps did not seek to confirm this hypothesis by field inspection during the early growing season.

- The second Corps "Memorandum for Rercord" [*sic*] dated 26 April 2011 (which was attached to the Corps JD letter of 10 February 2012), on its last page under the section "Site Conditions", makes specific reference to the two delineated wetlands of 0.59 acre and 0.32 acre. The next section ("Rationale for Determination of No Jurisdiction"), however, makes reference only to a single wetland, which is identified as "Wetland F" and describes that wetland as a "scrub/shrub wetland" -- yet that is not an accurate description for either of the two wetlands actually identified on this site. This reference in the Corps Memorandum apparently was cut and pasted from another document without editing to apply it to conditions at the present site.

- The same section "Site Conditions" notes that the two delineated wetlands "*are relatively small when compared to the larger area that is sometimes inundated*", in recognition of the periodic ponding that occurs onsite. It dismisses that ponding, however, by stating "*the area appears to drain through the ground relatively quickly*" and "*does not hold water long enough for reducing conditions to develop in the soils*". Neither contention is credibly documented in the JD, and the latter condition is specifically contradicted by the applicant's documentation provided to the Corps. The applicant's consultant provided a soil sample from the ponded wetland showing the results of reducing conditions, but provided no documentation regarding the rate of site drainage or the geographic extent of reducing conditions. Recent excavations through the fragipan may increase the future rate of wetland drainage.

- The Corps staff primarily relied on two aerial photographs taken during 2005, the first (reportedly on 1 April) showing extensive ponding, the second (reportedly

on 7 June) showing much less ponding. The visible ponding was interpreted to not satisfy the Delineation Manual standard (14 continuous days of ponding). Although those 2005 photos were taken during a year of normal precipitation, they document conditions at least[4] 63 days apart, significantly longer than the threshold 14 consecutive days required to satisfy the wetland hydrology criterion.

- The Corps files contained 5 separate aerial photographs taken during 4 different years (1939, 1971, 2005, and 2010). Only three of those photos represent "normal" precipitation (two from 2005 and one from 2010). Many other aerials that the Corps did not consider (as discussed below and presented in Attachment B), also taken during normal periods of precipitation, show ponding well beyond the two small areas identified as regulated features in the JD .

2) There are numerous flaws in the technical documentation provided by Pennoni and relied upon by the Corps in support of the 2012 JD, which cast doubt on the accuracy of the wetland delineation at Green Pond.

- Neither Pennoni nor Corps staff observed site conditions *during* the growing season. Pennoni did its delineation on December 7-8, 2010 (and reportedly had to bore through ice to obtain certain soil samples). The Corps inspection was on 4 March 2011, more than 3 weeks prior to the official start of the growing season[5]. Neither Pennoni nor Corps representatives returned to examine the site during the early growing season, as recommended by the 2012 EMP, when they could have observed the actual extent and persistence of ponding and saturation during the growing season.

- Although Pennoni and the Corps reported an absence of observed “redoximorphic features” (typically indicative of hydric soils) outside the delineated areas, both made procedural and interpretive errors as a result of incomplete analysis:

  - neither reported having waited for saturated soil samples to dry to a “moist” condition, as is clearly stated in the 2012 EMP "User Notes" under Indicator F8 (for Redox Depressions such as the Green Pond Marsh) as well as under many other hydric soil indicators -- "*If the soil is saturated at the time of sampling, it may be necessary to let it dry to a moist condition for redox features to become visible*." Only a 2-inch thick layer of redox features within the upper 6 inches is required, whatever the color of the soil matrix.

[4] We obtained a digital copy of the second (later) 2005 photo from the USDA-FSA in response to a Freedom of Information Act request for all available photographs of the Green Pond vicinity. It is certain that the photos were taken on the same date because the vehicles visible on Route 22 to the north of the site and all other features coincide. According to the metadata embedded with the FSA image, the photo was taken on 11 July 2005 (not 7 June 2005 as reported by the Corps). Thus, the two aerial photos relied upon by the Corps actually were taken more than 100 days apart (rather than "only" 63 days). It is not unexpected that some of the earlier ponding had receded by midsummer, considering the normal regional water balance calendar discussed above. We were surprised by the small number of photographs made available by the FSA. The staff members of the Bethlehem Field Office were very helpful, but the agency seems to have little or no interest in historic aerial photographs.

[5] According to the Northampton County Soil Survey (USDA-SCS 1974), 29 March is the last date when the air temperature is likely to be 28^{o} F. or less in 5 out of 10 years -- thus marking the start of the growing season.

- neither reported having employed chemical tests for ferrous iron (such as the organic dye α-α-dipyridyl), which can be useful when soils are encountered in a saturated state at the time of observation. The change in color to pink or red identifies the presence of ferrous iron, indicating that the soil is anaerobic at the time of sampling, and that the soil has been saturated for an extended period prior to sampling, whatever the actual temperature of the soil or air. Any soil that is anaerobic for any period of time by definition is hydric, whether or not there is any visible color contrast recording anaerobic conditions (*viz*., redoximorphic features).

These two soil indicator tests are to be made, according to the 2012 EMP (p. 133-134) wherever hydrology and/or vegetation suggest prolonged wetness, but immediate confirmation of soil samples is not provided by other indicators of hydric soil described by the National Technical Committee on Hydric Soils and summarized by the 2012 EMP. Each of these tests is capable of identifying the results of anaerobic conditions in a saturated soil. They were available and could have been used, but were not attempted by either the Corps or Pennoni staff during appropriate seasons.

Soils can be deemed hydric and vegetation can be deemed hydrophytic as a result of credible documentation showing the prolonged seasonal inundation or saturation of a parcel of ground, as discussed above. Where indirect (photographic) evidence is available, it is not necessary to examine the actual soil or vegetation on the ground. Because the Green Pond Marsh property currently is posted against trespass, we were unable to perform field investigations.

- There are at least three 2012 EMP wetland hydrology indicators that were not, but should have been, rigorously applied to ascertain the extent of wetlands at this site.

  - One of them is Indicator B7 (*Inundation Visible on Aerial Imagery*). This is a "primary" indicator, meaning that by itself it confirms wetland hydrology. Indicator B7 is met when ponding is evident on multiple years of aerial images taken during the growing season in periods of "normal" rainfall.

    The Corps included 5 different aerial photographs in its JD documentation, but apparently failed to interpret them accurately using available data. Two of the photos were from 2005 (a year of "normal" precipitation), but as mentioned above, they were taken about 100 days apart and even then showed much more extensive wetlands than the JD identified. The first, 1 April 2005, clearly shows extensive ponding during the early growing season (Figure 6); the second, taken more than 3 months later on 11 July 2005, shows little ponding but clearly shows that no crop was able to be planted in the area that had been ponded and saturated earlier in the year (Figure 7). Had the two photos been taken only 14 days apart, a lack of visible ponding and/or saturation on the second one could have been significant, but since the second one was taken so long after the first, it cannot be used to rule out prolonged ponding (defined as "14 days") as apparently was done here by the Corps.

Of the other 3 photos in the Corps JD file, one (15 July 1971) was taken after a 3-month period of "drier than normal" precipitation, and so it is not valid for use as negative evidence under Indicator B7 (Figure 8). Another, taken 29 March 1939, also is invalid because it was taken following a 3-month period that was "wetter than normal" (Figure 9). More relevant is the 29 August 2010 photo (Figure 10), which shows extensive ponding signatures even on this late-summer date, with normal precipitation recorded during the prior 3-month period.

In addition to the 5 photos used by the Corps, we compiled 13 additional aerial photographs, taken during the growing season of 12 different years from 1938 to 2013 (Attachment B). On each of the 18 photos, we superimposed the two small areas of wetlands identified in the 2012 Corps JD. For the earliest year (1938) there were no precipitation records, but for the other 17 we determined whether precipitation during the prior 3-month period was "normal', "wetter than normal", or "drier than normal". **Twelve of the photos represented periods of "normal" precipitation. In at least 7 of those 12 photos (>50%), ponding clearly is visible well beyond the small identified wetlands of the 2012 Corps JD.**

- A second hydrology indicator is Indicator C6 (*Recent Iron Reduction in Tilled Soils*). This also is a "primary" indicator. Unlike Indicator B7, C6 requires on-ground investigation (which we were unable to undertake). Indicator C6 is met where there are 2% or more redox concentrations visible anywhere within the tilled zone or within 12 inches, whichever is shallower. There is no minimum thickness requirement for the layer containing redox concentrations, and the color of the soil matrix is irrelevant. Pennoni claims to have observed redox concentrations in some soils between 6 and 12 inches, but ignored them because they were not within the upper 6 inches and so did not meet hydric soil indicator F8 (redox depressions). Neither Pennoni nor the Corps apparently recognized the significance of redox features *within 12 inches* in these tilled soils for satisfying Indicator C6.

- The presence of reduced iron (Indicator C4) was discussed previously. Neither Pennoni nor the Corps allowed their soil samples to dry from saturated to moist in order to reveal redoximorphic features that may be present but are not apparent immediately upon soil extraction. They also did not use α-α-dipyridyl dye to search for reduced iron in saturated soils.

◆ On the Pennoni drawing (Existing Wetlands Exhibit, 1"=300', Sheet 2 of 2, dated 2/1/11), flag numbers can be seen (though not read) around the larger (western) wetland, but no numbers at all are visible on the smaller wetland. There is no indication that the smaller wetland was flagged in the field or surveyed; it appears most likely to have been defined by a topographic elevation line. The data logs make no reference to nearby flag numbers, and none of the photographs in the Pennoni report shows any boundary flagging around the ponded, ice-covered wetland in the field. If it was not even flagged, the limits of the smaller wetland could not have been accurately confirmed by the Corps during its winter 2011 inspection.

◆ Documentation of wetland conditions inside the acknowledged wetlands is provided, but there are no upland/wetland pairs of data logs (from either Pennoni or the Corps). Thus no field documentation was provided for nonwetland conditions near but outside the acknowledged wetlands. Everyone is in agreement that the small areas mapped as wetlands are indeed wetlands; formal documentation that the areas just outside the delineated wetlands are *uplands*, however, is lacking, which is unacceptable given the obviously persistent ponding and saturation year after year over a much larger surrounding area.

2014 ARMY CORPS OF ENGINEERS JD

As you are aware, the project developer recently requested a new Corps JD for this site. A Corps field inspection for the new JD was conducted on 26 September 2014, during the early autumn season which normally is dry. That particular date followed a 3-month period of "drier than normal" precipitation beyond normal seasonal dryness. Matt Miller of your office was in attendance on that date (in part to follow up on a complaint the Department had received about a possible Chapter 105 violation associated with soil excavations that were then underway). It is our understanding that the two small wetlands previously confirmed by the 2012 Corps JD were reflagged in essentially the same locations as before. Because the new JD has not yet been issued, however, Mr. Weitknecht told us we cannot obtain (and thus, we cannot review) any technical information submitted as part of the pending JD request. To the extent that the many technical and procedural problems identified above were not addressed in the recent evaluation, this new JD, once issued, may be no more meaningful or accurate for the Department's jurisdictional purposes than the flawed 2012 Corps JD.

THE DEPARTMENT MUST EXERT ITS INDEPENDENT REGULATORY AUTHORITY

Given the many technical and procedural issues of concern associated with the 2012 Corps JD as enumerated above, which likely are associated as well with the pending JD, the Department must make its own assessment of the extent of regulated waters of the Commonwealth at this site. The Department should not simply rely on the Corps JD here. None of the areas identified in the JD will be regulated by the Corps. **Any regulation of wetlands or other waters at this site will be solely the responsibility of the Department, and its Chapter 105 jurisdiction over "regulated Waters of the Commonwealth" extends far beyond the two small Corps 2012 JD "wetlands".**

As discussed above, there are valid technical reasons for considering much larger areas as either wetlands or other "regulated Waters of the Commonwealth" (ponds) at this site. As many as 7.64 acres in the Green Pond Marsh are shown to exhibit ponding on more than 50% (7 out of 12) of available aerial photographs taken during the growing season of normal rainfall years (see Attachment B). Long-ponded areas such as these are State-regulated features, whether considered wetlands or other waters.

As noted above, on 26 September 2014, Matthew J. Miller of your office inspected soil excavations within the Green Pond Marsh in response to Complaint 307714. His

inspection report included field-sketched locations of three soil test pits and two areas of wetlands. Mr. Miller concluded that none of the earthwork underway as of that date had occurred in regulated wetlands or waters. However, based on oblique aerial photographs taken from a drone on 30 September 2014, three of the nine excavations dug by that time were within areas that qualify as "regulated Waters of the Commonwealth" (Figure 11). Mr. Miller recorded no information regarding site conditions of vegetation, soil, or hydrology in his report.

When contacted more recently about additional excavations underway on 20 October, Mr. Kenneth Murin (Environmental Manager in the Department's Harrisburg office) responded that Mr. Miller had observed no incursion into wetlands on 26 September. No further inspection was being made or information gathered by the Department in response to this second complaint. No applications have been submitted for Chapter 105 encroachment approvals or Chapter 102 erosion, sediment control, or stormwater NPDES approvals for proposed development on this property.

PROPOSED PLAN OF DEVELOPMENT

In the vicinity of Green Pond Marsh, the development plan proposed by Traditions of America (TOA) currently calls for the construction of extensive stormwater management facilities and a 6-foot wide asphalt pathway. As noted above, soil excavations are underway onsite in anticipation of that construction. To install the proposed facilities will require significant regrading and the placement of fill material, both of which constitute regulated "encroachments" under 25 *Pa. Code* Chapter 105. Even if the regulated areas were limited to the two small wetlands which were identified in the 2012 Corps JD (which we dispute as counter to the facts), the proposed work will require Chapter 105 approval for 0.05 acre of developer-acknowledged impact. **To the extent that the regulated wetland Waters of the Commonwealth are as large as aerial photographic evidence suggests they are, the impacts of the Plan will exceed 4.6 acres (Figure 12). Furthermore, the proposed TOA plan will directly impact more than half (18 acres) of the Audubon IBA "core" area and 44 acres of the IBA "buffer" area (Figure 13).**

CONCLUSIONS

The extent of "regulated Waters of the Commonwealth" at the Green Pond Marsh site is significantly larger than the extent of wetlands identified in the approved 2012 Corps JD. All available offsite information as provided herein leads to the conclusion that the extent of Department-regulated wetlands is about 8 acres, significantly more than the 0.91 acre that the developer identified in its 2012 Corps JD. It is possible that additional areas of regulated wetlands exist along the western and eastern margins of the wetlands as outlined by Schmid & Company in Figures 5 and 11. These areas warrant proper onsite investigation.

To date there has been no credible effort to establish the limits of Green Pond Marsh wetlands by the developer or regulatory agencies, including the Department. Work performed heretofore concerning the extent of these wetlands has been technically flawed and not in accordance with current

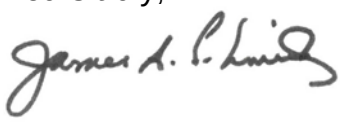
methodology for wetland identification and delineation.

Current land development plans under review by Bethlehem Township show that the developer plans to encroach into nearly 5 acres of the wetlands of Green Pond Marsh. Such encroachment, in the absence of a Chapter 105 permit, is prohibited by law. No permit application has been prepared to authorize such encroachment. Earthwork for soil testing within the wetlands already has begun and may be draining the marsh's hydrology as the annual season for surplus water accumulation approaches.

Hence it is imperative (1) that competent regulatory staff establish credibly the limits of the wetland Waters of the Commonwealth in this biologically important site; and (2) that earthwork not proceed within any potential wetlands prior to credible delineation followed by approval of any necessary permits authorizing encroachment into these regulated waters.

If you have any questions about any of the above matters, we would be happy to discuss these matters with you. Mr. Stephen Kunz of this office played a major role in the analysis of data and preparation of this letter. Both he and I are Certified Senior Ecologists (Ecological Society of America), Professional Wetland Scientists (Society of Wetland Scientists), and Wetland Delineators (Baltimore District, Army Corps of Engineers). Each of us has many years of professional experience delineating wetlands throughout the Mid Atlantic region.

