



State of Idaho
Department of Fish and Game
Boise, Idaho

MEMORANDUM

DATE: June 15, 2010
TO: Jeff Peppersack
FROM: Paul Wackenhut and Walt Poole
RE: Sterling WMA water rights

There are several water rights which pertain to the management of Sterling Wildlife Management Area (WMA). The WMA consists of property held by Idaho Department of Fish and Game (IDFG) and the U. S. Bureau of Reclamation (BOR). IDFG has day to day administrative responsibility for all properties. A small portion of the WMA is directly administered by the Natural Resources Conservation Service Plant Materials Center through a long term agreement. Irrigation beneficial use water rights that serve the WMA are held by Aberdeen Springfield Canal Company and IDFG. Wildlife beneficial use water rights are held by BOR and IDFG. Four water rights pertain to ponds served by ground water or surface water diversions. These four water rights relate to two wetland complexes – the Johnson-Fingal Wetlands (35-08624) and the Orth Ponds (35-08631, 35-12863A, 35-12863B). Water rights held by IDFG or BOR pertaining to the ponds are as follows:

Johnson-Fingal Wetlands

Water Right No. 35-08624, held by the State of Idaho IDFG, is a ground water diversion located in T 05S R31 E Sec 24. This source was intended to augment natural marshes in portions of the WMA known as the Johnson and Fingal Segments. Prior aerial photography (1966) indicates this entire basin was naturally inundated during periods of high water. The well and a series of two dikes were developed in the late 1980s in an effort to increase the amount of open water over additional months (Figure 1). It was suggested by engineering staff at the time that filling of the cells may be difficult due to porosity of suspected underlying lava formations. That concern has proven valid as only the uppermost cell appears to consistently hold higher than natural water levels. This cell lies completely within the Johnson Segment and is referred to as the Johnson Pond. The second cell, also within the Johnson segment also involves a low dike but only appears to influence water levels during periods of high runoff. The lowest cell is contained by natural topography and has no apparent surface water connection to the Snake River (American Falls Reservoir). Some work has been done in the lower cells (Fingal and Johnson Segments) through mechanical excavation and pothole blasting to increase areas of open water given the existing water table. The permitted year round rate of diversion is 1.01 cfs with

a volume of 731.2 acre feet. The actual estimated surface area of the upper pond is 29 acres. This pump is operated year round to provide maximum open water during drought and freezing conditions.

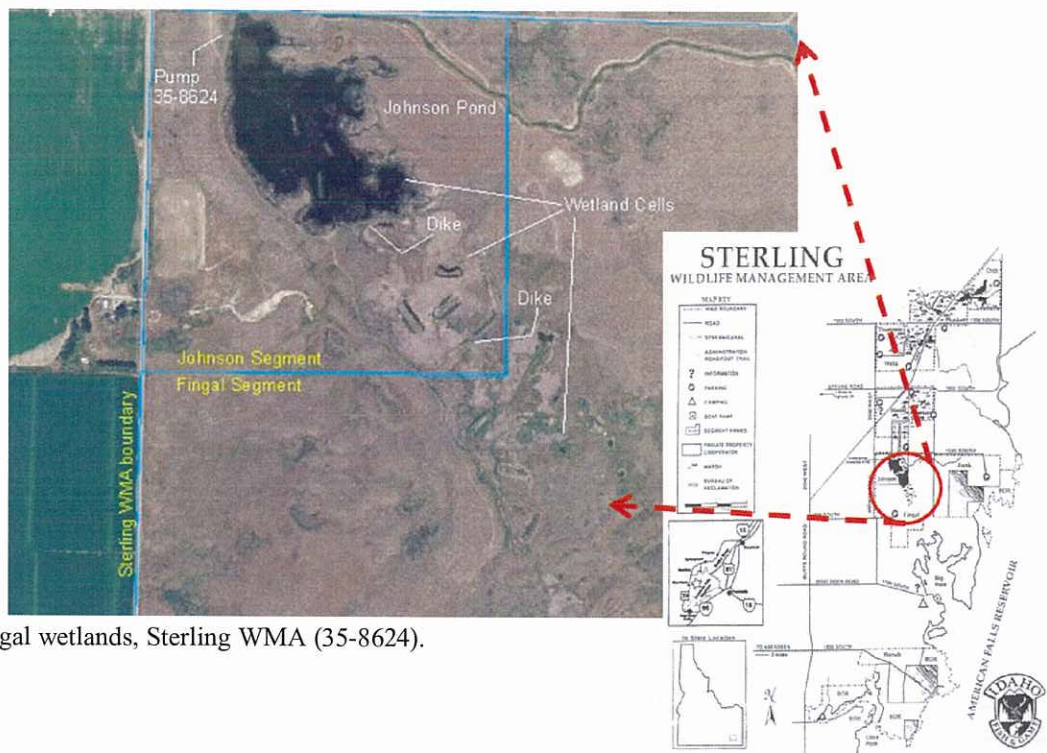


Figure 1. Johnson-Fingal wetlands, Sterling WMA (35-8624).

