ECOLOGICAL STUDIES OF WILLOW (*SALIX CAROLINIANA*): MONTHLY STATUS REPORT #7

Pedro Quintana-Ascencio
John E. Fauth
Luz M. Castro-Morales

Department of Biology, University of Central Florida,
4000 Central Florida Boulevard, Orlando, Florida 32816

17 August 2009

Ecological Studies of Willow (*Salix caroliniana*): Monthly Status Report #7
Covering the time period from July 1-31, 2009

This status report summarizes progress made on the Ecological Studies of Willow project through July 31, 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, completed tasks in red.

YEAR 1

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

YEAR 2

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

Progress on Task 1 – Finalizing the Research Plan
The UCF team revised and submitted the final research plan for approval.

Progress on Task 2.1 – Germination and Early Survival and Growth Experiments
The UCF team completed data entry and analysis of the two germination experiments completed in late April. Dr. Quintana-Ascencio will discuss the results in detail during his presentation to the District in August. Preliminary results were included in the June report.

The greenhouse experiments on willow seedlings and cuttings neared conclusion this month. We performed the 4th (next-to-last) iteration of treatments in the cross-over design and re-randomized positions of plants within the greenhouse twice. Seedlings now are as tall as cuttings were at the beginning of the experiment; several cuttings are now >1.0 m tall. The cover photo illustrates the substantial growth that occurred between May 15 and August 7, 2009.

Progress on Task 2.2 – Willow Transplantation

A. Competition Experiment – We monitored all blocks of the field experiment to evaluate responses of willow seedlings and cuttings to competition. The single cutting that was alive in the northern block succumbed during this period and we only located one cutting in the central block. All seedlings were gone in both blocks. In contrast, multiple cuttings and seedlings were alive and growing in the southernmost block (Fig. 1).

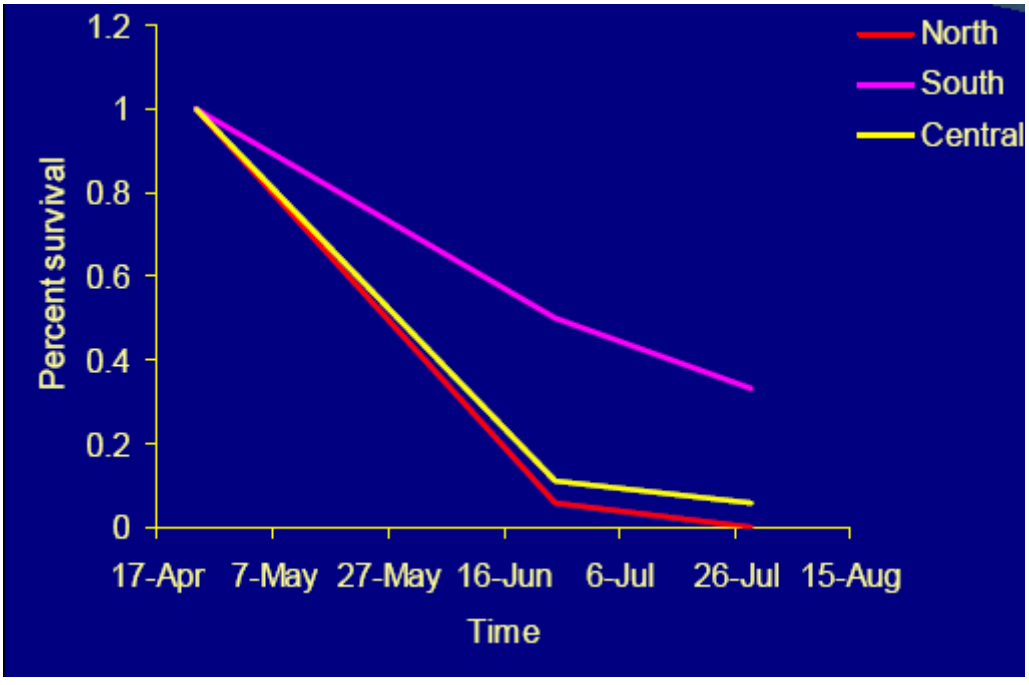

Figure 1. Survival of willow cuttings and seedlings in the competition experiment.

B. Hydrology Experiment – We performed our monthly monitoring of the willow island experiment, which tests the ability of seedlings and cuttings to survive at different elevations in the marsh. Islands were about halfway submerged at the end of July and differences among elevations in survival became apparent, especially for seedlings (Fig. 2).