Yours truly,



James A. Schmid, Ph. D.
President

Attachments

Report Figures 1 through 13
Report Photos A through H
A - Audubon IBA Documentation
B - Aerial Photographic Evidence of Ponding (Intro., LIDAR map, captioned photos)

cc: Michael Bedrin, PADEP-NERO Regional Director
Kenneth Murin (PADEP Harrisburg environmental Manager)
Glenn Weitknecht (Corps of Engineers Philadelphia District)
Sam Reynolds (Section II Chief, Philadelphia District Regulatory Branch)
Frank Cianfrani (Chief, Regulatory Branch, Philadelphia District)
Melissa A. Shafer, Bethlehem Township Manager
Nathan Jones, Bethlehem Township Planner
Bruce Pysher, Manager, Northampton County Conservation District

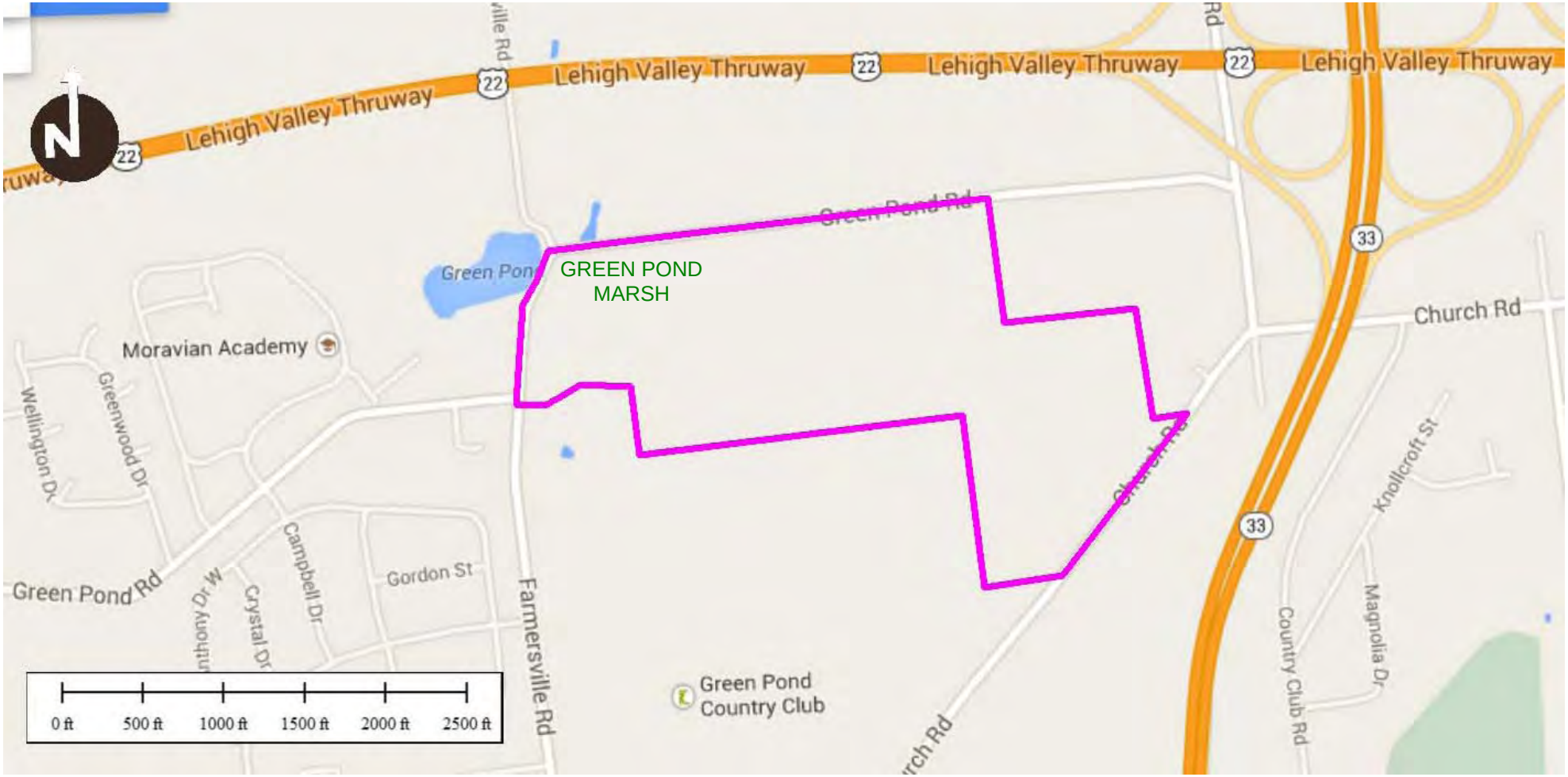


FIGURE 1. Location of the 119-acre Traditions of America project site (purple outline) along Green Pond Road and Farmersville Road in Bethlehem Township, Northampton County, Pennsylvania. Green Pond Marsh is located in the northwestern section of the project site, across the road from Green Pond.

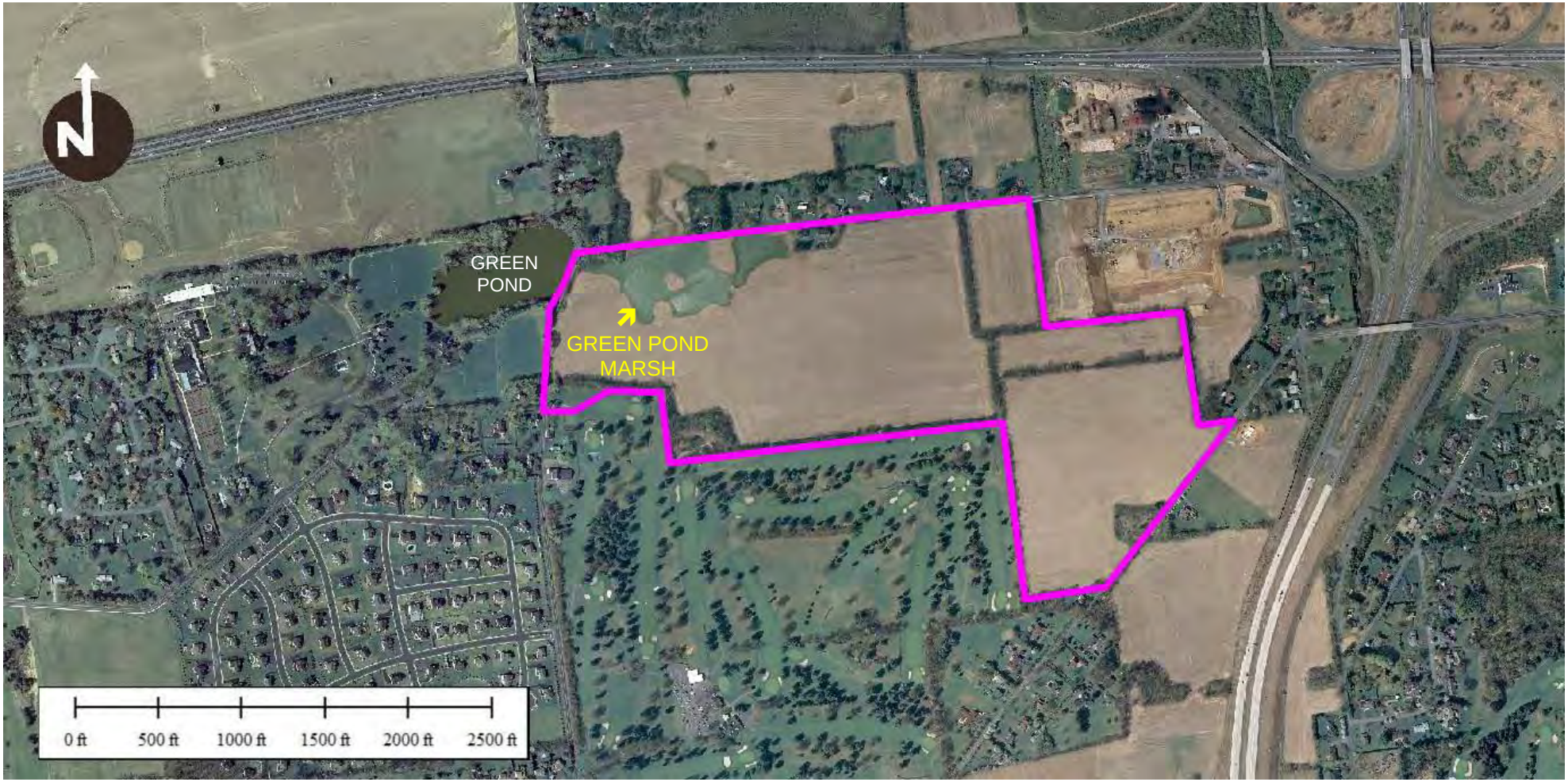


FIGURE 2. Location of the 119-acre Traditions of America project site (purple outline) on a 27 March 2010 aerial photograph. The ponded area known as Green Pond Marsh is in the northwestern segment of the project site. Permanently and intermittently ponded areas also are visible north of Green Pond Road.

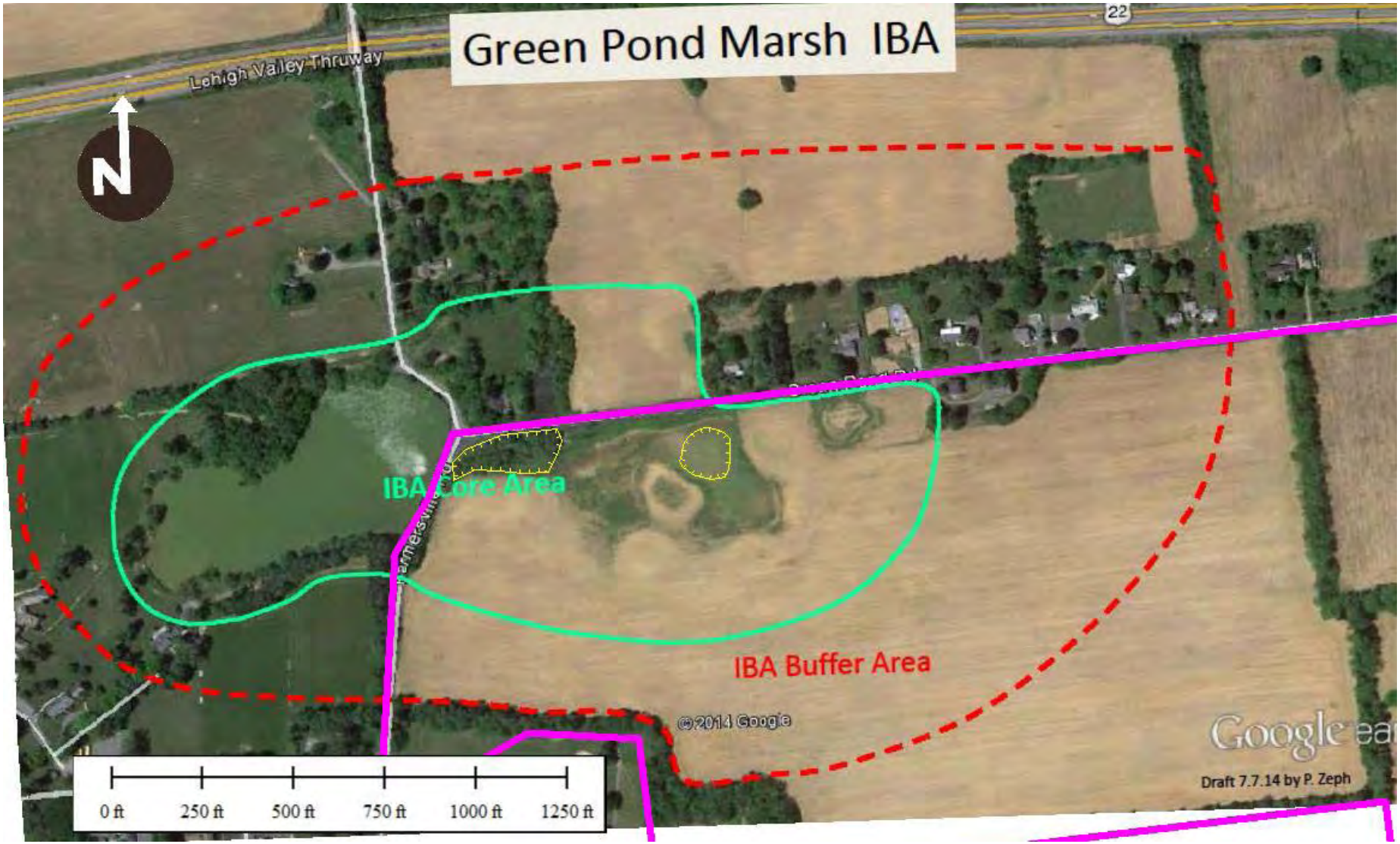


FIGURE 3. Location of the Audubon Green Pond Marsh IBA (Important Bird Area) in the northwestern section of the Traditions of America project site (purple outline). As measured from this drawing, the IBA Core area (green line) encompasses 35 acres (including 18 acres on the TOA site). The IBA Buffer area (red dash) as shown encompasses 105 acres (including 44 acres on the TOA site). The two small wetlands identified in the 2012 Corps JD are identified in yellow. The GoogleEarth photograph used as the basemap here was dated 19 May 2012.

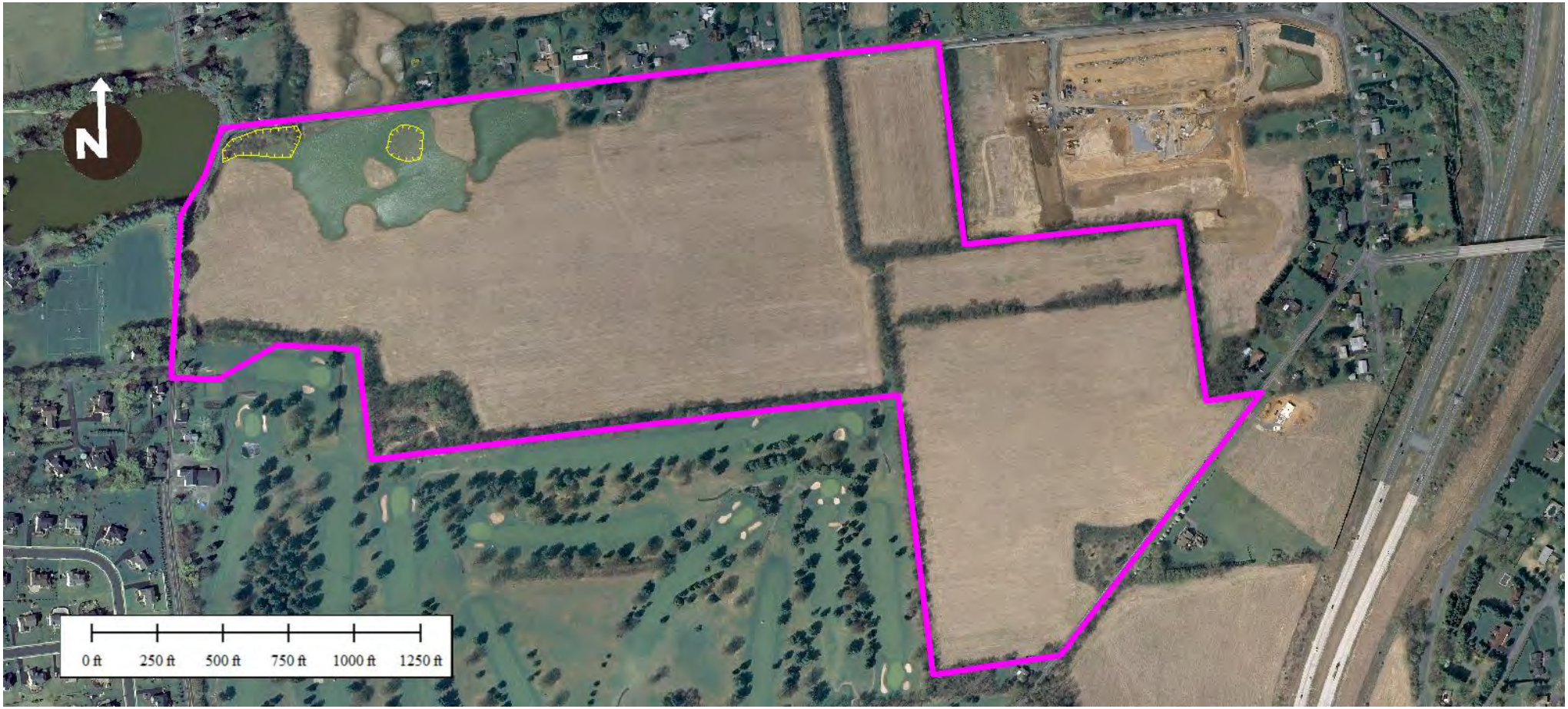


FIGURE 4. Location of the two small wetlands confirmed in the 2012 Corps JD (yellow outline) within the much larger area that is subject to long-term ponding in the northwestern section of the Traditions of America project site (purple outline). Basemap is a 27 March 2010 aerial photograph.

