

**City of Edmonton Rural Southeast:  
Wetland Delineation and Classification**

**Final Report**

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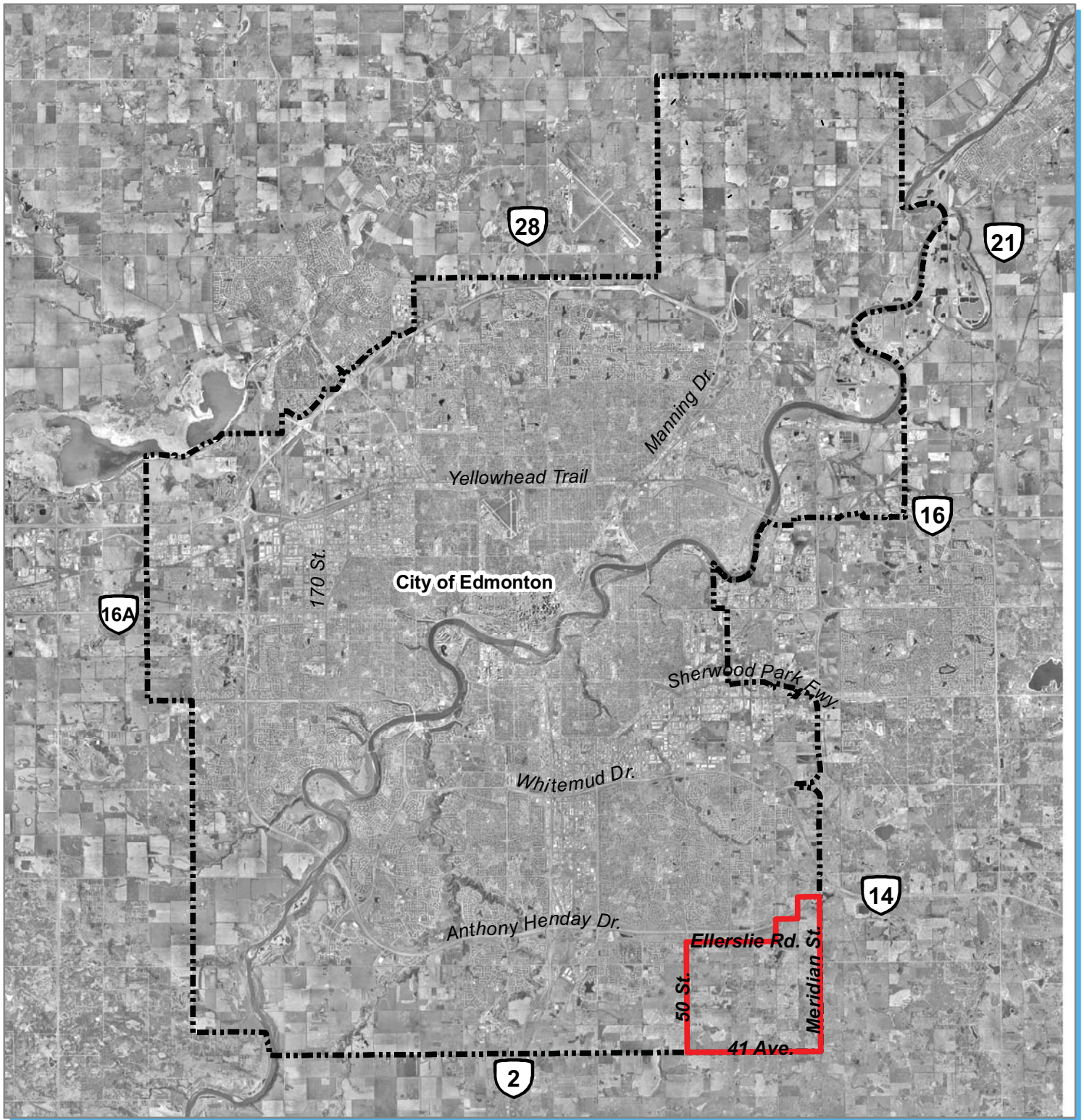
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## **1.0 INTRODUCTION**



### **1.1 Background**

The City of Edmonton, in general, and the Office of Biodiversity, in particular, continues to make strides with respect to wetland and natural area conservation and identification, conservation and restoration of Edmonton's Ecological Network. Recent efforts include adoption of the Natural Connections Strategic Plan and Natural Areas System Policy; development of new guidelines for determination of Environmental Reserve (ER) for wetlands and water bodies; preparation of a Natural Areas Securement Strategy; commissioning of a city-wide wetland inventory; consultation with Alberta Sustainable Resource Development (ASRD) regarding proactive determination of wetland crown-ownership; participating in a study to identify degraded wetlands suitable for wetland loss compensation activities; and mandating the dedication of seasonal, semi-permanent and permanent wetlands as ER in the City's new Environmental Strategic Plan (The Way We Green).

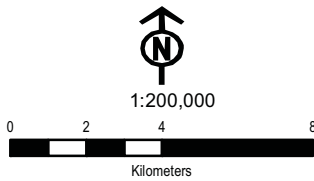
Office of Biodiversity (OOB) has identified the City's extreme southeast corner as an area supporting a multitude of wetlands and an area of interest for proactive conservation planning prior to the approval of Area and Neighbourhood Structure Plans (ASPs and NSPs). The area of interest (i.e., the area defined as the Rural Southeast study area) is the area within the City limits south of the Transportation and Utility Corridor (TUC) and east of 50<sup>th</sup> Street (Figure 1). As of January 2012, there were no approved ASPs, NSPs or other statutory plans for those lands. The study area encompasses 31 full quarter sections and portions of two others. In support of proactive planning for the area, several studies of environmental features in the rural southeast study area have been recently completed. This current project builds on that previous work and provides a detailed inventory of wetlands in the rural southeast study area.



**Legend**

-  Rural Southeast Study Area Boundary
-  City Limit

**Figure 1. Location of Study Area**



Aerial Photograph Date: May 2010  
 Date Map Created: 26 March 2012

## **1.2 City of Edmonton Policy Context**

In recent years, the City of Edmonton has promoted a heightened awareness of the ecological goods and services provided by natural areas and biodiversity conservation, with a particular emphasis on wetlands. This focus has been realized primarily through the adoption of several Council-approved plans and policies and several other initiatives. Following are brief descriptions of the key bylaws and policies relevant to the matter of wetlands, their protection and, more generally, the conservation of natural areas in the City of Edmonton.

### ***The Way We Grow – Edmonton’s Municipal Development Plan - Bylaw 15100 (2010)***

Edmonton’s Municipal Development Plan (MDP) Bylaw 15100 is the primary document aimed at guiding Edmonton’s growth and development over the next 10 years, and provides the overarching mandate supporting the protection of natural areas. The MDP includes nine strategic goals, one of which pertains specifically to the natural environment: “*Edmonton protects, preserves and enhances its natural environment by maintaining the integrity and interconnectivity of its natural areas, river valley, water resources, parks and open spaces, recognizing that these elements form a functioning ecological network within the Capital Region.*” Within the context of protecting the natural environment, the MDP provides more specific goals to “*protect, preserve and enhance a system of conserved natural areas within a functioning and interconnected ecological network.*” In fact, the MDP also includes even more specific policy statements with specific reference to wetlands: “*Protect, manage and integrate natural wetlands into new and existing developments as key assets in Edmonton’s ecological network.*” The MDP also commits the City to “*develop a comprehensive plan for wetland conservation and the integration of wetlands into the urban environment*”, to “*acquire wetlands, riparian areas and buffers according to the Municipal Government Act definition of environmental reserve*” and to “*work with land owners to see that compensation required by the Province, as a result of the alteration or destruction of wetlands, is carried out within city boundaries.*”

### ***The Way We Green, Draft (May 2011)***

*The Way We Green* is the City of Edmonton’s updated, long-term environmental strategic plan, developed pursuant to the strategic plan *The Way Ahead*. *The Way We Green* sets out principles, goals, objectives, policies, and approaches for the City of Edmonton to preserve and sustain its environment. The plan outlines 12 goals that describe what ultimately must be achieved for the City to be sustainable and resilient with respect to its environment. *The Way We Green* includes a particular emphasis on the natural environment and sustaining healthy ecosystems and reiterates specific objectives of the City’s MDP, including those with specific relevance to wetlands: “*Protect, manage and integrate natural wetlands into new and existing developments as key assets in Edmonton’s ecological network.*” Building on the policies of the MDP, *The Way We Green* also outlines detailed strategic actions to:

- “dedicate permanent, semi-permanent, and seasonal wetlands (i.e., Class III, IV, and V Wetlands in the Stewart and Kantrud system) and all peatlands as Environmental Reserve upon subdivision of land” and to,
- require “compensation within the borders of the city for wetland drainage or alteration (in full or part) for all non-ephemeral wetlands (i.e., Class II, III, IV, and V wetlands in the Stewart and Kantrud system) and all peatlands in the form restoration or construction of a similarly functioning wetland.”

#### ***Guidelines for Determining Environmental Reserve (ER) Dedication for Wetlands and Other Water Bodies***

Released in 2007, the City of Edmonton’s Guidelines for *Determining Environmental Reserve (ER) Dedication for Wetlands and Other Water Bodies* (2007) supports its intention of using its full legislative entitlements with respect to environmental reserve, in accordance with the Municipal Government Act and as mandated by the City’s Municipal Development Plan (2010; see above). In short, the guidelines are intended to help determine an appropriate buffer zone for wetlands and other water bodies that may be dedicated as Environmental Reserve (ER). The guidelines state that an appropriate buffer zone needs to address areas subject to flooding, areas considered to be unstable and areas required for pollution prevention and public access. The overall ER dedication of a wetland or water body should then be the greatest extent of all of the individual components. A fixed minimum buffer width of 30 m from the wetland boundary is used for pollution prevention, and thus represents the minimum ER buffer possible under the guidelines. Accordingly, further discussion of ER dedication in this report assumes an ER buffer of 30 m around all retained wetlands.

#### ***Natural Connections: City of Edmonton Integrated Natural Areas Conservation Plan – Strategic Plan (2007)***

Natural Connections outlines strategies aimed towards realizing the vision of “a system of conserved natural areas, ecologically and effectively managed, connecting the river valley with tableland natural areas, restored green spaces and regional natural areas, and recognized and supported by the community of Edmonton as a valued asset.” The Plan focuses on using an ecological network approach to conserve natural areas and integrate them into a single natural areas conservation system. Based on conservation science, this approach aims to protect biodiversity and ecological functions by recognizing the natural connections between natural areas and their surroundings. Following these concepts, Natural Connections strives to protect an ecological network in the City of Edmonton that will comprise “a system of conserved and protected core natural areas that are ecologically connected by both natural and semi-natural linkages and, to the extent possible, surrounded by compatible land uses.” Accordingly, one of the Plan’s key strategic directions is to “expand Edmonton’s ecological network through securement and restoration”. The Plan states that “Edmonton is extremely fortunate to have all of the elements of a functional ecological network, including core natural areas and linkages (stepping stones and corridors), within it’s boundaries. The next crucial step is to ensure that these network elements are secured, or in some cases restored, to

*maintain the structural and functional value of our natural areas systems and the many benefits they provide.”*

### **1.3 Report Organization**

This document reports on the results of the wetland assessment. Chapter 1 provides the background to this report. In Chapter 2 we present the wetland delineation and classification methodology. Chapter 3 provides a summary of the results of the mapping process. Chapter 4 presents a short discussion on the conservation implications of the study findings. This report has 2 appendices.

## **2.0 METHODS**

### **2.1 *Review of Existing Datasets***

Considering the scale of the study area, the vast number of wetlands it supports and the private ownership of the lands, the wetland mapping and classification exercise relied on existing geographic information system (GIS) datasets rather than individual wetland site investigations. The first step was to examine relevant existing datasets. In particular, the products of two recent studies were key to this process. Those were:

- Rural Southeast Edmonton: Ecological Network Assessment and Recommendations Final Report (Fiera 2010), and
- a City of Edmonton remote sensing plant community mapping project completed by Golder Associates in 2011.

In consultation with the City of Edmonton Office of Biodiversity (OoB), we investigated the potential uses of those existing data sources in this current study. Ultimately, it was decided that to realize the objectives of this study, the best course of action was to refine elements of the 2010 wetland inventory and use other components of both data sources as supplementary ecological information. At a meeting with OoB on 14 September 2011, this deviation from our original proposed approach was agreed to.

### **2.2 *Wetland Delineation***

To that end, we conducted a thorough review of all previously identified Class III, IV and V wetlands (referring to the Stewart and Kantrud, 1971 method) located in the study area and refined wetland boundaries and classifications as required for this exercise. Limiting our review to this subset of wetlands (i.e., not considering Class I and II wetlands) focused our efforts on those wetlands likely to be the focus of future conservation interest (i.e., those definable as Environmental Reserve) and, at the same time, limited the extent of potentially costly dataset revisions. Many Class I and II wetlands do exist across the landscape of the rural southeast study area and do contribute importantly to the ecology of the region; however, their inclusion was beyond the scope of this current exercise. Class I and II wetlands should be reviewed in more detail through the land planning process.

Our approach to the delineation of wetlands focused on the detailed review of high resolution digital aerial photography from 2010, and the use of imagery from 2009 and 2008 as supporting resources. Although the interpretation of aerial photography is inherently subjective, we developed a set of criteria and rules to guide the delineation and classification process, rendering it as objective as possible and provide transparency regarding process.

#### ***Delineation Rules and Criteria***

In general, wetland delineations were guided by changes in color and/or apparent texture visible in the aerial photographs. Wet areas typically show as darker than dry areas, with flooded areas (i.e., having open surface water) showing as near black. Wetland



vegetation is typically diverse in composition and variable in height compared to crops and hayfields. Accordingly, wetlands typically show as variable in color and texture in aerial photographs, while crops and hayfields show as relatively consistent in color and texture. Woodland habitats were easily distinguished from wetlands as the greater variation in tree/shrubs heights results in sharp contrast between areas of shadow and non-shadow.

The following are specific rules and criteria followed during the wetland delineation process:

- Wetland boundaries include willow fringes where there is evidence that willow, and not aspen/poplar trees are dominant. The shadows visible on the aerial photographs differ between the two; willows are more likely to show up as individual/separate features.
- Wetland boundaries extend to the interface with cultivation where there is no indication it should be drawn otherwise.
- Drainage connections between wetlands will be included as part of the wetland where there is an indication of wetland vegetation in the drainage feature. Ditches or flooded swales without evidence of wetland vegetation are not included.
- Wetland delineation will ignore the fragmentation of wetlands caused by narrow, minor, unsurfaced farming trails; however, other roads (driveways, range roads, paved roads) provide sufficient separation to act as wetland boundaries.
- Where the differentiation between wetland vegetation and surrounding vegetation was difficult (e.g., where tame pasture, which can appear similar to wetland vegetation, was located adjacent to wetlands, or where willow dominated areas graded into wooded upland), topographic contour data (at intervals of 0.5 m) will be used to assist in delineating wetland boundaries. In those cases, a rise of greater than 0.5 m above obvious wetland vegetation will be considered sufficient to determine that a wetland boundary should be drawn. Where there was less than 0.5 m in topographic relief between the area in question and the adjacent wetland area, the area will be considered as wetland unless there is additional evidence against this.
- Where cross-referencing between the 2010 aerial photography and the photography from 2008 or 2009 indicated a change in boundary (e.g., as a result of cultivation), the wetland was delineated at whichever boundary was most consistent over the 3 years. As a result of this, some previously mapped wetlands were not included in the current exercise if the 2009 and 2010 photography showed that the wetland supported no wetland plant communities in both those years.

Delineations were performed at a scale of approximately 1:1,500 to ensure suitable representation when displayed at a quarter section per 8.5 x 11 sheet, as was requested by the terms of reference.

### **2.3 Wetland Classification**

Upon completion of wetland delineation, we reviewed the classification of each newly-delineated Class III, IV and V wetland, (i.e., seasonal ponds, semi-permanent ponds and permanent ponds and lakes, respectively). In addition to these wetland classes, our classification exercise also identified two additional wetland types: altered natural wetlands and constructed water bodies. These two wetland types are described in more detail below.

Classification followed the general approach of the Stewart and Kantrud (1971) system, that is, wetlands were classified based on the wettest, most central plant community comprising greater than 5% of the wetland area as determined through the interpretation of 2010 aerial photography. However, at the time the 2010 aerial photography was taken the landscape was very dry and wetland water levels were low. Thus, we also reviewed aerial photography from 2008 and 2009 to determine more typical conditions of the recent past. To assist in the differentiation of wetland plant communities, Google Earth imagery was also reviewed. Taken in the fall of 2008, this publicly available imagery provided a view of wetlands in what was a drier part of the year and also provided the added benefit of color to aid in community differentiation.

During this exercise, wetlands were classified using the following visual criteria:

- **Class V wetland** – Displayed consistent flooding of the central/wettest area with no indication of emergent vegetation ; or, if dry, showed a marked transition between areas of emergent vegetation and exposed soils where open water would typically dominate.
- **Class IV wetland** – Supported robust emergent vegetation (e.g., cattail and bulrush) and did not show a definable area of standing water without emergent vegetation (i.e., did not have an open water zone); or, in dry conditions, there were no obvious signs of an area of exposed soils with a marked transition to surrounding emergent vegetation.
- **Class III wetland** – Showed no signs of robust emergent vegetation (e.g., cattail and bulrush) or open water and, even in flooded spring conditions, flooding appeared to be shallow (i.e., based on paler coloration) suggesting the hydrology typical of Class III wetlands (i.e., flooded in early spring but dry by late summer). Google Earth imagery from the fall of 2008 showed no signs of open water or exposed soils.
- **Altered natural wetland** – The 2010 aerial photography showed existing, natural wetland plant communities, but also evidence of direct physical disturbance of the

wetland (e.g., excavation, fill, extensive ditching). Where dugouts existed within the boundaries of a larger, natural wetland boundary and formed greater than or equal to about 10% of the area, the site was classified as an ‘altered wetland’. In other words, the presence of the dugout (or other disturbance) was considered to sufficiently influence the ecological functionality of the wetland. Where a dugout represents less than 10% of a wetland, it was deemed to have only a minor influence on the functionality of the natural wetland and the wetland was classified according to Stewart and Kantrud (1971), ignoring the contribution of the open water of the dugout. Review of historical aerial photographs (2009, 2008, 1998, 1982, 1966 and 1950) was used to determine if a natural wetland was present prior to disturbance.

- **Constructed water body** – The 2010 aerial photography showed no indication of natural wetland plant communities not directly associated with the constructed water body (e.g., presence of open water and shoreline vegetation, but no other surrounding wetland communities). The entire shoreline of the water body appeared to be the result of excavation.

## **2.4 Field Inspections**

Our wetland delineations and classifications were ground-truthed through a windshield survey of as many wetlands in the rural southeast study area as was possible. Constraints associated with private land ownership, meant field investigations were restricted to roadside reconnaissance. Seven roads border or bisect the study area. Over the course of three days in early to mid-October 2011 we drove each road and from the roadside, for each visible wetland, we noted visible plant communities, general wetland condition and the condition and use of surrounding lands. Results were used to adjust wetland delineation and class, as required.

Using this approach, we assessed a total of 75 wetlands, representing 32% of all Class III, IV and V wetlands identified in the rural southeast study area. As a result of this exercise, we:

- identified 7 previously unmapped wetlands,
- re-classified 19 wetlands,
- made slight modifications to the boundaries of 10 wetlands, and
- deleted 1 wetland from the inventory.

## **2.5 Determination of Crown Claimable Permanent and Naturally-Occurring Bodies of Water**

With a revised and updated wetland inventory completed, this project also set out to proactively identify wetlands that meet the criteria of permanent and naturally-occurring and, thus, are claimable as Crown land by the Province pursuant to the *Public Lands Act*.

Alberta Environment and Sustainable Resource Development (AESRD) typically examines all available historical aerial photographs and original land survey maps to make their determination of bodies of water that are permanent and naturally occurring. Considering the expansive study area and the large number of wetlands involved in this exercise a more streamlined approach was required. We restricted our investigation to wetlands that we classified through the assessment phase of project as either Class IV or Class V, following the Stewart and Kantrud (1971) wetland classification system. We also considered modified wetlands to account for identified natural wetlands that have sustained some physical disturbance that could have impacted the site's wetland classification. By restricting our review in this way we ensured we would be focusing on the wetlands with the greatest potential for Crown ownership and not wasting resources on the review of temporary and seasonal wetlands.

Following the guidance of AESRD, instead of reviewing all available historical aerial photographs, we founded our review on aerial photographs from six years spanning a period 60 years. Those photographs were:

- 4 May 1950 (below average precipitation; drought),
- 24 August 1966 (below average precipitation),
- 30 September 1982 (above average precipitation),
- 4 September 1998 (above average precipitation),
- 1 October, 2008 (below average precipitation; drought),
- May 2010 (below average precipitation; drought)

This series is characterized by 16 years of separation between photographs or, in one case, 10 years. The sixth photograph we used was the most recent one from May 2010. With the exception of the 1950 and 2010 photographs, the photographs were taken during the late summer or fall, the preferred timing of photographs used for this purpose.

