Capstone and Phenology Opportunities – CNat 2015

as of 4/17/15

OPPORTUNITIES AT SSI

April info listed here, but contact people and activities will continue into ***May***. Will post May info when available. https://cnssi.files.wordpress.com/2015/02/april-volunteer-opportunities.pdf

PHENOLOGY OPPORTUNITIES

Wednesday, April 22nd 3-5 pm: Phenology Walk on the Tribute Trail. Contact julia@sierrastreams.org for more info.

SPECIFIC CAPSTONE OPPORTUNITIES

YELLOW-LEGGED FROG study with Tom Van Wagner ~ talk with Tom on Sat. 4/18 field trip, or let me (Susan) know if you're interested and I'll put you in touch. I know some of you have already spoken with him about this.

SSI ~ INFO FROM JEFF LAUDER ~
jeff@sierrastreamsinstitute.org ~ ori@sierrastreamsinstitute.org
I (Jeff) wanted to follow up with some of the project ideas we spoke about. Outside of our other multiple on-going projects (which I believe Ori said she would forward) such as mammal surveys, bird surveys, veg surveys, and water quality monitoring activities, I have two major projects I am focusing on right now that can always use an extra hand, and students may be interested in using these projects as a basis for their capstone projects.

1) Phytoremediation: We previously did a pilot study that found that three native local plant species are indeed capable of germinating in, tolerating, and accumulating high concentrations of heavy metals in contaminated soil at the Providence Mine site.

We are now shifting the focus of this project to look at the actual real-world applicability, and looking at incorporating phytoremediation into actual mine site clean up and revegetation. To augment that previous study, we (myself and Ori) are focusing on how Arroyo Willow (*Salix lasiolepis*) responds to heavy metal contamination and if they begin to show local adaptation to contamination. *S. lasiolepis* has previously been shown to accumulate large concentrations of Cadmium, which is present in high concentrations at the Providence Mine site. We are curious how local adaptation, then, can influence potential of the species to grow from cuttings and help future reveg work.

We are doing a factorial, replicated experiment by taking cuttings from willows from the site, as well as from other non-contaminated sites (verified with soil samples), and planting them in a factorial design in both "control" soils and contaminated soils. Our hypothesis is that willows that have been growing at Providence (contaminated) will show higher tolerance and better rooting and vigor in contaminated soils than cuttings taken from non-contaminated site willows. Results will help inform land managers of where to source potential native species cuttings to get the best response to local site conditions.

We are also pairing this study with a separate, controlled "lab" study (but in the field, most likely) using inert growing medium in which the willow cuttings are planted, and spiking them with synthetic cadmium (all in controlled chambers with no loss of cadmium to the environment) to look at actual uptake, again based on location of the parent tree.

This project is fairly complete as far as design and experiment plan go, but there is plenty of room for help on almost every step of the process, from cutting and rooting the willows, to planting, monitoring, and tissue/soil sampling.

2) Forest structure/composition surveys at Hirschman's Pond: This one kind of piggy-backs on the field trip.

We are still finalizing environmental review documentation for approval of a land management plan at Hirschman's Pond to reduce fuels and encourage "healthy forests" in the area. The current and next steps of this process over the next few months involve fairly exhaustive surveys of the whole property to delineate forest types, sizes, fuel loads, etc. This includes everything from simply walking the trail and mapping forest types based on species composition to in-depth surveys in previously established plots to measure and identify all trees and fuel load types.

We will also be doing things like owl surveys (not sure if the timing of these will match the capstone timing), other bird surveys, and general data analysis of everything we talked about on the field trip (relationships between overstory and understory, mammals, birds, etc.) to model restoration goals.

This project could be very heavily field based, or even very data-analysis and writeup-driven; this is up to the participant, should anyone be interested.