# Scoring Criteria and Ranking for Environmental Quality Incentives Program Rainwater Basin Public and WRP Wetland Watershed Restorations

**Produced by the Rainwater Basin Joint Venture**

**2015**

RAINWATER BASIN
JOINT VENTURE
ESTABLISHED 1992

## 2015 Environmental Quality Incentives Program RWB Upland Pit Fill

This ranking criterion was developed to identify those pits that most negatively impact watershed integrity of publicly owned and Wetlands Reserve Program (WRP) playa wetlands. Currently, the U.S. Fish and Wildlife Service (USFWS) manages 59 Waterfowl Production Areas (WPAs), and the Nebraska Game and Parks Commission oversees 35 Wildlife Management Areas (WMAs). These wetlands flood as a result of annual precipitation or snowmelt. With the transition to pivot irrigation, a large number of irrigation reuse pits have been abandoned over recent years. Although not being used for irrigation, these pits continue to fill with water from precipitation events, thus shortstopping water that could have reached the neighboring public wetland at the terminus of the watershed. The goal of this EQIP wetland watershed restorations initiative is to strategically remove abandoned/unused irrigation pits that negatively impact WMA, WPA and WRP watersheds. Watersheds for public wetlands were delineated by NRCS staff in 2003 using USGS 7.5 minute 1:24,000 topoquads. The watershed boundaries were further refined in 2010 by the Rainwater Basin Joint Venture, using LiDAR data. Only pits within public or WRP watersheds are eligible for this initiative. Additionally, this initiative is targeted at privately owned upland pits; therefore, pits within SSURGO (NRCS Soil Survey Geographic Database) defined hydric soil footprints are not eligible. Two scoring criteria were used to identify the pits that most negatively impacted wetland function. The first is a ratio of pit storage volume to wetland storage. The second scoring criterion was proximity of the pit to the public wetland.

**Pit volume Protocol**

Nearly all irrigation reuse pits in the RWB are rectangular. For a typical rectangular pit, the long sides have an average slope of 2:1 with the short ends of the pit having 4:1 slope. To compensate, all pits were assumed to be rectangular with a 2.5:1 slope constant for all four sides. This translates into a 2.5 ft horizontal distance for every 1 foot in pit depth. Pit depth is typically deeper in the western basins than in the eastern basins, but to simplify calculations we used a universal depth of 8 feet. Using an average slope of 2.5:1 and a depth of 8 feet, an interior buffer of 20 ft was generated for the pit's perimeter. This buffer creates an internal area that represents the bottom surface area of the pit. Ducks Unlimited engineer Mitch Messmer and past RWBJV coordinator/engineer Steve Moran developed a formula to analyze this information to calculate pit volume in cubic feet.

The formula is: [A + (4xC) + B] x (D / 6) = volume of the pit

Results were calculated in cubic feet, and then converted to acre-feet. "A" is surface area of the top of the pit and is calculated in GIS as ($ft^2$). The interior buffer is used to derive "C" and is represented in square feet as well. The value for "B" is calculated by taking (A + C) / 2. Average depth of the pit or "D" in this case is assumed to be 8 feet.

| PIT | Derived constants |
|---|---|
| ---------- | --> = A |
| ---------- | |
| ------- | --> = B |
| --- | --> = Cs |

A = top surface area of the pit in square feet
B = middle surface area of the pit in square feet
C = bottom surface area of the pit in square feet
D = depth of pit

**Wetland Pit volume Determination**

Wetland storage volume was calculated using the Hydrogeomorphic Model (Stutheit et al 2004). This model assumes that at full pool, 8" of water will pond over a Massie (semi-permanent) soil, 6" of water will flood a Scott (seasonal) wetland, and 4" of water will pond over a Fillmore (temporary) wetland. The volumes were calculated (Average depth for soil type * acres of soil type in basin). For wetlands with multiple zones or soil types, the storage volume for each soil was calculated for the different soils and summed to determine total wetland storage capacity.

**Wetland Impact Ratio Scoring Criteria**

Once the pit volumes and wetland storage volumes were calculated, the wetland impact ratio (WIR) for each pit was determined. This was done by dividing the pit storage volume by the wetland storage volume. The resulting ratio provides a relationship to understand the storage impacts of different pits in relation to the impacted wetland. A quantile grouping was completed in the GIS to assign an equal number of pits into each of five classes based on WIR.