We reviewed 89 wetlands (comprising 37 Class IV wetlands, 25 Class V and 27 modified natural wetlands) to determine if they qualified as permanent and naturally occurring bodies of water. The delineated ecological boundary of some wetlands included multiple basins that might be considered separate bodies of water using the definition of bed and shore as outlined in the *Alberta Surveys Act*. Accordingly, where we thought it appropriate, we sub-divided wetlands into separate basins for the purpose of our review. After sub-dividing wetlands, a total of 103 separate features were reviewed. The review of each feature consisted of a thorough analysis of each of the six aerial photographs. We considered the permanence of the feature over the years, taking into account historical climatic conditions. We also analyzed each photograph for indications of a wetland's origin and for the occurrence of any anthropogenic disturbances (e.g., blocked drainage, excavation of a dugout) that may have artificially made the site wetter and/or deeper. This exercise was carried out by two Professional Biologists also included data quality assurance exercises using randomly selected subsets of the entire dataset at two separate stages of the review process.

## 3.0 RESULTS

### 3.1 Wetland Inventory

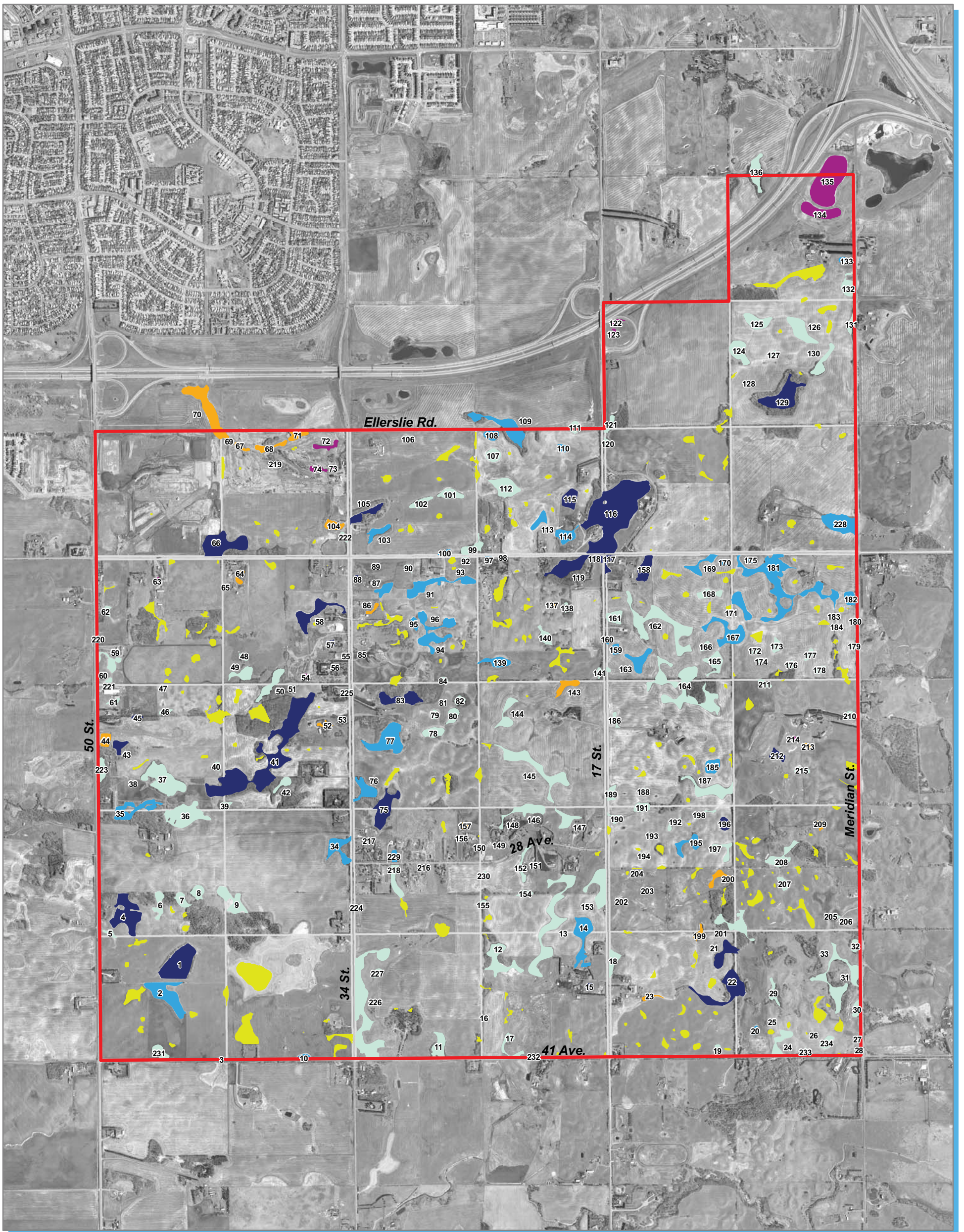
The wetland delineation and classification process resulted in the identification of 234 water bodies covering a combined area of 178 ha in the rural southeast study area (Figure 2, Table 2). Those 234 wetlands comprise Class III, IV and V wetlands (Stewart and Kantrud 1971), as well as altered natural wetlands and constructed water bodies. Combined, those wetlands cover approximately 8% of the study area. Appendix B comprises a series of 33 maps that displays the wetland delineations and classifications at the scale of individual quarter sections. The wetland mapping completed by Fiera (2010) identified an additional 260 Class I and II wetlands in the study area. The rural southeast study area supports approximately 500 wetlands (Class I to V) and modified water bodies.

**Table 1. Summary statistics describing the number and area of wetlands in the rural southeast study area (2162 ha).**

Wetland Class	Number of Wetlands		Area of Wetlands	
	Count	% of total	Total (ha)	% of total
Class III	131	56.0	81.4	45.6
Class IV	37	15.8	36.9	20.7
Class V	25	10.7	47.3	26.5
Modified Natural	27	11.5	6.5	3.6
Constructed Water Body	14	6.0	6.3	3.5
<b>Total</b>	<b>234</b>	<b>100</b>	<b>178.4</b>	<b>100</b>

Class III was by far the most abundant wetland type (n= 131), representing 56.0% of all sites (Table 2; Figure 3). Class IV and V wetlands represented 15.8% and 10.7% of all sites, respectively. Modified natural and constructed water bodies combined for the remaining 17.5% of sites.

Wetlands in the rural southeast study area were generally quite small (Figure 4), 183 sites were less than 1 ha in size, including 135 smaller than 0.5 ha. Across all 234 sites, the average size was 0.8 ha, however, there was considerable variation among the different wetland classes (Table 3). Class V wetlands averaged the largest, at 1.9 ha. Class IV wetlands averaged 1.0 ha and Class III wetlands averaged 0.6 ha. Modified natural wetlands were, on average, the smallest at 0.2 ha. Constructed water bodies averaged 0.5 ha. When modified natural wetlands and constructed water bodies are excluded, the average size increases marginally to 0.9 ha. In total, there were only four wetlands greater than 5 ha in size (i.e., 2 Class V, 1 Class IV and 1 Class III) and 23 greater than 2 ha.



**Figure 2. Wetlands in the Rural Southeast Study Area**

**Legend**

**WETLAND CLASSIFICATION**

**Spencer (2011) Mapped Wetlands**

- Class 3
- Class 4
- Class 5

■ Modified Natural

■ Constructed Water Body

**Wetlands Mapped by Others (2010)**

■ Class 1&2

Rural Southeast Study Area Boundary

1/4 Section Boundaries

**68** Wetland ID Number (Spencer wetlands only)



1:24,000

0 250 500 1,000



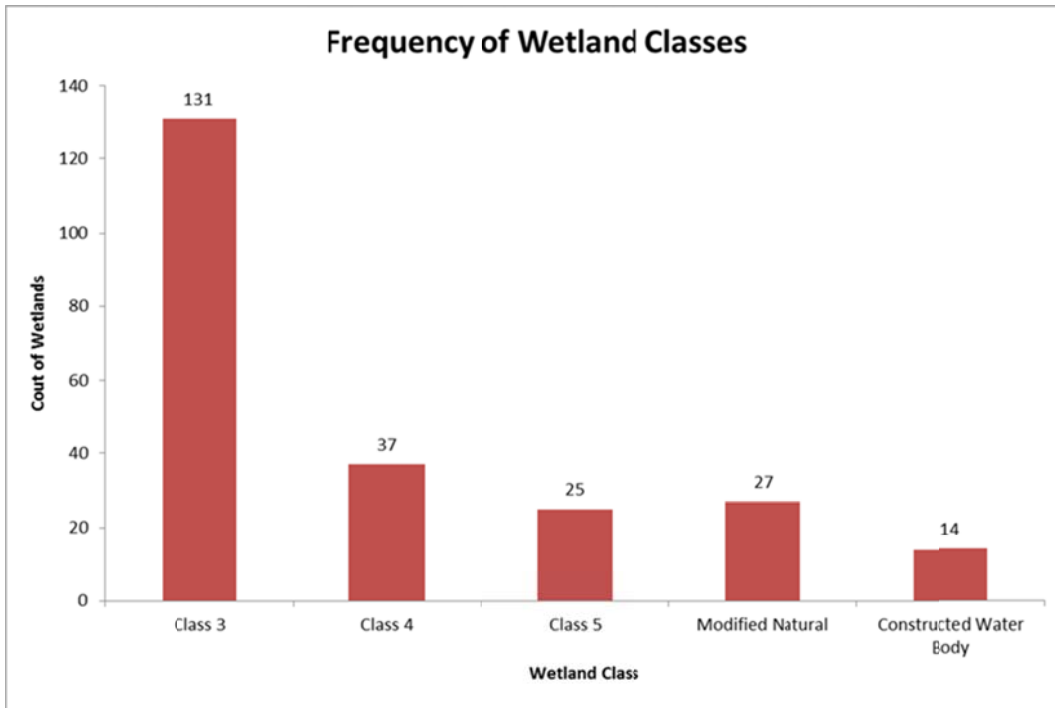
Meters

Aerial Photograph Date: May 2010  
Date Map Created: 24 July 2012

**Table 2. Summary size statistics wetlands in the rural southeast study area.**

Wetland Class	Average Wetland Size (ha)	Minimum Size (ha)	Maximum Size (ha)
Class III	0.62	0.01	5.36
Class IV	1.00	0.05	5.51
Class V	1.89	0.10	10.24
Modified Natural	0.24	0.02	0.66
Constructed Water Body	0.45	0.01	3.19

Wetlands are widespread throughout the study area. Each of the 33 full or partial quarter sections in the study area contains at least one wetland of Class III or greater. The Class IV and V wetlands are somewhat more concentrated in the northwest half of the study area, with the southeast half comprising mainly Class III wetlands. This pattern of wetland class distribution does not seem to correlate with surficial geology (Chao 2002), soil classification (CLI 2008) or topographic elevation.



**Figure 3. Frequency of wetlands classes.**

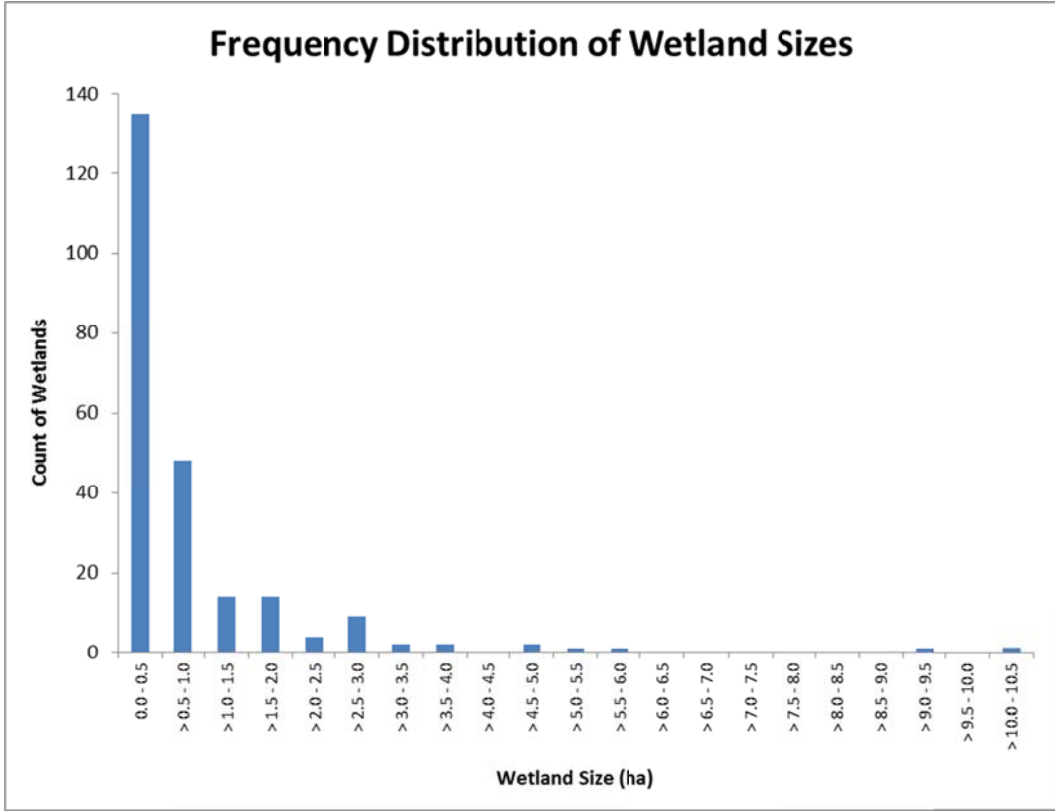


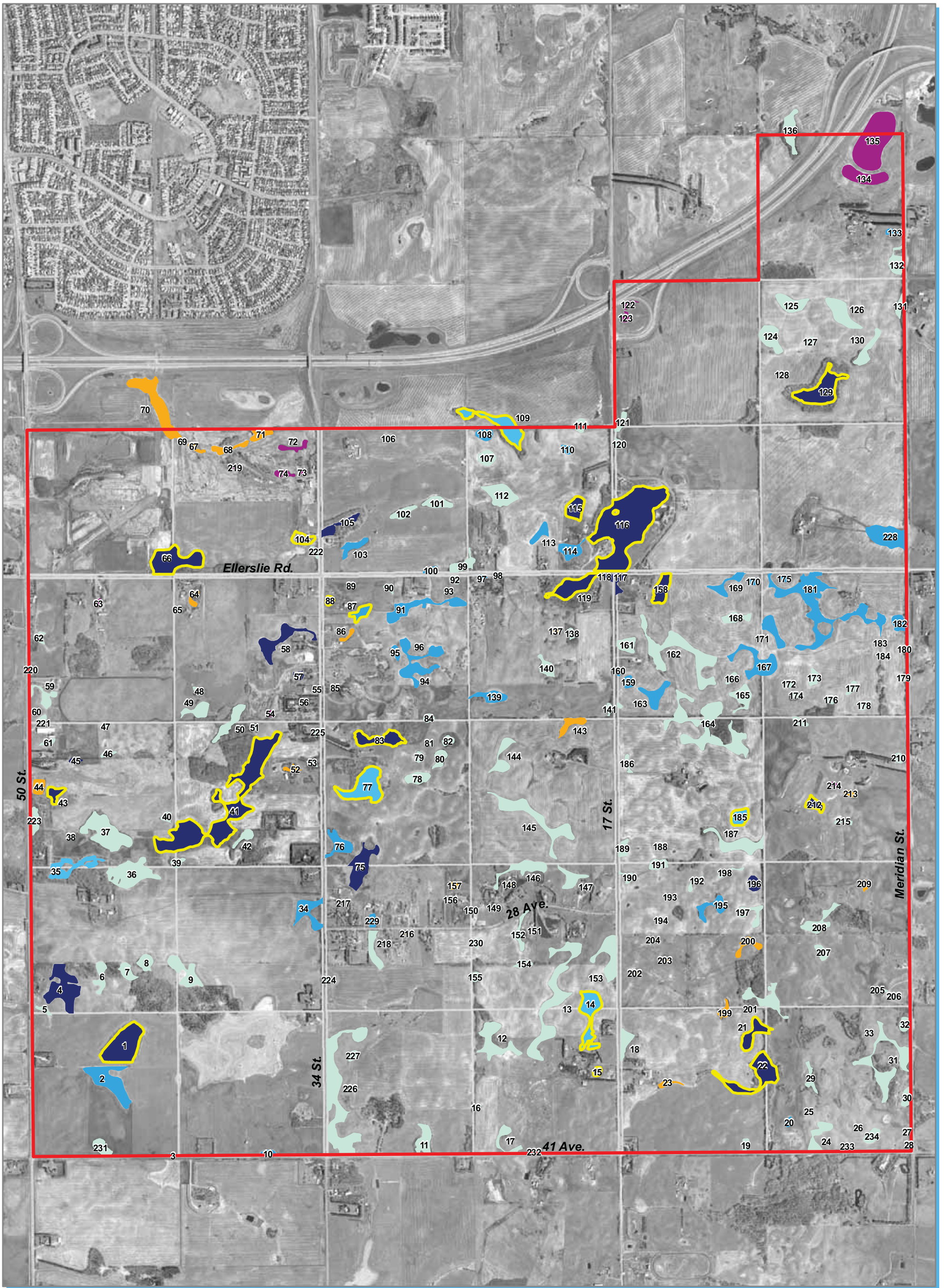
Figure 4. Frequency distribution of wetland sizes.

**3.2 Determination of Crown Claimable Permanent and Naturally-Occurring Bodies of Water**

Of the 103 wetland features we reviewed, we identified 27 wetland basins (comprising all or part of 23 separate wetlands) that meet the criteria of permanent and naturally occurring bodies of water (Figure 5). We did not identify any watercourses that meet those criteria. Of the 23 wetlands with at least one permanent and naturally occurring basin, 17 are currently classified as permanent open water (Class V) wetlands, 5 are classified as semi-permanent deep marsh (Class IV) wetlands and one is a modified natural wetland.

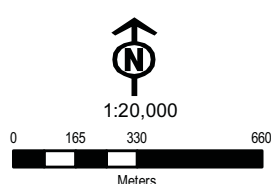
At the end of April 2012, AESRD responded to our submission stating their agreement with our determination for 24 of the 27 wetland basins (see Appendix B). Three wetland basins we deemed as permanent and naturally-occurring were determined to be not claimable by the Crown based on the findings of AESRD’s review. AESRD also identified one additional wetland as permanent and naturally-occurring that we had not. Thus, in the end, 25 wetland basins comprising all or part of 21 separate wetlands were deemed as permanent and naturally-occurring.





**Legend**

- Permanent and Naturally Occurring Wetland (Crown Claimable) - Confirmed by ASRD April 27, 2012
- Class III Wetland
- Class IV Wetland
- Class V Wetland
- Modified Natural
- Constructed Water Body
- Rural Southeast Study Area Boundary
- #** Wetland Identification Number



**Figure 5. Overview of Wetlands in the Rural Southeast Study Area**

Aerial Photograph Date: May 2010  
Date Map Created: 14 May 2012



Note: additional Class I/II wetlands are present in the Rural Southeast Study Area, but are not shown on this map.

## **4.0 DISCUSSION**

This study created an accurate inventory of Class III and higher wetlands in the rural southeast study area. The inventory includes 234 separate wetland features, each classified and delineated at a scale appropriate for representation at the quarter section scale.

The rural southeast study area remains as one of the largest unplanned areas of the City of Edmonton. Although largely dominated by agricultural land uses, this study and antecedent studies have shown that this area of the City supports numerous wetlands and other natural areas of high conservation value. As planning for development in the City's rural southeast study area begins, the issue of wetland conservation will become a comprehensive matter. The long-term ecological sustainability of wetlands in the future developed context will depend on many things; among them the need for ecological connectivity, proper management of water inputs, compatibility with adjacent land uses and consideration of wetland restoration/compensation opportunities. Integrating natural wetlands into an otherwise developed landscape is likely to never be a simple process, but the proactive identification of wetland features completed through this exercise provides the City with the information necessary to tackle the matter at the earliest stages of planning. Ultimately, these measures being taken by the City should help achieve a functional ecological network in Edmonton's southeast that will sustain biodiversity as the City continues to grow.