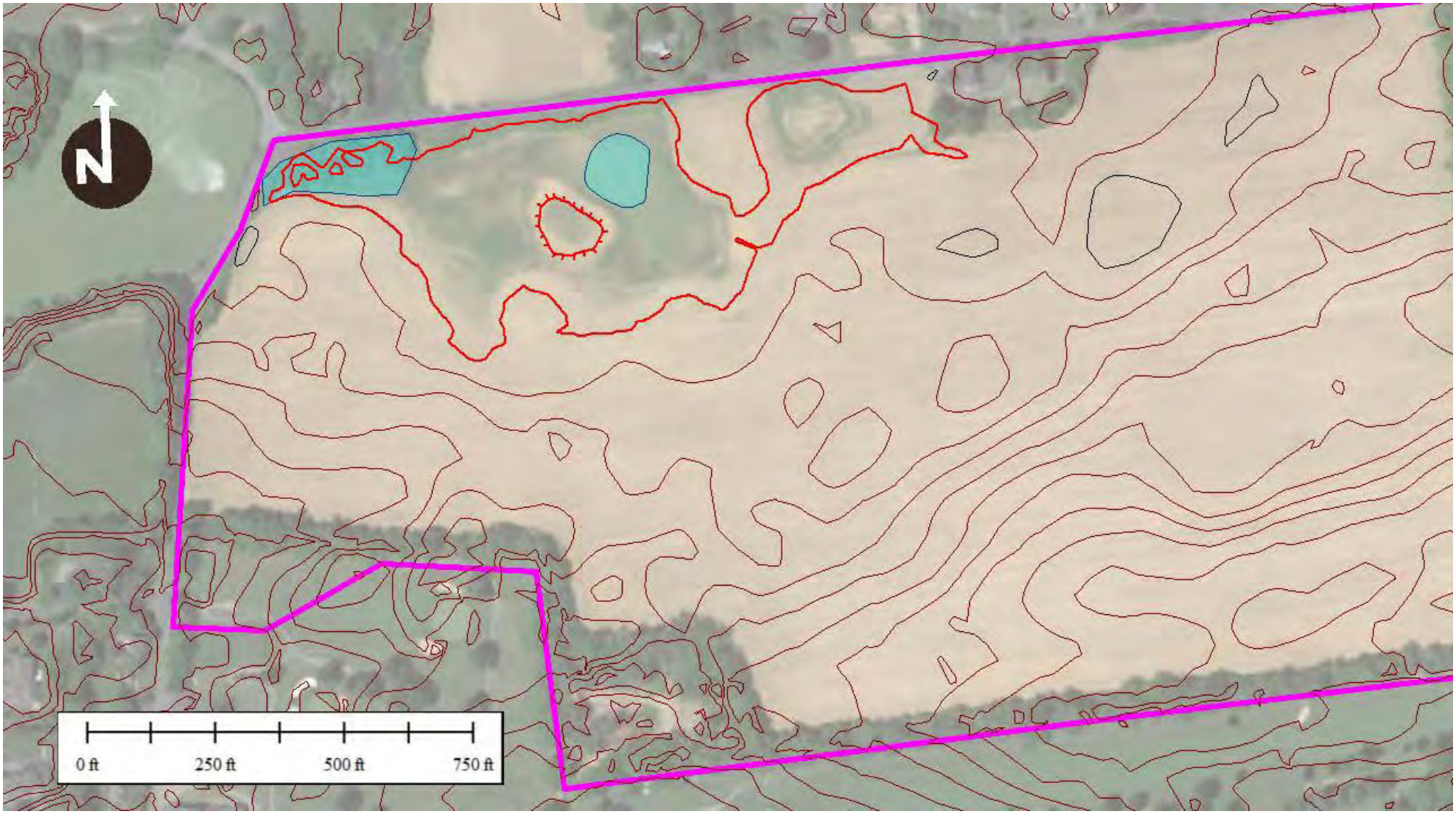
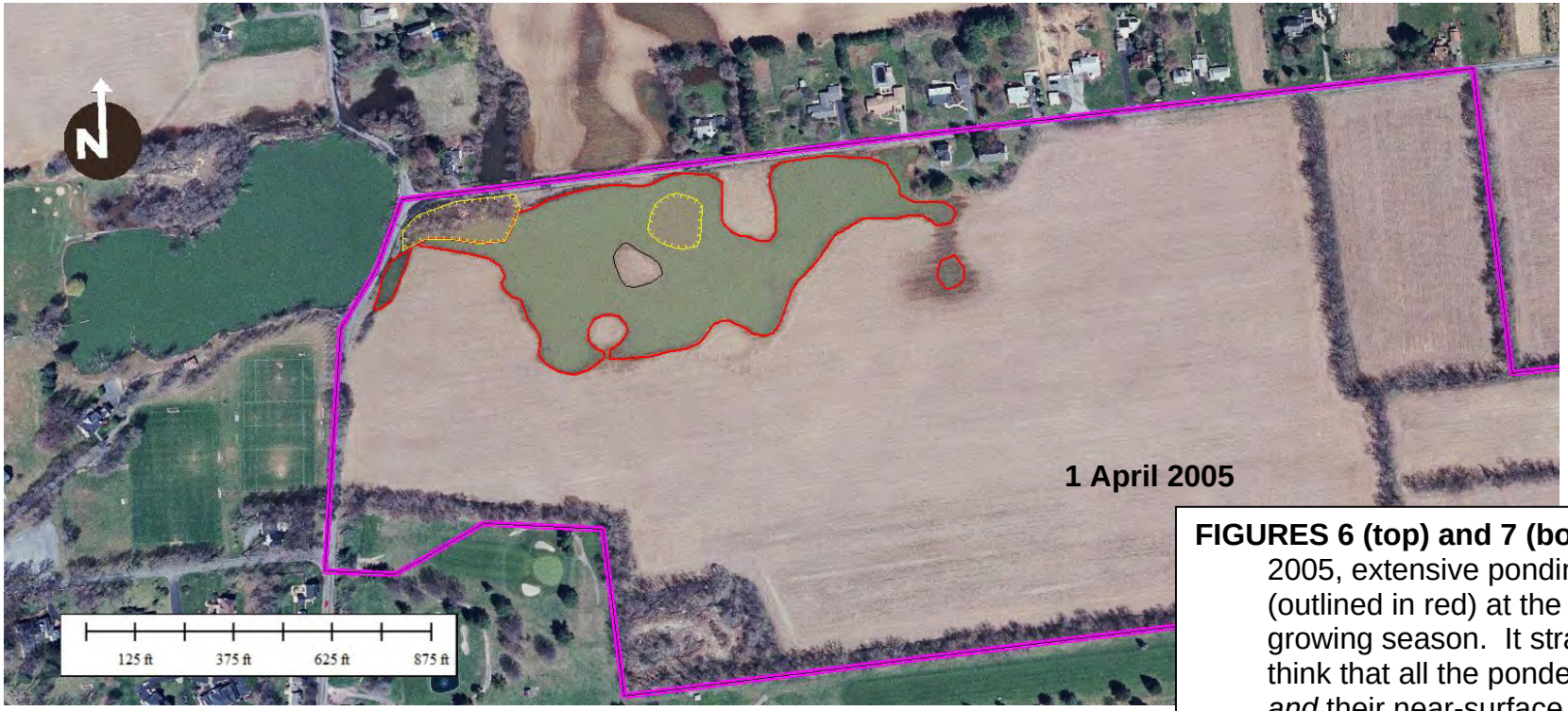
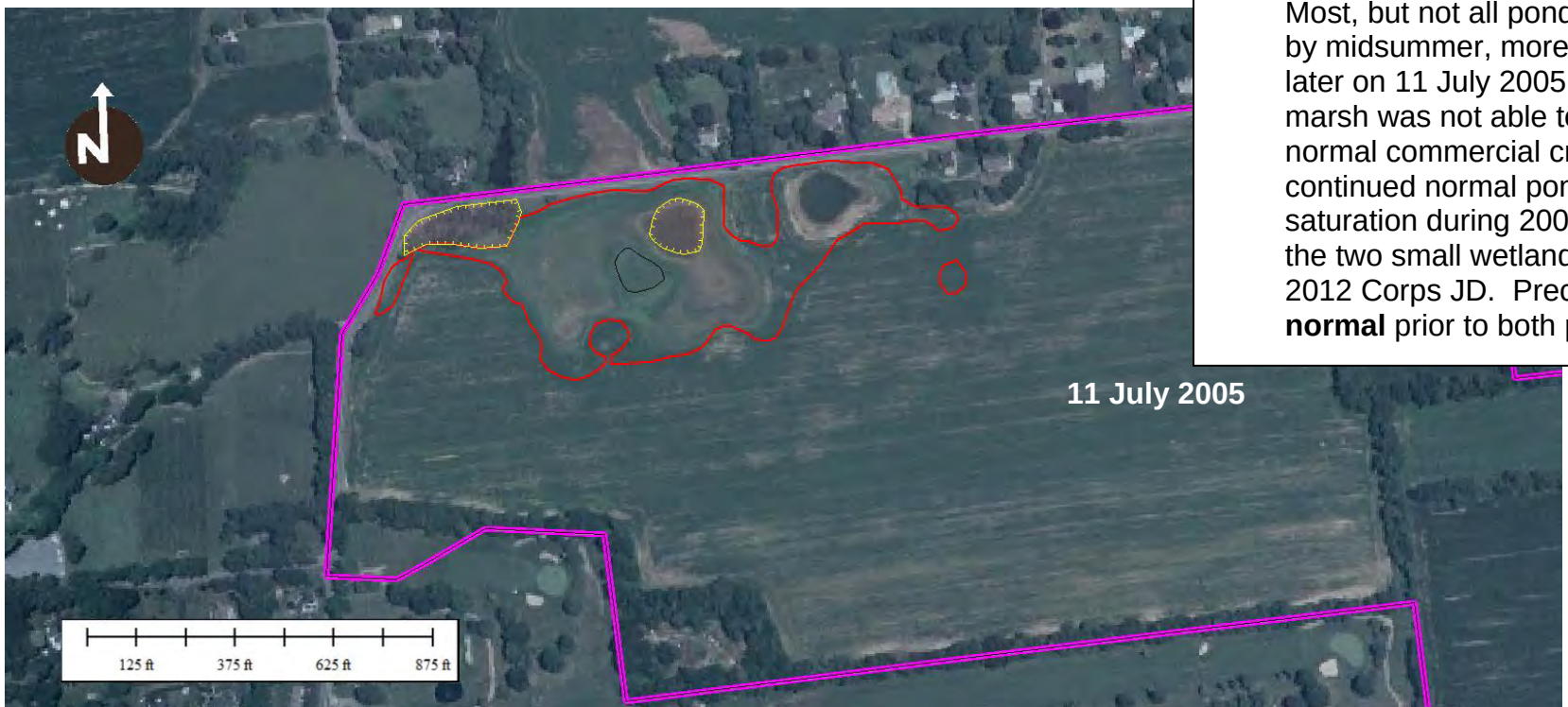


FIGURE 5. PADCNR LIDAR topographic mapping in the northwestern section of the Traditions of America project site (purple outline). The lowest elevation locally (highlighted in red) coincides well with the area of Green Pond Marsh that ponds year after year, and it is much more extensive than the two small wetlands identified in the 2012 Corps JD (shaded blue). Base is an aerial photograph taken on 19 May 2012 (following a 3-month period that was "drier than normal". Contour interval 2 feet.





FIGURES 6 (top) and 7 (bottom). On 1 April 2005, extensive ponding is evident (outlined in red) at the beginning of the growing season. It strains credibility to think that all the ponded areas dried up *and* their near-surface saturation also disappeared within two weeks here. Most, but not all ponding had receded by midsummer, more than 100 days later on 11 July 2005. Most of the marsh was not able to be planted in normal commercial crops due to the continued normal ponding and saturation during 2005. Yellow outlines the two small wetlands identified in the 2012 Corps JD. Precipitation was **normal** prior to both photo dates.

FIGURE 8. Midsummer photo taken on 15 July 1971 (following a 3-month period that was **drier than normal**) showing the northwestern section of the Traditions of America project site (purple outline). The two small wetlands confirmed in the 2012 Corps JD are depicted (yellow outline). During this dry period small areas of bare ground (solid red lines) appear in the marsh. Whether these areas were too wet for vegetation to become established during 1971 is uncertain.

FIGURE 9. Photo taken on 29 March 1939 (following a 3-month period that was **wetter than normal**) showing the northwestern section of the Traditions of America project site (purple outline). The two small wetlands confirmed in the 2012 Corps JD are depicted (yellow outline). Additional ponding (solid red line) extends well beyond the JD wetlands. Large areas appear to be ponded north of Green Pond Road.

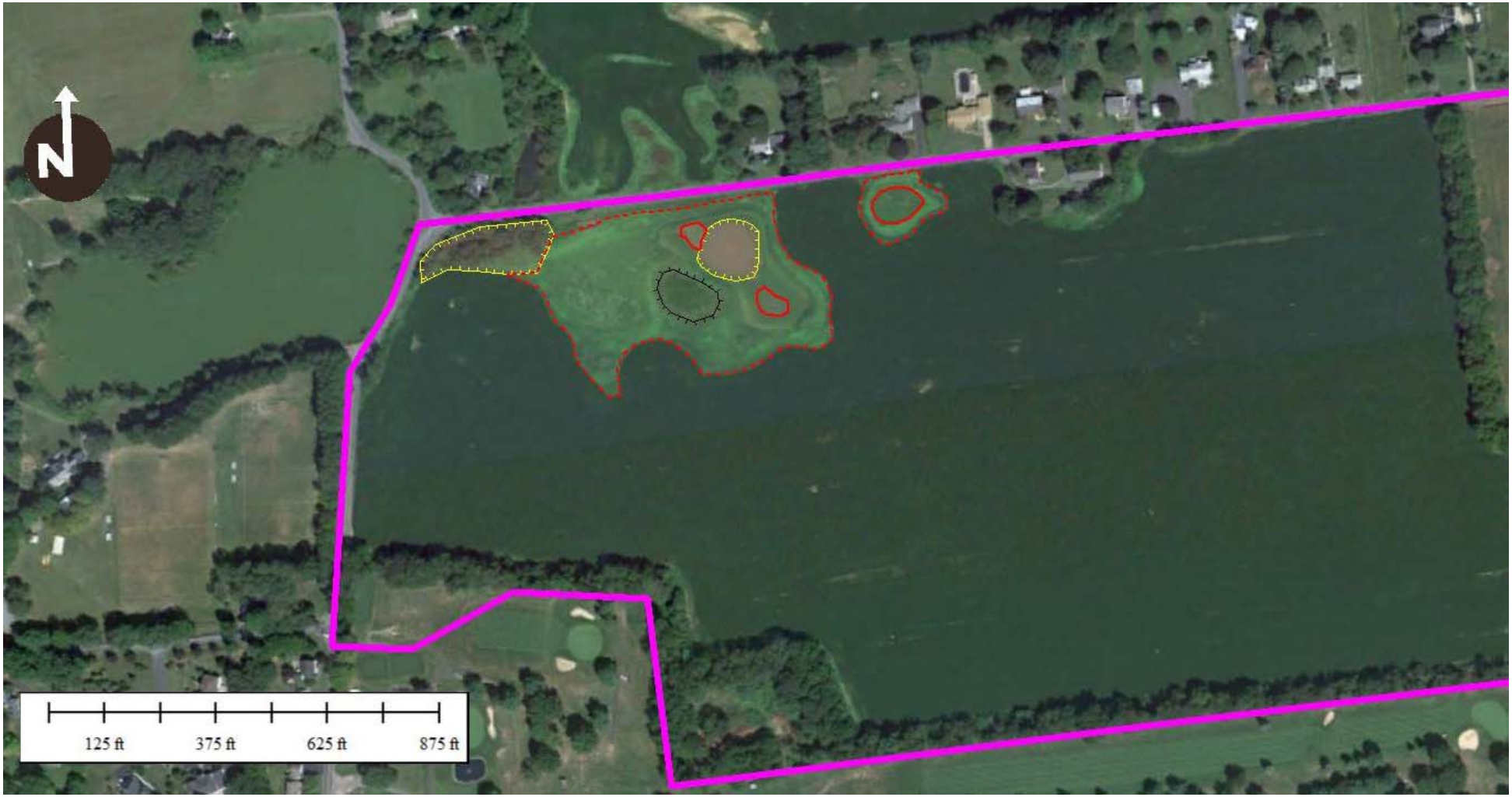


FIGURE 10. Late summer photo taken on 29 August 2010 (following a 3-month period that was **normal**) showing the northwestern section of the Traditions of America project site (purple outline). The two small wetlands confirmed in the 2012 Corps JD are depicted (yellow outline). Additional ponding (solid red lines) and areas where wetness precluded farming that year (dashed red lines) extend well beyond the JD wetlands.

