ESTABLISHING HERBACEOUS WETLAND PLANTS ON A WRP SITE

Janet Grabowski*, Paul Rodrigue**
*** USDA-NRCS Jamie L. Whitten Plant Materials Center, Coffeeville, MS**
**** USDA-NRCS Wetlands Science Institute, Oxford, MS**

OBJECTIVE

To evaluate the potential for using herbaceous wetland plants on a Wetland Reserve Program (WRP) site and to determine the appropriate planting area on the site that will provide the required water regime for each species planted.

SITE

Two WRP properties located in Quitman County, MS were selected. Four planting sites were selected on the two properties. Sites were surveyed to determine area from one foot below (WL-1.0') to one foot above (WL+1.0') winter water level with each 0.5 foot increment marked (Figure 1). Each surveyed area was divided into three equidistant sections to determine planting row locations between the 0.5 foot elevation markers. Rows of plants were located parallel to the waterline on each elevation measurement and division totaling thirteen rows. Three plants of each species were planted on each row.

PLANTING DATES

Plots were planted in 1998 and 1999. Two spring and two fall plantings were planned, however, a decision was made during the summer of 1999 to forgo the second fall planting.

SPECIES EVALUATED

Indian Bayou Source Powdery Thalia –
Thalia dealbata Fraser ex Roscoe (THDE)
Leaf River Source Woolgrass –
Scirpus cyperinus (L.) Kunth (SCCY)
Common Rush - *Juncus effusus* L. (JUEF)
Soft-stem bulrush –
Schoenoplectus tabernaemontani (K.C. Gmel.) Palla (SCTA2)
(Synonym = *Scirpus validus* Vahl)

PLANTING SITE PREPARATION

Each planting site was mowed approximately one month before planting. The areas were sprayed with glyphosate after weed regrowth, first planting year only. No herbicides were used during the second planting year and no lime or fertilizer was applied during either year.

HYDROLOGY: PONDING (Figure 2)

Most ponded areas on WRP tracts are considered "moist soil units" and water levels can be manipulated to control vegetation and allow planting of a wildlife food crop [e.g. Japanese Millet, (*Echinochloa frumentacea* Link)]. They are generally flooded by the landowner in the fall after production of an agricultural crop. Moist soil units are not normally planted to woody species. Sometimes bald cypress [*Taxodium distichum* (L.) L.C. Rich.] are planted along the perimeter of the ponded areas.

All sites were ponded prior to drawdown in March of 1998. Two of the four planting sites (PW 1 and 2) were to have a "permanent" hydrology in that the water control structure would not be manipulated to drawdown any ponding. Boards were reinstalled on these sites immediately after the first planting (5/12/98). The other two sites, designated as temporary sites (TW 1 and 2) would follow the landowner's normal hydrologic cycle of installing the boards in the water control structure in late October to pond the area, and to remove the boards the following spring in late February or early March. Figure 2 shows the water level on the four sites during the measurement period. Due to the below average rainfall in the spring and summer of 1998, the permanent sites were not able to reestablish ponding any earlier than the temporary sites. At the time of the fall planting (11/18/98), no ponding had been reestablished. Both sets of sites had ponding by January 1999. The TW 1 site was inaccessible for two months, so data is missing and shows no ponding.

Sites maintained their ponded condition until March 10, 1999, when the boards were removed from the temporary sites and one of the permanent sites (PW 2) at the landowner's discretion. What appears as a re-flooding of TW 1 just prior to 4/15/99 was actually a backwater flooding event. Boards at the PW 2 site were reinstalled in the water control structure immediately after it was drained, however precipitation was not sufficient to re-establish any degree of ponding until late June 1999.

At the time of the second spring planting (5/10/1999), PW 1 was the only site with remaining ponding, so that plants at the WL, WL-0.5' and WL-1.0' level on this site were planted in standing water. Water levels on the PW 1 site (Figure 2) have fluctuated throughout its range, becoming dry in the fall of 1999 due to a prolonged period of below average rainfall (Figure 3). By not draining some sites (permanent or natural ponding) hydrologic diversity is increased significantly, which potentially allows for greater vegetation and wildlife diversity.