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## **APPENDIX A. Classification of Wetlands in the Rural Southeast Study Area**



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

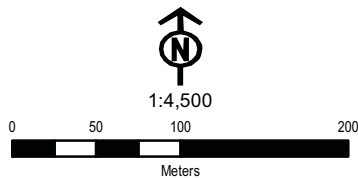
Rural Southeast Study Area Boundary

1/4 Section Boundaries

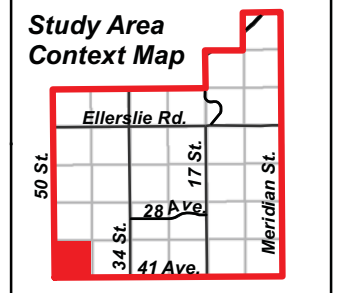
68 Wetland ID Number (Spencer wetlands only)

Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## SW 13-51-24 W4





## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

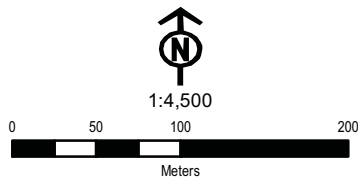
Rural Southeast Study Area Boundary

1/4 Section Boundaries

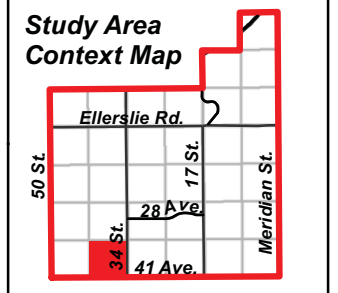
68 Wetland ID Number (Spencer wetlands only)

Aerial Photograph Date: May 2010

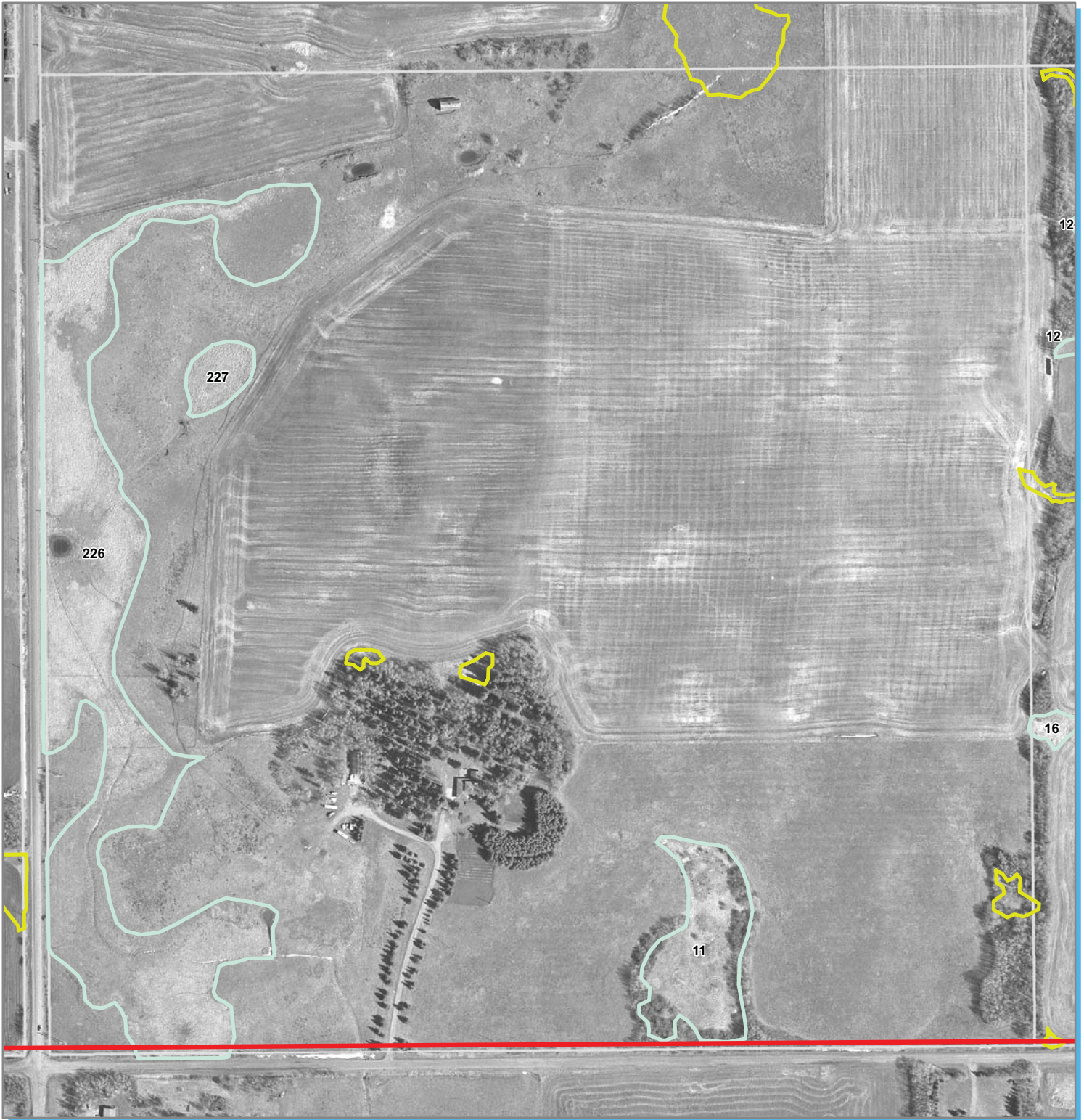
Date Map Created: 26 March 2012



## SE 13-51-24 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

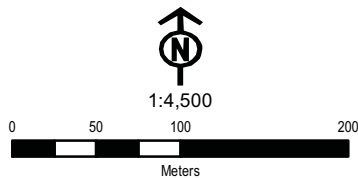
Rural Southeast Study Area Boundary

1/4 Section Boundaries

68 Wetland ID Number (Spencer wetlands only)

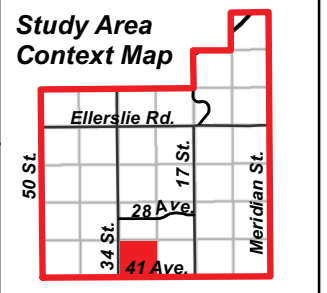
Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



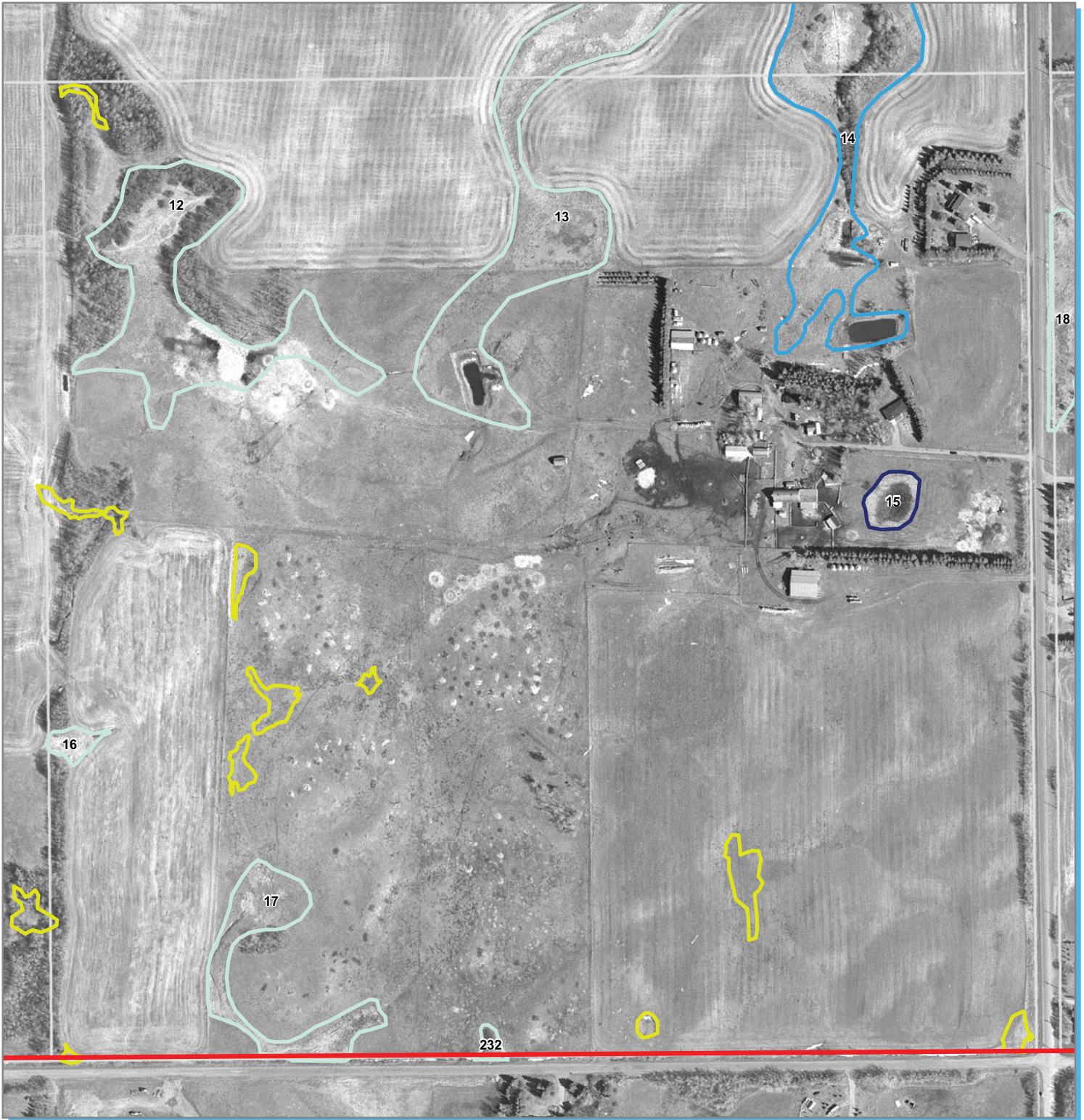
## SW 18-51-23 W4

### Study Area Context Map





# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

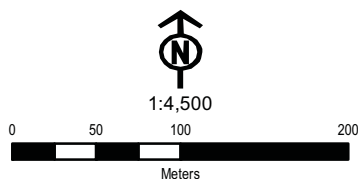
Rural Southeast Study Area Boundary

1/4 Section Boundaries

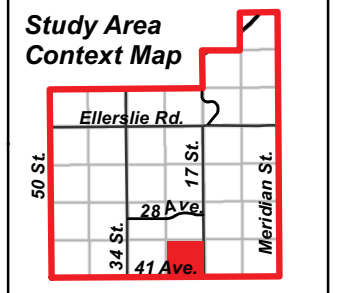
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Aerial Photograph Date: May 2010

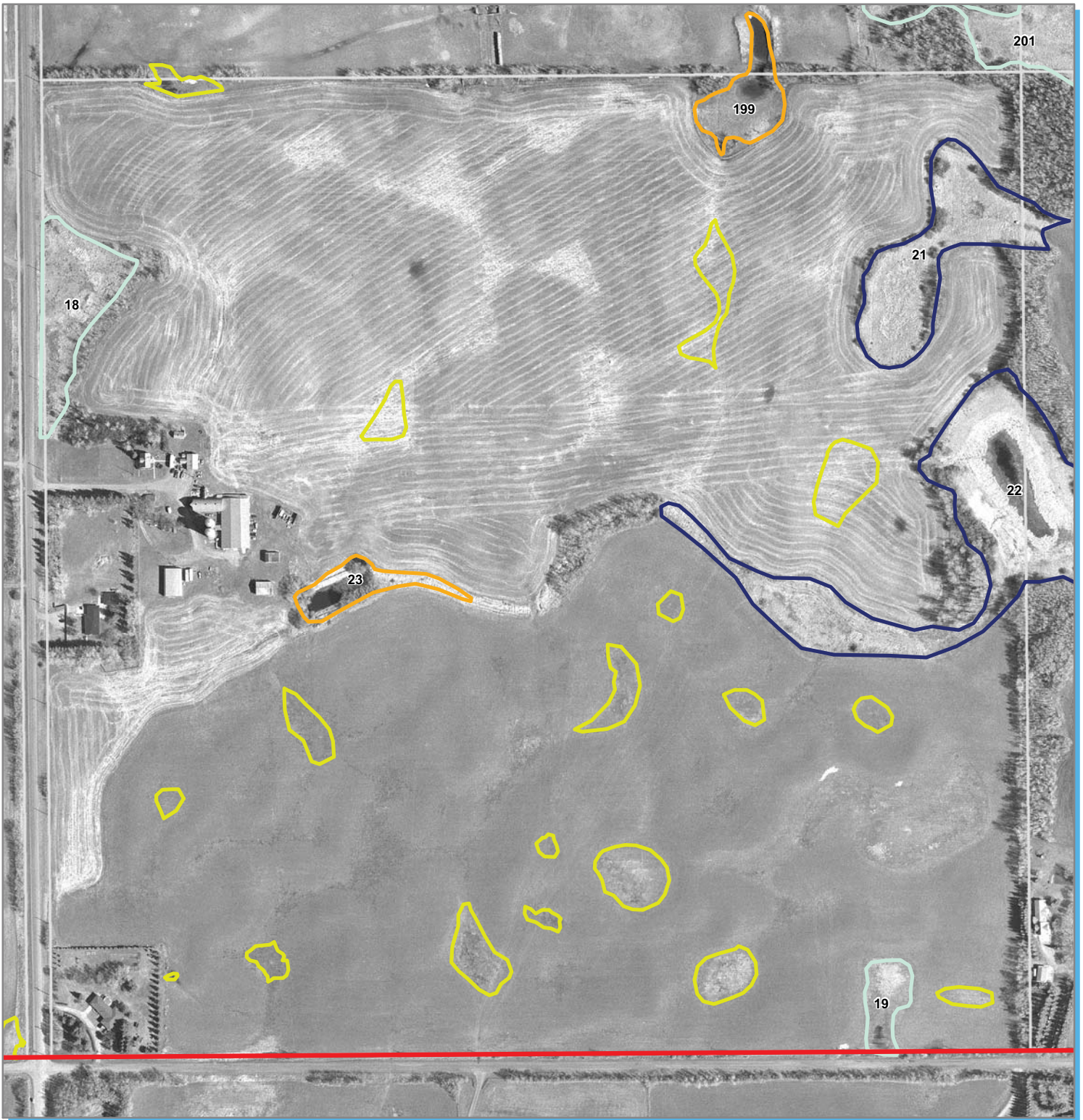
Date Map Created: 26 March 2012



## SE 18-51-23 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

Rural Southeast Study Area Boundary

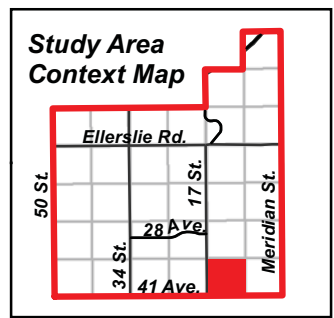
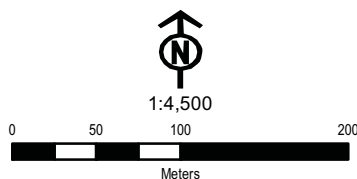
1/4 Section Boundaries

68 Wetland ID Number (Spencer wetlands only)

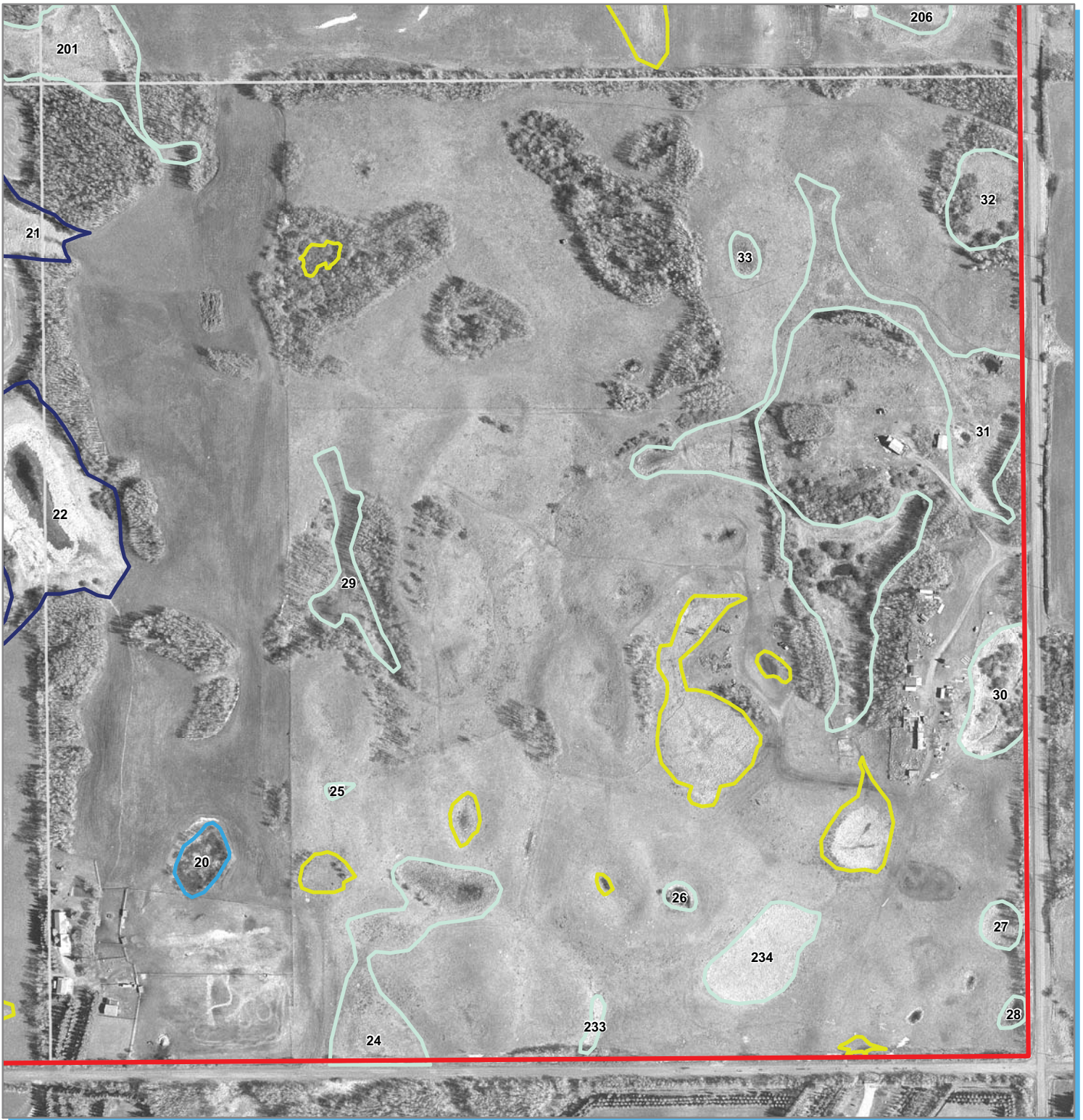
## SW 17-51-23 W4

Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

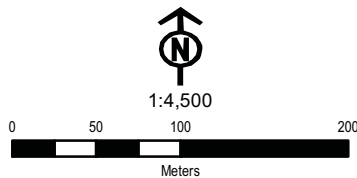
Rural Southeast Study Area Boundary

1/4 Section Boundaries

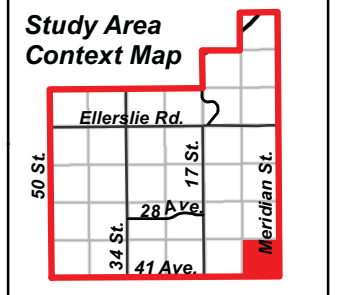
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Aerial Photograph Date: May 2010

