

ECOLOGICAL STUDIES OF WILLOW (*SALIX CAROLINIANA*):  
MONTHLY STATUS REPORT #2



Drs. Pedro Quintana-Ascencio & John E. Fauth  
Department of Biology, University of Central Florida,  
4000 Central Florida Boulevard, Orlando, Florida 32816



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Ecological Studies of Willow (*Salix caroliniana*): Monthly Status Report #2  
Covering the time period from project initiation through February 28, 2009

This status report summarizes progress made on the Ecological Studies of Willow project through February 28, 2009, with reference to the tasks and timeline outlined in the Scope of Work and presented in Table 1 below.

**Table 1.** Timeline of tasks to be accomplished in Year 1 and later. Tasks initiated and underway in this reporting month are highlighted in blue.

YEAR 1

Quarter	Months	Tasks accomplished
1 <sup>st</sup>	Oct – Dec, 2008	Initiate and complete Task 1 ( <i>Finalize research plan</i> )
2 <sup>nd</sup>	Jan – Mar, 2009	Initiate Task 2.1 ( <i>Germination &amp; early survival and growth experiments</i> ) Initiate Task 2.4 ( <i>Life history</i> )
3 <sup>rd</sup>	Apr – Jun, 2009	Continue Task 2.1 ( <i>Germination experiment</i> ) Initiate Task 2.2 ( <i>Willow transplantation</i> ) Initiate Task 2.3 ( <i>Fire response</i> ) Continue Task 2.4 ( <i>Life history</i> )
4 <sup>th</sup>	Jul – Sep, 2009	Continue Task 2.4 ( <i>Life history</i> ) Complete Tasks 2.1 & 2.2 ( <i>Germination experiment &amp; Willow transplantation</i> ) Complete Task 3.1 ( <i>Data analysis and final report, Year1</i> )

YEAR 2

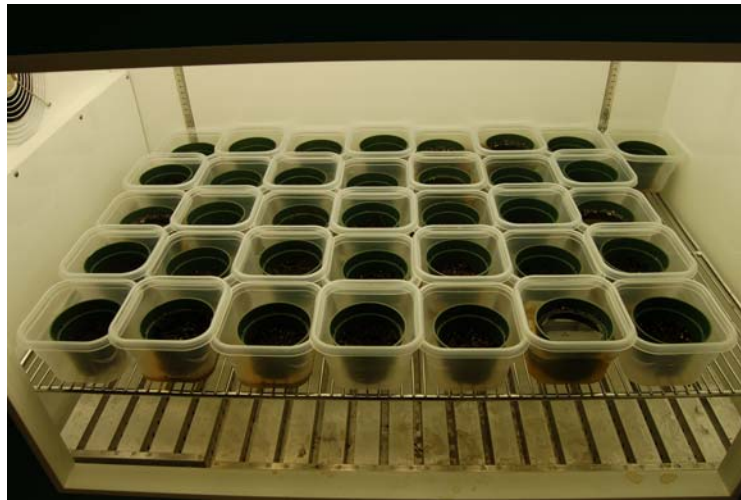
Quarter	Months	Tasks accomplished
1 <sup>st</sup>	Oct – Dec, 2009	Continue Task 2.3 ( <i>Fire response</i> ) Continue Task 2.4 ( <i>Life history</i> )
2 <sup>nd</sup>	Jan – Mar, 2010	Continue Task 2.3 ( <i>Fire response</i> ) Continue Task 2.4 ( <i>Life history</i> ) Initiate Task 2.5 ( <i>Spatial analysis of willow distribution</i> )
3 <sup>rd</sup>	Apr – Jun, 2010	Initiate Task 2.2 (2nd iteration, <i>Willow transplantation</i> ) Continue Task 2.3 ( <i>Fire response</i> ) Continue Task 2.4 ( <i>Life history</i> ) Continue Task 2.5 ( <i>Spatial analysis of willow distribution</i> )
4 <sup>th</sup>	Jul – Sep, 2010	Complete Task 2.2 (2nd iteration, <i>Willow transplantation</i> ) Continue Task 2.3 ( <i>Fire response</i> ) Continue Task 2.4 ( <i>Life history</i> ) Continue Task 2.5 ( <i>Spatial analysis of willow distribution</i> ) Complete Task 3.2 ( <i>Data analysis and final report, Year2</i> )

**Progress on Task 1 – Finalizing the research plan**

The UCF team recently received comments from District personnel and is in the process of modifying the planned field experiments, per the discussions made during our meeting at UCF in early March.







**Progress on Task 2.1 – Germination and early survival and growth experiments**

The UCF team began a preliminary experiment in a growth chamber to identify optimal conditions for willow germination. Twenty willow seeds were placed in pots subjected to a gradient of soil moisture using two soil types (commercial potting soil or sand) and water conditions (see below). treatment was replicated six times, in a total of 36 pots (Fig. 1). Results of this experiment will be assessed in March.



Growth Chamber Location

0053	0031	0034	0041	0015	0012	0054	0042
0044	0033	0063	0046	0014	0056	0052	x
0013	0036	0026	0055	0062	0064	0011	x
0066	0025	0065	0043	0024	0045	0022	x
0061	0021	0023	0051	0035	0016	0032	x

Treatments		
Code #		
1	Continuously flooded (5 cm > that the soil surface)	
2	Kept moist by capillarity (always 2 cm with water in the outside container)	
3	Watering daily	
4	Water once every three days.	
5	Watering once every five days.	
6	Sand / watering once every eight days.	