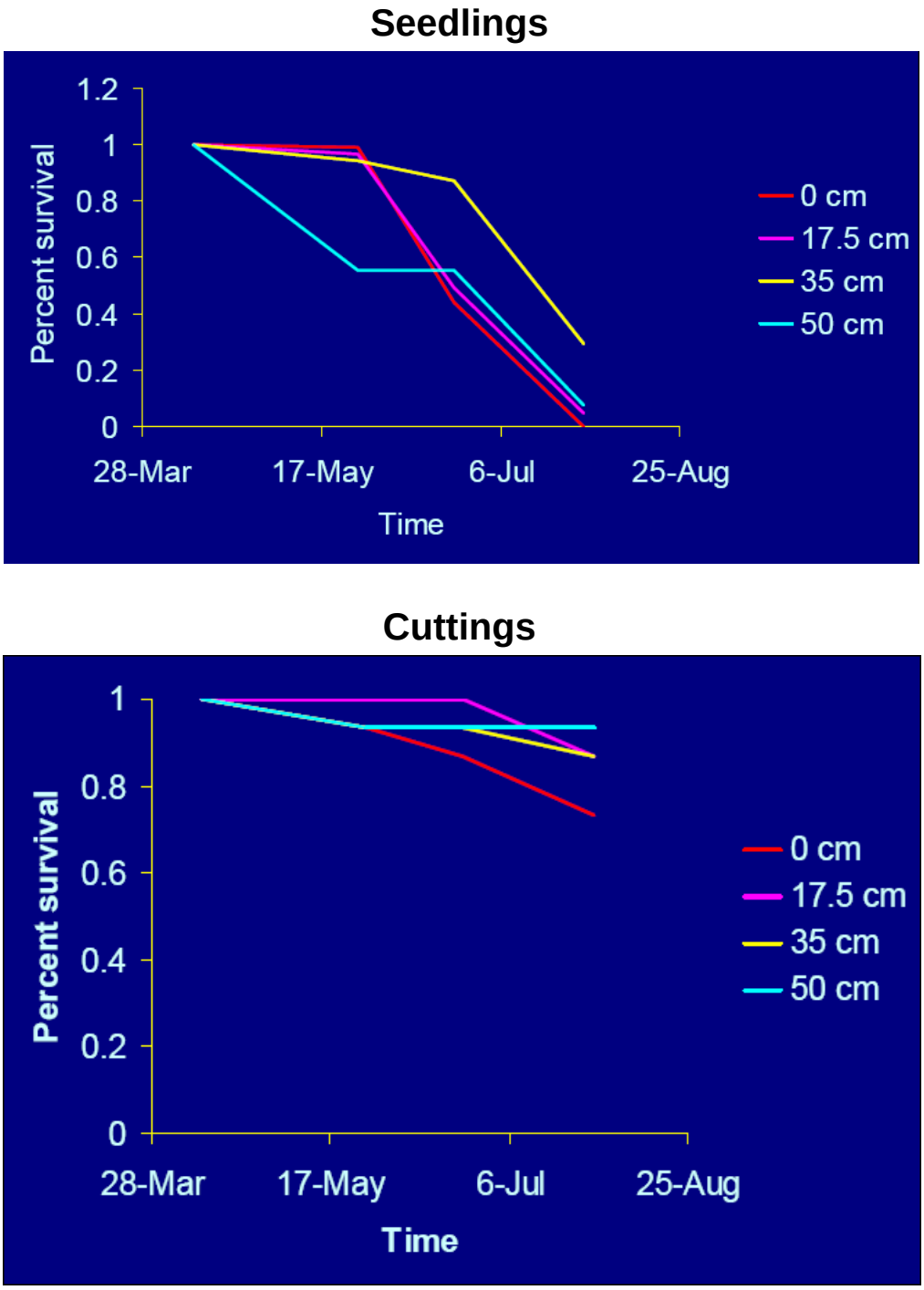

Figure 2. Survival of willow cuttings and seedlings in the island experiment.

Progress on Task 2.4 - Life History

We dissected a small (~ 3.5 m tall) willow to describe its architecture and improve our estimates of leaf numbers and fecundity. We currently are searching the literature for more efficient ways to estimate these life history variables for our demographic model. We also devised our sampling scheme for demography data, which relies on sampling ~100 locations throughout the upper St. Johns River basin (Fig. 3).