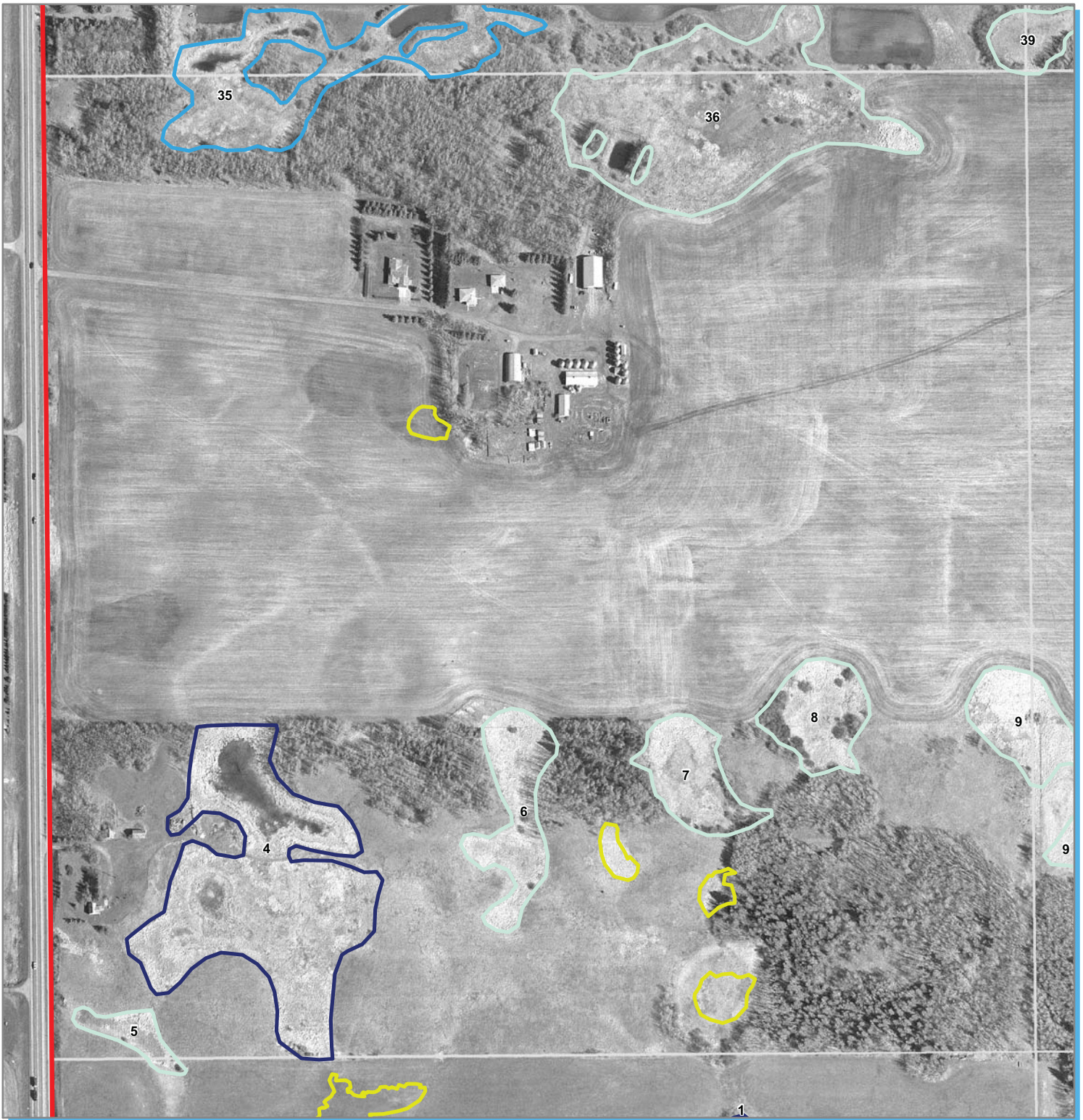
Date Map Created: 26 March 2012



## SE 17-51-23 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

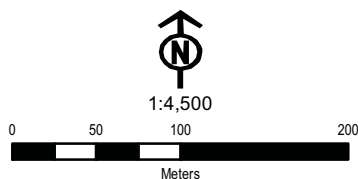
Rural Southeast Study Area Boundary

1/4 Section Boundaries

68 Wetland ID Number (Spencer wetlands only)

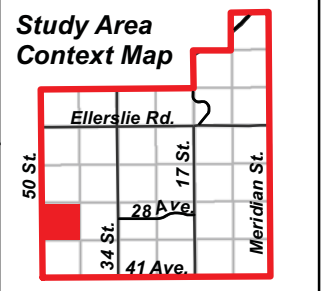
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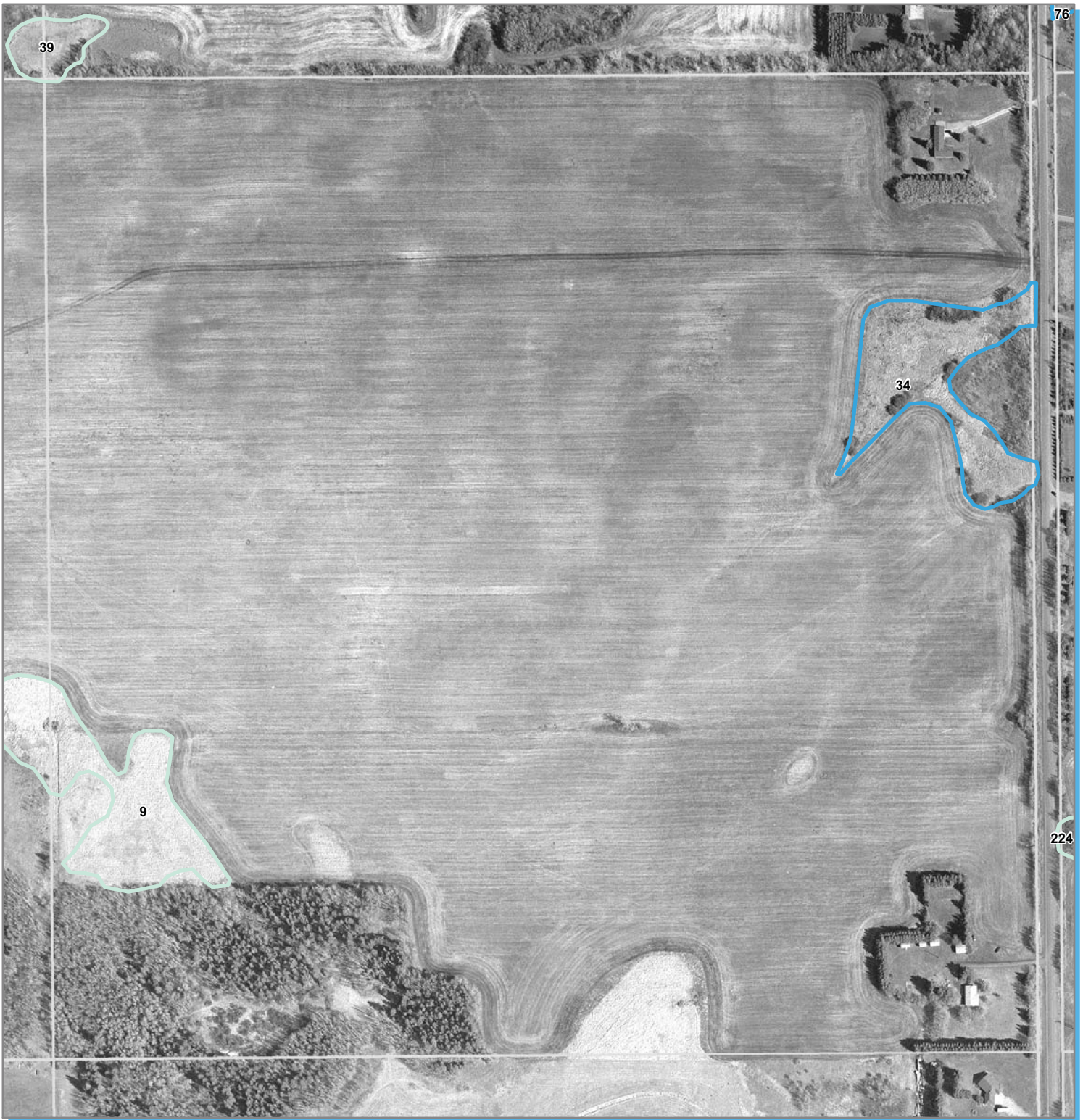
Date Map Created: 26 March 2012



## NW 13-51-24 W4

### Study Area Context Map





## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

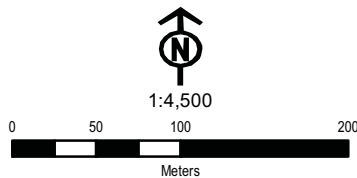
Rural Southeast Study Area Boundary

1/4 Section Boundaries

68 Wetland ID Number (Spencer wetlands only)

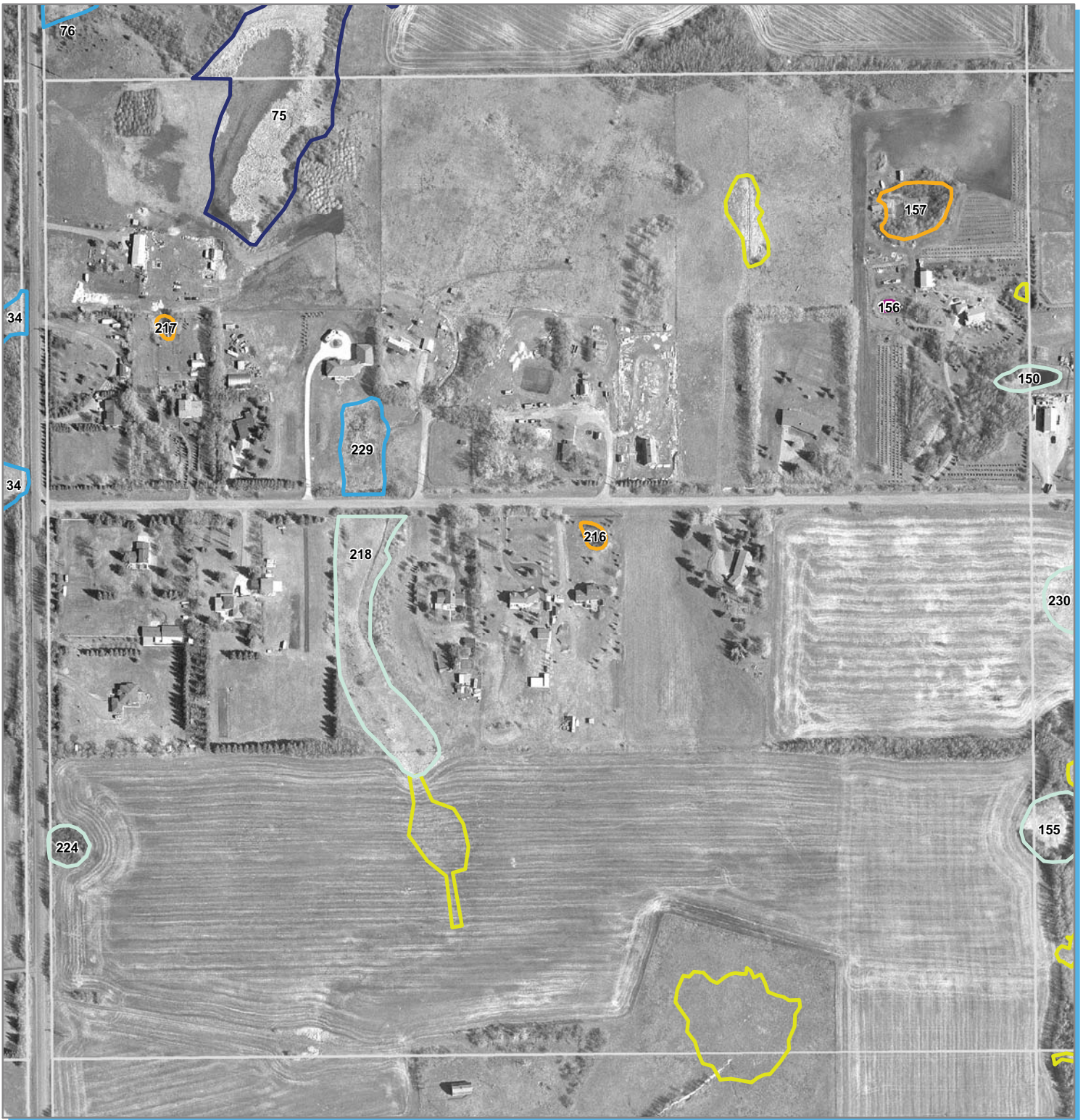
Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## NE 13-51-24 W4





## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

Rural Southeast Study Area Boundary

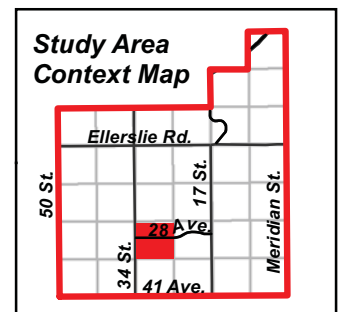
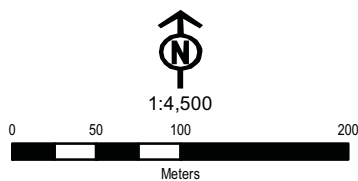
1/4 Section Boundaries

**68** Wetland ID Number (Spencer wetlands only)

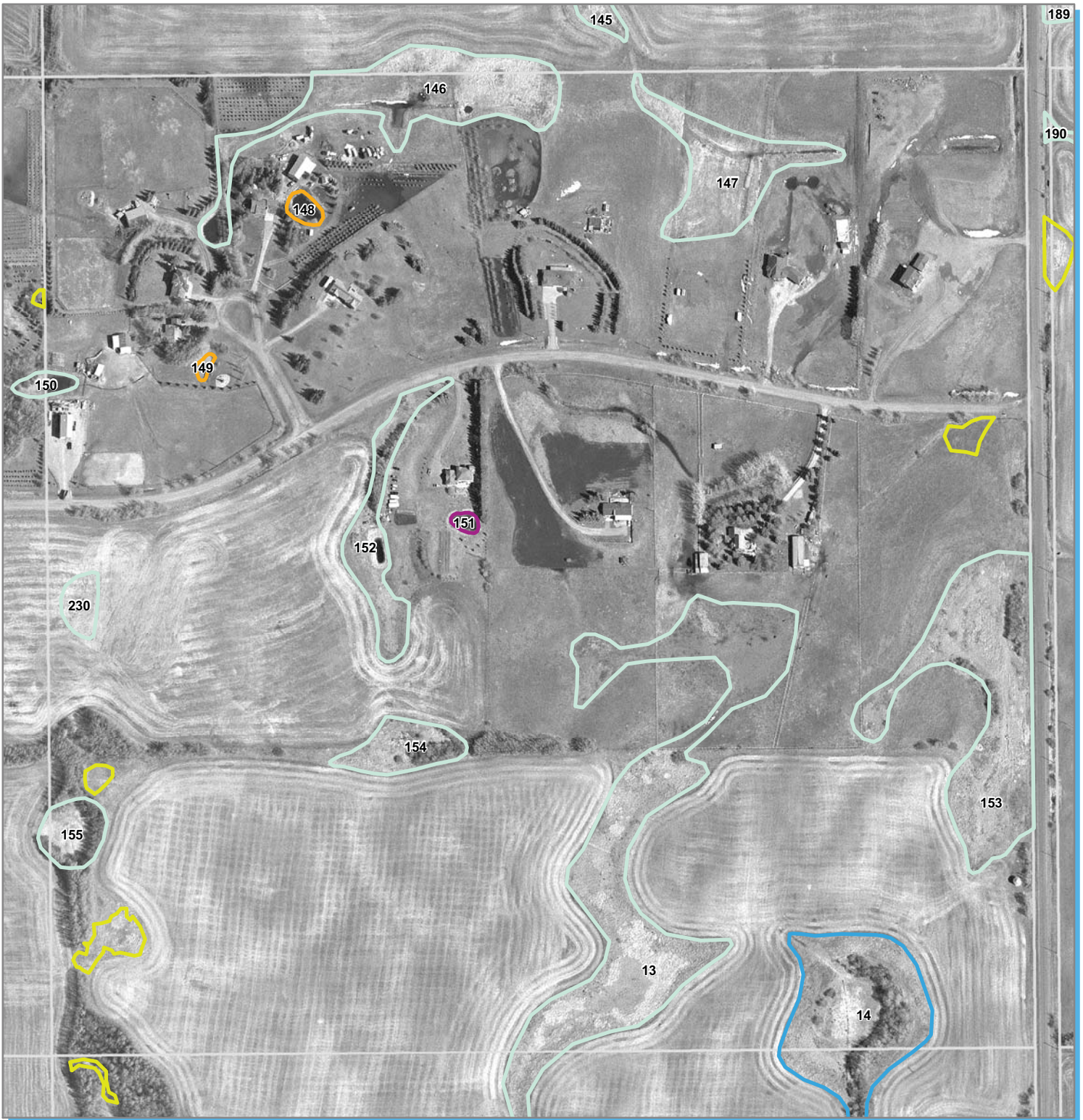
## NW 18-51-23 W4

Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

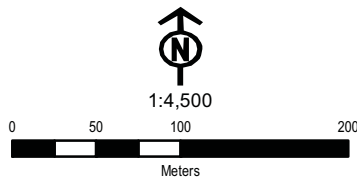
Rural Southeast Study Area Boundary

1/4 Section Boundaries

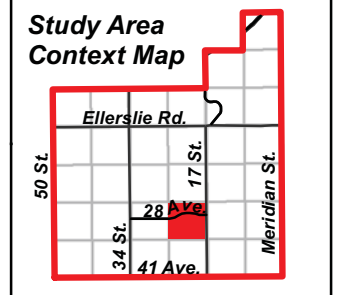
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Aerial Photograph Date: May 2010

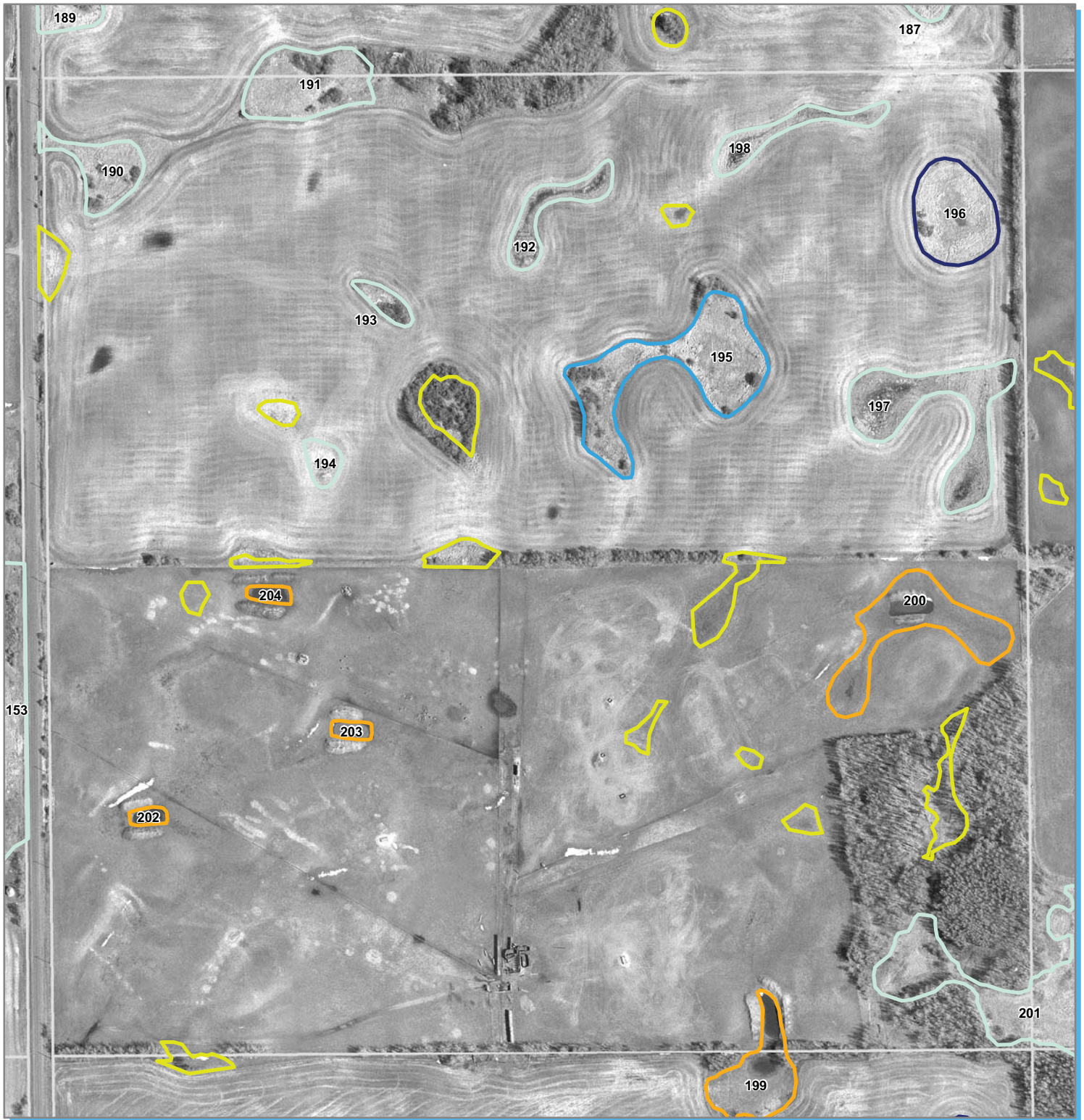
Date Map Created: 26 March 2012



## NE 18-51-23 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

Rural Southeast Study Area Boundary

1/4 Section Boundaries

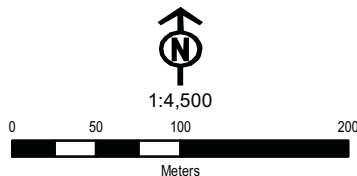
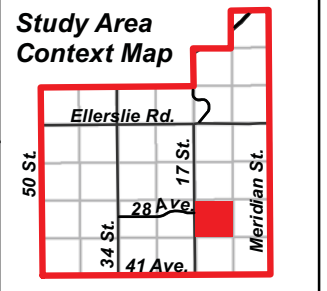
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**NW 17-51-23 W4**