Orth Ponds and Pond #1 Dam

The Orth Ponds includes six interconnected bodies of water within the Orth and Plunkett Segments. Evidenced by historical aerial photos (1966), some of these ponds appear to have natural origin from numerous springs in the area. The original diversion works (Pond #1 dam) was to serve an offsite irrigation water right (35-2009) and was first completed in 1910. In 1971 IDFG acquired the property now referred to as the Orth Segment which included the location of Pond #1 dam. In 1981 BOR acquired the Plunkett Segment, which has been leased to and administered by IDFG since that time. This gave IDFG administrative authority over most of the property inundated by Orth Pond #1. In 1983 IDFG began plans to construct additional dikes that would create or augment Orth Ponds #2, #3, #4, #5 and #6 (Figure 2). In 1985 IDFG secured an easement agreement from John Hamilton allowing impoundment from Pond #1 on the southeast corner of the Hamilton property. That agreement states that the water level of Pond #1 would not change. The dam design includes a spillway limiting freeboard to not less than one foot. Original drawings suggest intended height of 7.5 feet from the base of the outlet stream to the top of the dam, or 6.5 feet for the effective dam height. Our recent observations suggest the final construction conforms with the original design. A photo included in the 4 May, 2010 Idaho Dept. of Water Resources internal memo seems to confirm this design and construction (assumes the measuring stick is anchored in the base of the outlet stream and the person on the dam is of average height). In 1985 work began to reconstruct the Pond #1 dam, which included provision for diversion into Ponds #2, #3, #4, and #5. Additional diking, ditching and minor berm work created Pond #3 and augmented Ponds #2, #4 and #5, all to the east of Pond #1.

The primary dike (Pond #3 and #5) includes two water level control structures and a spillway. A third dike in the natural drain immediately east of Pond #1 created Pond #6. Staff gauges are in place in Pond #1 and Pond #3. Flows from the natural drain and on site springs that feed the WMA wetlands return to American Falls Reservoir. Other than evaporation or seepage, the only consumptive water use is the neighbor's irrigation water diversion from the southeast end of Pond #1 dam.