HYDROLOGY: PRECIPITATION (Figure 3).

The period following the spring 1998 planting had below average monthly rainfall (Figure 3), which did not allow reestablishment of ponding on the permanently flooded sites. In the period May through October 1998, the site received 10.72 in. of rainfall when the average for the same period is 24.05 in. July was the only month with above average precipitation (5.32 in. measured, 4.21 in. average). Evapotranspiration rates measured by an atmometer on-site recorded ET rates of 0.30 in/day maximum and 0.20 in/day average for the months recorded (June and July, 1998 and 1999).

After the fall planting, the weather remained dry, with 2.00 in. of rain for November and December when the average is 10.68 in. The sites finally began to receive significant rainfall in January 1999. For the period January through April 1999, the accumulated rainfall was 23.72 in. when the average is 19.97 in. This allowed all sites to pond. The spring planting in April 1999 was followed by a dry May (1.96 in. measured, 5.48 in. average) with a wet June (9.88 in. measured, 4.66 in. average).

For the period of measurement (May 1998 through December 1999), rainfall was compared to what would be considered "normal" based upon the climatic record for Lambert, MS, from 1961 to 1990. The measured rainfall of 61.0 in. is between the dry side of normal (54.3 in.) and the wet side of normal (108.8 in.) while being below the "average" of 83.9 in. The site was clearly on the "dry" side of "normal" rainfall.

From the information in Table 1, it can be seen that for the 20 months of rainfall measurement, nine were "DRY", three were "WET", and eight were "NORMAL".

PLANT RESPONSES

Statistical analysis of the data was not possible because the landowner removed the boards from the water control structure on PW 2 in both evaluation years, leaving only one replication of this treatment. The data (Table 2) is presented as plant survival on each row, with row number 1 located at WL-1' winter water level and row 13 at WL+1' as described previously. Plant survival from the spring 1998 planting was adversely affected by a lack of rainfall after planting (Figure 3). Therefore, data on this planting is not presented in the tables below; however, general observations are as follows. THDE survived in small numbers from this planting, mainly because of the increased food reserves that can be stored in its large rhizome system. The other species are only weakly rhizomatous and are not capable of storing large quantities of food in their below ground parts.

Tables 2 and 3 contain the data on plant survival for the fall 1998 planting and the spring 1999 planting. The fall planting was evaluated three times, the spring planting twice, on the dates indicated. Overall survival was better for the fall planting. This result is not unexpected because fall planting allows plants to take advantage of increased water levels in the winter months (Figure 2). However, due to continued dryness, even the fall planting suffered significant plant loss by the final evaluation date. Both JUEF and SCCY appear to be better adapted to slightly higher elevations than THDE where the plants are not flooded as deeply. Survival was poor for most species on row 13 (the highest elevation). THDE is the only species that consistently performed well when planted in both spring and fall. SCTA2 is not well suited to planting on sites such as these, and if used, should be planted at the lower elevations with no drawdown. Plant survival was slightly better

when the boards were left in the water control structure, but the spring 1998 planting demonstrated that this would only be true in years when sufficient rainfall was available to promote ponding during the critical plant establishment phase. Observation wells showed that water did not move laterally to any great extent in these soils, so for plants to benefit from the accumulated rainfall, they would have to be located close to the ponded water. Not allowing the water to drawdown in the spring would be a major alteration in the normal management scheme that most landowners follow. However, this change would promote establishment and growth of herbaceous wetland plants to increase plant diversity and could also improve the wildlife benefits of WRP sites.

COOPERATORS

USDA-NRCS Jamie L. Whitten Plant Materials Center, Coffeeville, MS
USDA-NRCS Wetland Science Institute, Oxford, MS
USDA-NRCS Marks Field Office, Marks, MS
Info-Lab Properties
Quitman County SWCD
USDA-NRCS Area IV Office, Greenwood, MS
USDA-NRCS Mississippi State Office, Jackson, MS
USDA-NRCS Delta Regional Wetlands Team, Vicksburg, MS