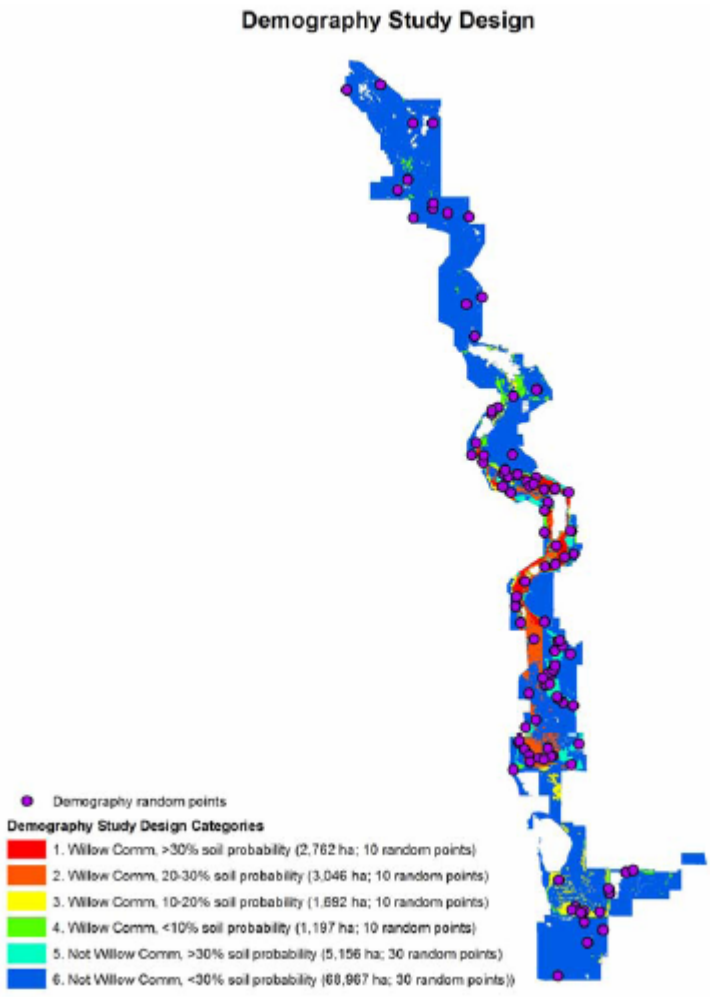

Figure 3. Randomly selected points along the gradient of willow densities in the upper St. Johns River basin. More points are required in areas where willow is rare, to ensure finding plants.

Progress on Task 2.5 – Spatial Analysis of Willow Distribution.
We began refining the spatial model by incorporating information on recent fire history (Fig. 4). We intend to continue improving the model during the next three months.

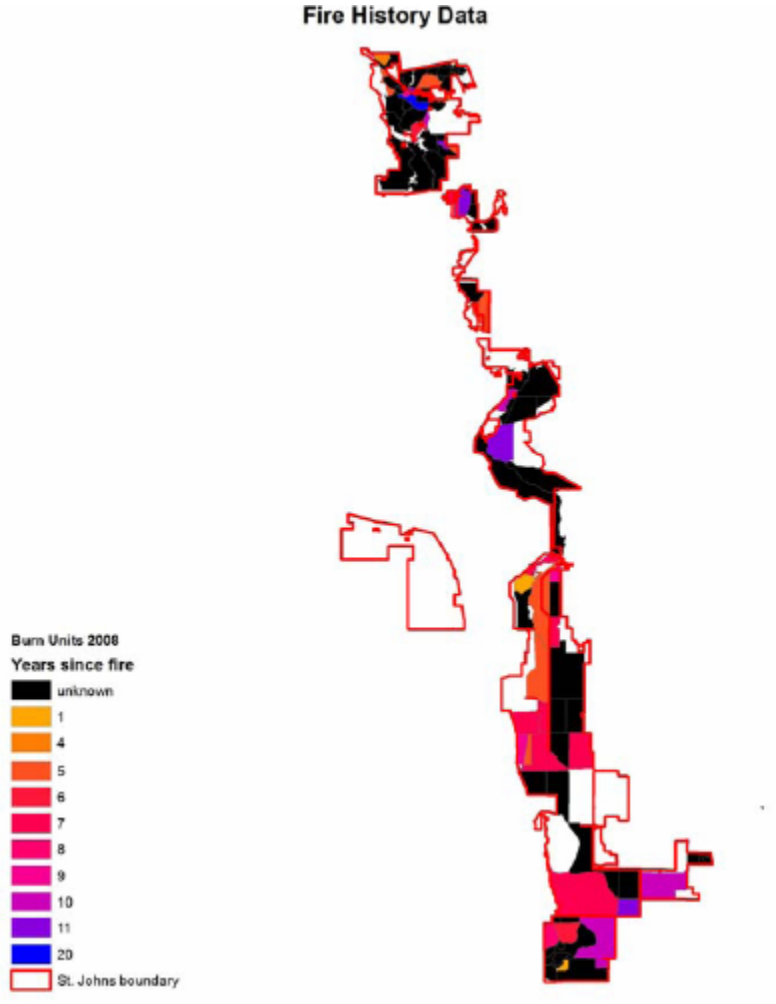

Figure 4. Years since fire in the upper St. Johns River basin.

Summary of Activity
During this reporting period, the UCF team maintained two greenhouse and two field experiments, collated and entered their data, and analyzed the results of the two germination experiments. High water levels at our field sites made sampling challenging!