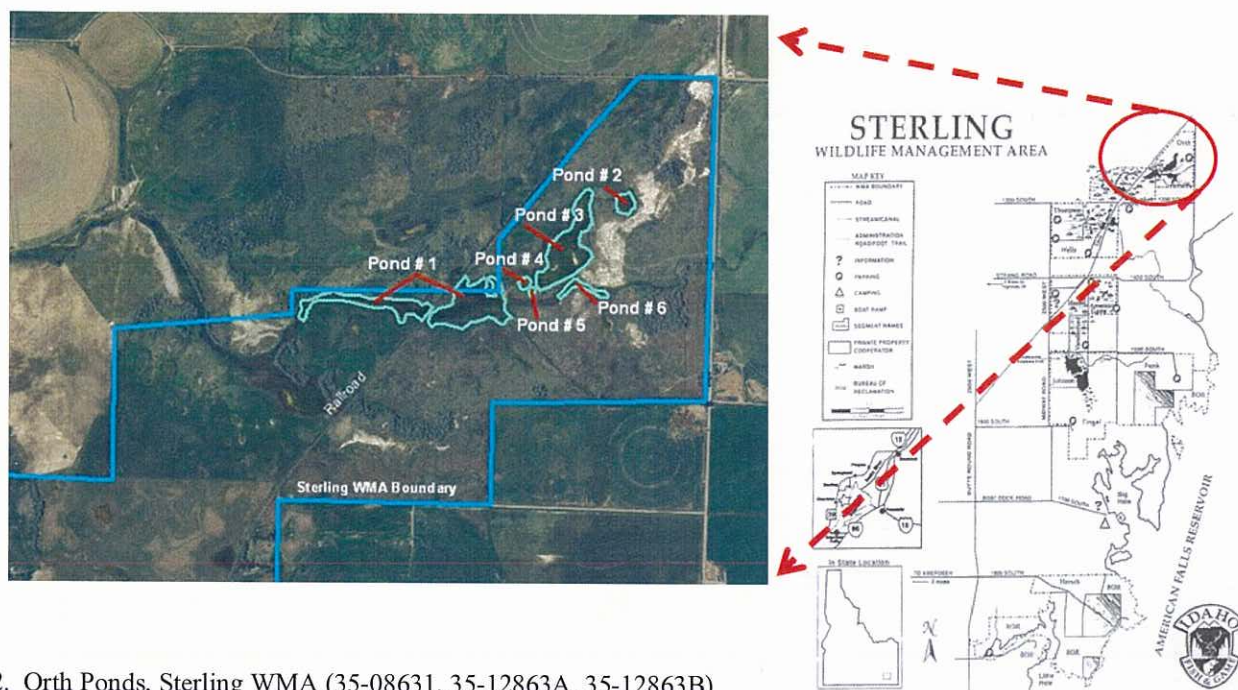


Figure 2. Orth Ponds, Sterling WMA (35-08631, 35-12863A, 35-12863B)

Water Right No. 35-08631, held by IDFG, originally was intended to cover Pond #6. Upon completion of the 1980s development which included additional diversion and the creation or augmentation of Ponds #2, #3, #4 and #5, the 'place of use' was amended in 1994 to include ponds #2 thru #6 (An additional claim was filed in 1990, which split into water rights 35-12863A and 35-12863B in 2000, covers Ponds #1 thru #6). Points of diversion refer to both barriers within the natural drain. The 'beneficial use' for the year round storage (20AF) is 'wildlife storage'. Ponds #2 thru #5 receive natural flow from springs or via a diversion from Pond #1. Pond #6, impounded by a separate dike, receives inflow directly through the natural drain, and indirectly from Pond #3 and #5 after being diverted from Pond #1 (Figure 3). A field report from 1991 (pond numbering varies from that used here) concluded a total storage capacity of 74.8 AF. Since that time Pond #6 capacity has been reduced by lowering the spillway. This was done to address the neighbor's concern with backing water against the Pond #1 dam. Even allowing for this discrepancy, recent readings taken by IDFG personnel (see below) are well within the permitted 75 AF. Water levels would have to have been substantially higher in

1991 to approach the depths and surface areas reported. Average depths used in the 1991 field report calculations approximate the maximum depths found in 2010.