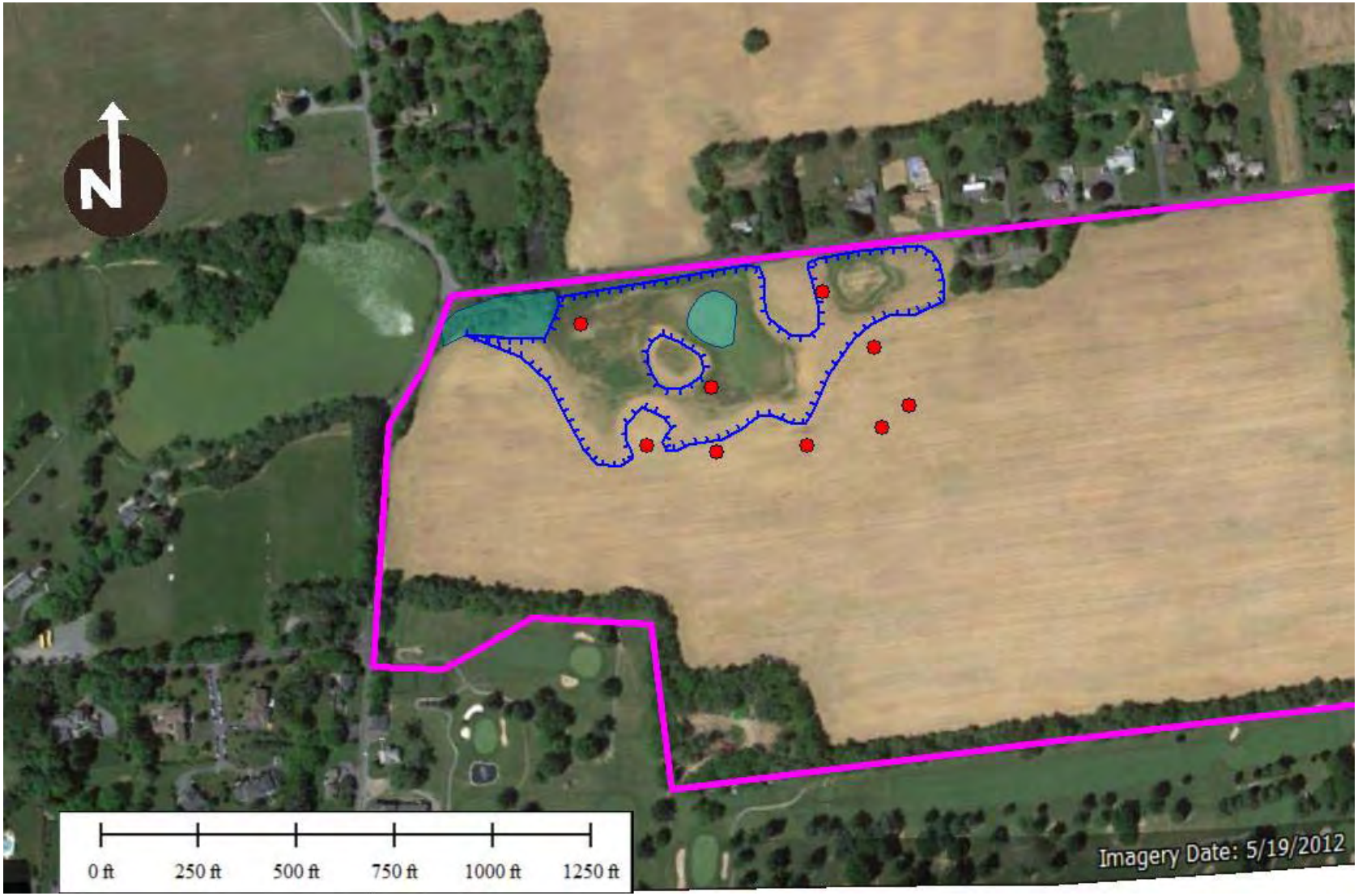


FIGURE 11. Approximate locations of large soil test pits (red dots) excavated by a backhoe in and near Green Pond Marsh on 26 September 2014. Basemap is an aerial photograph dated 19 May 2012 representing a drier than normal period.. Blue shading represents the two small wetlands identified in the 2012 Corps JD. Blue toothed line represents additional areas that qualify as "regulated Waters of the Commonwealth". Three of the nine excavations clearly lie within PADEP-regulated areas, which are visible more than 6 weeks into the growing season of this dry year. Excavation continued on 20 October 2014.

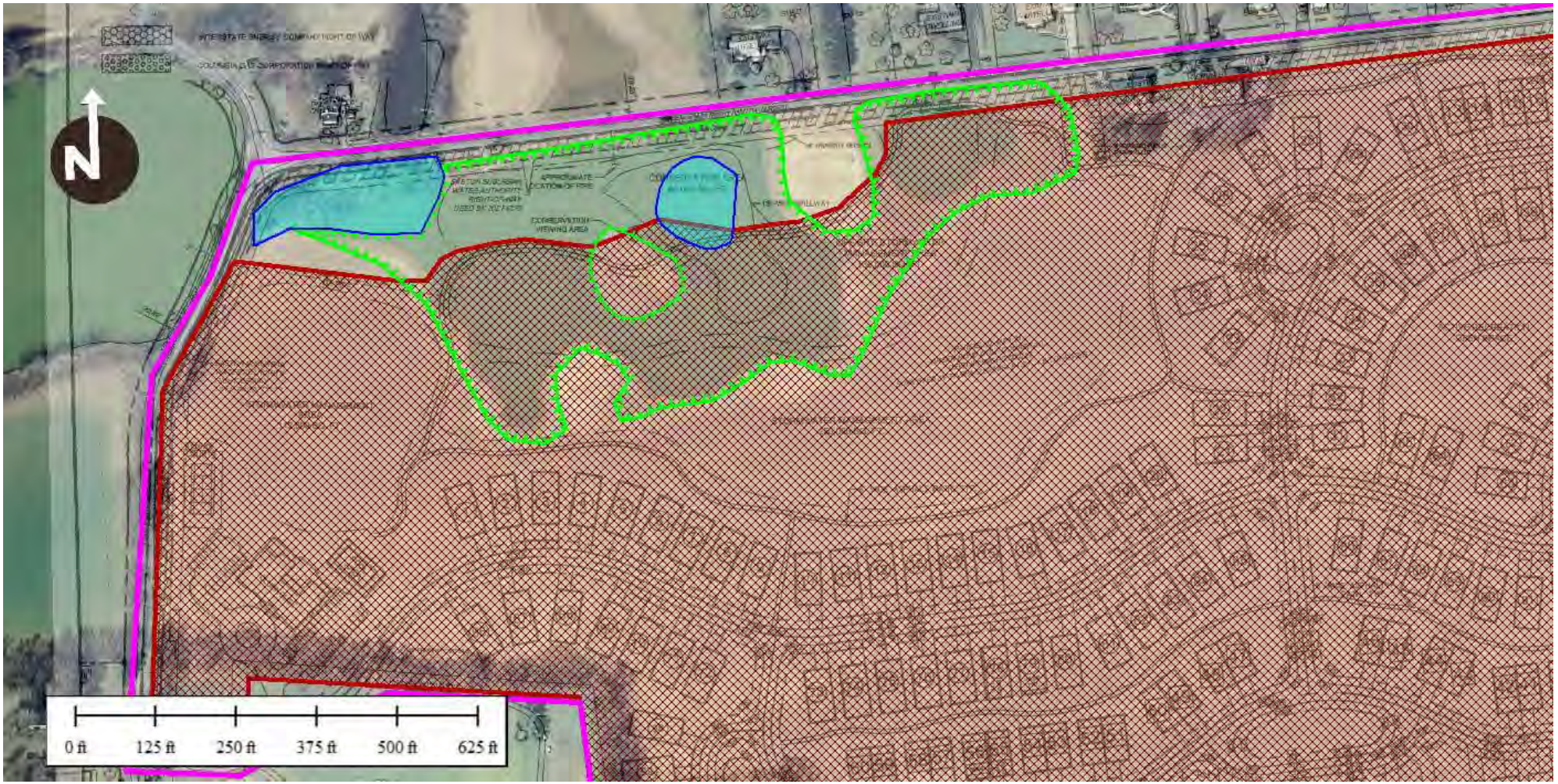


FIGURE 12. Disturbance associated with the current TOA site plan (brown cross-hatch) will directly impact 0.05 acre of wetlands as identified in the 2012 Corps JD (blue). In fact, the Plan will directly impact 4.63 acres of regulated waters of the Commonwealth (within the blue shade plus green toothed outline), which include documented areas of ponding and extended saturation in most years of normal rainfall. Additional areas of wetlands may be affected.

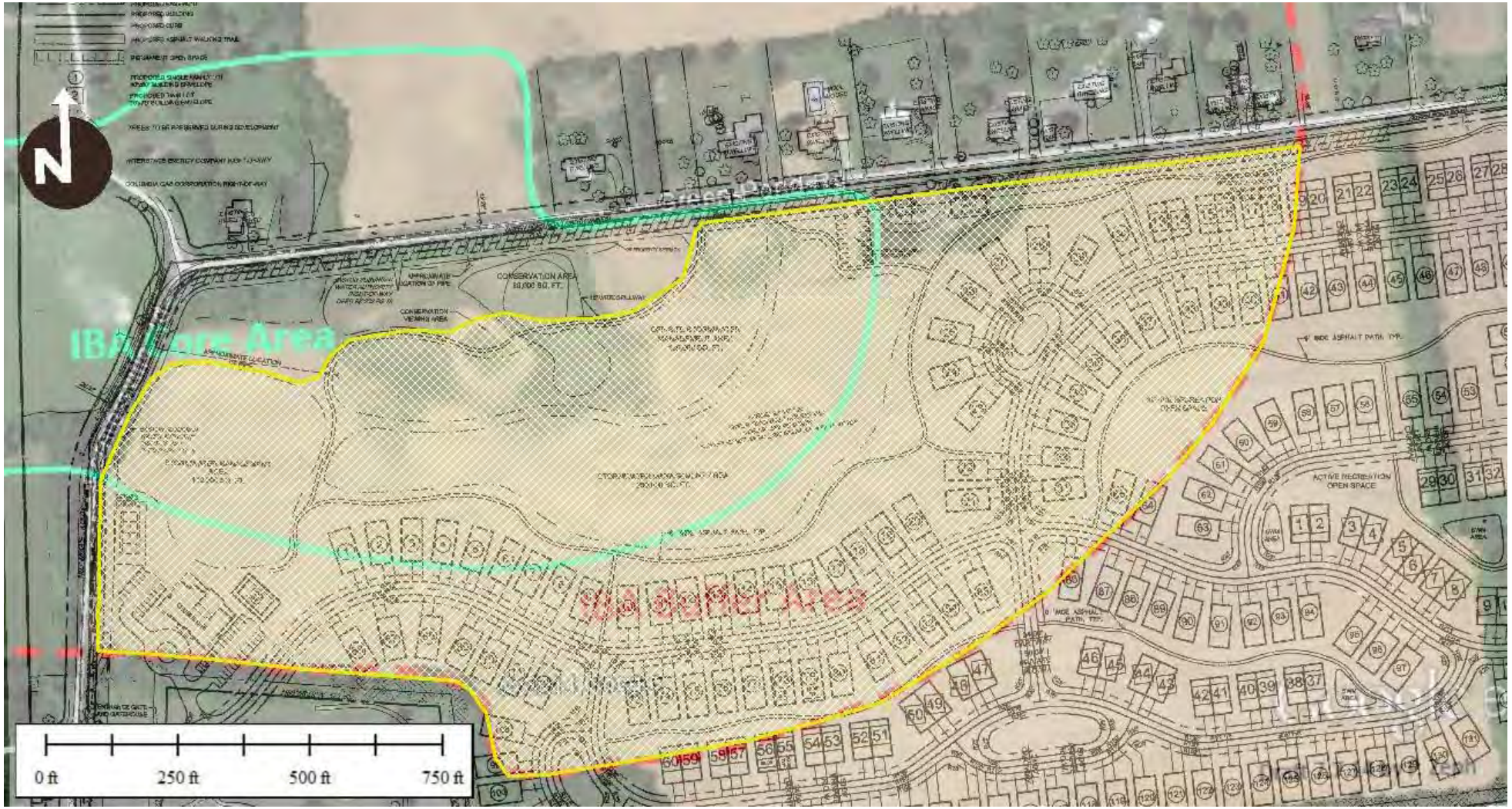


FIGURE 13. The current TOA site plan will directly impact (yellow cross-hatch) 13.5 acres of the IBA "core" area and 24 additional acres of the IBA "buffer" area. The small remaining IBA "core" area onsite will lose virtually all of its value to migratory birds.

Photo A. View northwest across Green Pond Road, Bethlehem Township, Northampton County, Pennsylvania, 31 January 2013. Typical flow of water over the cartway from Green Pond (background) eastward into Green Pond Marsh during a winter with normal precipitation. Camera is positioned just inside the adjacent farm field.

Photo B. View north along Green Pond Road, 14 March 2013, Bethlehem Township, Northampton County, Pennsylvania. Water from Green Pond (left) is flowing into Green Pond Marsh (right) less than 3 weeks before the growing season. Forested wetland is at right of intersection in background where Green Pond Road resumes its east-west course.

Photo C. View south showing Canada geese in Green Pond Marsh, Bethlehem Township, Northampton County, Pennsylvania, 11 March 2004. As usual, the marsh is ponded less than 3 weeks prior to the start of the growing season during a period of normal precipitation. Upland farm field occupies the background in front of trees.

Photo D. Snow geese on Green Pond Marsh three weeks prior to the start of the growing season, 14 March 2014. View is southwest from Green Pond Road. Bethlehem Township, Northampton County, Pennsylvania.

Photo E. View east along Green Pond Road, Bethlehem Township, Northampton County, Pennsylvania, 1 January 2014 during a period of normal precipitation. Lower ground beyond strip of corn stubble at right is the north edge of Green Pond Marsh. Geese on marsh.

Photo F. Another view west along Green Pond Road on 14 March 2014, Bethlehem Township, Northampton County, Pennsylvania. The forested wetland is to the left of the road in the right background. This is an opposite view toward Photo E from a point farther east. Geese on marsh.

Photo G. View east showing Green Pond Marsh in distance, forested wetlands at left, Bethlehem Township, Northampton County, Pennsylvania, 31 January 2013. The ponded water provides a good indication of topography following this period of normal precipitation. Farmed field at right is higher ground outside the marsh. Migratory geese are visible in background.

Photo H. View east from Green Pond Road, Bethlehem Township, Northampton County, Pennsylvania, 13 April 2014. Upland island within the ponded marsh is clearly visible. This photo was taken 13 days into the growing season during a period of normal precipitation.

ATTACHMENT A

AUDUBON IBA DOCUMENTATION

Audubon Pennsylvania IBA Site Information

Green Pond Marsh -- Important Bird Area
1. Name of site: Green Pond Marsh or Green Pond Road ponds
2. County: Northampton
3: Municipalities: Bethlehem Township, Easton, PA (zip code 18020)

4. General Location and Boundaries: East-Southeast of Green Pond along Farmersville Road. Green Pond Marsh is fed by overflow from the adjacent pond, Green Pond. Northern boundary of IBA is the Green Pond Road and the Western boundary is Farmersville Road and the edge of Pond (see attached map).
5. Geographical coordinates (center of marsh site): N 40.68003° W 75.30840°

6. Approximate area: 20 acres for Green Pond and Green Pond Marsh alone; 69 acres including field area around Marsh. Four additional acres on north side of road would include some buffer to both water bodies and includes an additional intermittently wet field area and thickets that attract some birds.

7. Physiographic province: Per DCNR- RIDGE AND VALLEY PROVINCE, Great Valley section

8. Elevation range (in feet): 400'

9. USGS Quads used to delineate site: Nazareth, PA quadrangle.

10. State legislative districts of site: Congressional District 15, Senate Legislative District 18.

Criteria for Green Pond Marsh Qualification as Pennsylvania IBA:
D3-PA: Species in rare/unique habitat
D4ii-PA: waterfowl (2000+ at one time)
D4v-PA: shorebirds (100+)
Green Pond Marsh is best qualified as a shorebird and waterfowl stopover site in spring and fall migration (D4-PA). It is also used during winter months for resting and feeding by waterfowl and waders. The wetland habitat of shallow pools with adjacent open field habitat is a rare and unique habitat (D3-PA). Many wetlands designated as IBAs in Pennsylvania are forested wetlands or shrub thicket habitats, but few are wetlands in open fields as seen at this site. These "pothole" open-field, shallow pools are rare particularly in eastern Pennsylvania. They may occur more in northwest corner of the state but in southeast region, Green Pond Marsh may be one of the few remaining sites characterized by such habitat. Wetland birds in general have lost considerable habitat in recent decades, these remaining sites that provide important stopover habitat for shorebirds and waterfowl are even more important as wetland habitat diminishes regionally. The Green Pond Marsh has been used by shorebirds consistently since the 1970s. It

consistently attracts unique concentrations of birds and in many ways it is the birds that have chosen the site to be an important area.

Records from eBird are incomplete but when considered in conjunction with long term records from Lehigh Valley birders (see Appendices) the criteria of 100 plus shorebirds has been met annually (see Least Sandpiper numbers alone in tables below). The waterfowl using the site, such as Northern Pintail, Green-winged Teal, and Blue-winged Teal are found in notable numbers as well.