***Wetland Impact Ratio Scoring***

| Wetland Impact Ratio | Score |
|---|---|
| 0 - 0.003808 | 2 |
| 0.003809 - 0.008179 | 4 |
| 0.008180 - 0.0157927 | 6 |
| 0.0157928 - 0.035340 | 8 |
| 0.035341-3.744 | 10 |

**Pit Juxtaposition**

Pit proximity was determined by creating a buffer around the property at 400-meter increments up to 2000 meters. Pits were scored based on proximity to the property.

**Pit Proximity Scoring**

| Distance | Score |
|---|---|
| 0 - 400 Meters | 10 |
| 400 - 800 Meters | 8 |
| 800 - 1200 Meters | 6 |
| 1200 - 1600 Meters | 4 |
| 1600 - 2000 Meters | 2 |
| > 2000 Meters | 0 |

Final scores were calculated for all eligible pits within public wetland watersheds by summing the wetland impact ratio score with the pit proximity score. Ineligible pits within hydric soils or on public properties were also scored as a resource for partners, but are indicated on the map as N/E (Not Eligible) for the EQIP initiative. Pits that are field verified to be within a public or WRP watershed but not identified on the maps may be scored using these criteria and the estimated wetland volumes for the watersheds in the following list.

| Wetland Name | Volume Est. (ac-ft) |
|---|---|
| Anderson, Larry | 13.17 |
| Askey, James (East) | 7.58 |
| Askey, James (West) | 13.12 |
| Atlanta | 289.59 |
| Ayr Lake | 211.33 |
| B&P Enterprise LTD (Schlictman) | 40.16 |
| Beister, Gary (East) | 34 |
| Beister, Gary (West) | 13.7 |
| Blender, Helen (Kent) | 86.09 |
| Bluebill (North) | 23.67 |
| Bluebill (South) | 10.07 |
| Bluestem | 59.41 |
| Bluewing (North) | 207.9 |
| Bluewing (South) | 14.93 |
| Borchers, Bruce | 118.83 |
| Bragg, Cliff (Wendell) | 23.59 |
| Brauning (Central) | 9.79 |
| Brauning (East) | 33.88 |
| Brauning (West) | 80.19 |
| Bulrush | 129.75 |
| Burmester, Karl | 19.55 |
| Clark | 181.07 |
| Cottonwood | 160.91 |
| County Line | 213.5 |
| Deep Well | 120.23 |
| Divis, Anton | 33.93 |
| Dougherty, John | 222.72 |
| DU - Dietz | 40.21 |
| DU - Heinze | 5.19 |
| DU - Kramer | 15.46 |
| DU - Swanson South (East Central) | 0.89 |
| DU - Swanson South (Northeast) | 5.41 |
| DU - Swanson South (Northwest) | 2.75 |
| DU - Swanson South (South Central) | 3.49 |
| DU - Swanson South (Southeast) | 5.32 |
| DU - Wolf North | 11.5 |
| DU - Wolf South (North) | 14.83 |
| DU - Wolf South (South) | 38.08 |
| Eckhardt | 42.08 |
| Eckhardt, Jeff | 7.09 |
| Edgerton Family Trust | 63.11 |
| Edwin & Donna Ficken Trust (East) | 69.95 |
| Edwin & Donna Ficken Trust (West) | 17.12 |
| Elley | 22.98 |
| Father Hupp | 192.72 |
| Flatsedge | 47.9 |