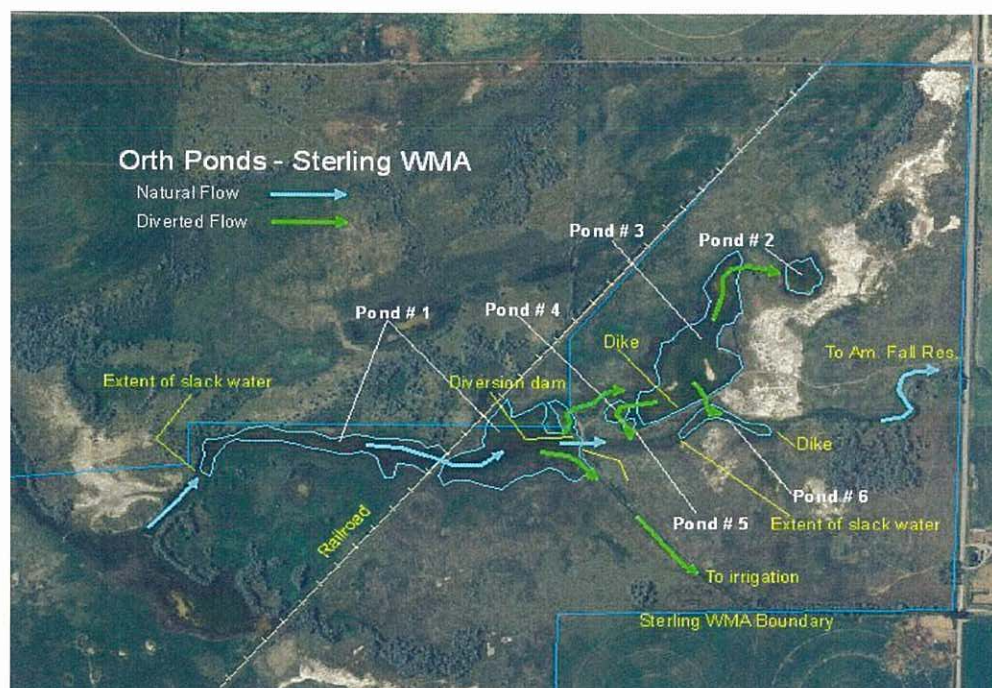


Figure 3. Orth Ponds with flows and structures, Sterling WMA

Water Right No. 35-12863A, held by IDFG, refers to the same surface water diversions as 35-08631. In addition to Ponds #2 thru #6, this water right addresses Orth Pond #1. Orth Pond #1 is the most upstream pond on the Orth Segment, but also backs up onto the Plunkett Segment. The portion within the Plunkett Segment is covered by Water Right No. 35-12863B, held by the BOR (see below), but total storage (50 AF) is combined between the two water rights. Purpose of use is ‘wildlife storage’ and ‘period of use’ is year round. The Partial Decree states that “refilling the impoundment is allowed”.

Water Right No. 35-12863B, held by BOR, has ‘place of use’ directed at the portion of Pond #1 within the Plunkett Segment (property owned by BOR and leased to IDFG). All other aspects of this water right are identical to 35-12863A and the 50 AF of year round wildlife storage is in combination with 35-12863A.

Orth Ponds Storage Capacity

Questions and concerns regarding issues of water right beneficial uses, diversion rates and storage volumes had been placed with Idaho’s Department of Water Resources. Wildlife Habitat Biologist Dean Rose and Paul Wackenhut, Regional Wildlife Habitat Manager, discussed the best methods to provide information supporting Idaho Fish and Game’s use of water governed by the above water rights with Regional Fisheries Manager Dave Teuscher and

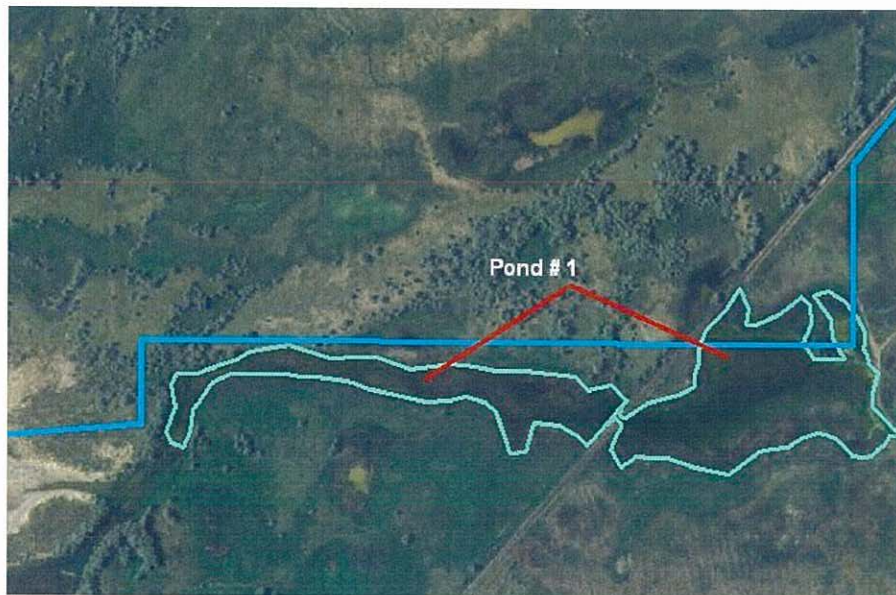
GIS Specialist Tracey King. It was determined the most accurate measurements of the pond surface areas could be made combining interpretation of aerial photography with field ground truthing. Pond bathymetry could accurately and efficiently be determined using a sonar device and Surfer 8.0 software. On 17 May, 2010 Paul Wackenhut, Dean Rose and field technicians took depth measurements of all six ponds related to the water rights. The two larger ponds (#1 and #3) were coursed with a small boat fitted with an Eagle Fish Elite 480 sonar device. It was determined on site that Ponds #2, #4, #5, and #6 were of such size and uniform depth that repeated measurements from a boat with a simple tape would provide adequate coverage. All pond perimeters were walked out to ground truth apparent upper elevations from aerial photography (2004 NAIP).

The upper limits of Pond #1 and Pond #6 were determined based on the upstream extent of slack water.