11. General description of site:

a) short description -- Green Pond Marsh is characterized by a large open field with 2-3 depressions that collect water during most of the year, becoming dry sometimes during summer months. It is fed periodically by a nearby permanent, six acre pond that lies across the rural road from the Green Pond Marsh area. The fields are planted with corn and left fallow during winter and spring. Thickets adjacent to fields and pond attract wet-thicket birds, including occasional Rusty Blackbird. The Green Pond Marsh is a premiere site for wetland birds in eastern Pennsylvania with large numbers of shorebirds and waterfowl using the shallow pools for stopover on migration with numbers of shorebirds exceeding 100 individuals often.

b. longer description -- *Green Pond Marsh Proposed Important Bird Area* is characterized by a large open agricultural field with 2-3 depressions that collect water during most the year and becoming dry sometimes during summer months. It is fed periodically by an adjacent six acre pond that lies across the rural township road from the Green Pond Marsh area. The soils have been examined by an ecologist and determined to be hydric, characteristic of wetlands (see Appendices). In recent years the fields are planted with corn and left fallow during winter and spring. Thickets adjacent to fields and pond attract wet-thicket birds, including occasional blackbird flocks including Rusty Blackbird. The Green Pond Marsh is a premiere site for wetland birds in eastern Pennsylvania with large numbers of shorebirds and waterfowl using the shallow pools for stopover on migration. Records of concentrations date back to 1970s but may have occurred over a longer period. Compared to other pond or lake areas in the region it appears to offer a unique habitat and attracts larger concentrations than seen in many areas of eastern Pennsylvania. The shorebird and waterfowl numbers can rival current IBAs such as Middle Creek WMA in concentration for areas in eastern counties.

Highest numbers of birds are seen in spring and autumn migration. In spring after heavy rains, Green Pond Marsh holds water in shallow pools for long periods. It often stays wet for extended periods of time providing a muddy shoreline where shorebirds and waterfowl can feed. Many of these birds remain for days and sometimes a week or more feeding on organisms in the soft mud. It is especially important to the shorebirds since it provides an area where they can refuel and build up body fat they need to complete their long journey to their Arctic and sub-Arctic nesting grounds. .

Over the years, the wet fields at Green Pond have attracted over 160 species of birds and at least 20 different species of shorebirds, including such rarities as American Avocet, Wilson's Phalarope, and Red-necked Phalarope (see Appendices). Sometimes flocks of Least Sandpipers reach 100+ individuals. On one occasion, a flock of 11 Glossy Ibis were seen here, the largest

flock ever recorded in the region. Once a Sandhill Crane spent an entire winter in the fields around Green Pond, which at the time was the longest stay of a Sandhill Crane in Pennsylvania during the winter months. Green Pond Marsh has also attracted over 20 species of migratory waterfowl. Over 100 Northern Pintails have been seen here at one time and Green-winged Teal and Blue-winged Teal are seen regularly. The first county record of the rare Ross's Goose came from Green Pond. In addition, the Greater White-fronted Goose has been recorded here several times. The site is presently one of the largest staging areas of Lesser Black-backed Gulls in North America, with counts of 200+ individuals. Other gulls seen here have included Iceland, Glaucous, Bonaparte's and Laughing Gull. Occasionally terns are seen, particularly after storms, including Black Tern, Royal Tern.

The area is also a great spot for Neotropical songbirds including breeders like Eastern Kingbird, Warbling Vireo, Yellow Warbler, Baltimore Oriole, and Orchard Oriole and migrants like Blackpoll Warbler and Northern Waterthrush. During migration, one can see five different species of swallows feeding on insect life over the water.

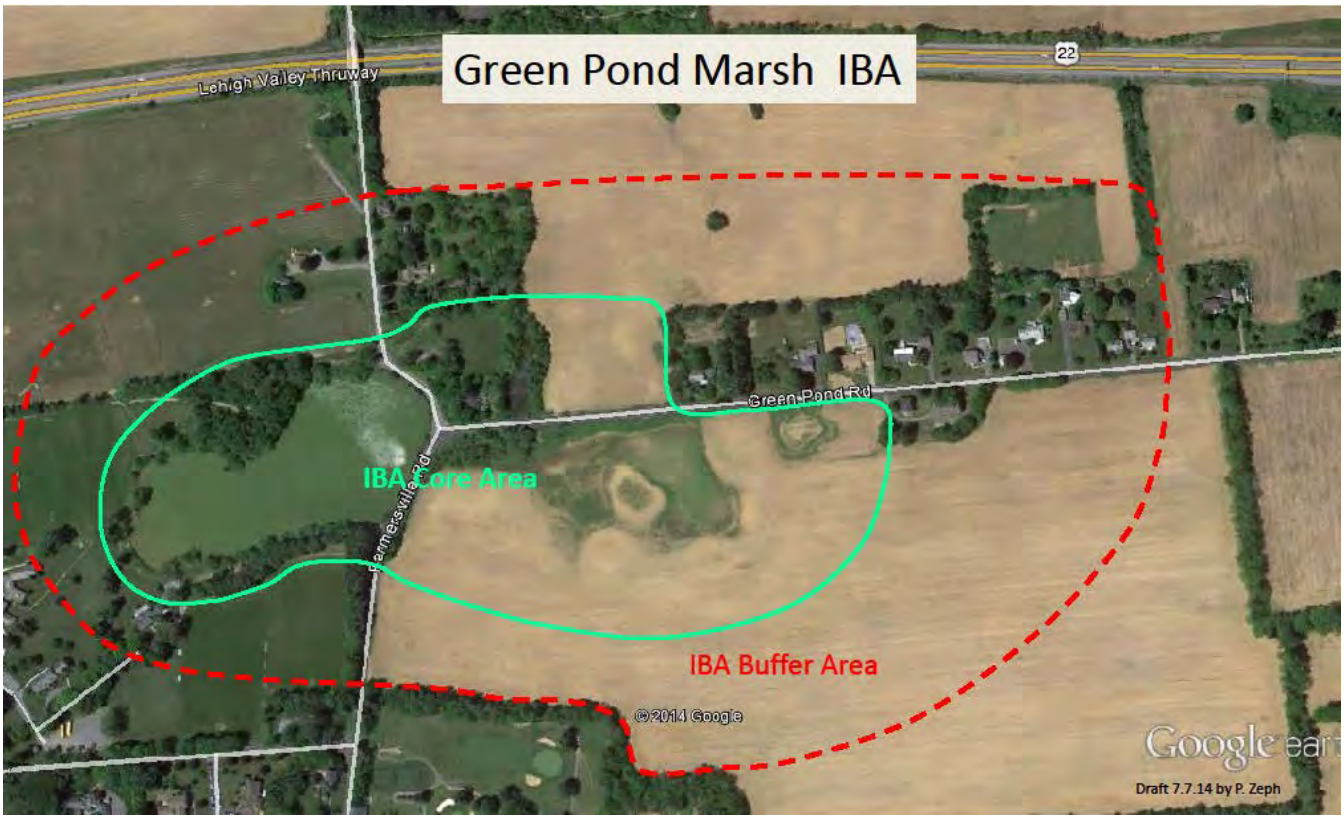
Habitat of the field/marsh area of IBA could be improved with minor changes. If the agricultural fields around the Marsh flooded area could be planted in native grasses and wildflowers the invertebrate abundance would increase and provide additional foraging for birdlife. Most importantly, Green Pond Marsh would be an ideal location for outdoor education. Being located adjacent to the Moravian Academy there are opportunities for immediate use by high school and middle schools. A community college nearby could also use the site if it was protected. It would be an excellent location for teaching students about the characteristics and importance of wetlands and preserving habitat. The students could be involved in management projects such as planting native wetland plants, erecting and placing nesting boxes, and collecting data on the bird life. The U.S. Fish and Wildlife Service sponsors a "Shorebird Sister Cities Program" where cities are nominated as a "Shorebird Sister City" if they have demonstrated their commitment to shorebird conservation through good city planning. Green Pond Marsh would be an ideal model for this program. The local land conservancy, Wildlands Conservancy, is interested in adopting the site and has approached the current landowner regarding conservation opportunities.

12. Bird Conservation Region: Piedmont Region, BCR 29; Delaware River Basin drainage

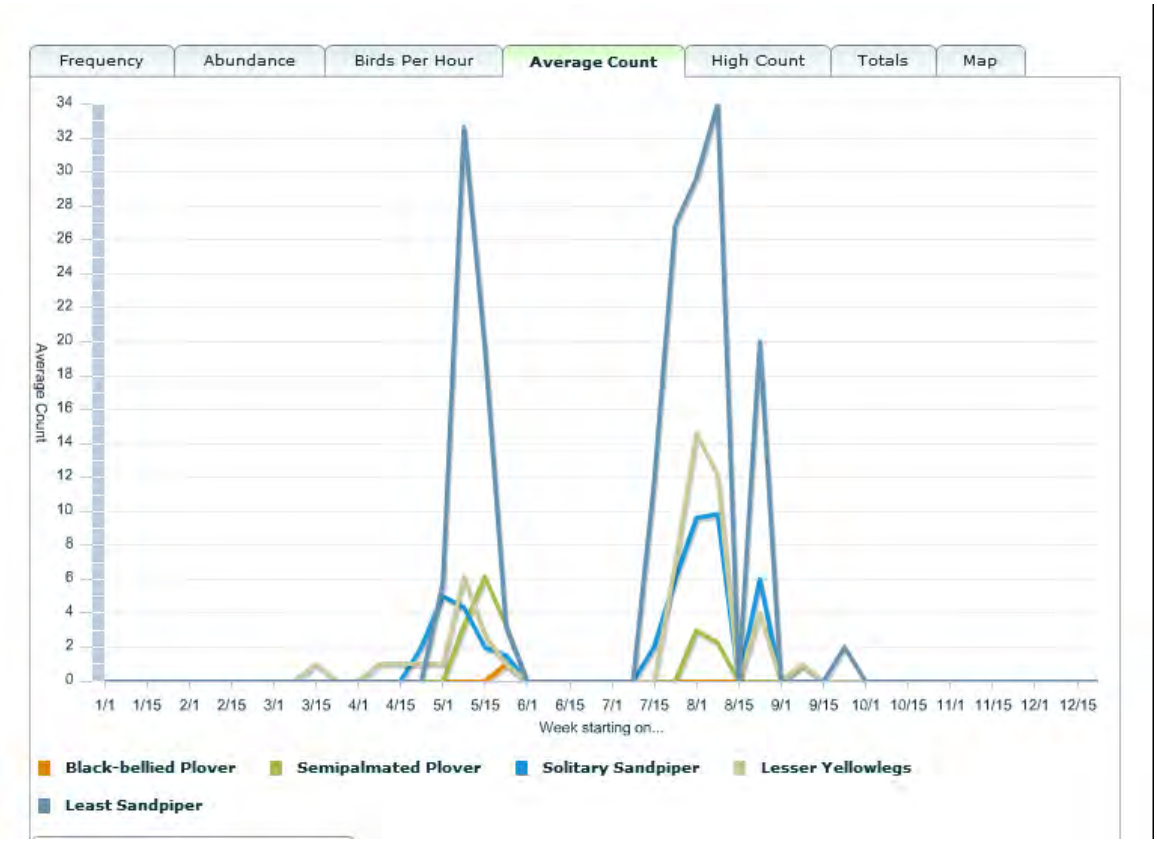
Ownership: The permanent pond is owned by Moravian Academy, a private high school. The marsh across the road is owned by Green Pond Country Club. A smaller field adjacent to permanent pond and across from main marsh area is owned by Jaindel Turkey farms. The most critical part to protect is the marsh and field area where shorebirds and waterfowl concentrate, but the pond is essential to keeping the water flowing to marsh.

Land Use: Farming and recreation primarily. Bird watching. School uses the pond for educational activities.

Appendix A. Site Map for Green Pond Marsh IBA.

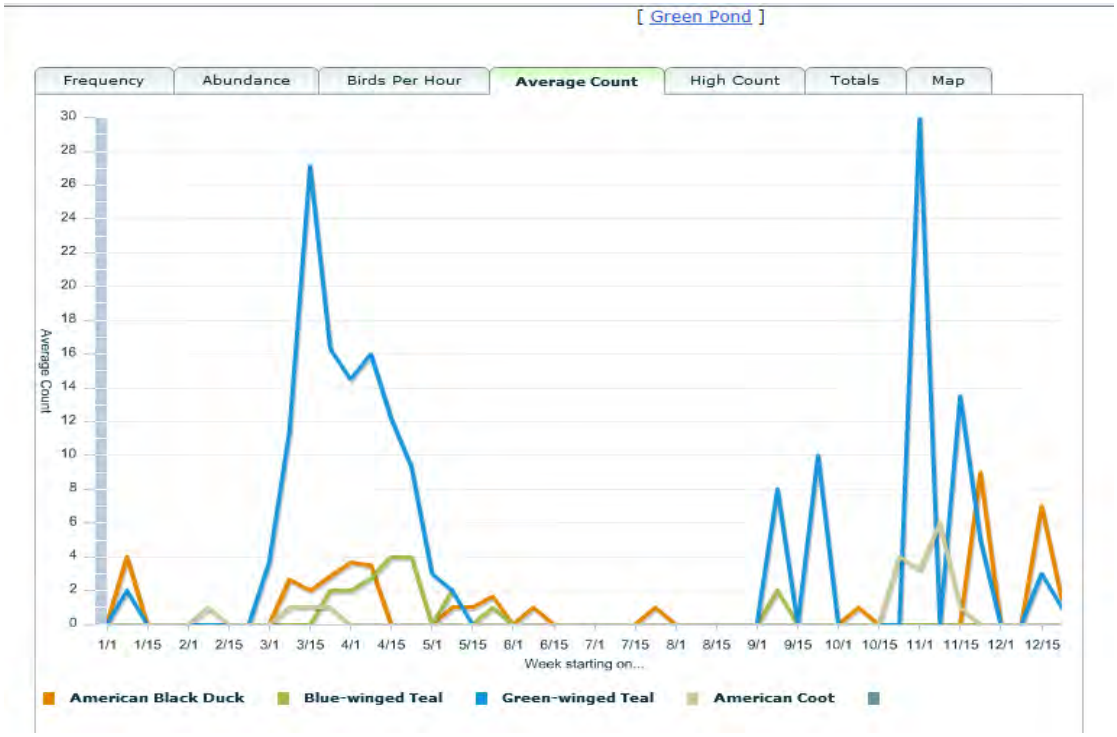


Appendix B. Information on timing and abundance of shorebirds and waterfowl from www.ebird.org.



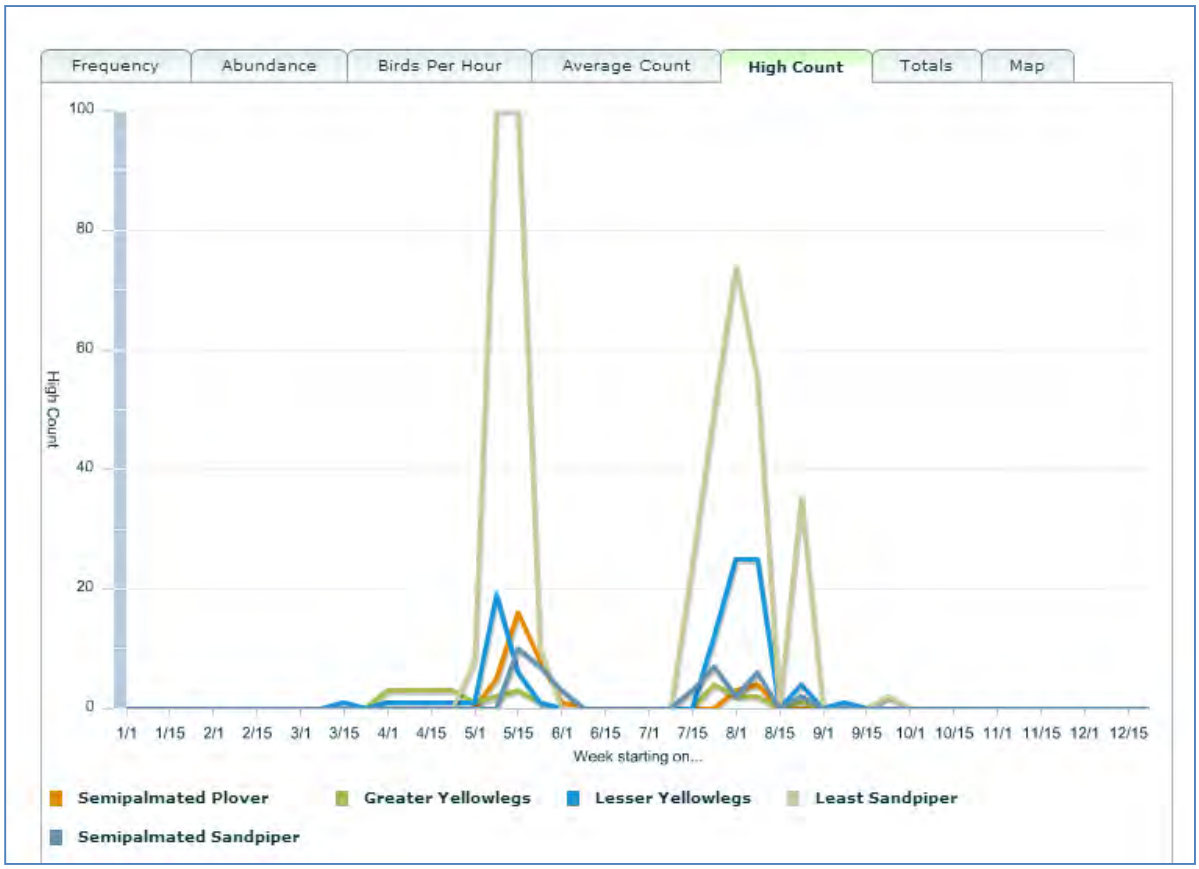
Average daily count and timing of five species of shorebirds, Green Pond Marsh, Easton, PA, from www.ebird.org.