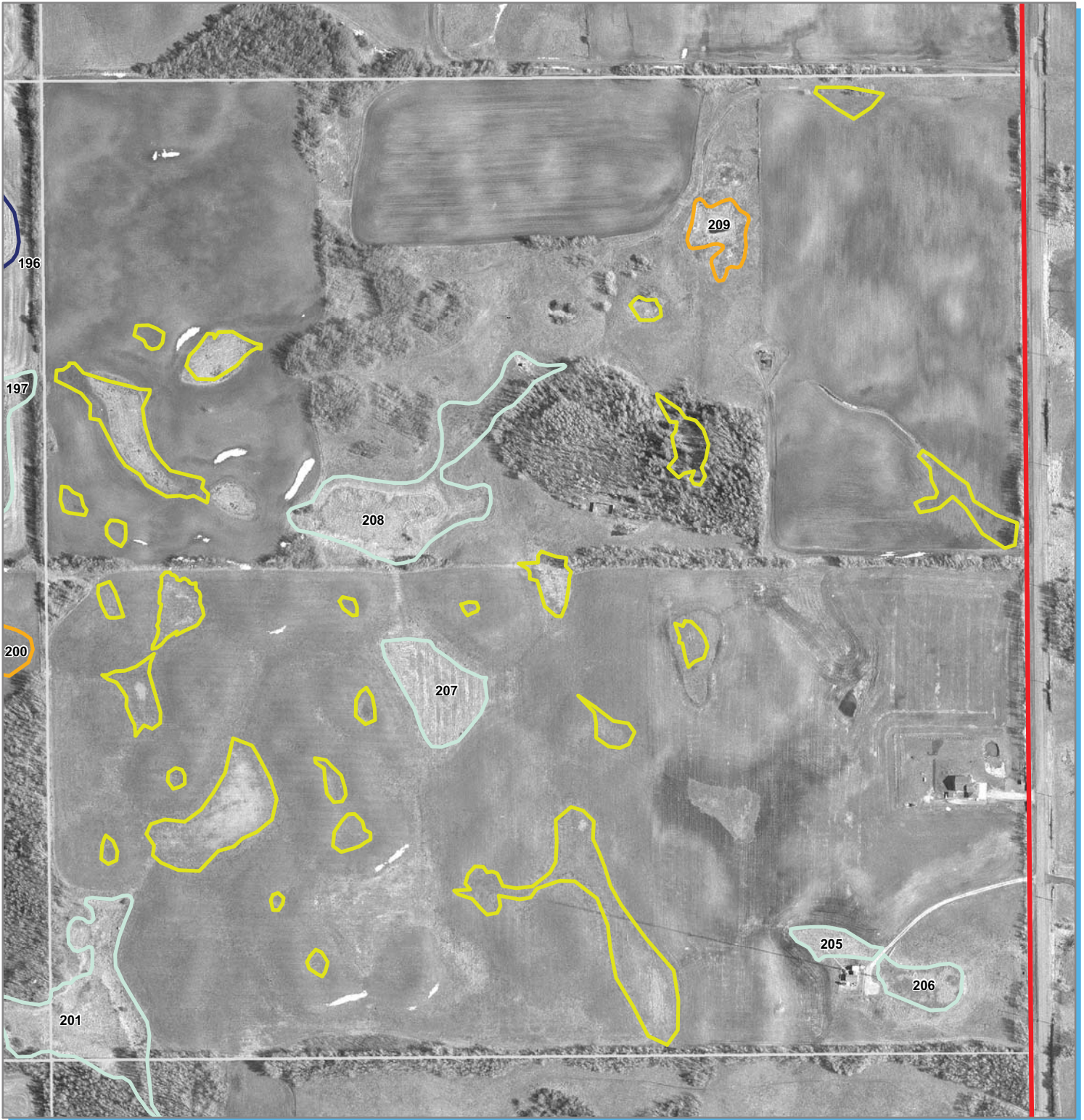
Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012

### Study Area Context Map







## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

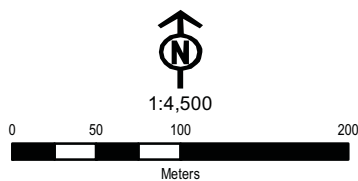
Rural Southeast Study Area Boundary

1/4 Section Boundaries

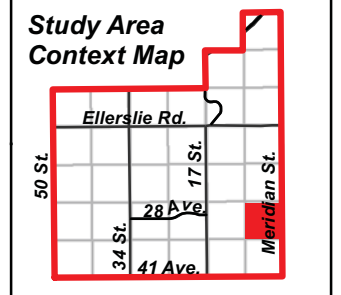
68 Wetland ID Number (Spencer wetlands only)

Aerial Photograph Date: May 2010

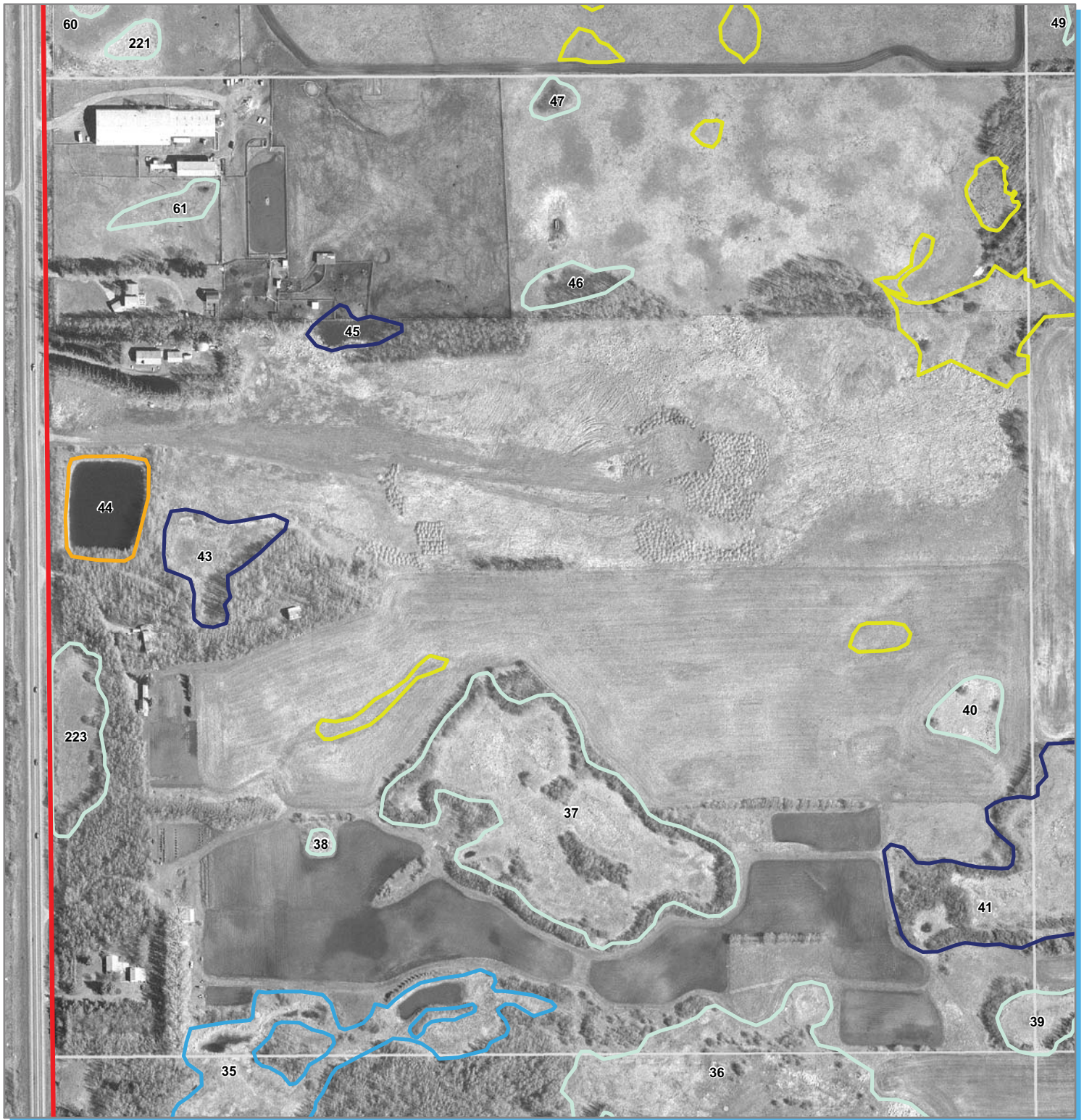
Date Map Created: 26 March 2012



## NE 17-51-23 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

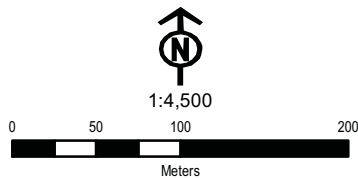
Rural Southeast Study Area Boundary

1/4 Section Boundaries

**68** Wetland ID Number (Spencer wetlands only)

Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## SW 24-51-24 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

- Class 3
- Class 4
- Class 5
- Modified Natural
- Constructed Water Body

#### Wetlands Mapped by Others (2010)

- Class 1&2

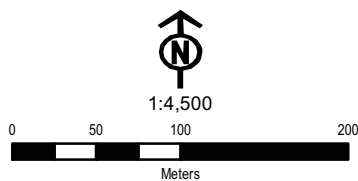
Rural Southeast Study Area Boundary

1/4 Section Boundaries

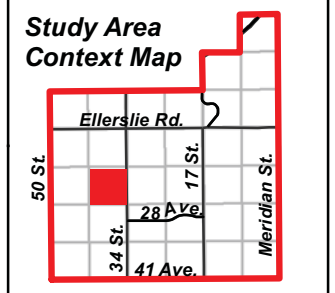
**68** Wetland ID Number (Spencer wetlands only)

Aerial Photograph Date: May 2010

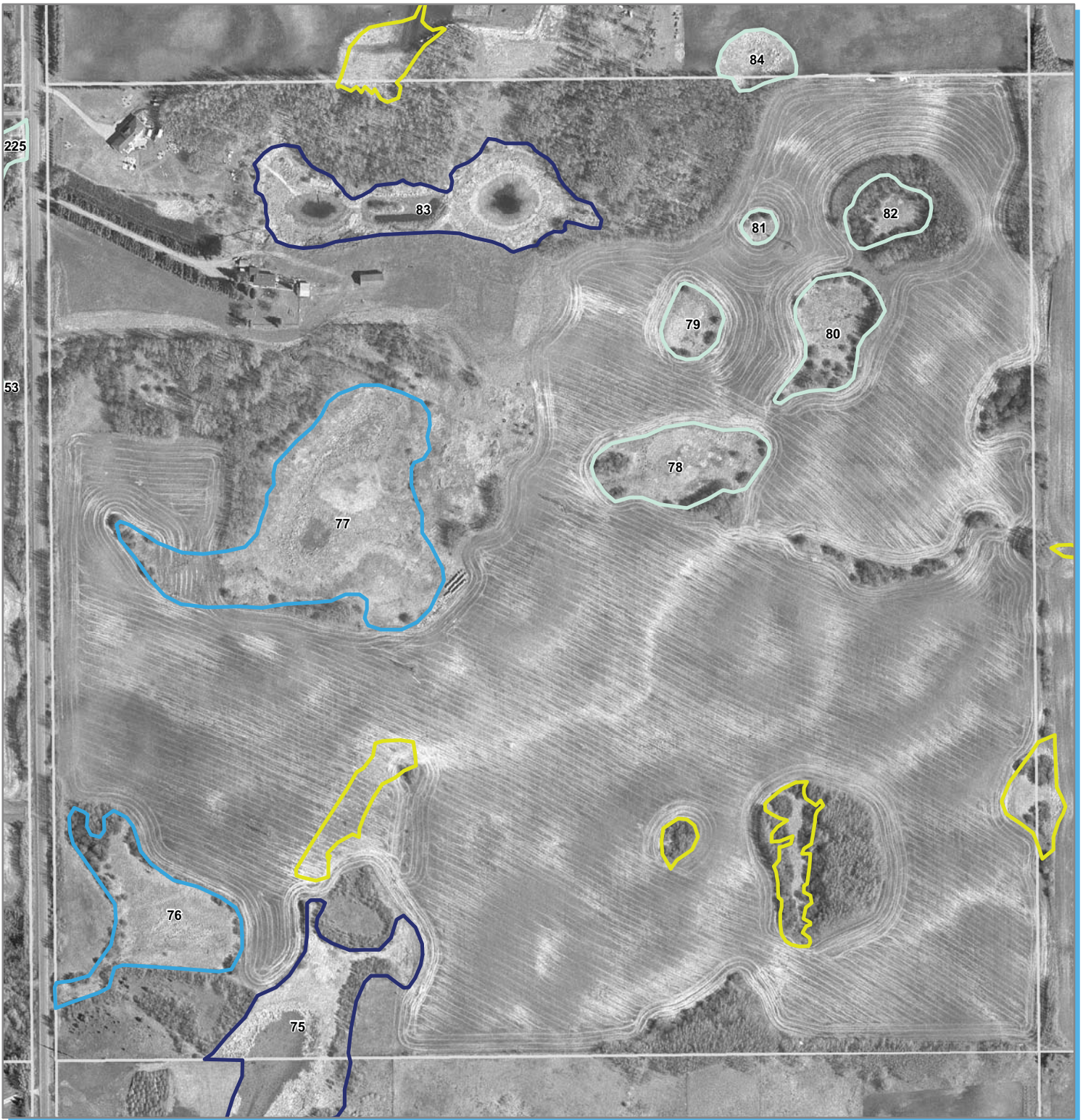
Date Map Created: 26 March 2012



## SE 24-51-24 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

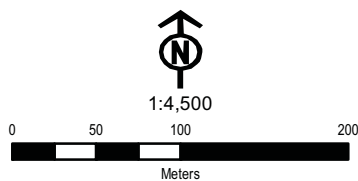
Rural Southeast Study Area Boundary

1/4 Section Boundaries

68 Wetland ID Number (Spencer wetlands only)

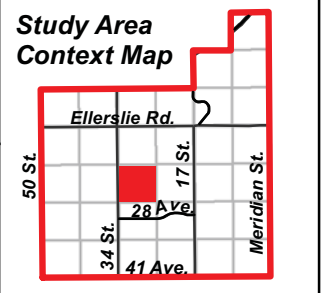
Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012

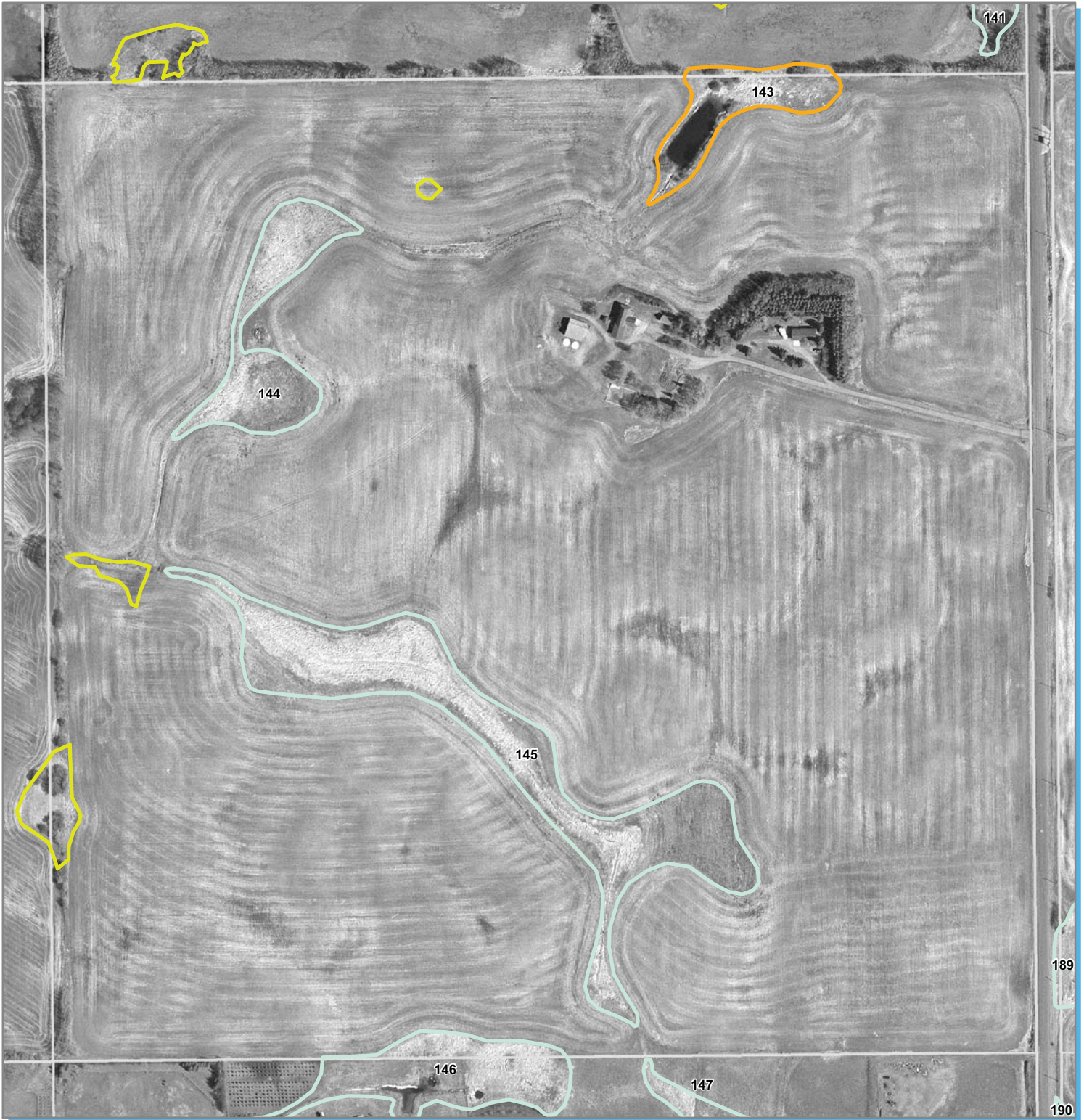


## SW 19-51-23 W4

### Study Area Context Map



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

- Class 3
- Class 4
- Class 5
- Modified Natural
- Constructed Water Body

#### Wetlands Mapped by Others (2010)

- Class 1&2

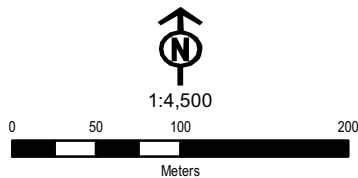
Rural Southeast Study Area Boundary

1/4 Section Boundaries

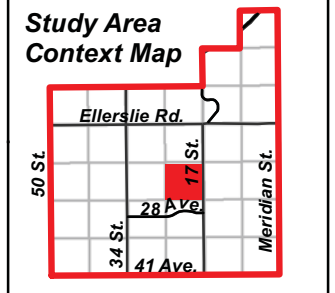
**68** Wetland ID Number (Spencer wetlands only)