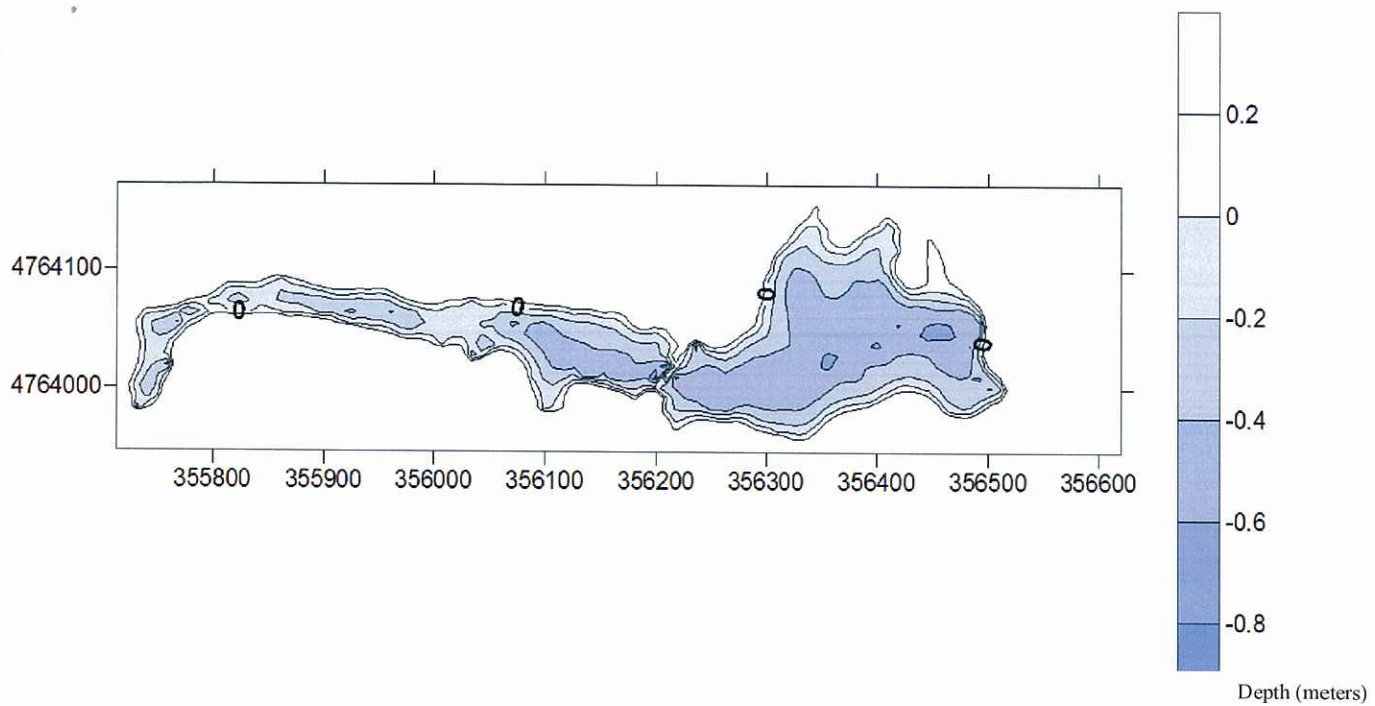
Data collected by the use of the sonar devices was analyzed by Dave Teuscher with the Surfer 8.0 software.

Depth data from the smaller ponds was used to calculate an average depth and that average applied to the observed surface area. Results are presented below.