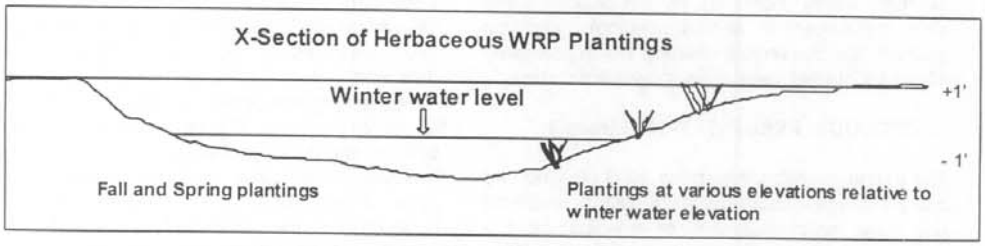

Figure 1.

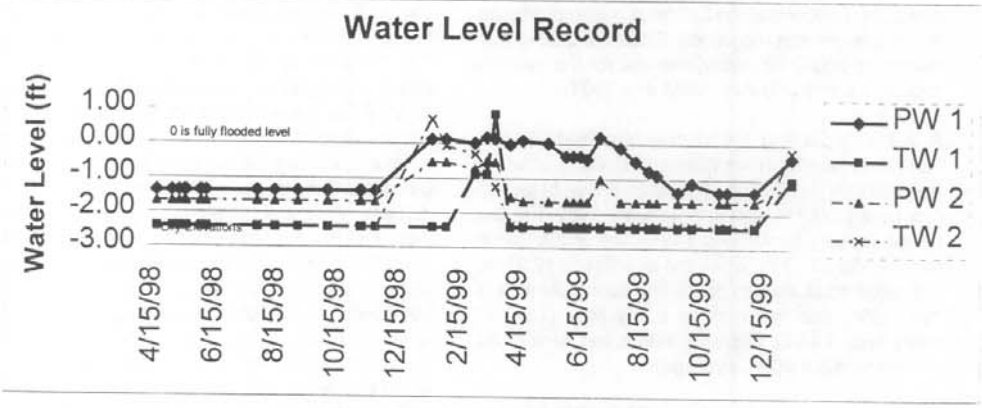

Figure 2.

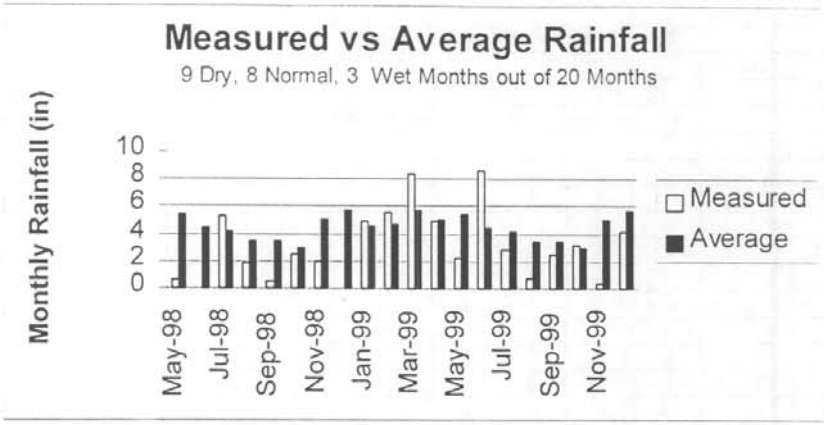

Figure 3.

Table 1. Wetness Condition					
Month	Rain	Average	DRY	WET	Condition
			30%<	30%>	
	(in)	(in)	(in)	(in)	
May-98	0.56	5.48	3.6	6.58	D
Jun-98	0.04	4.46	2.66	5.61	D
Jul-98	5.32	4.21	2.68	5.08	W
Aug-98	1.84	3.44	1.85	4.2	D
Sep-98	0.52	3.49	2.09	4.23	D
Oct-98	2.44	2.97	1.74	3.74	N
Nov-98	1.96	5.05	3.18	6.09	D
Dec-98	0.04	5.63	3.41	6.82	D
Jan-99	4.88	4.53	2.67	5.5	N
Feb-99	5.6	4.75	2.91	5.76	N
Mar-99	8.36	5.63	3.64	6.78	W
Apr-99	4.88	5.06	3.28	6.09	N
May-99	2.24	5.48	3.6	6.58	D
Jun-99	8.6	4.46	2.66	5.61	W
Jul-99	2.88	4.21	2.68	5.08	N
Aug-99	0.68	3.44	1.85	4.2	D
Sep-99	2.44	3.49	2.09	4.23	N
Oct-99	3.2	2.97	1.74	3.74	N
Nov-99	0.36	5.05	3.18	6.09	D
Dec-99	4.2	5.63	3.41	6.82	N