Sample of timing and abundance chart of shorebirds for Green Pond Marsh (ebird.org).



Timing and average abundance of several waterfowl species using Green Pond Marsh, Easton, PA.

See www.ebird.org for complete data.



High counts for five shorebird species from Green Pond Marsh records in eBird.org showing combined total exceeding 100 shorebirds per day and meeting IBA threshold.

Green Pond Marsh High Counts per species from www.ebird.org reports, April 2014*				Identified in Action Plan's as
Species	**Max Number**	**Date**	**Observer**	**CONCERN species**
Blue-winged Teal	8	13-Apr-14	Dan Altif	NAWaterfwl.Plan
Greater White-fronted Goose	1	30-Dec-90	PORC Data	BCR declining
Bufflehead	2	3-Apr-07	Bill Etter	
Hooded Merganser	5	16-Mar-11	Dan Altif	
Double-crested Cormorant	2	1-May-11	Dan Altif	
Ruddy Duck	1	6-Nov-11	Edward Komito	
American Coot	6	9-Nov-11	Barbara Hiebsch	
Northern Shoveler	2	22-Nov-11	William Keim	
Mallard	120	22-Nov-11	William Keim	
American Black Duck	12	23-Nov-11	Stephen Kloiber	BCR declining; PIF Priority
Mute Swan	2	25-Nov-11	Matthew Sabatine	
Pied-billed Grebe	2	2-Dec-11	Ray Duffy	
Ross's Goose	3	31-Dec-11	Aidan Bodeo-Lomicky	
Snow Goose	30,000	19-Jan-12	Corey Husic	
Green-winged Teal	53	16-Mar-12	Dustin Welch	WAPlan spp.
Gadwall	6	16-Mar-12	Dustin Welch	
Canada Goose	3000	13-Jan-13	Andrew McGann	
American Wigeon	6	24-Mar-13	Leslie H	
Cackling Goose*	12	17-Mar-14	Michael Schall	
Wood Duck	15	19-Mar-14	Tom Johnson	
Ring-necked Duck	5	22-Mar-14	Edward Komito	
Northern Pintail	**196**	24-Mar-14	Michael Schall	
Tundra Swan	18	24-Mar-14	Michael Schall	
duck sp.	25	8-Nov-12	Corey Husic	
American Black Duck x Mallard (hybrid)	1	23-Nov-11	Stephen Kloiber	

American Bittern	1	29-May-00	Michael Schall	PA Endangered., NE Priority
Great Egret*	19	24-Aug-06	Corey Husic	PA Endangered
Glossy Ibis*	11	20-Apr-07	Michael Schall	
Common Gallinule	1	1-Jun-07	Michael Schall	
Black-crowned Night-Heron*	1	7-Jun-08	Michael Schall	PA Endangered
Little Blue Heron	1	1-Aug-08	Corey Husic	
Snowy Egret	1	19-May-11	Dustin Welch	
Cattle Egret	1	31-May-11	Dustin Welch	
White Ibis	1	25-Jul-11	matthew sabatine	
Great Blue Heron	5	5-Apr-12	Dan Altif	
Sandhill Crane	1	12-Apr-13	Michael Schall	
Green Heron	8	6-Aug-13	Michael Schall	
Pectoral Sandpiper	8	23-Apr-06	Michael Schall	
Greater Yellowlegs	4	31-Jul-06	Michael Schall	
Baird's Sandpiper	1	24-Aug-06	Corey Husic	
Stilt Sandpiper*	21	2003	Corey Husic	
Spotted Sandpiper	11	18-May-07	Bill Etter	
Semipalmated Plover	17	18-May-07	Bill Etter	
Dunlin*	9	18-May-08	Michael Schall	
Wilson's Phalarope	1	19-May-08	Corey Husic	
Wilson's Snipe	4	24-Apr-10	Stephen Kloiber	
Least Sandpiper	100	9-May-10	Edward Komito	Shorebird Plan spp.
Semipalmated Sandpiper	10	17-May-11	Stephen Kloiber	
Red-necked Phalarope	1	19-May-11	Dan Altif	
Short-billed Dowitcher*	38	1996	Dan Altif	
Black-bellied Plover*	9	31-May-11	matthew sabatine	
White-rumped Sandpiper	5	june 2008	Dustin Welch	
Killdeer*	75	25-Jul-11	matthew sabatine	Shorebird plan SCC
Solitary Sandpiper	16	10-Aug-11	Bill Etter	

Lesser Yellowlegs*	**116**	11-Aug-11	Matthew Sabatine	
Black Vulture	3	26-Apr-11	Rich Rehrig	
Turkey Vulture	5	19-May-11	Matthew Sabatine	
American Kestrel	3	15-Jul-11	Matthew Sabatine	
Red-shouldered Hawk	1	6-Nov-11	Stephen Kloiber	
Bald Eagle	1	26-Dec-11	Keith Michael	
Sharp-shinned Hawk	1	16-Mar-12	Dustin Welch	
Cooper's Hawk	1	27-Mar-12	Corey Husic	
Broad-winged Hawk	1	4-May-12	Michael Schall	
Osprey	1	4-Jul-13	Michael David	PA Threatened
Red-tailed Hawk	3	6-Sep-13	Edward Komito	
Peregrine Falcon	1	15-Mar-14	Dan Altif	PA Endangered
Northern Harrier	1	24-Mar-14	Michael Schall	PA Threatened
Great Horned Owl	3	5-May-02	Michael Schall	
Ring-billed Gull	500	18-Apr-07	Bill Etter	
Glaucous Gull	1	28-Apr-07	Bill Etter	
Forster's Tern	1	11-May-07	Michael Schall	
Lesser Black-backed Gull*	332	8-Mar-08	Michael Schall	
Iceland Gull	3	8-Mar-08	Michael Schall	
Bonaparte's Gull*	80	9-Apr-10	Dan Altif	
Black Tern	1	14-May-10	Edward Komito	PA Endangered
Great Black-backed Gull	4	15-Jan-12	Matthew Sabatine	
Herring Gull	40	15-Jan-12	Matthew Sabatine	
Wild Turkey	2	20-Apr-12	Edward Komito	
Least Flycatcher	2	21-May-03	Michael Schall	
Eastern Wood-Pewee	1	21-May-03	Michael Schall	
Rusty Blackbird	**24**	2-Feb-06	Michael Schall	BCR SCC; PIF High Priority
Cliff Swallow	20	9-Aug-06	Corey Husic	
Savannah Sparrow	2	13-Sep-09	Dennis Glew	

House Sparrow	4	4-Apr-10	Dustin Welch	
Yellow-rumped Warbler	14	11-Apr-10	Edward Komito	
Palm Warbler	4	11-Apr-10	Edward Komito	
Rock Pigeon	20	9-May-10	Edward Komito	
Louisiana Waterthrush	1	9-May-10	Dan Altif	WACPlan spp
Ruby-crowned Kinglet	1	21-Apr-11	Dan Altif	
Field Sparrow	2	11-May-11	Matthew Sabatine	
Prothonotary Warbler	1	12-May-11	Dan Altif	
Baltimore Oriole	3	13-May-11	Dustin Welch	
Orchard Oriole	2	13-May-11	Dustin Welch	
Northern Waterthrush	2	13-May-11	Dustin Welch	
Chimney Swift	20	13-May-11	Dustin Welch	
Barn Swallow	50	16-May-11	Matthew Sabatine	
Tree Swallow	50	18-May-11	Rich Rehrig	
Northern Parula	1	19-May-11	Dustin Welch	
Blackpoll Warbler	3	21-May-11	Edward Komito	
Rose-breasted Grosbeak	1	27-May-11	Bill Etter	
Eastern Towhee	1	28-May-11	matthew sabatine	
Gray Catbird	4	29-May-11	Edward Komito	
Red-eyed Vireo	1	29-May-11	Edward Komito	
Mourning Dove	12	29-May-11	Edward Komito	
Scarlet Tanager	1	31-May-11	matthew sabatine	
Northern Cardinal	3	12-Jun-11	Edward Komito	
Yellow Warbler	3	13-Jul-11	matthew sabatine	
Northern Mockingbird	3	13-Jul-11	matthew sabatine	
Bank Swallow	3	18-Jul-11	matthew sabatine	
House Wren	2	22-Jul-11	matthew sabatine	
Eastern Kingbird	8	28-Jul-11	matthew sabatine	
House Finch	2	4-Aug-11	matthew sabatine	

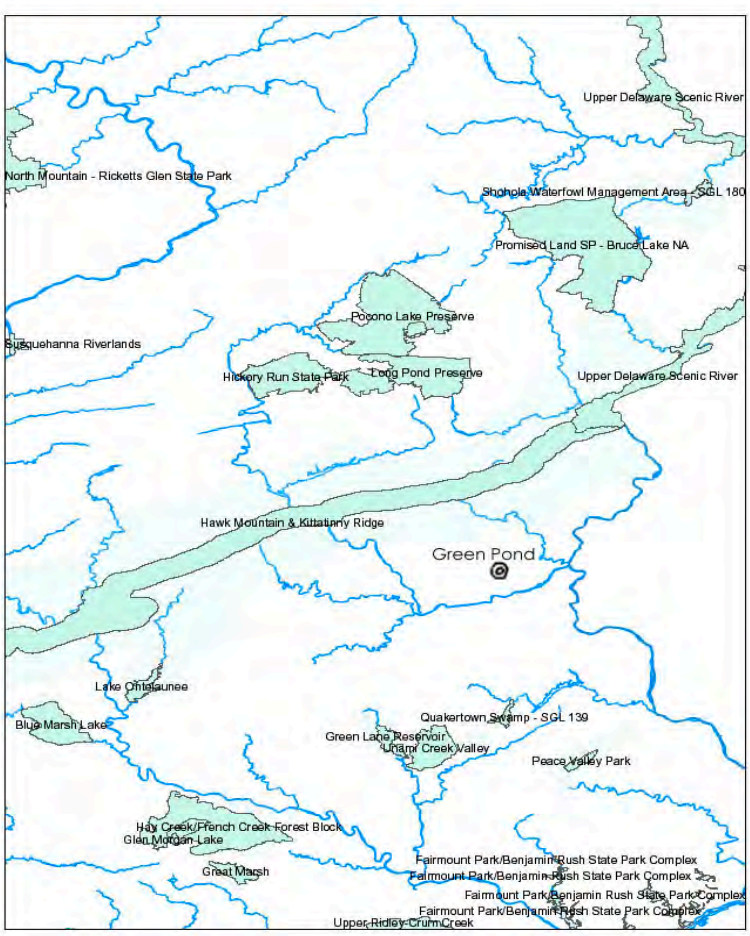
Ruby-throated Hummingbird	1	6-Aug-11	matthew sabatine	
European Starling	500	6-Nov-11	Edward Komito	
American Crow	50	19-Jan-12	Corey Husic	
Black-capped Chickadee	2	18-Feb-12	Edward Komito	
Brown-headed Cowbird	75	8-Mar-12	Edward Komito	
Common Grackle	1100	8-Mar-12	Edward Komito	
Red-winged Blackbird	751	8-Mar-12	Edward Komito	
Belted Kingfisher	2	16-Mar-12	Dennis Glew	
Dark-eyed Junco	10	18-Mar-12	Edward Komito	
Eastern Bluebird	1	18-Mar-12	Edward Komito	
Carolina Chickadee	1	1-Apr-12	Michael Schall	
Golden-crowned Kinglet	1	9-Apr-12	Stephen Kloiber	
Horned Lark	1	16-Apr-12	Dan Altif	
American Goldfinch	20	20-Apr-12	Edward Komito	
Tufted Titmouse	2	20-Apr-12	Edward Komito	
Cedar Waxwing	13	30-May-12	Kurt Zimmerman	
American Robin	20	1-Aug-12	Kurt Zimmerman	
White-throated Sparrow	10	2-Mar-13	Dan Altif	
White-breasted Nuthatch	1	2-Mar-13	Dan Altif	
Downy Woodpecker	2	2-Mar-13	Dan Altif	
Red-bellied Woodpecker	1	14-Apr-13	Edward Komito	
Eastern Phoebe	2	2-May-13	Kurt Zimmerman	
American Pipit	5	4-May-13	Michael Schall	
Song Sparrow	5	9-May-13	matthew sabatine	
Common Yellowthroat	1	9-May-13	matthew sabatine	
Blue-gray Gnatcatcher	1	9-May-13	matthew sabatine	
Carolina Wren	2	9-May-13	matthew sabatine	
Warbling Vireo	1	9-May-13	matthew sabatine	
Great Crested Flycatcher	1	9-May-13	matthew sabatine	

Indigo Bunting	3	29-Jul-13	Dennis Glew	
Northern Flicker	2	29-Jul-13	Dennis Glew	
Chipping Sparrow	5	3-Aug-13	matthew sabatine	
Northern Rough-winged Swallow	20	6-Aug-13	Michael Schall	
Blue Jay	5	6-Sep-13	Edward Komito	
Hairy Woodpecker	1	6-Sep-13	Edward Komito	
Swamp Sparrow	1	24-Mar-14	Michael Schall	
crow sp.	3	6-Aug-13	Michael Schall	
Carolina/Black-capped Chickadee	2	15-Jan-12	matthew sabatine	
Fish Crow	2	24-Mar-14	Michael Schall	

***Higher numbers in Lehigh Valley Audubon records see above**
WAP= Wildlife Action Plan listed species; Shorebird Plan=regional shorebird species of concern; NE Priority or BCR Priority species=listed as "of Concern" by Partners In Flight region.

Photo of Green Pond Marsh in March 2014 with Snow Geese.

Common Gallinule at Green Pond Marsh, June 2007 (m.Schall).



Location of Green Pond relative to other Pennsylvania IBAs.

Photograph of Marsh area from Pond shoreline.