Pond #1

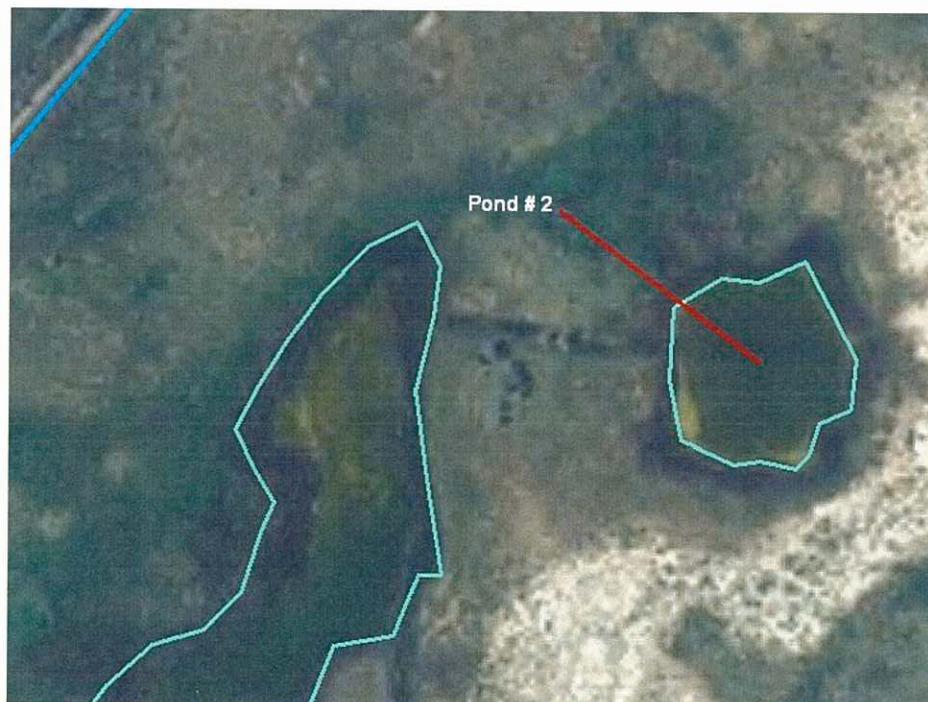


Pond #1 is formed by a dam within the natural drain. The dam was originally constructed in the early 1900s to provide diversion to an irrigation ditch which in turn serves neighboring properties to the south and east. In the late 1980s, the Department negotiated with the downstream neighbor to modify this dam and allow use of excess water through and beyond the irrigation season in Pond #1 as well as Ponds #2 thru #6. Depth measurements were taken with a sonar device and analyzed with Surfer 8.0 software to create a bathymetric map and calculate a volume estimate.



Maximum depth measured on 17 May was less than 1 meter, with the in pond staff gauge reading at 2.6. As associated water rights indicate, up until recently we believed this drain handled only natural flows from upstream springs and runoff. This drain can be used to deliver Aberdeen Springfield Canal water, ultimately to the same diversion ditch delivering the natural flows. There are three outlets. The modified dam construction includes an emergency spillway.

Pond # 2



Pond # 2 is connected to Pond #3 by a manmade ditch, but fills naturally in the spring apparently from surface water sources just to the north. Older photos and maps (1966) indicate

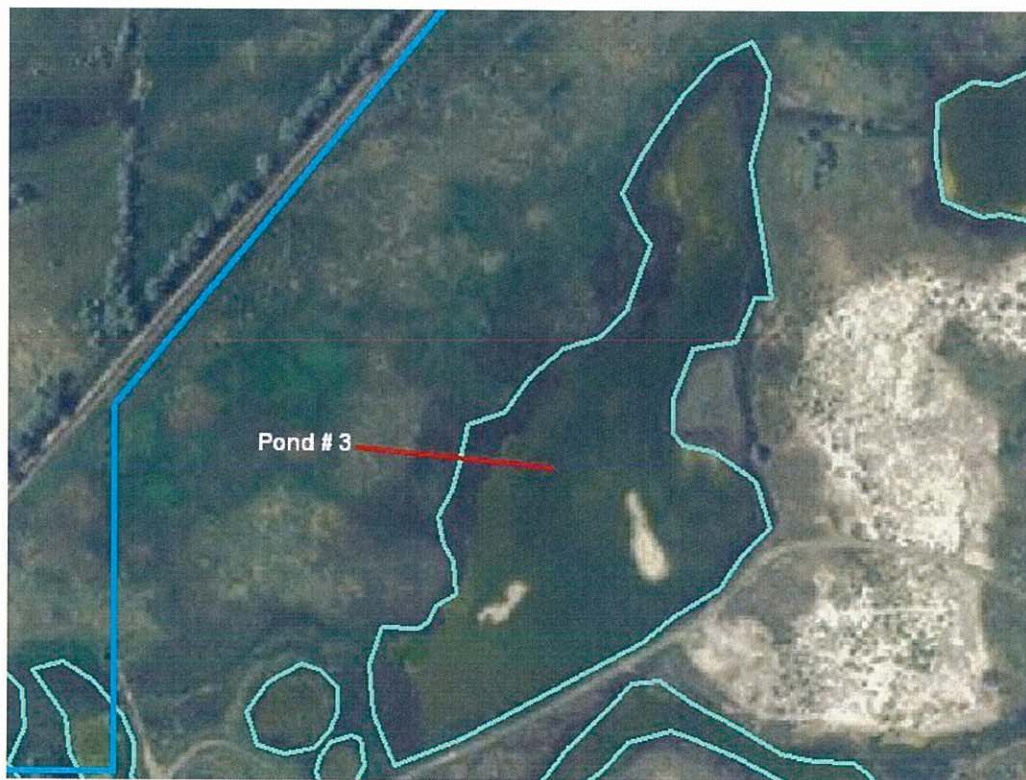
this pond occurred at least intermittently before the dike and ditch work was completed in the late 1980s. In fact, on 11 March, 2010, Paul Wackenhut witnessed flow out of Pond #2 through the manmade ditch into Pond #3. This pond is intended to be augmented by the diversion with flow from west to east. On 17 May, 2010, fifty two depth measurements were made from a boat with a tape measure within the open water of the Pond #2. (Depth measurements for Ponds #2, #4, #5, and #6 are from within open water only, while the surface area used in the volume calculation attempted to capture all inundated areas based on interpretation of aerial photography coupled with ground truthing. Depth measurements did not include shallows with emergent vegetation so average depths are likely overestimated.)