Table 2. 1998 Fall Planting (evaluations made in 1999)													
Site	Row #	THDE			SCCY			JUEF			SCTA2		
		4/29	6/22	9/14	4/29	6/22	9/14	4/29	6/22	9/14	4/29	6/22	9/14
		# of plants surviving on row											
Boards *	1	1	1	1	0	0	0	0	0	0	0	0	0
	2	2	2	2	2	3	0	0	0	0	0	0	0
	3	1	1	1	3	3	3	0	1	0	1	0	0
	4	1	1	1	3	3	3	1	2	1	1	0	0
	5	2	1	0	3	3	3	3	3	2	1	0	0
	6	1	0	1	3	3	3	1	1	2	0	0	0
	7	0	0	1	2	2	1	1	1	1	0	0	0
	8	0	0	0	2	2	1	3	0	0	0	0	0
	9	0	0	0	2	2	0	3	2	0	0	0	0
	10	0	0	0	3	0	1	3	3	0	0	0	0
	11	0	0	0	2	0	0	3	3	0	0	0	0
	12	0	0	0	2	2	1	3	1	0	0	0	0
	13	0	0	0	3	3	3	3	1	0	0	0	0
No Boards**	1	1	1	0	2	2	1	3	2	1	1	0	0
	2	2	2	0	2	2	1	2	1	0	0	0	0
	3	2	1	0	2	2	0	2	1	1	0	0	0
	4	1	2	0	3	2	1	3	1	0	1	0	0
	5	1	1	1	2	2	0	3	2	0	1	0	0
	6	1	2	0	3	2	0	3	2	0	1	0	0
	7	0	1	1	2	3	0	3	1	0	0	0	0
	8	1	1	1	2	2	0	2	1	1	0	0	0
	9	1	1	0	3	2	0	2	1	0	0	0	0
	10	0	1	0	2	2	0	1	1	0	0	0	0
	11	1	1	0	2	2	0	3	1	0	0	0	0
	12	1	0	1	2	2	0	2	1	0	0	0	0
	13	0	0	1	1	2	0	2	1	0	0	0	0

* Observations from one site only.
** Average of observations from three sites

Table 3. 1999 Spring Planting (evaluations made in 1999)									
Site	Row #	THDE		SCCY		JUEF		SCTA2	
		6/22	9/14	6/22	9/14	6/22	9/14	6/22	9/14
		# of plants surviving on row							
Boards *	1	3	3	1	1	0	0	1	1
	2	3	2	2	0	1	1	2	1
	3	3	3	2	1	3	3	3	1
	4	1	2	0	0	3	3	0	0
	5	2	1	0	0	1	1	0	0
	6	0	1	0	0	0	2	0	0
	7	1	0	0	0	1	0	0	0
	8	3	0	0	0	0	0	0	0
	9	1	1	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	3	0	0	0	0	0	0	0
	12	1	0	0	0	0	0	0	0
	13	2	0	0	0	1	0	0	0
No Boards**	1	2	0	0	0	1	0	0	0
	2	2	0	0	0	1	0	1	0
	3	2	1	0	1	0	0	0	0
	4	1	0	0	1	1	0	0	0
	5	2	1	0	0	0	0	0	0
	6	3	0	0	0	1	0	0	0
	7	2	0	0	1	1	0	1	0
	8	2	0	0	1	1	0	0	0
	9	3	0	0	0	1	0	0	0
	10	2	0	0	1	0	0	0	0
	11	2	0	0	1	1	1	0	0
	12	3	0	0	1	0	1	0	0
	13	2	0	0	1	0	1	0	0

* Observations from one site only.
** Average of observations from three sites