Aerial Photograph Date: May 2010

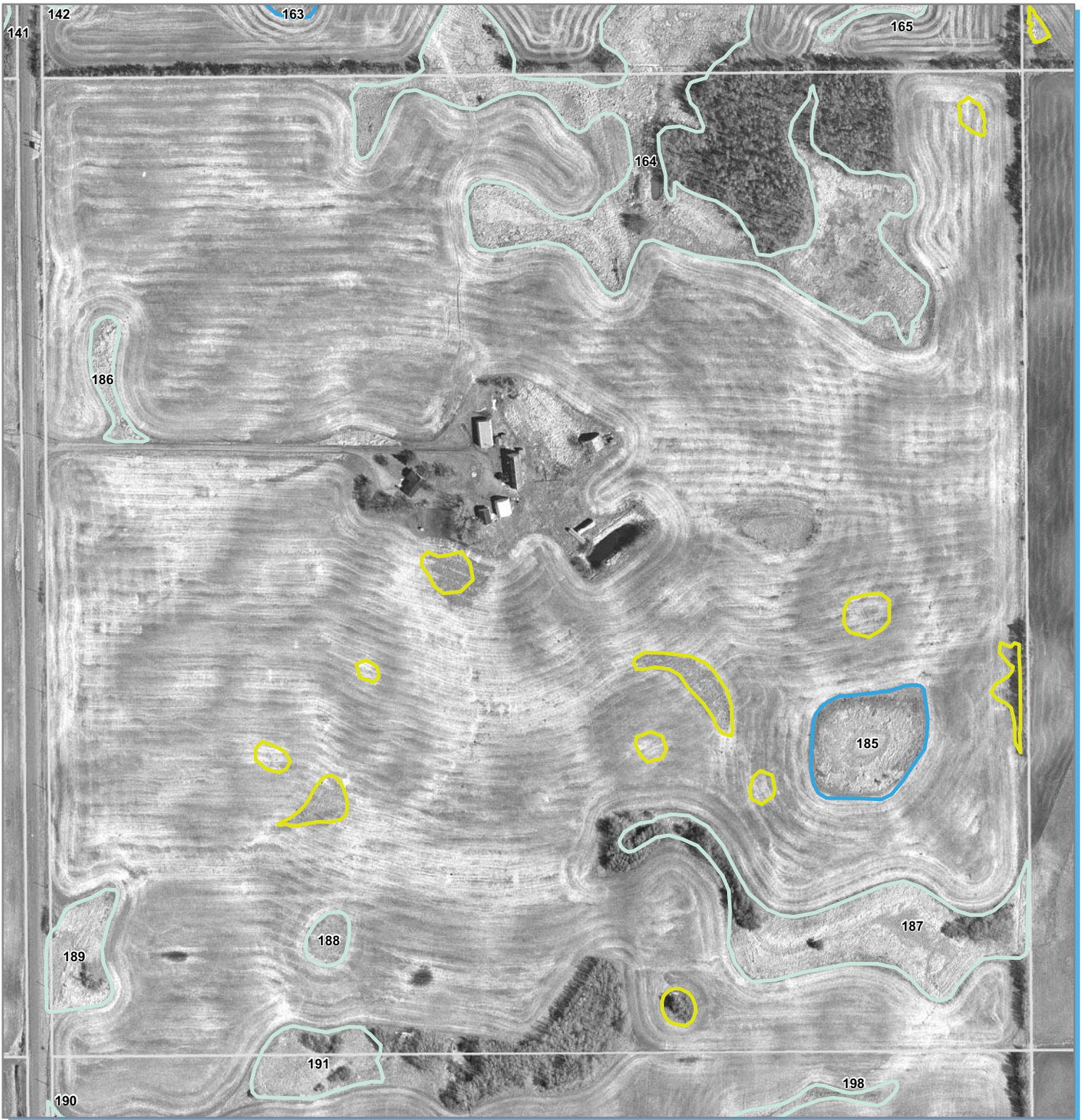
Date Map Created: 26 March 2012



## SE 19-51-23 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

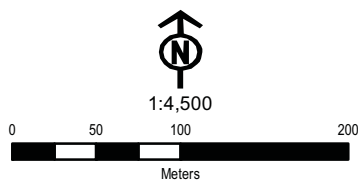
Rural Southeast Study Area Boundary

1/4 Section Boundaries

68 Wetland ID Number (Spencer wetlands only)

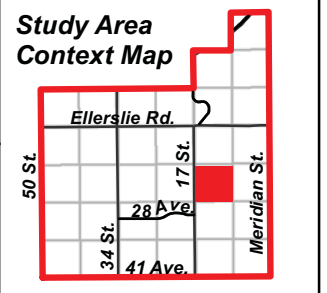
Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## SW 20-51-23 W4

### Study Area Context Map





## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

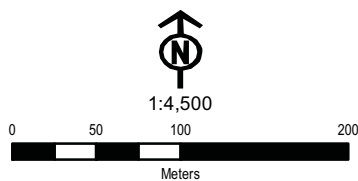
Rural Southeast Study Area Boundary

1/4 Section Boundaries

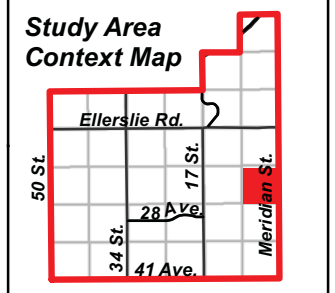
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Aerial Photograph Date: May 2010

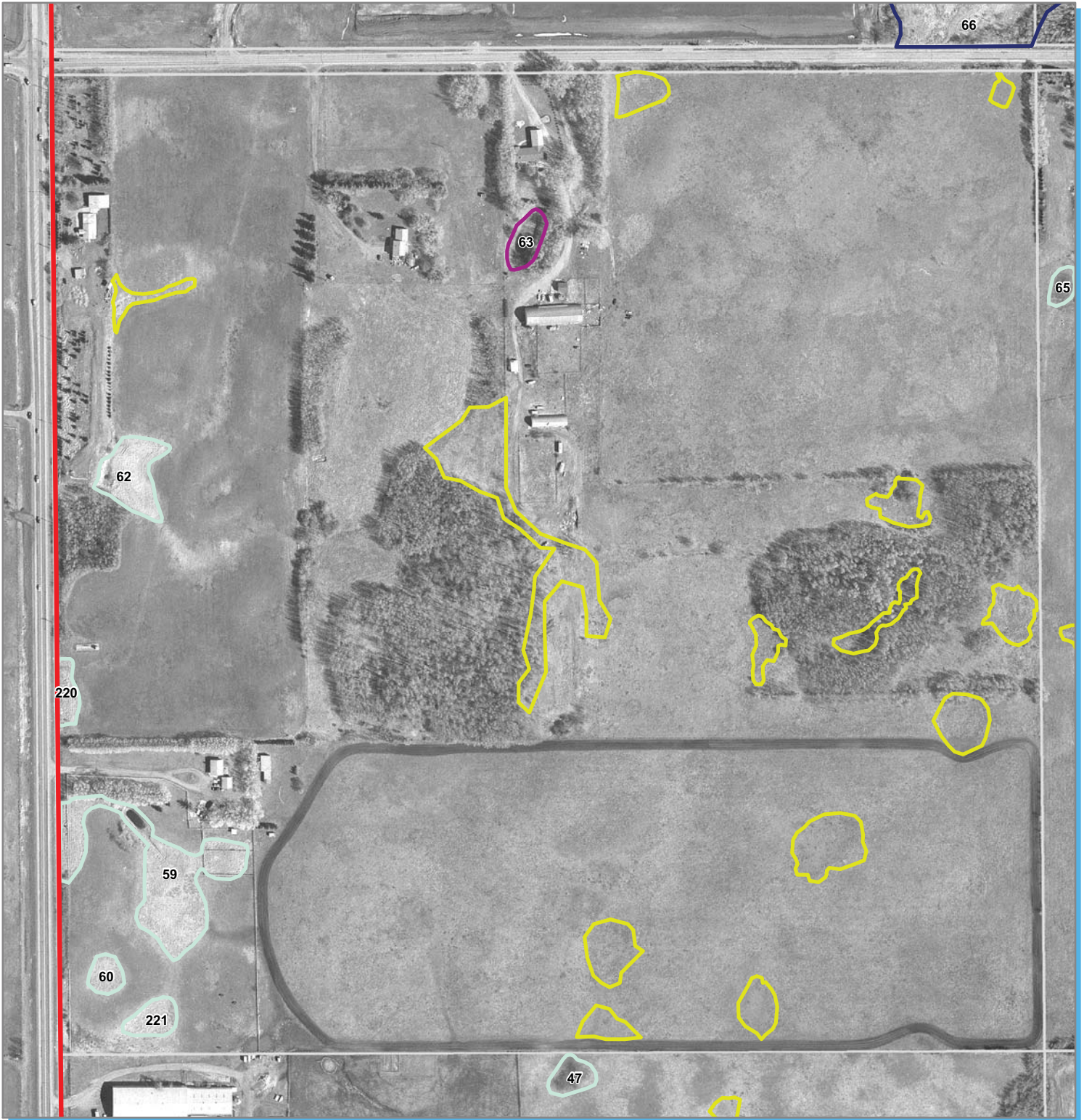
Date Map Created: 26 March 2012



## SE 20-51-23 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

- Class 3
- Class 4
- Class 5
- Modified Natural
- Constructed Water Body

#### Wetlands Mapped by Others (2010)

- Class 1&2

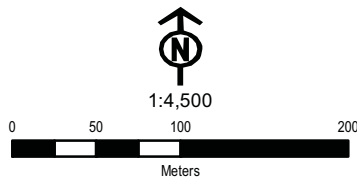
Rural Southeast Study Area Boundary

1/4 Section Boundaries

**68** Wetland ID Number (Spencer wetlands only)

Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## NW 24-51-24 W4







## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

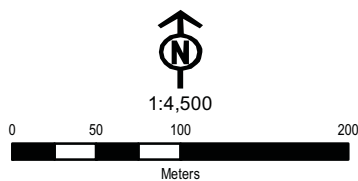
Rural Southeast Study Area Boundary

1/4 Section Boundaries

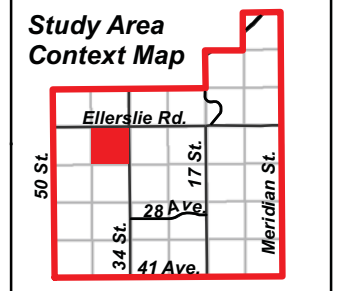
**68** Wetland ID Number (Spencer wetlands only)

Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## NE 24-51-24 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

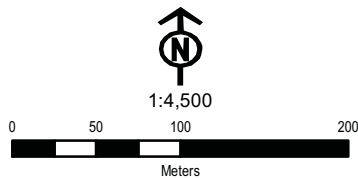
Rural Southeast Study Area Boundary

1/4 Section Boundaries

68 Wetland ID Number (Spencer wetlands only)

Aerial Photograph Date: May 2010

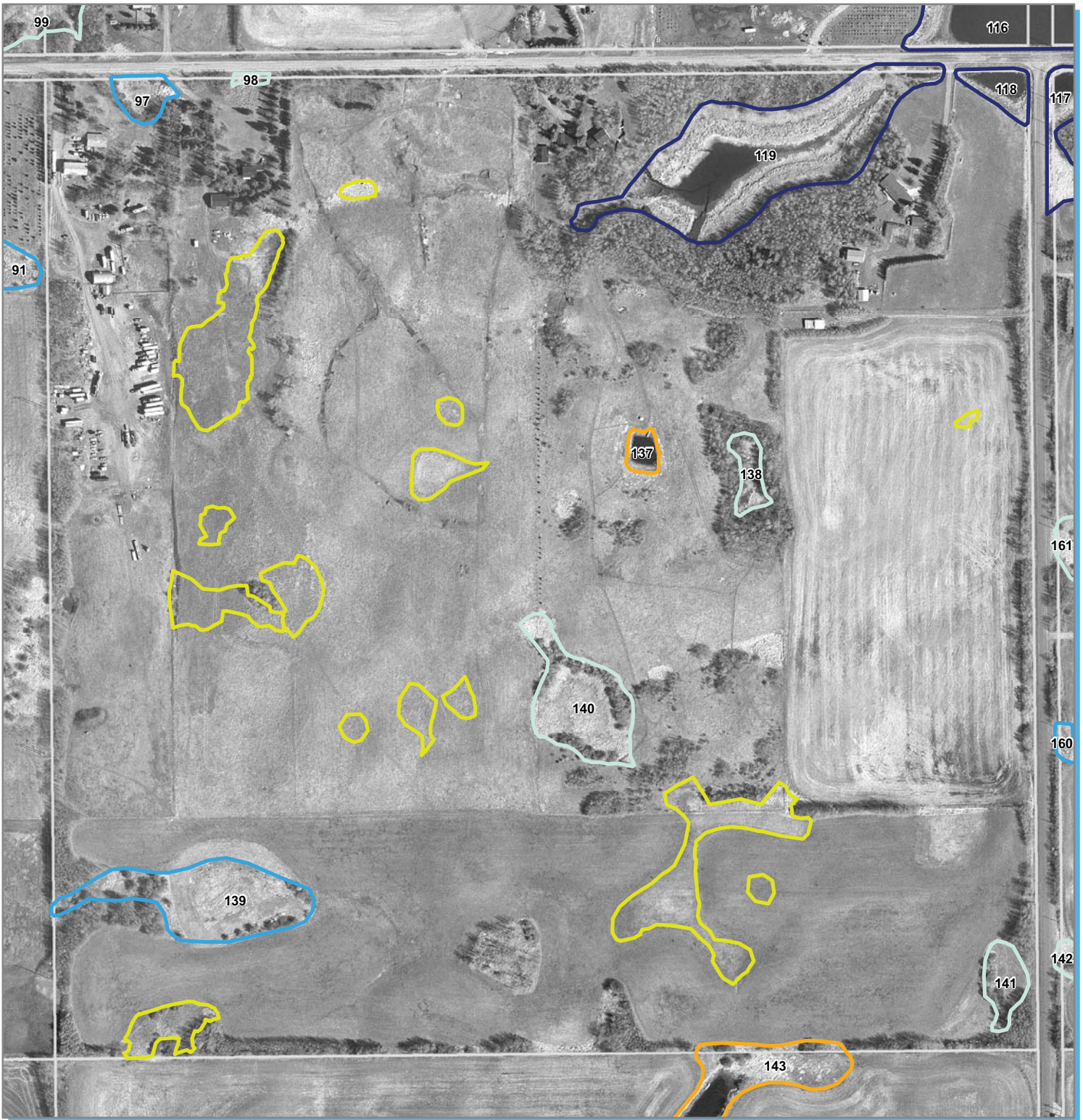
Date Map Created: 26 March 2012



## NW 19-51-23 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

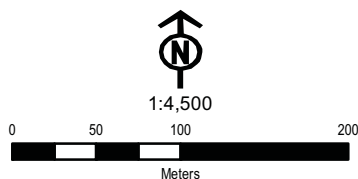
Rural Southeast Study Area Boundary

1/4 Section Boundaries

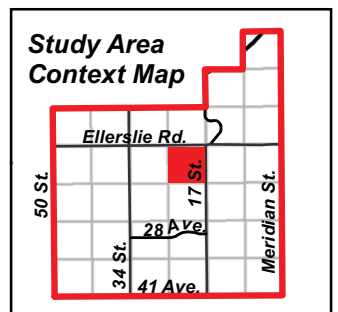
68 Wetland ID Number (Spencer wetlands only)

Aerial Photograph Date: May 2010

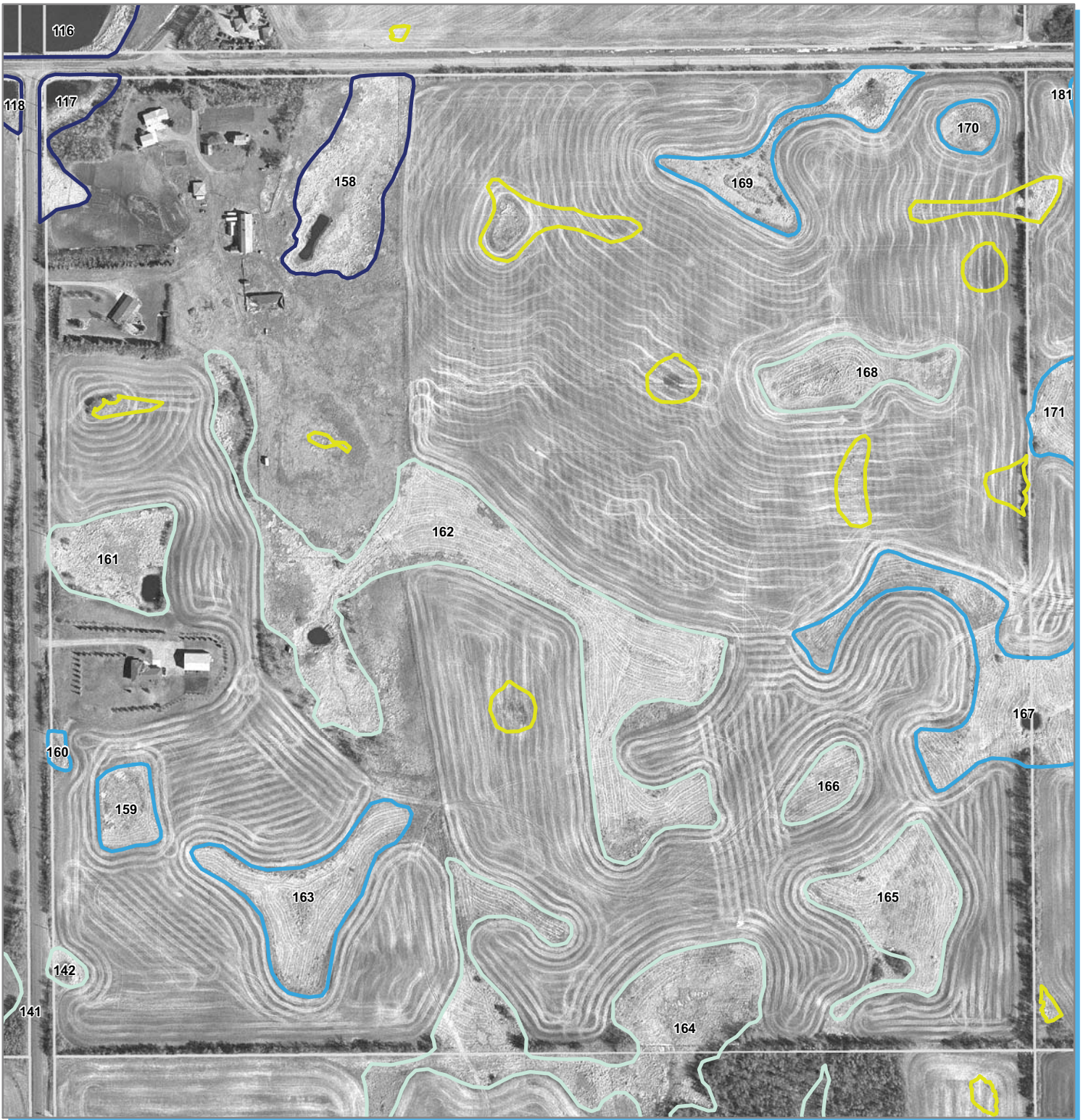
Date Map Created: 26 March 2012



## NE 19-51-23 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

Rural Southeast Study Area Boundary

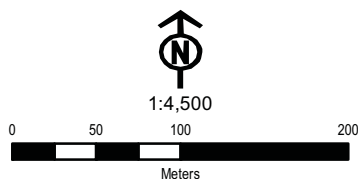
1/4 Section Boundaries

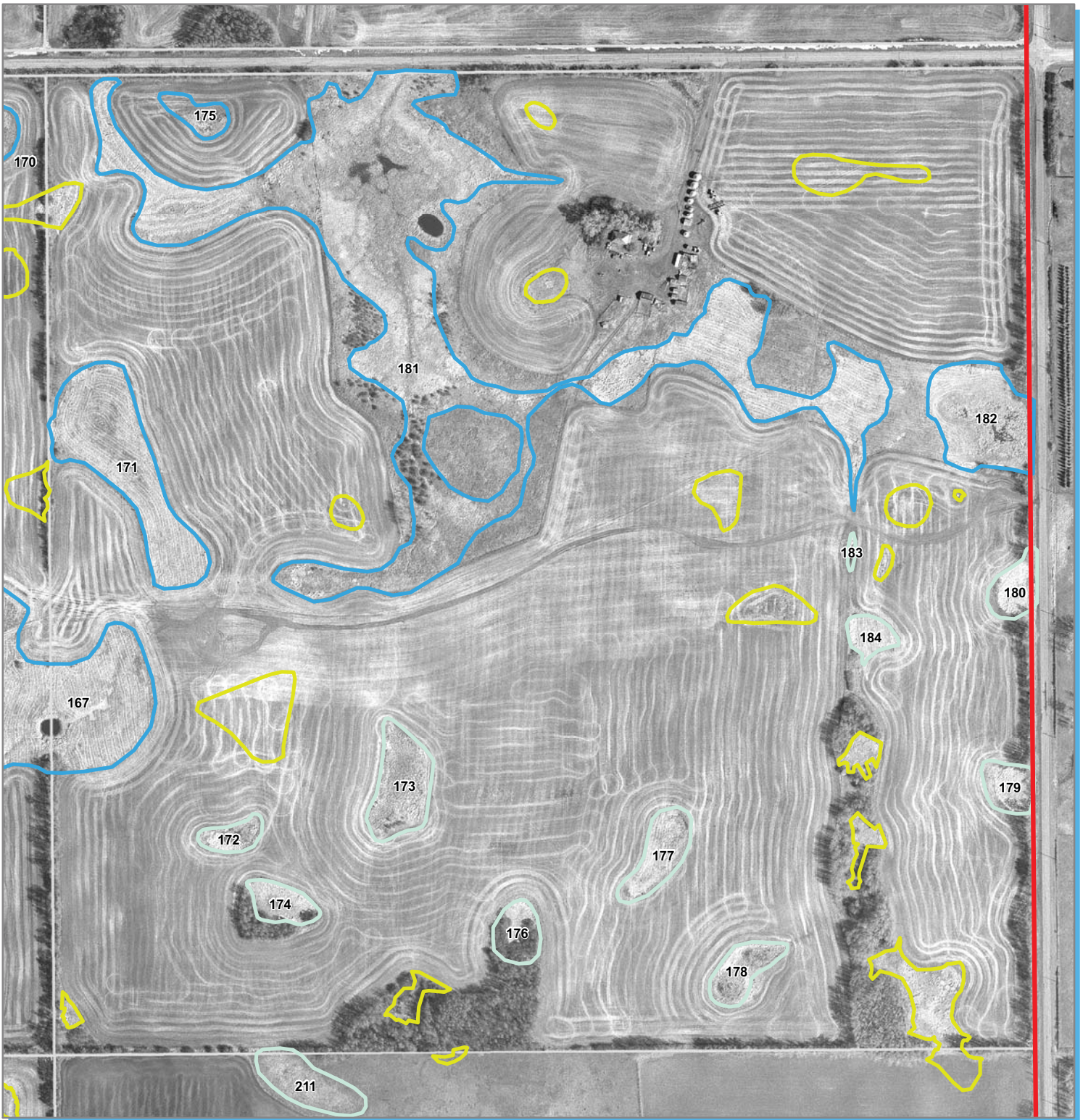
68 Wetland ID Number (Spencer wetlands only)