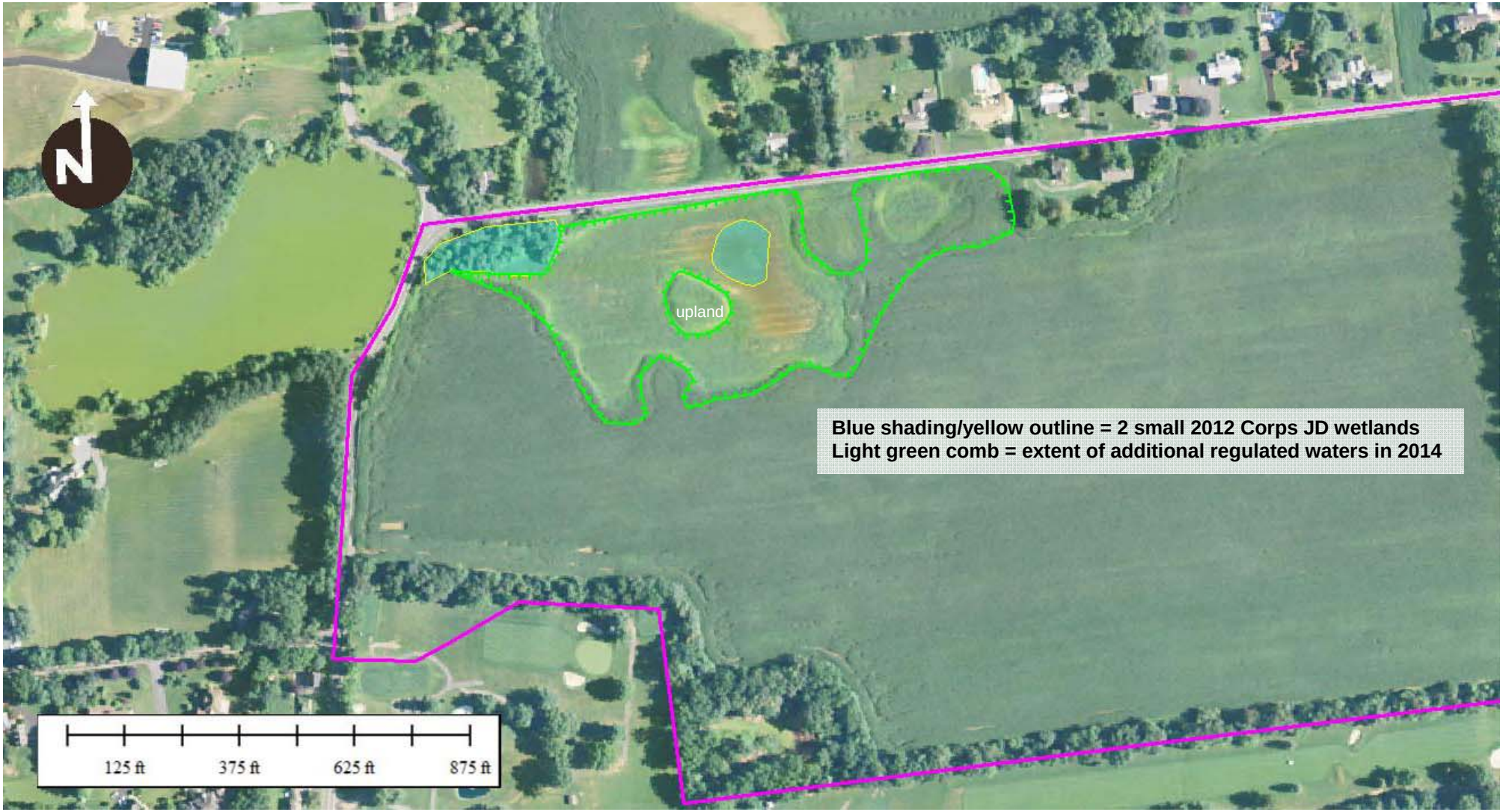


PHOTO DATE: 23 June 2013 Precipitation during prior 3-month period was "normal"

This summer photo shows clear evidence of ponding and saturation earlier in the year which prevented normal farming well beyond the two small areas identified as wetland in the 2012 Corps JD.

PHOTO DATE: 19 May 2012 Precipitation during prior 3-month period was "drier than normal"

Despite the prior period being drier than normal, this photo shows extensive ponding and saturation more than 6 weeks into the growing season. Site wetness clearly had inhibited normal farming in large areas, well beyond the two small areas identified as wetland in the 2012 Corps JD.

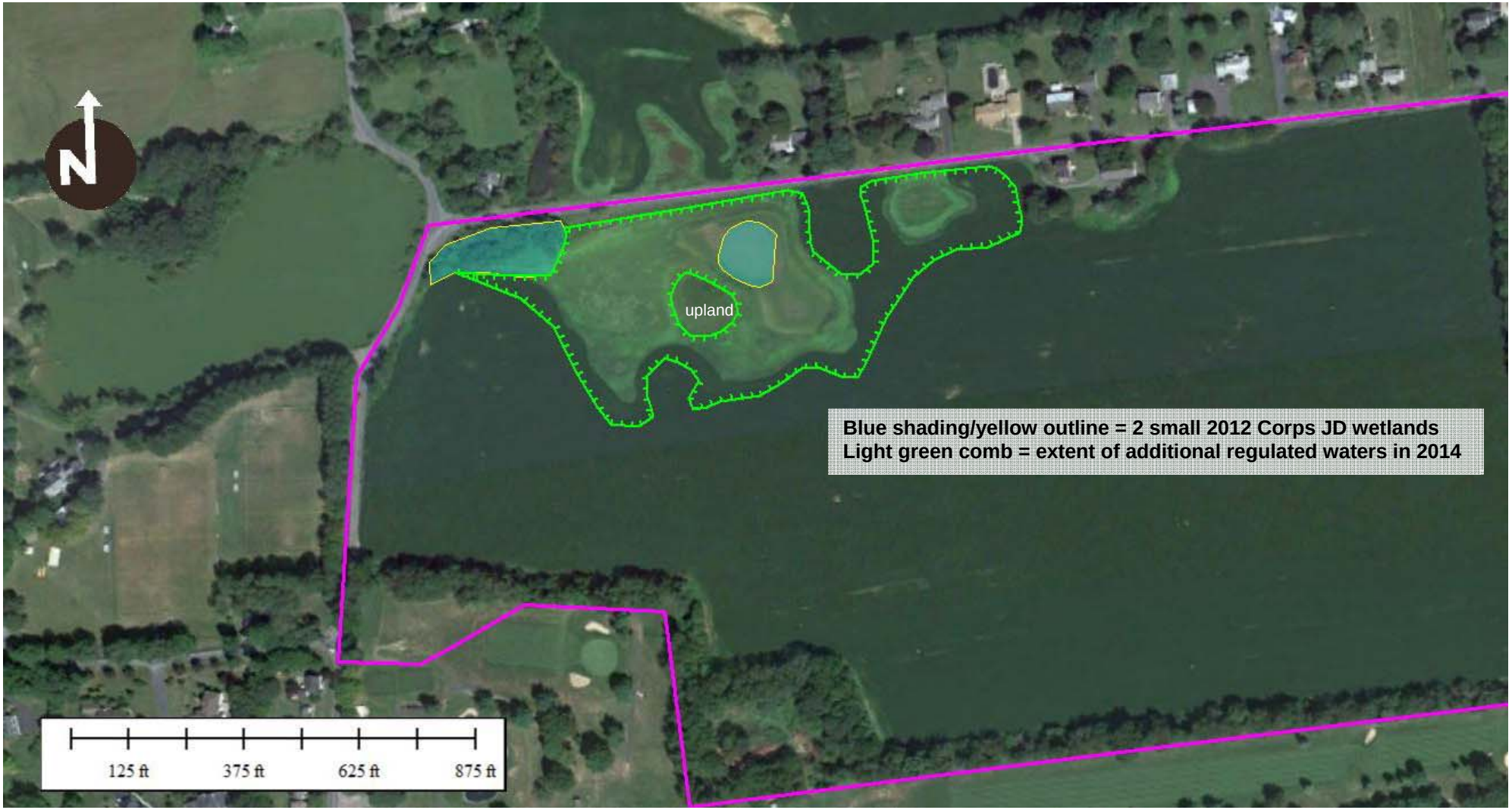


PHOTO DATE: 29 August 2010 Precipitation during prior 3-month period was "normal"

This late-summer photo shows clear evidence of ponding and saturation which prevented normal farming well beyond the two small areas identified as wetland in the 2012 Corps JD.

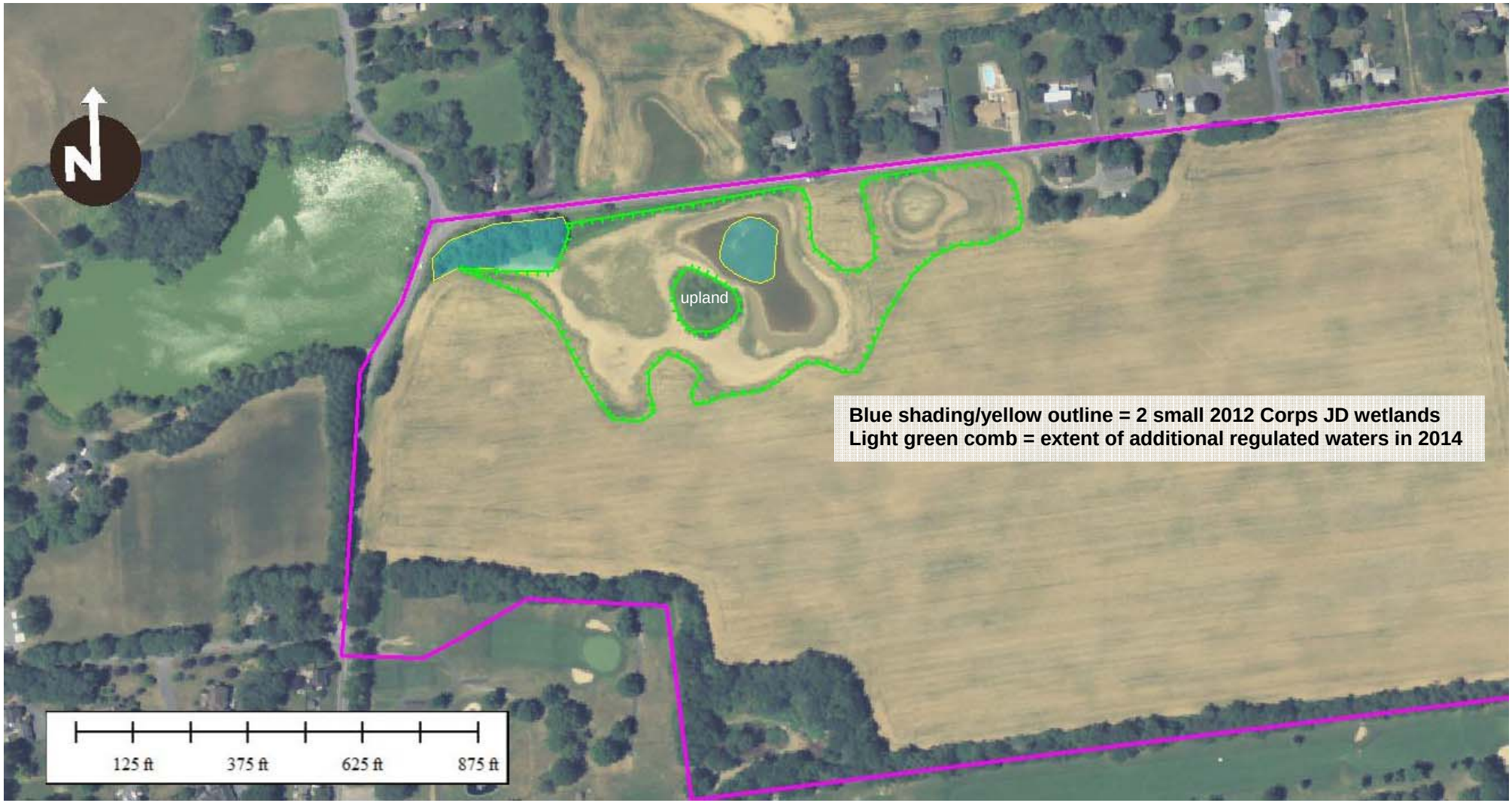


PHOTO DATE: 4 July 2010 Precipitation during prior 3-month period was "drier than normal"

Despite the fact that this photo was taken following a drier than normal period, it clearly shows evidence of ponding and saturation (some of which remains as of this date in midsummer) which prevented normal farming well beyond the two small areas identified as wetland in the 2012 Corps JD.

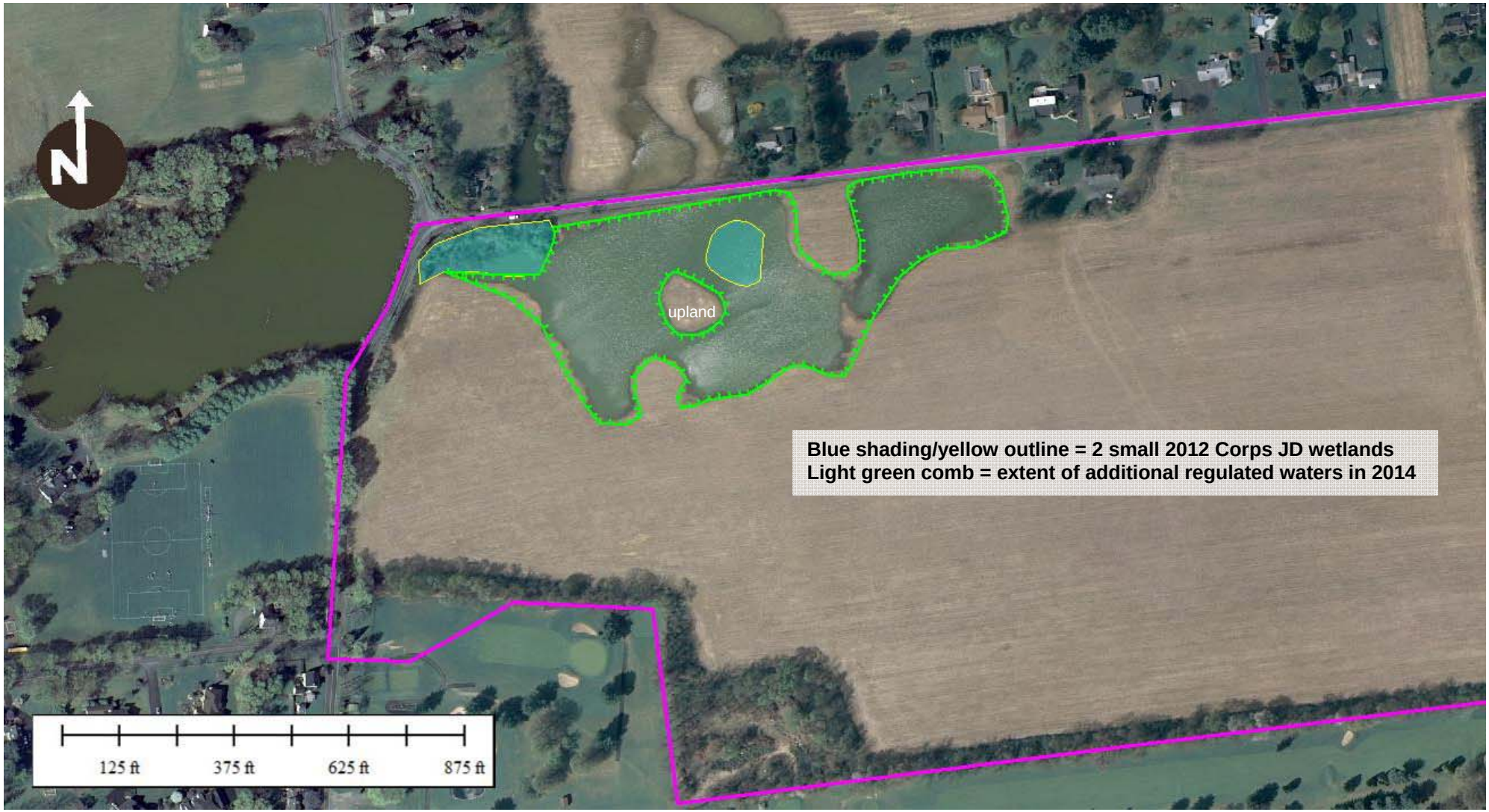


PHOTO DATE: 27 March 2010 Precipitation during prior 3-month period was "wetter than normal"

Despite the fact that this photo was taken following a wetter than normal period, it clearly shows the extent of ponding in the lowest elevation onsite, well beyond the two small areas identified as wetland in the 2012 Corps JD. The photo was taken just prior to the start of the average local growing season (29 March).

PHOTO DATE: 13 June 2008 Precipitation during prior 3-month period was "normal"

This summer photo shows clear evidence of ponding and saturation which prevented normal farming well beyond the two small areas identified as wetland in the 2012 Corps JD.

PHOTO DATE: 23 April 2007 Precipitation during prior 3-month period was "normal"

This photo shows clear evidence of ponding and saturation well beyond the two small areas identified as wetland in the 2012 Corps JD more than three weeks into the growing season.

