



Scoring Criteria and Ranking for Environmental Quality Incentives Program Rainwater Basin Public Wetland Watershed Special Initiative 2015

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Irrigation reuse pits are common in the Rainwater Basin region (RWB) of Nebraska. When precipitation events occur, water that would normally end up in nearby playa wetlands now stops in reuse pits. Public wetlands on Waterfowl Production Areas (WPA) and Wildlife Management Areas (WMA) are no longer receiving that important runoff. The goal of this Environmental Quality Incentives Program (EQIP) Special Initiative (SI) is to strategically remove abandoned/unused irrigation pits that negatively impact WPA and WMA watersheds. Only pits on privately owned uplands within public area watersheds are eligible for this SI.

The Soil Survey Geographic (SSURGO) Database was used to determine upland areas by identifying all hydric soils and removing those from consideration. Watershed boundaries were then determined using U.S. Geological Survey 7.5 minute 1:24,000 topoquads delineated by the Natural Resources Conservation Service in 2003 and refined by the Rainwater Basin Joint Venture (RWBJV) through LiDAR data.

Two scoring criteria were used in Geographic Information Systems (GIS) to identify the pits that most negatively impacted wetland function (Figure 1): (1) the ratio of pit storage volume to wetland storage volume and (2) the proximity of the pit to the public wetland.

To determine the ratio of pit storage to wetland storage, the volume of each pit was calculated. Nearly all irrigation reuse pits in the RWB are rectangular. Pits were assumed to have a 2.5:1 slope for all sides and an average depth of 8 ft, making the bottom of the pit 20 ft smaller in all dimensions. The following formula was used to calculate pit volume in cubic feet:

$$(A + 4C + B) \times (D / 6)$$

where A is the surface area of the top of the pit as delineated in GIS (ft²), C is the surface area of the bottom of the pit (ft²), B is the surface area halfway down the pit (ft²), and D is the average depth (8 ft). C was calculated as 20 ft smaller in all dimensions than the top surface area. B was determined as the mean of A and C. Cubic feet were then converted to acre-feet.

Wetland storage volume was calculated using the hydrogeomorphic model (Stutheit et al. 2004), which assumes a Massie soil (i.e., semi-permanent wetland) to be 0.67 ft deep when full, a Scott soil (seasonal) to be 0.5 ft deep, and a Fillmore soil (temporary) to be 0.33 ft deep. Water storage volume for a soil type was calculated as average water depth for that type, multiplied by the acres. The volumes of water storage for each soil type were summed to determine the storage of the entire wetland.

The pit volume to wetland volume ratio was calculated by dividing the pit storage volume by the wetland storage volume. Ratios were scored as follows:

<u>Ratio</u>	<u>Score</u>
0 – 0.004.....	2
0.004 – 0.008	4
0.008 – 0.016	6
0.016 – 0.035	8
> 0.035.....	10

The proximity of the pit to the public wetland was determined using GIS. The distance between the pit and public wetland was scored as follows:

<u>Distance (m)</u>	<u>Score</u>
> 2000.....	0
1600 – 2000	2
1200 – 1600	4
800 – 1200	6
400 – 800.....	8
0 – 400.....	10

Final scores were calculated for all eligible pits by summing the pit volume to wetland volume score and the pit proximity score. Irrigation pits with the highest scores have the highest priority for inclusion in the SI. Ineligible pits were also scored, but only as a resource for partners, not as potential sites for the SI.



Figure 1. Ranking for irrigation reuse pits in the watershed of County Line Waterfowl Production Area for inclusion in the Special Initiative (SI). The green line indicates the public area boundary. The blue line indicates the watershed boundary. Numbers indicate scores assigned to irrigation pits within the watershed. The black spots are pits ineligible for the SI.

Literature Cited:

Stutheit, M. C., P. Gilbert, M. Whited, and K. L. Lawrence. 2004. A regional guidebook for applying the hydrogeomorphic approach to assessing wetland functions of rainwater basin depressional wetlands in Nebraska. ERDC/EL TR-04-4.