Average depth was estimated to be 1.4 feet, N=52 (Depths from open water only-See above)

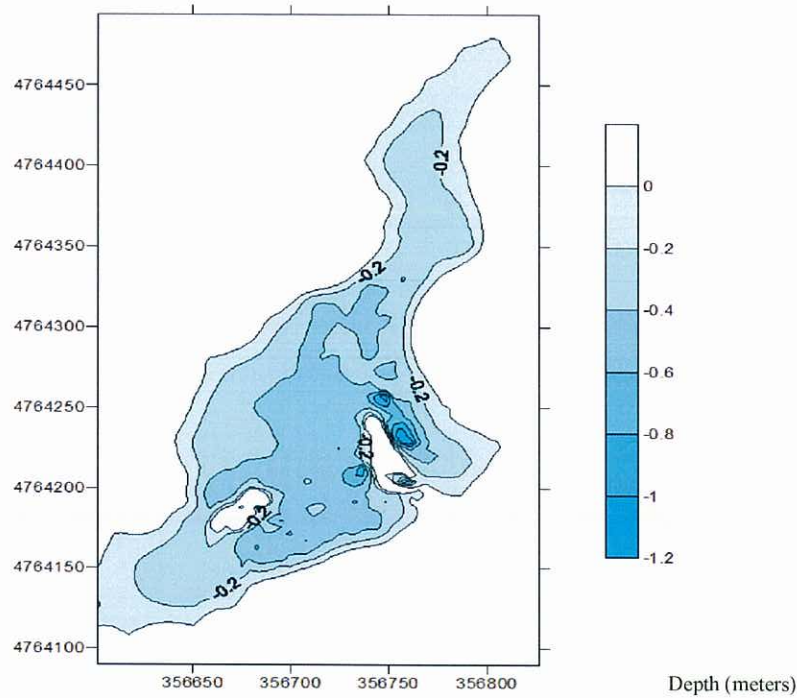
Total Surface Area = 1.05 acres

Maximum Volume Estimate = 1.47 acre-feet

Pond #3



Pond #3 is the first pond affected by the diversion ditch off of the Pond #1 dam north water level control structure. This pond appears to exist mainly as a result of the 1980s dike work although as with Pond #2, in the early part of the year some inflow appears to be natural. Depth measurements were taken with a sonar device and analyzed with Surfer 8.0 software to create a bathymetric map and calculate a volume estimate.