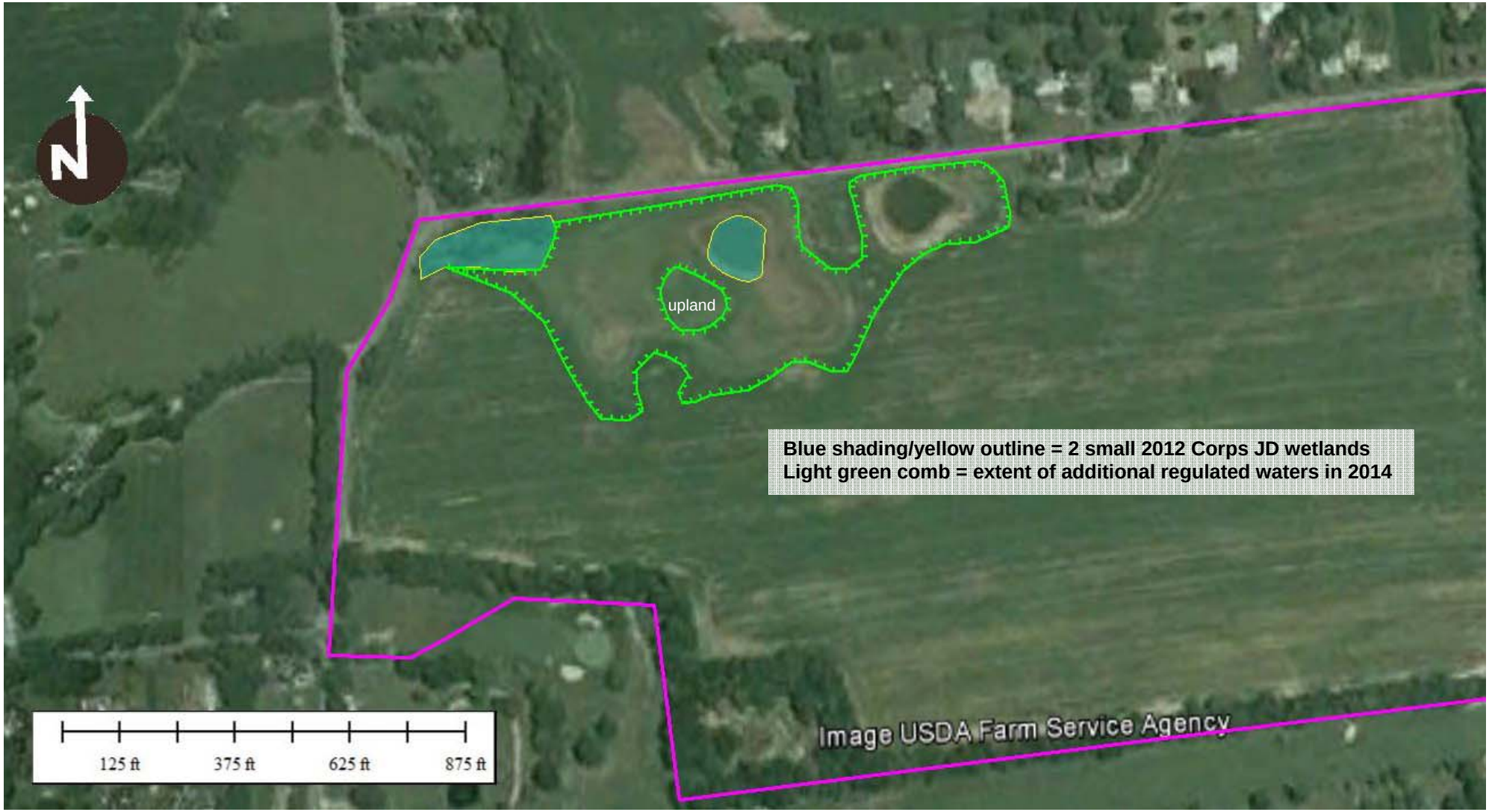


PHOTO DATE: 11 July 2005 (Corps incorrectly reported this as 6 June) Precipitation during prior 3-month period was "normal"

This summer photo shows clear evidence of early growing season ponding and saturation which prevented normal farming well beyond the two small areas identified as wetland in the 2012 Corps JD. This photo was taken 101 days after the photo on next page.

PHOTO DATE: 31 March 2005 (Corps reported it as 1 April) Precipitation during prior 3-month period was "normal"

This photo shows clear evidence of ponding and saturation during the early growing season, even beyond what is believed to be the actual extent of "regulated waters of the Commonwealth", and well beyond the two small areas identified as wetland in the 2012 Corps JD.

PHOTO DATE: 14 April 1999 Precipitation during prior 3-month period was "normal"

This photo shows clear evidence of ponding and saturation well beyond the two small areas identified as wetland in the 2012 Corps JD two weeks into the growing season.

PHOTO DATE: 13 April 1993 Precipitation during prior 3-month period was "normal"

This photo shows clear evidence of ponding and saturation well beyond the two small areas identified as wetland in the 2012 Corps JD two weeks into the growing season.

PHOTO DATE: 14 April 1986 Precipitation during prior 3-month period was "normal"

This photo shows clear evidence of ponding and saturation well beyond the two small areas identified as wetland in the 2012 Corps JD two weeks into the growing season.

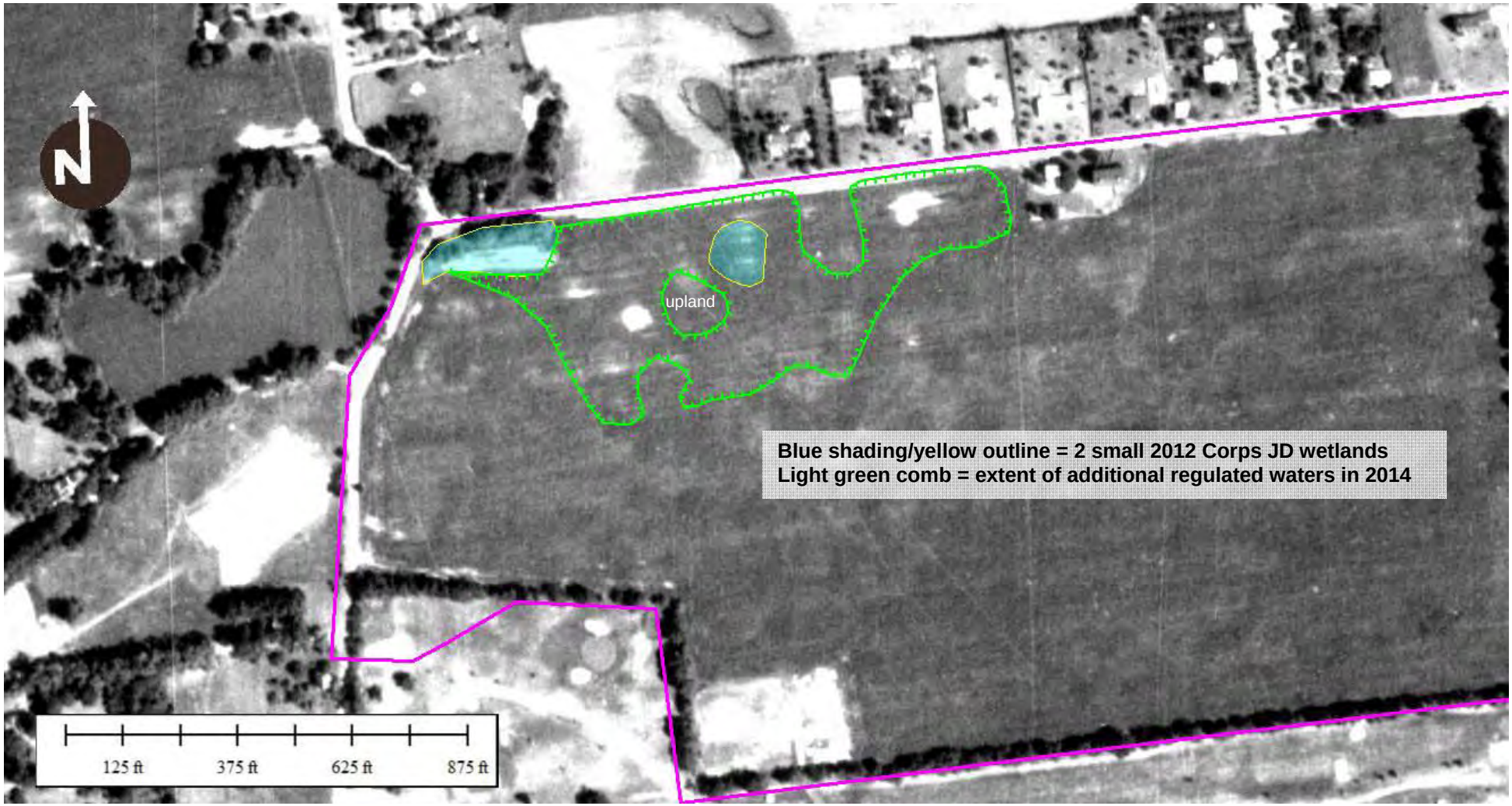


PHOTO DATE: 15 July 1971 Precipitation during prior 3-month period was "drier than normal"

This summer photo taken after a dry period is inconclusive regarding the extent of wetlands or ponding on this site. Even the eastern "ponded" wetland and part of the forested wetland identified in the 2012 Corps JD are not evident at this time.

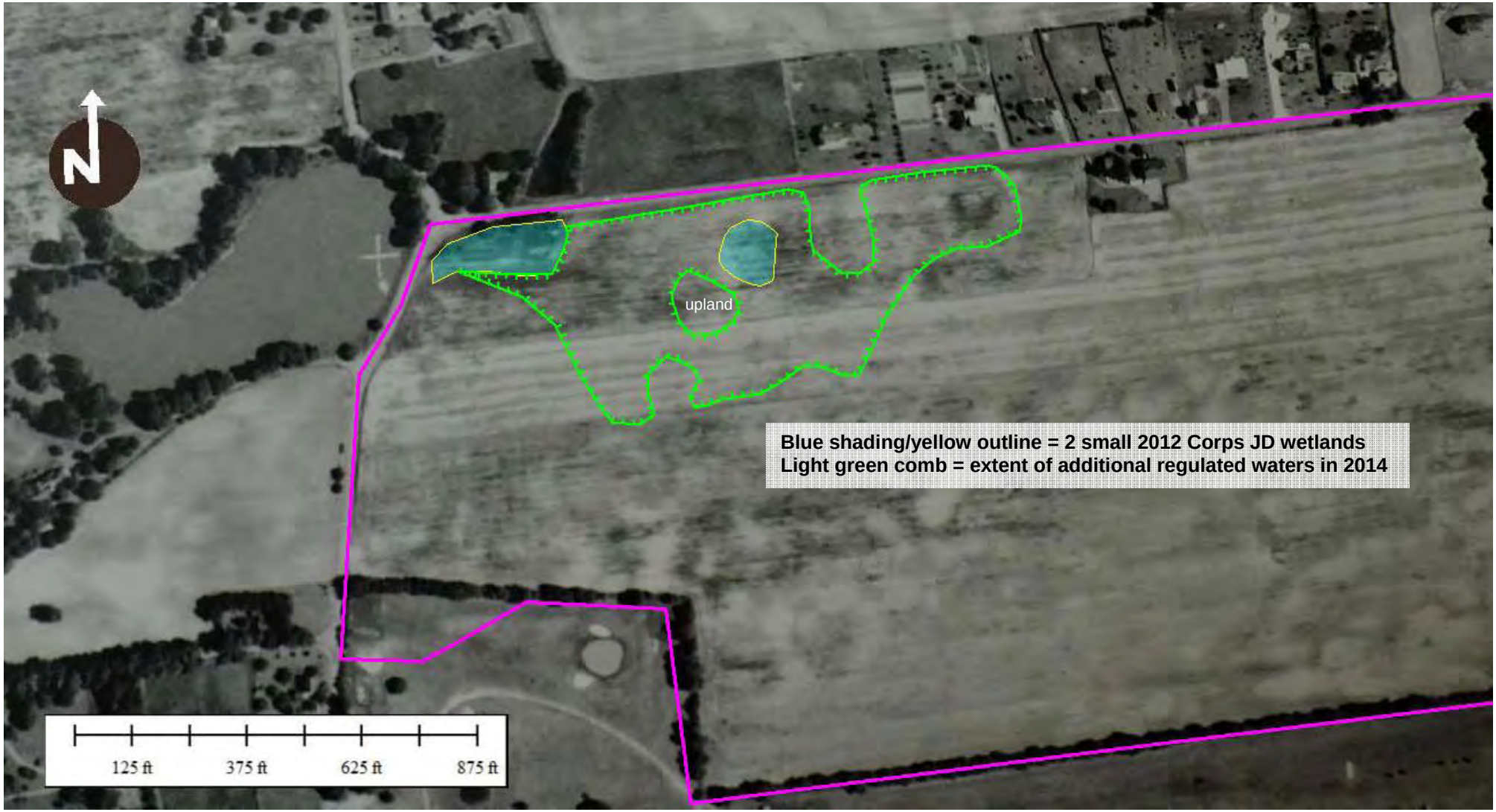


PHOTO DATE: 17 June 1964 Precipitation during prior 3-month period was "normal"

This summer photo, despite being taken after a period of "normal" precipitation, is inconclusive regarding the extent of wetlands or ponding on this site. Even the eastern "ponded" wetland identified in the 2012 Corps JD is not evident at this time.

PHOTO DATE: 16 October 1958 Precipitation during prior 3-month period was "normal"

This autumn dry season photo shows clear evidence of ponding and saturation that earlier in 1958 prevented normal farming in much of the Green Pond Marsh. Although not extending the full extent of likely "regulated waters", the ponding/saturation goes well beyond the two small areas identified as wetland in the 2012 Corps JD.

PHOTO DATE: 6 October 1958 Precipitation during prior 3-month period was "normal"

This inconclusive autumn photo taken during the normal seasonal dry period shows evidence of some ponding and saturation that earlier in 1958 prevented normal farming well beyond the two small areas identified as wetland in the 2012 Corps JD.

PHOTO DATE: 23 April 1939 Precipitation during prior 3-month period was "wetter than normal"

This growing season photo shows evidence of ponding and saturation well beyond the two small areas identified as wetland in the 2012 Corps JD; however, it is inconclusive because it was taken following a period of "wetter than normal" precipitation. Lands north of Green Pond Road appear to be very wet.

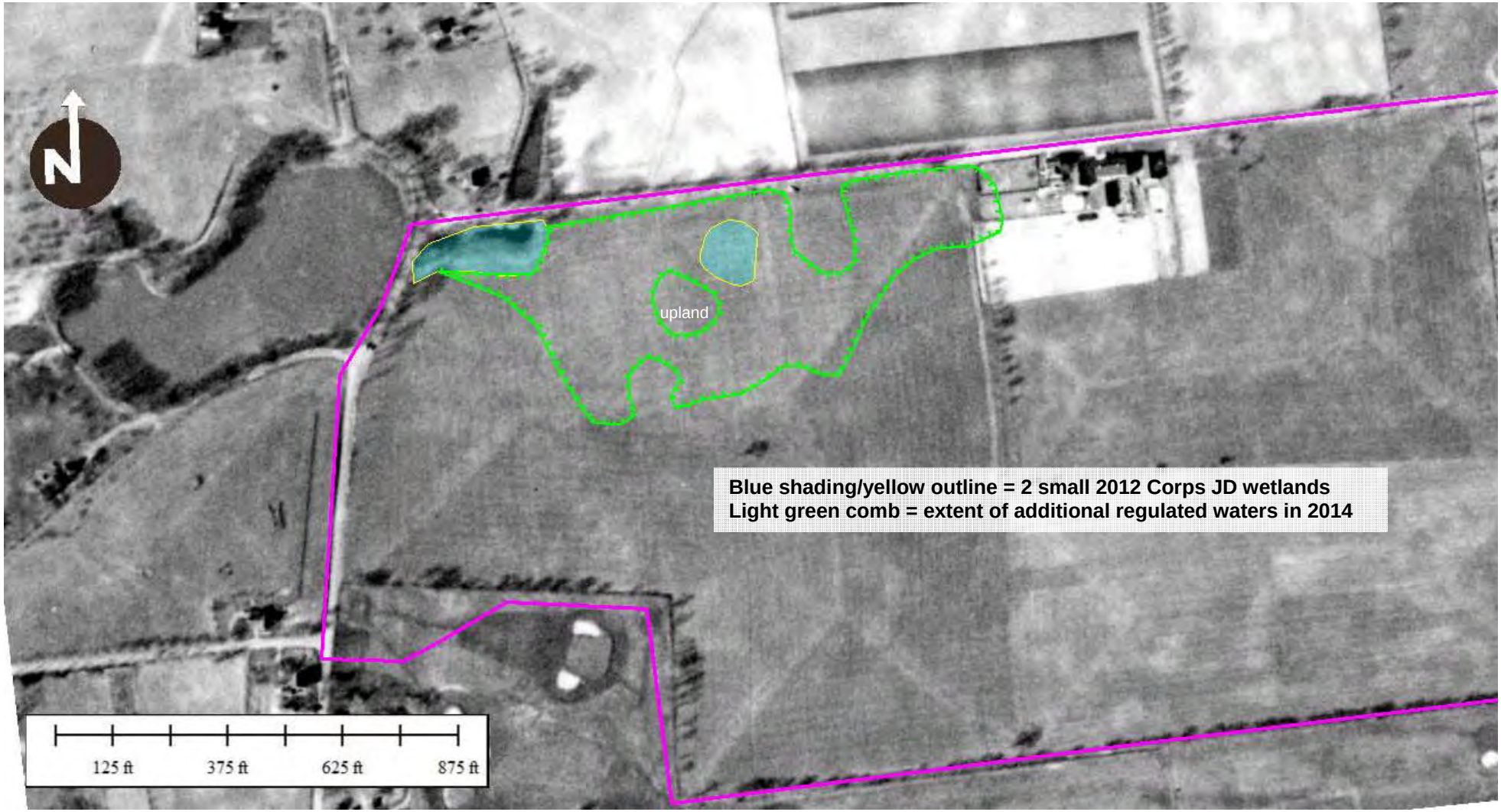


PHOTO DATE: 25 March 1938 No precipitation records available for 1938

This photo is inconclusive because it is unknown how much precipitation occurred in the 3-month period prior to the date it was taken. It would appear to be a drier than normal period, based on other photos above. This photo shows conditions just prior to the start of the growing season.