## NW 20-51-23 W4

Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012





## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

Rural Southeast Study Area Boundary

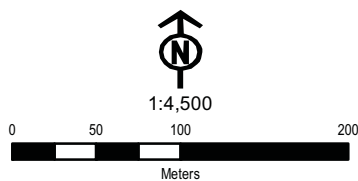
1/4 Section Boundaries

**68** Wetland ID Number (Spencer wetlands only)



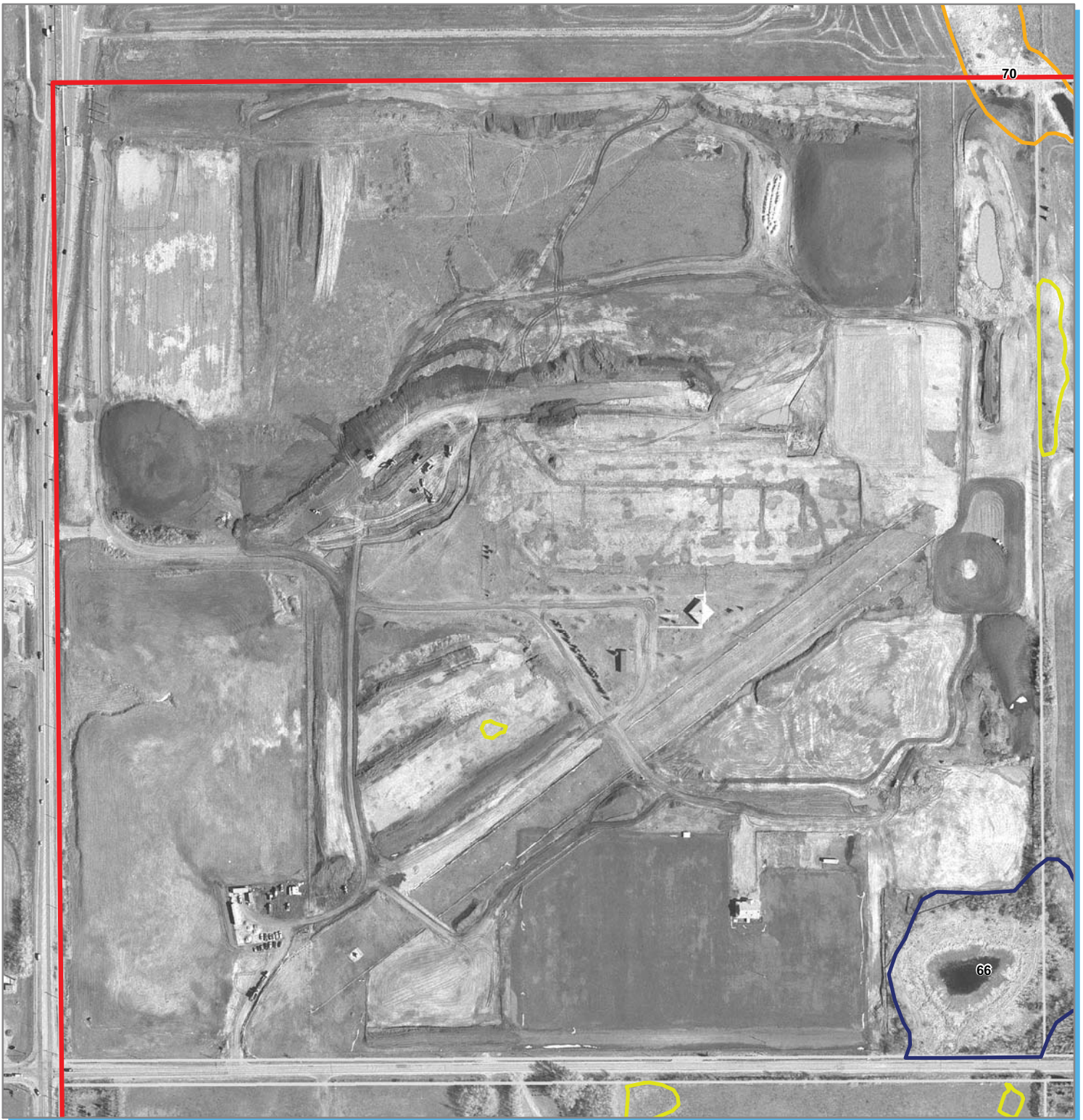
Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## NE 20-51-23 W4





## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

Rural Southeast Study Area Boundary

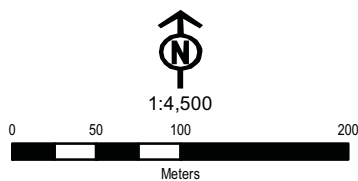
1/4 Section Boundaries

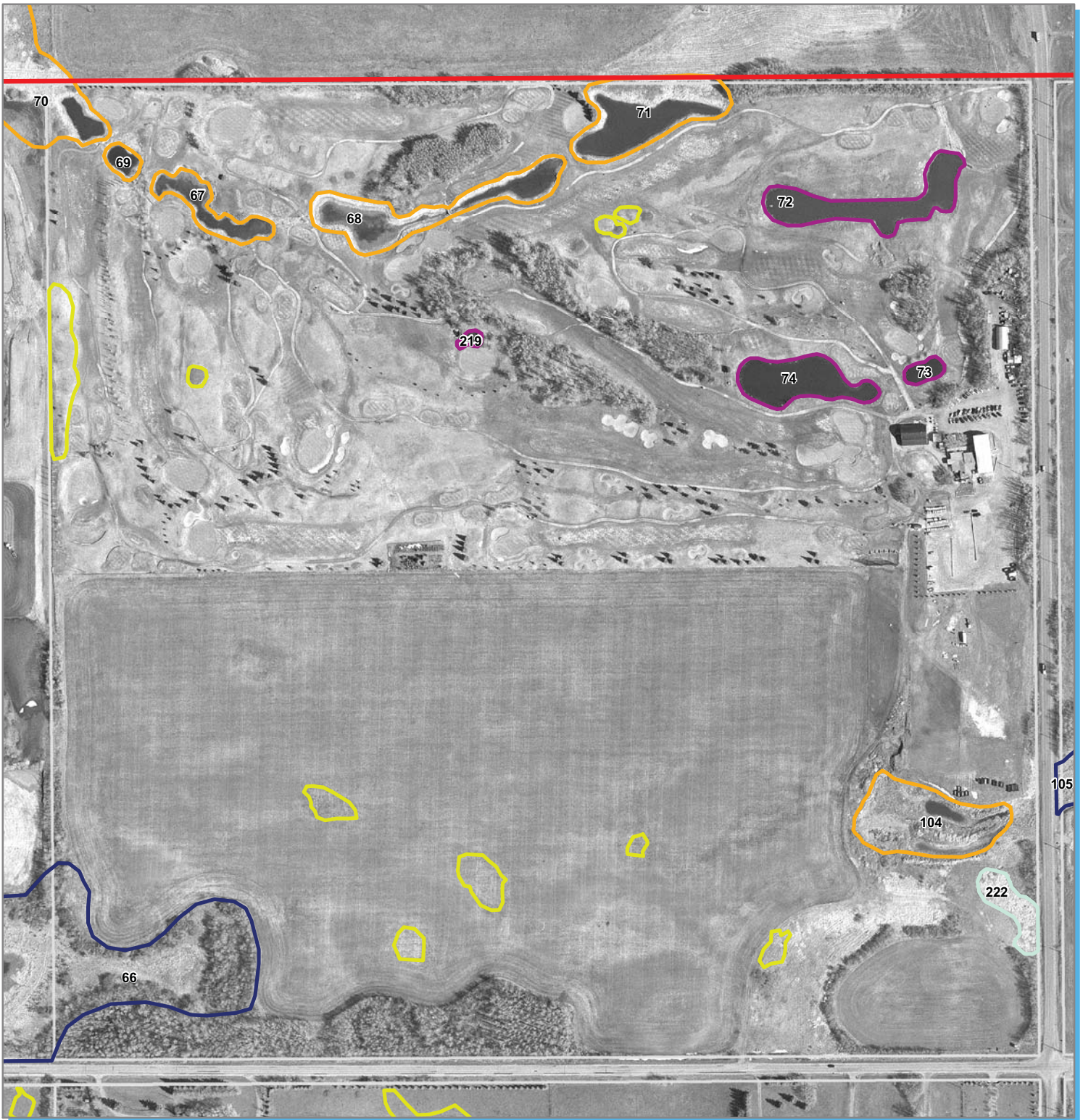
**68** Wetland ID Number (Spencer wetlands only)

## SW 25-51-24 W4

Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012





## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

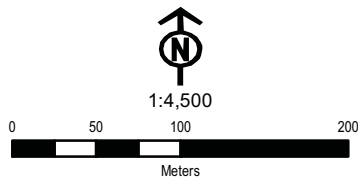
Rural Southeast Study Area Boundary

1/4 Section Boundaries

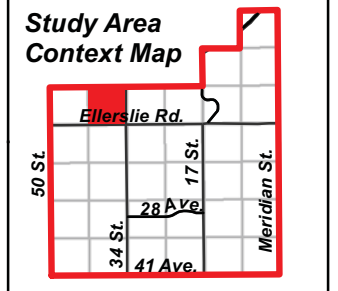
68 Wetland ID Number (Spencer wetlands only)

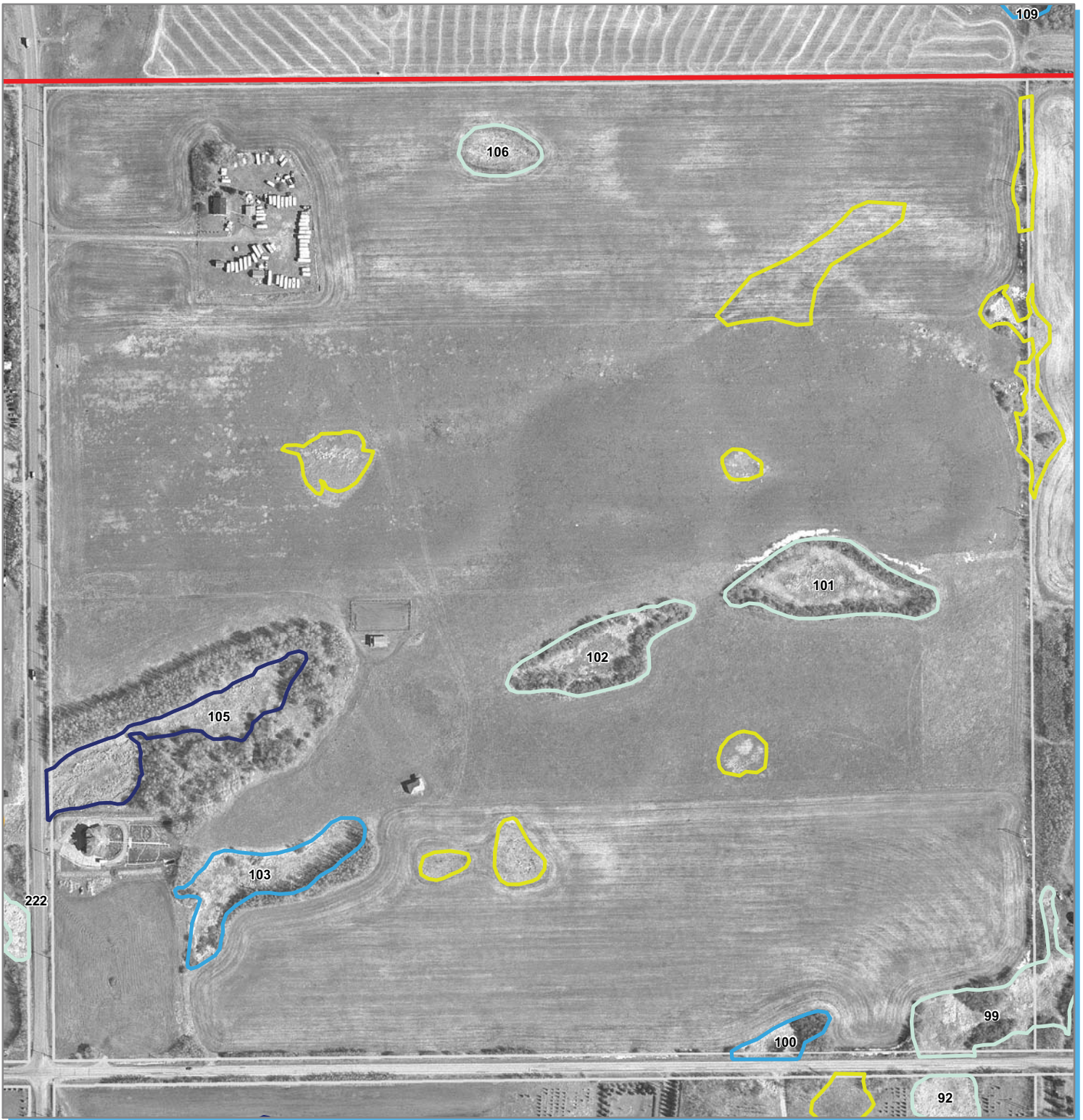
Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## SE 25-51-24 W4





## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

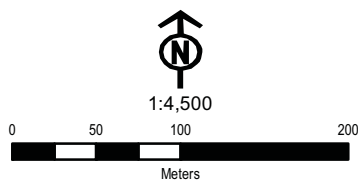
Rural Southeast Study Area Boundary

1/4 Section Boundaries

68 Wetland ID Number (Spencer wetlands only)

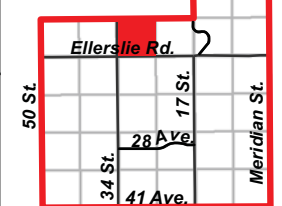
Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



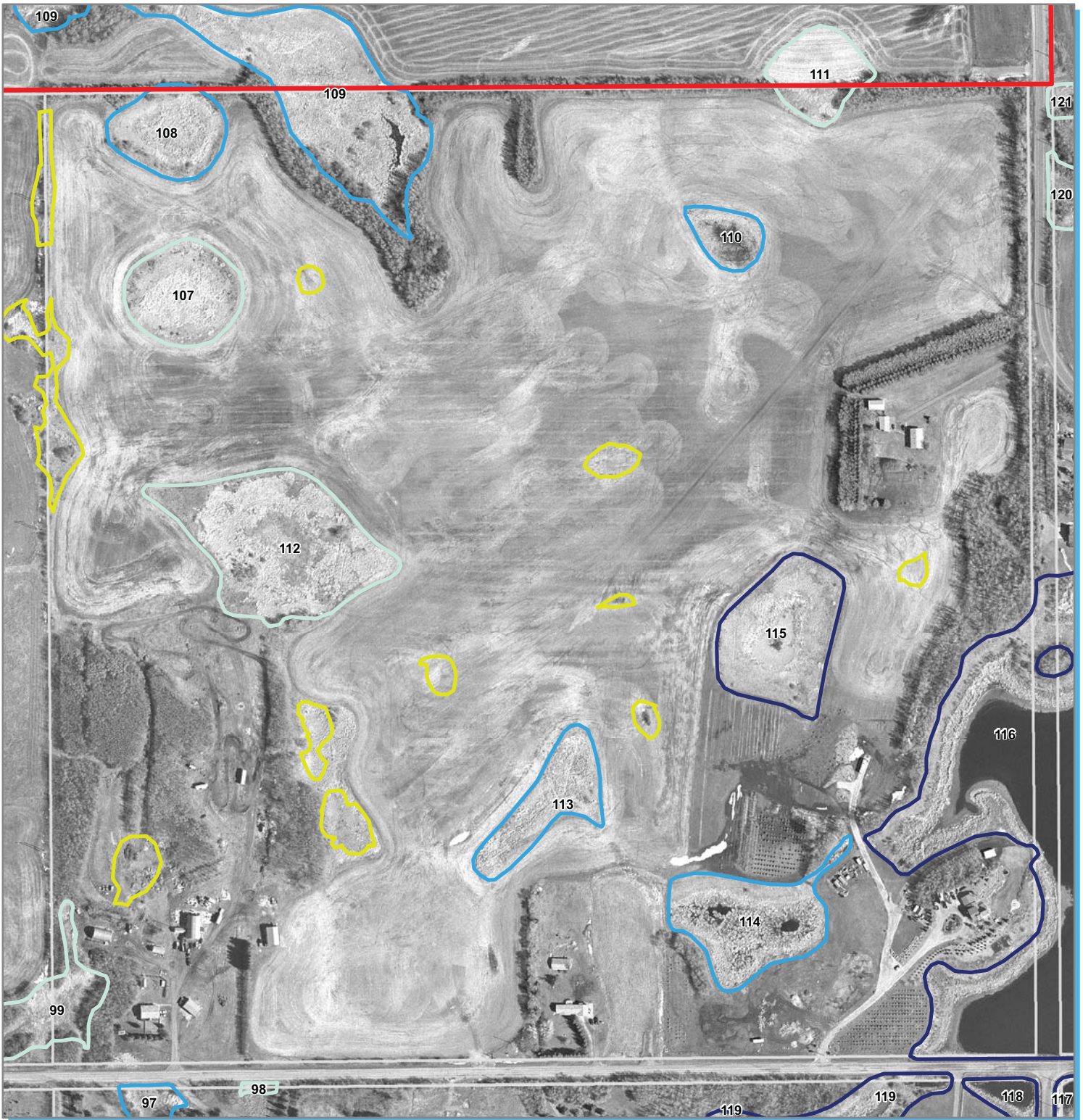
## SW 30-51-23 W4

### Study Area Context Map





# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

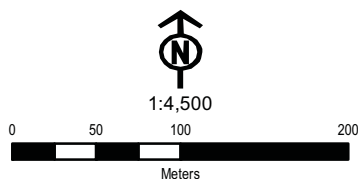
Rural Southeast Study Area Boundary

1/4 Section Boundaries

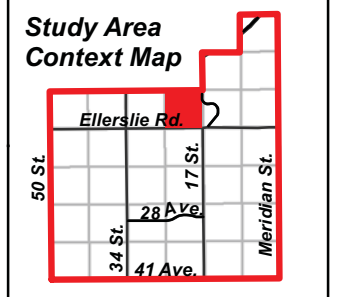
68 Wetland ID Number (Spencer wetlands only)