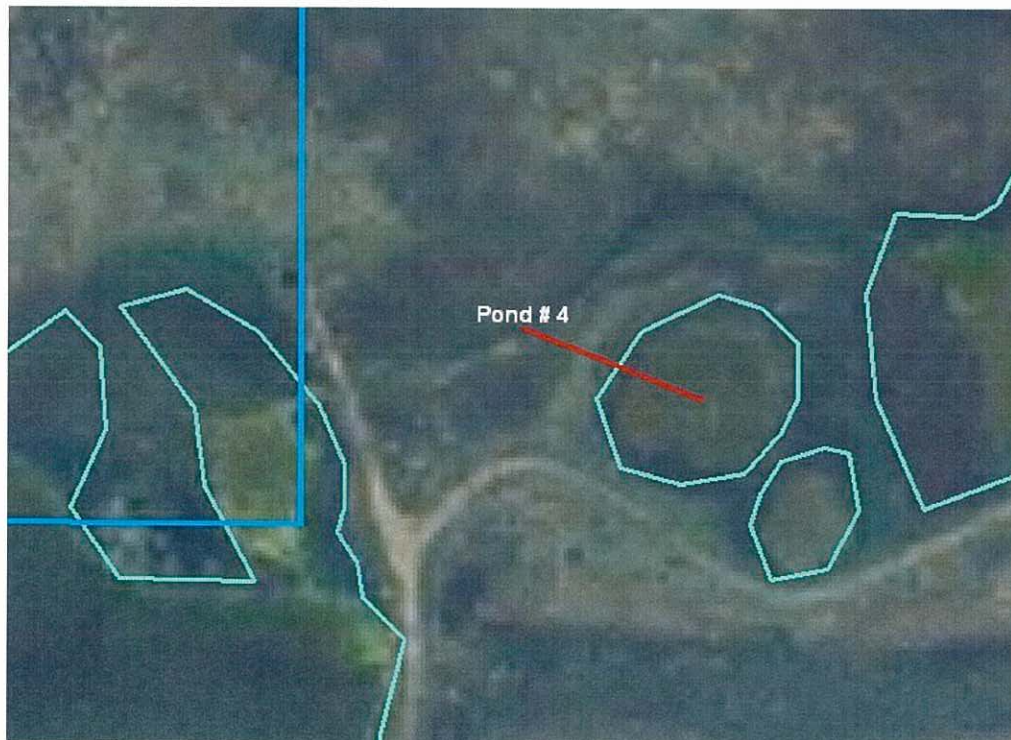


Maximum depth measured on 17 May, 2010, was less than 1.3 meters, with the in pond staff gauge reading at 2.0. As of 10 June, 2010 this pond had a slight outflow into Pond #6 with no inflow from the Pond # 1 diversion. The dike along the south edge of the pond includes one water level control structure and an emergency spillway emptying into the natural drainage.

Total Surface Area = 8.23 acres

Maximum Volume Estimate = 6.659 acre-feet (Software - Surfer 8.0, N=722 depth meas.)

Pond #4



Pond #4 has no manmade surface connection to Pond #3, but Ponds #3, #4 and #5 appear to be in equilibrium at typical pool levels. Both Ponds #4 and #5 are very similar in size and shape to aerial photo depictions from 1966, prior to the 1980s dike work. Pond #4 is likely affected by diverted flows and the continuation of the dike which forms Pond #3. On 17 May, 2010, thirty two depth measurements were made from a boat with a tape measure within the open water of the pond.

Average depth was estimated to be 1.6 feet, N=32 (Depths taken from open water only-See Pond #2 above)

Total Surface Area = .4 acres

Maximum Volume Estimate = .64 acre-feet

Pond #5



Pond #5 has no manmade surface connection to Pond #3 or #4, but appears to be in equilibrium with those ponds. Both Ponds #5 and #4 are very similar in size and shape to aerial photo depictions from 1966, prior to the 1980s dike work. Pond #5 is likely affected by diverted flows and the continuation of the dike which forms Pond #3. There is a control structure on the outflow from Pond #5 emptying into the natural drainage. On 17 May, 2010, twenty eight depth measurements were made from a boat with a tape measure within the open water of the pond.

Average depth was estimated to be 1.5 feet, N=28 (Depths taken from open water only-See Pond #2 above)

Total Surface Area = .15 acres

Maximum Volume Estimate = .23 acre-feet

Pond #6



Pond #6 is formed by a dike within the natural drain. It receives any natural flows down the natural drain or through Ponds #3 and #5, as well as diverted flows from Ponds #3 and #5. There is a screw head gate on the dike but no functional water level control structure. The maximum water level is essentially set by the elevation of the permanent spillway (lowered in the early 1990s) on the southeast end of the dike. On 17 May, 2010, one hundred thirty five depth measurements were made from a boat with a tape measure within the open water of the pond.

Average depth was estimated to be 1.4 feet, N=135 (Depths taken from open water only-See Pond #2 above)

Total Surface Area = .97 acres

Maximum Volume Estimate = .41 acre-feet

Summary

The upstream extent of Ponds #1 and #6 were estimated based on the downstream extent of visible flow observed on 17 May. Other open water bodies in the southwest corner of section six are perched above Pond #1, evidenced by visible flow into Pond #1, and were not intended to be covered by these water rights. Staff gauges installed on Ponds #1 and #3 are relative scales and do not indicate actual pond depths. Absolute attainable maximum volumes would be determined by emergency spillways. Levels encountered on 17 May, 2010 are typical but do vary.

	Surface Area (acres)	Maximum Volume Est. (acre-feet)
35-08631 (20 AF)		
Pond # 2	1.05	1.47
Pond # 3	8.23	6.69
Pond # 4	.4	.64
Pond # 5	.15	.23
Pond # 6	.97	.41
35-12863A (50 AF - w/12863B)		
Pond # 1 (Orth Segment)	12.88	12.13
Ponds #2-#6 (See above)	----	----
35-12863B (w/12863A)		
Pond # 1 (Plunkett Segment)	----	----
Total	23.68	21.57