| Wetland Name | Volume Est. (ac-ft) |
|---|---|
| Greenhead | 90.86 |
| Griess | 43.83 |
| Gustafson, Millard | 99.86 |
| Gustafson, Tom | 0.68 |
| Guzowski Trust (North) | 14.83 |
| Guzowski Trust (South) | 73.4 |
| Hansen | 304.01 |
| Hansen, Steve | 42.41 |
| Harms | 39.64 |
| Harvard | 599.78 |
| Heron | 112.39 |
| Hidden Marsh (Northeast) | 7.08 |
| Hidden Marsh (Northwest) | 2.73 |
| Hidden Marsh (South) | 25.51 |
| High Basin | 47.08 |
| Hill, Frank | 135.88 |
| Hultine (Northeast) | 38.25 |
| Hultine (Northwest) | 89.11 |
| Hultine (South) | 170.8 |
| Iliff, Vernan | 50.84 |
| Imperial Homes | 17.14 |
| Jensen | 176.22 |
| Johnson (East) | 2.79 |
| Johnson (West) | 48.13 |
| Johnson, Blake | 93.34 |
| Jones | 83.95 |
| Junge, Yvonne | 57.47 |
| Kenesaw | 73.02 |
| Killdeer | 68.4 |
| Kirkpatrick Basin North | 155.49 |
| Kirkpatrick Basin South | 295.51 |
| Kissinger Basin (Northwest) | 136.68 |
| Kissinger Basin (Southeast) | 4.45 |
| Kohtz, Rojean (Deryl Hilligas) | 167.24 |
| Krause (Northeast) | 23.73 |
| Krause (Southwest) | 205.46 |
| Kuhl, Jean | 87.57 |
| L'Heureux Trust | 23.29 |
| Lange | 82.83 |
| Leininger, Max | 16.97 |
| Lemmerman, Steve | 13.97 |
| Lindau | 102.69 |
| Linder | 46.29 |
| Macon Lakes | 518.84 |
| Mallard Haven (East) | 200.39 |

| Wetland Name | Volume Est. (ac-ft) |
|---|---|
| Mallard Haven (West) | 619.68 |
| Marsh Duck | 88.74 |
| Marsh Hawk | 141.43 |
| Marsh Trust | 103.79 |
| Massie (Central) | 1.15 |
| Massie (East) | 41.76 |
| Massie (North) | 404.16 |
| Massie (West) | 10.95 |
| McMurtrey | 346.55 |
| Meadowlark (East) | 13.41 |
| Meadowlark (West) | 3.87 |
| Meyer, JoAnne | 13.6 |
| Miller's Pond | 172.28 |
| Moger | 50.86 |
| Morphy | 64.65 |
| Mosier, Verlin | 23.59 |
| Mullally Farms Grant | 156.15 |
| Naber, Neil | 95.33 |
| Nelson | 164.8 |
| North Lake Basin | 378.4 |
| Northeast Sacramento | 85.97 |
| Oquist, Alice | 4.54 |
| Oquist, Steve | 8.76 |
| Peterson | 233.14 |
| Pintail | 314.03 |
| Poggemeyer, Marian (Bill Nunns) | 8.12 |
| Prairie Dog | 388.27 |
| Prairie Marsh West | 16.51 |
| Prososki, Robert (Sandy) | 19.19 |
| Quadhamer | 117.85 |
| Quality Builder (Jeff and Kurt Schelkopf) | 19.25 |
| Rauscher | 166.26 |
| Rauscher, Shirley | 15.6 |
| Real | 93.78 |
| Redhead | 227.27 |
| Renquist Basin WMA | 77.18 |
| Richards, Blaine | 169.46 |
| Rieflin, Duane | 27.14 |
| Ritterbush | 86.92 |
| Rolland | 79.32 |
| Sacramento-Wilcox | 654.18 |
| Sandpiper | 66.51 |
| Schuck | 26.43 |
| Shypoke | 445.6 |
| Siebert, Janice (Larry Siebert) | 67.45 |

| Wetland Name | Volume Est. (ac-ft) |
|---|---|
| Sinninger | 63.2 |
| Smartweed Marsh | 60.97 |
| Smartweed Marsh West | 41.68 |
| Smith | 252.7 |
| Smith, Richard | 5.97 |
| Sora | 83.64 |
| South Sacramento | 87.21 |
| Southeast Sacramento | 303.44 |
| Spikerush | 215.27 |
| Springer | 152.68 |
| Stevens, Dennis | 8.14 |
| Stevens, Jerry | 22.49 |
| Straight Water | 77.3 |
| Sullivan, Tim | 14.89 |
| Tamora | 266.01 |
| Theesen | 156.69 |
| Thonen, David (Rod Thonen) DU | 135.48 |
| Troester | 100.44 |
| Verona | 14.84 |
| Victor Lakes | 89.02 |
| Welte, Ralph | 6.22 |
| Weseman | 82.93 |
| West Sacramento | 210.78 |
| White Front | 108.52 |
| Whitmore, Ruthann | 4.88 |
| Wilkins | 440.65 |
| Wochner, George | 135.79 |
| Youngson | 82.19 |

Wetland Impact Ratio = Est. Pit Vol. (ac-ft) / Est. Wetland Vol. (ac-ft)