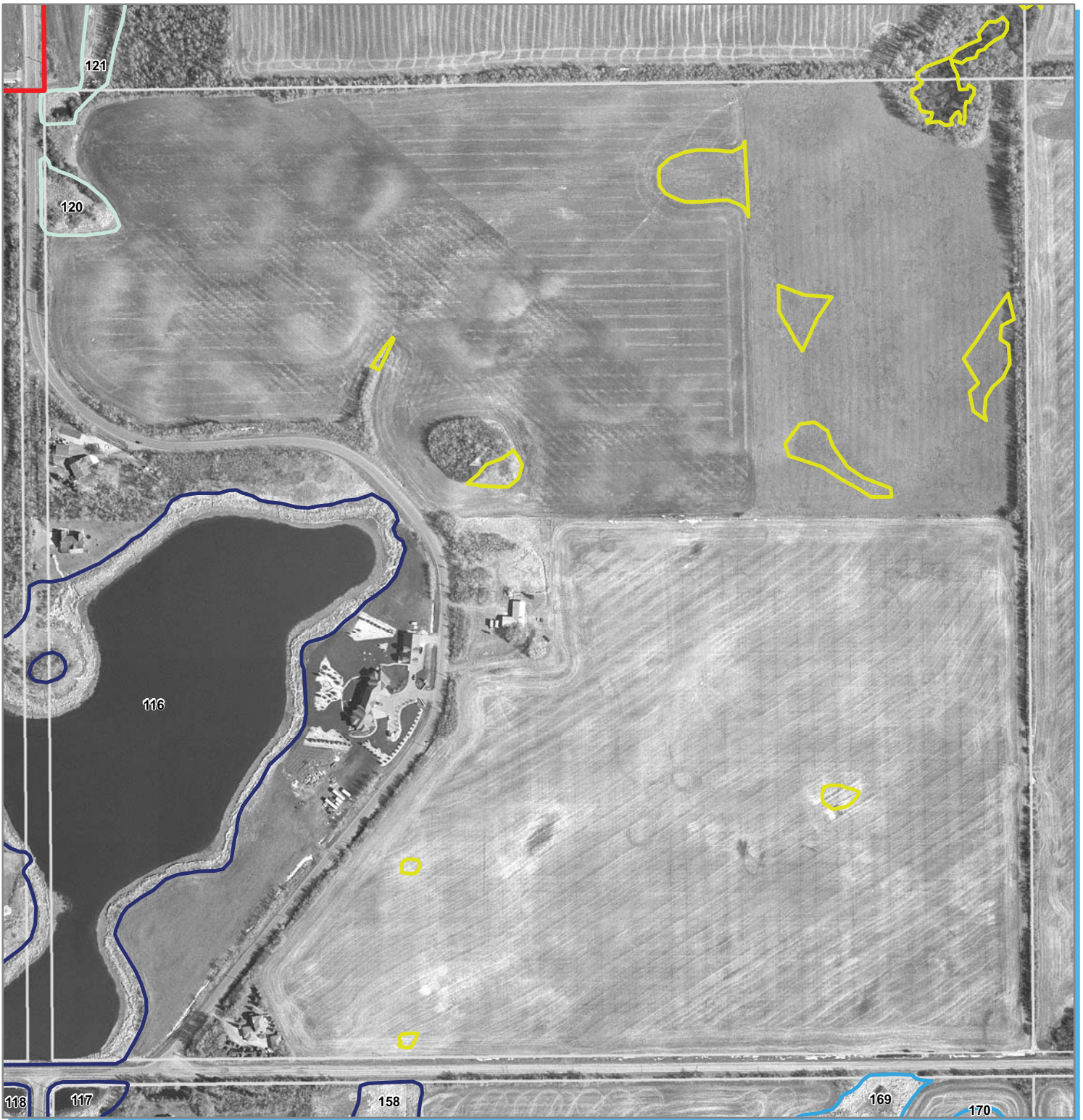
Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## SE 30-51-23 W4





## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

Rural Southeast Study Area Boundary

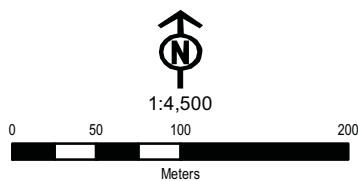
1/4 Section Boundaries

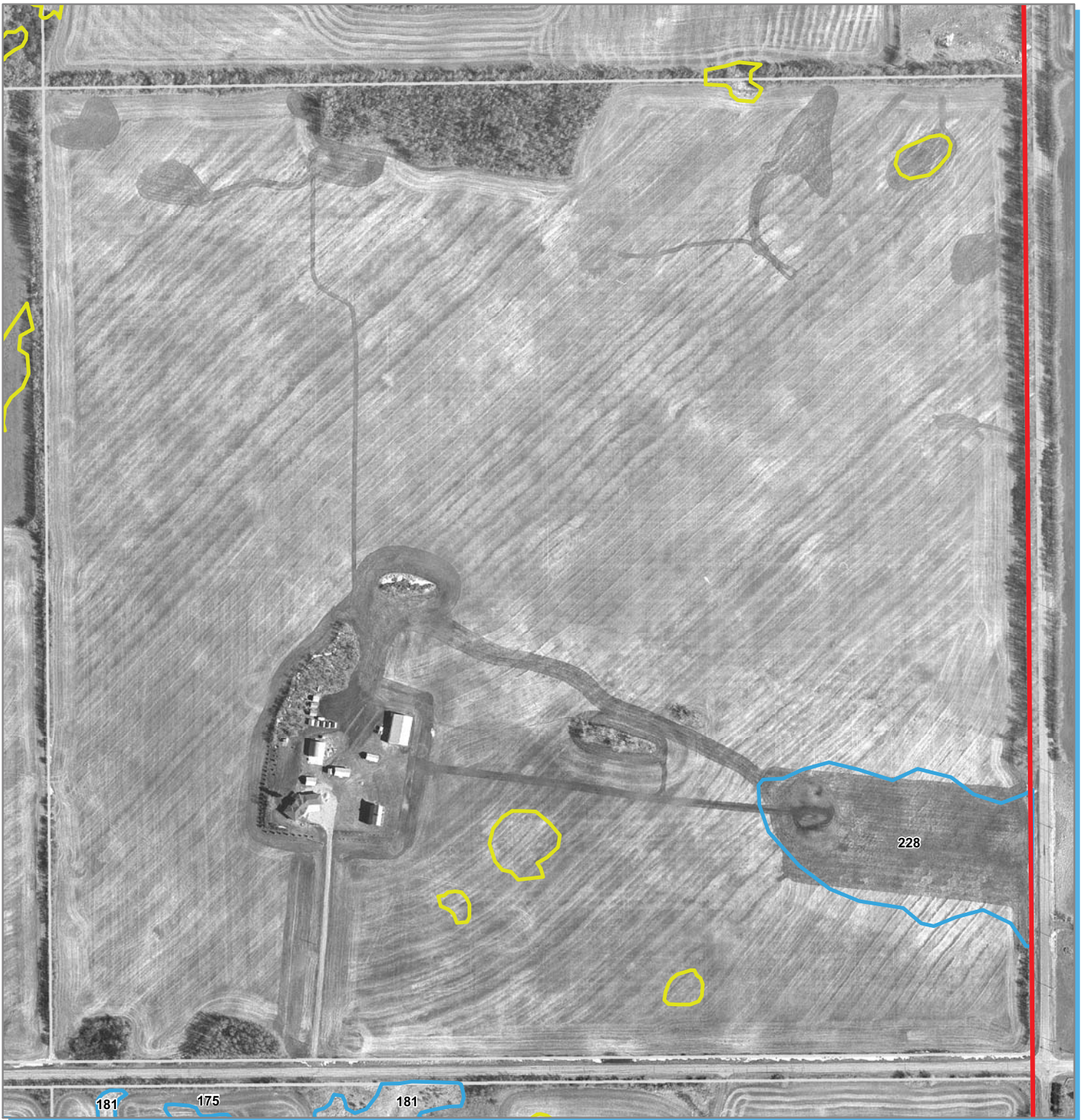
68 Wetland ID Number (Spencer wetlands only)

## SW 29-51-23 W4

Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012





## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

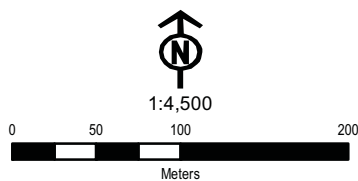
Rural Southeast Study Area Boundary

1/4 Section Boundaries

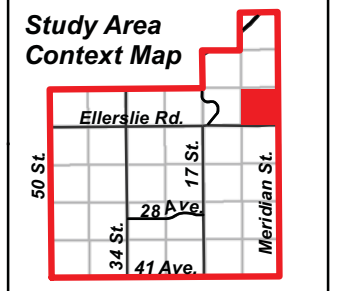
68 Wetland ID Number (Spencer wetlands only)

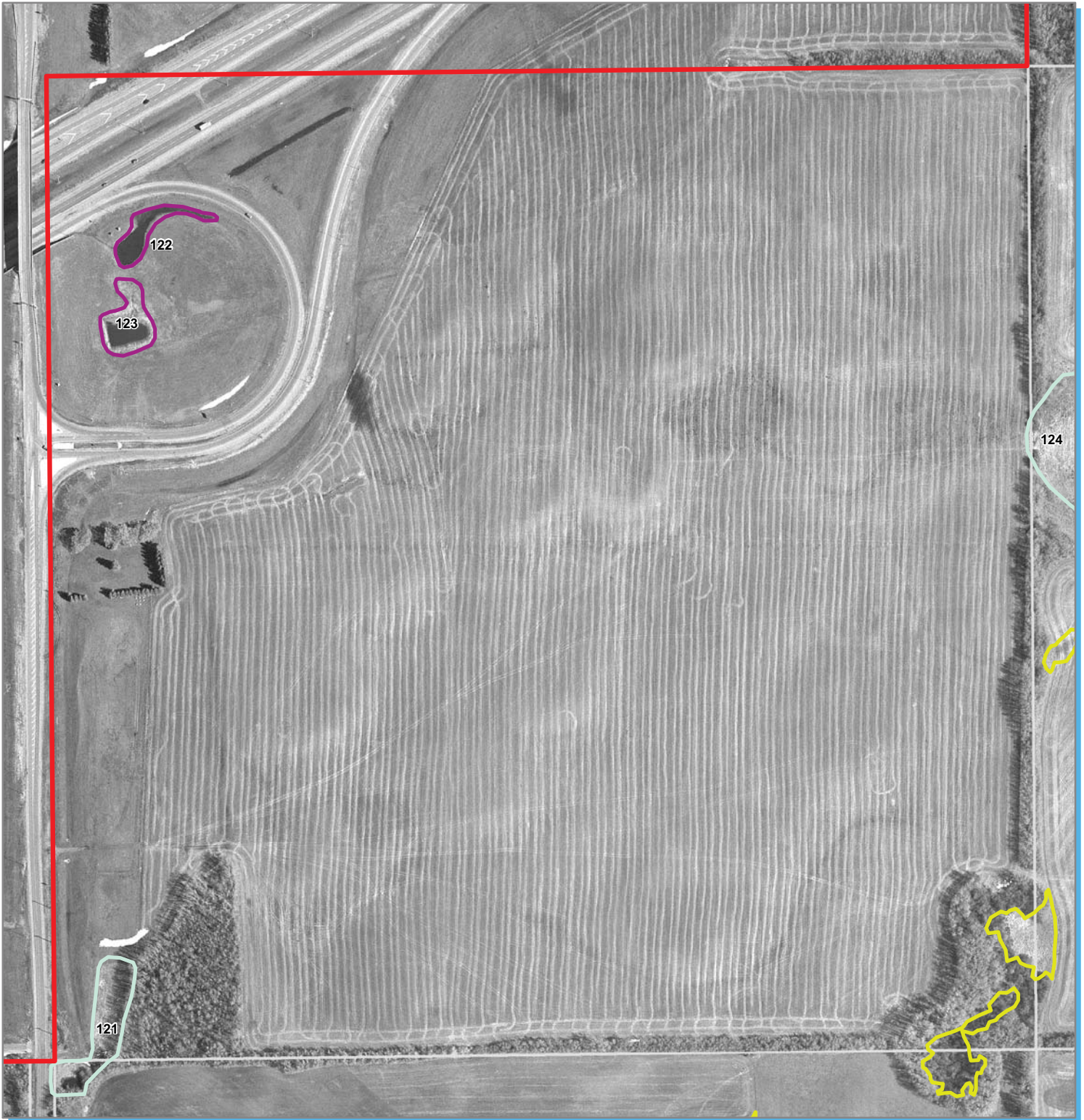
Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## SE 29-51-23 W4





## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

- Class 3
- Class 4
- Class 5
- Modified Natural
- Constructed Water Body

#### Wetlands Mapped by Others (2010)

- Class 1&2

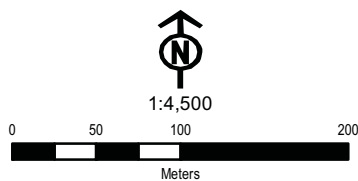
  Rural Southeast Study Area Boundary

  1/4 Section Boundaries

**68** Wetland ID Number (Spencer wetlands only)

Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## NW 29-51-23 W4



# Wetland Classification



## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

Class 3

Class 4

Class 5

Modified Natural

Constructed Water Body

#### Wetlands Mapped by Others (2010)

Class 1&2

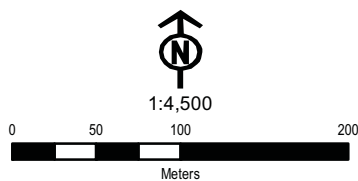
Rural Southeast Study Area Boundary

1/4 Section Boundaries

68 Wetland ID Number (Spencer wetlands only)

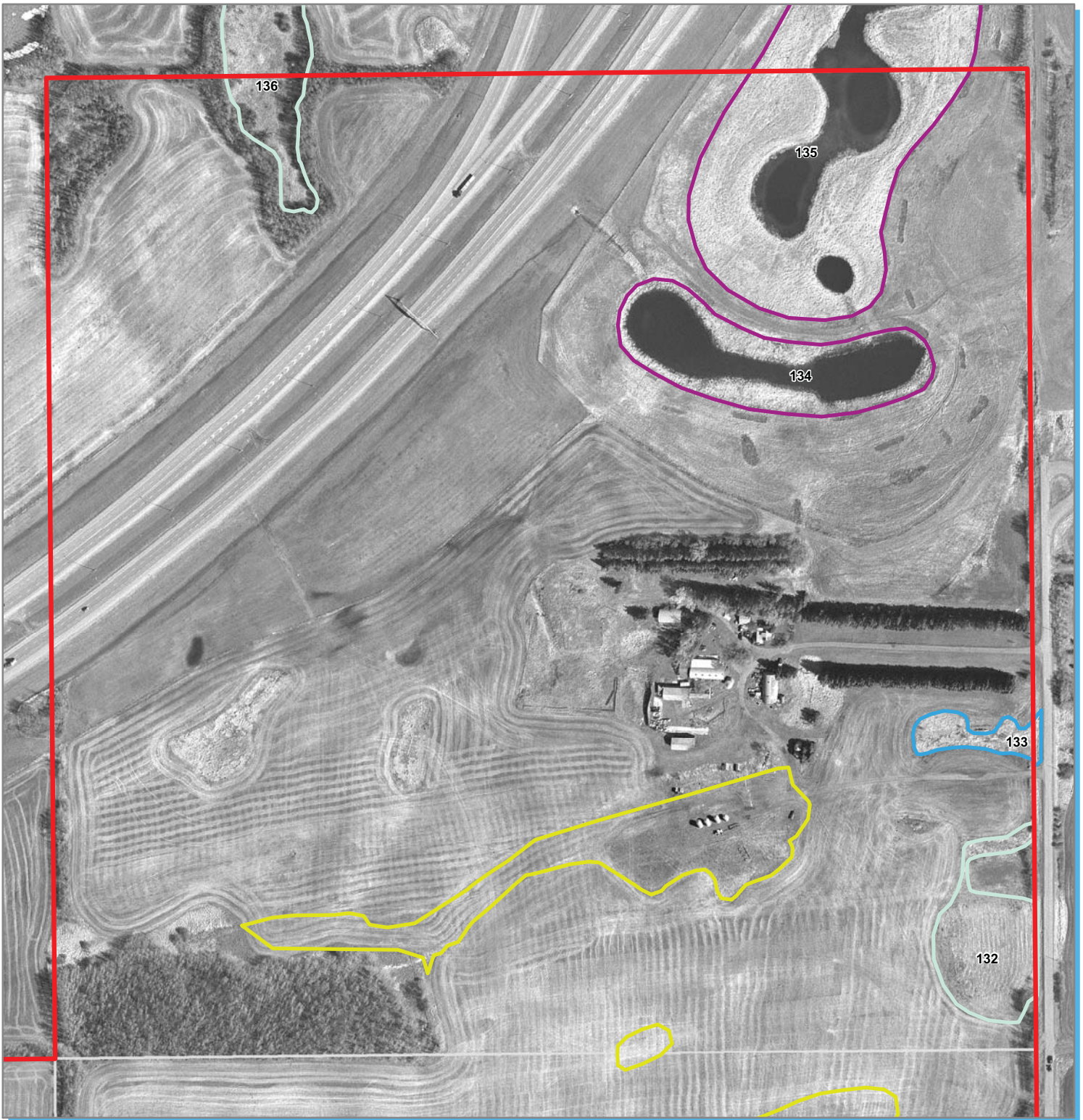
Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## NE 29-51-23 W4





## Legend

### WETLAND CLASSIFICATION

#### Spencer (2011) Mapped Wetlands

- Class 3
- Class 4
- Class 5
- Modified Natural
- Constructed Water Body

#### Wetlands Mapped by Others (2010)

- Class 1&2

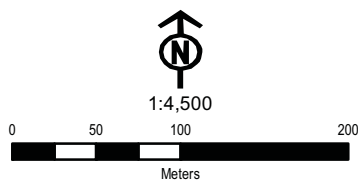
Rural Southeast Study Area Boundary

1/4 Section Boundaries

**68** Wetland ID Number (Spencer wetlands only)

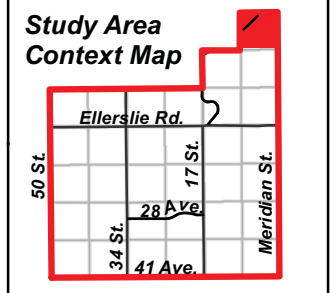
Aerial Photograph Date: May 2010

Date Map Created: 26 March 2012



## SE 32-51-23 W4

### Study Area Context Map



## **APPENDIX B. Correspondence from Alberta Environment and Sustainable Resource Development**

Our File Reference: WOBAR 4946

Your File Reference: EP-518

April 27, 2012

Spenser Environmental Management Services Inc.  
Suite 801, Capital Place  
Edmonton, AB T5K 2L9

**Attention: Andrew Forrest**

Dear Andrew:

**Re: Report – Determination of Crown Ownership of Bodies of Water in Rural Southeast Edmonton (01 February 2012)**

---

Thank you for your request, on behalf of the City of Edmonton, to have our office review the ownership and Crown claimability of the water features identified in your report. The report and assessment by Spencer Environmental were well done. The supplied Excel spreadsheet summarizing the findings was very helpful as we conducted the audit of your assessment. We have added a few comments to the attached spreadsheet. Much of this area was previously assessed by our office in 2006 and 2007. In general our office agrees with the assessment of water features under review with the following exceptions:

- Wetland ID 75: The feature was previously assessed on 23 October 2007 and determined to be not claimable by the Crown.
- Wetland ID 105: The feature was previously assessed on 01 February 2006 and determined to be not claimable by the Crown.
- Wetland ID 108: The feature was determined to be not claimable by the Crown.

All of the above features are also located within the lands that previously formed the Papaschase Surrendered Indian Reserve, which poses a unique set of jurisdictional uncertainties regarding the ownership of beds and shores.

Within the study area, the former Papaschase Surrendered Indian Reserve involves the following lands:

<b>Twp</b>	<b>Range</b>	<b>Section</b>
51	24	S½ 25
51	24	24
51	24	N½ 13



<b>Twp</b>	<b>Range</b>	<b>Section</b>
51	23	S½ 30
51	23	19
51	23	N½ 18

On Oct 12, 1889 the Papaschase Band surrendered to HMQ in right of Canada the whole of Papaschase Reserve to be held in trust by Canada to dispose of the same for the benefit of the Band. The surrendered lands included beds and shores of numerous unsurveyed creeks and water bodies located within the limits of the reserve, as surveyed by J. C. Nelson in 1884. The surrendered land was subsequently surveyed and sold to freehold owners. When the lands were disposed of, their disposition was subject to the provisions of the North-west Irrigation Act of 1894 which reserved title to the beds and shores of bodies of water to the Dominion of Canada (the federal Crown). Natural resources were held by the federal Crown until 1930 when they were transferred to the Province of Alberta, however this transfer was subject to existing trusts, etc. Section 1 of the Transfer of Natural Resources Act (TNRA) obligated the province to respect any existing trusts and third party (i.e., non-Crown) interests and Section 11 of TNRA precluded the possibility of the province acquiring jurisdiction over any lands, including beds and shores, within the surrendered reserves. The Lands Division is not aware of any enactment, Privy Council Order, or other instrument transferring the beds and shores within the surrendered Indian Reserves from Canada to Alberta. Canada has not confirmed its view on the matter.

That being said, the water features within the former Surrendered Indian Lands that have been assessed as permanent and naturally occurring, are Crown claimable bodies of water despite the uncertainty over which Crown jurisdiction owns them (provincial or federal). The features are however separately owned land parcels to be differentiated from the private uplands adjoining them. This information should assist the City of Edmonton in its land use zoning, subdivision planning, and the application of the Environmental Reserve provisions under the Subdivision and Development Regulation.

All the water features, whether or not their beds and shores are claimable by the provincial Crown, are all subject to the provisions of the provincial Water Act.

Should you have any questions regarding the above, you may contact me at 780-427-4767.

Sincerely,



Gerry Haekel, PBIOL  
Head, Riparian Land Management & Water Boundaries Unit

cc: Cody Nahirniak, Land Management Specialist, SRD-Sherwood Park Office  
(780) 464-7955, fax (780) 449-0718



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