Growth Chamber Settings			
(set on 2/23/09) simulating Winter in Central/S Florida			
Time	°C	Finarescent	Incandescent
0:00	8.3	0	0
1:00	8.2	0	0
2:00	8	0	0
3:00	8	0	0
4:00	8.2	0	0
5:00	8.4	0	0
6:00	8.5	0	0
7:00	8.7	1	0
8:00	9	1	1
9:00	13	2	1
10:00	16.7	2	1
11:00	19.4	2	2
12:00	21.7	2	2
13:00	20.9	2	2
14:00	21.7	2	2
15:00	21.7	2	2
16:00	21.3	2	1
17:00	18.2	1	1
18:00	15.6	1	0
19:00	12.1	0	0
20:00	10.9	0	0
21:00	10.2	0	0
22:00	8.6	0	0
23:00	8.5	0	0
0:00	8.4	0	0

**Fig. 1. Settings for germination experiment.**

### **Progress on Task 2.2 – Willow Transplantation**

The UCF team transplanted to pots cuttings taken from multiple willows at  $\geq 20$  locations within District lands (Fig. 2). The result was several hundred cuttings that are rooting and available for transplant into field experiments (Fig. 3). We maintained additional willow cuttings for use in the greenhouse experiment; these plants were potted on March 7.



**Fig. 2. UCF students transplanting and measuring Willow cuttings.**



**Fig. 3. Transplanted Willow cuttings**

### Progress on Task 2.4 - Life history

We collected our first data set on willow life history information. Briefly, we identified individual willow plants (ramets) based on gender, which we identified from their flowers, and continuity of trunks. We then counted the number of trunks, measured their diameter, and selected one trunk at random. We next determined the number of branches, chose one at random, and so on, continuing in this manner until the terminal branch was reached. We then counted the number of flowers on the terminal branch. From this information, we can estimate the fecundity of the entire plant (Fig.4).

Collectors:	HEARL, TERRE, Luis CASTRO, PERE
date	2/21/04
location	Hwy. 60
Plant number	4
sex	F

**procedure**  
 number of groups of rooted main branches (choose one)  
 number of main branches in a group (choose one and **measure ALL**)  
 number of secondary branches in a main branch (choose one)  
 number of tertiary (if any) branches in a secondary branch (choose one)  
 count the number of inflorescences in the terminal branch (choose one)  
 count the number of flowers/fruits in the inflorescence

basal diameters and indicate which one you choose

width x length	4m x 3m
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groups of branches rooted main

number	1
id	294
Diameters selected #	3.0
secondary branch	4.5
tertiary branch	*
# inflorescences	
# fruits/flowers	

random numbers	2	3	4	5	6	7	10	20
	2	2	3	5	2	4	6	8
	2	1	4	5	3	7	2	13
	1	1	1	5	5	2	5	16
	1	X	4	5	6	7	7	1
	1	X	1	4	6	7	2	11
	1	2	2	1	4	7	3	9
	1	1	1	3	2	4	4	3
	2	2	3	5	4	6	1	4
	1	1	3	4	6	6	6	5
	2	2	2	1	4	2	6	11
	1	1	2	5	2	1	7	7
	2	1	3	3	1	5	8	16
	1	1	1	1	3	3	4	6
	2	1	4	2	6	1	3	14
	2	1	2	2	5	4	6	20
	1	2	1	5	2	2	5	5
	2	2	1	5	6	3	6	12
	2	2	4	4	4	6	6	7
	2	3	4	3	5	7	6	4
	2	2	4	1	6	7	9	20
	2	2	4	5	4	2	2	19
	2	1	3	2	5	2	10	12
	2	1	4	3	3	5	8	9
	1	3	4	2	4	4	5	3
	1	2	2	2	5	4	2	9
	1	2	1	3	5	2	5	16
	1	2	1	1	4	2	6	5
	2	1	1	4	5	5	5	19
	2	1	2	4	2	3	3	8
	2	1	2	4	2	3	3	4

Fig. 4. Example of data sheet for fecundity

**Progress on Task 2.5 – Spatial Analysis of Willow Distribution.**

We concentrated on preparing plants for the germination, greenhouse and field experiments and therefore did not complete any additional formal work on the spatial model.

**Summary of activity**

During this reporting period, the UCF team logged more than 14 person-days collecting and potting willow cuttings and preparing the experiments (Table 1). Copies of our data notebooks and spreadsheets are being sent electronically, as PDF and MS Excel files, respectively.

**Table 1.** Dates of field trips and other major activities during this reporting period. Not included in this list are routine activities such as watering plants and monitoring those in the growth chamber.

Date	Work performed	Purpose
02/03/09	SJRWMD staff	Conference call to discuss protocol for soil preparation
02/06/09		Collection of willow cuttings
02/10/09		Collection of willow cuttings
02/19/09	SJRWMD staff	Conference call to discuss protocol for soil experiment
02/21/09	UCF graduate students	Collection of seeds and fecundity estimation
02/24/09	UCF graduate students	Fecundity estimation
03/03/09	UCF graduate students	Transplant of Willow cuttings

**Acknowledgments**

Kimberli Ponzio, Dianne Hall and Ken Snyder offered critical information and advice that were essential for the design and implementation of this work. They also kindly provided access to remote sites. University of Central Florida graduate students Camille Brescacin, Stormy Haynes, Matthew Gordon, Katherine Grablow, Leesa Souto, Joseph Waddell and Annalisa Weiler-Lazarz helped in the field and with criticisms of the experimental design. Lisa McCauley made the maps. Luz M. Castro-Morales collaborates with us on the experiment with the seeds in the growth chamber.