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Insulated Greenhouse For Growing Fruit Trees

In April, 2011 I began construction of the greenhouse in a cleared area near the top of our driveway. The site is flat and has good exposure to the southern sky. With the clearing of additional trees to the east and west, the greenhouse should get more than eight hours of direct sun daily during the summer months.

Holes for the concrete foundation pads were dug down to hard clay subsoil. Form boxes of 1x6 lumber were placed in the holes and leveled. Concrete tube forms were then placed in the center of the boxes and the tops leveled. The forms were then filled with concrete and capped with wet anchors for 6x lumber. After the concrete cured, 6x6 sill beams were placed in the anchors and bolted in. The sill beams define a space 24 feet wide and 48 feet long.

Construction then began on the trusses. In a plywood rigid frame structure trusses are made from the two wall studs, the two roof rafters and 6 plywood gussets. I built 25 trusses spaced two feet on center. The studs are 8 feet high. The south facing rafter is 20 feet long and is at a 6:12 pitch. The north facing rafter is 14 feet long and is at a 12:12 pitch. The peak of the trusses is 16 feet above the sill beams. Plywood rigid frame structures are very strong and can span long distances without posts.

All the trusses were assembled and stacked at one end of the foundation. With two helpers, the trusses were tilted into place and braced. In a few hours the trusses were all in place. The north wall was sheathed in half inch plywood for shear strength. The end walls were framed in, and the structure was complete.

In preparation for winter I gathered fallen leaves and spread them about a foot thick around the trees. This insulating layer protects the trees' roots from severe cold.

What I didn't prepare for was the amount of snow that fell this winter. So far, Haines has received 360" of snow, a new record. The greenhouse shed the snow through November, but then the piles of shed snow prevented new snowfall from sliding off the roof. After about four feet of accumulation I decided to shovel the snow off the roof to prevent structural damage. I shoveled the roof four times during the winter. I also put temporary posts under some of the long rafters as extra insurance against collapse.

In a winter with normal snowfall, the greenhouse would have required little attention. In hindsight, an alteration to the design would have helped shed the snow. Using 10 foot studs, and rafters with a 12:12 pitch on both sides of the ridge would have helped to keep the building out of the snow and prevented large accumulation on the roof. However, the peak of the building would have been well over twenty feet high, which would have made construction more difficult.

As of this writing, I have managed to clear most of the snow from the south side of the roof to let light into the building. The south wall is still blocked by ten feet of snow. Even with only partial light transmission the temperature in the greenhouse yesterday was 51F when it was 41F outside. I'm hoping that the trapped heat will help to melt the snow around the building.

The trees appear to have all survived the winter and are ready to grow. It will be interesting to see how much earlier the trees inside leaf out as compared to my fruit trees outdoors.

Project Cost: I have submitted four receipts totaling \$4772.26. These are for materials only. The concrete aggregate was \$250, the construction materials were \$2752.26 and the greenhouse fabric was \$1770.

Presentation: On March 17, 2012 I presented my project to an audience of about thirty people at the American Bald Eagle Foundation in Haines. My presentation was part of a gardening conference organized by Ed Buyarski of Juneau. Some of the other presenters were Darren Snyder of the Cooperative Extension Service and Jeff Smeenck of UAF. Both of them attended my presentation. I have included a copy of my PowerPoint with this submission.

The audience response to my talk was very positive. I handed out 15 copies of my "Guide to Growing Fruit Trees in and Around Haines, Alaska." Melissa Aronson, who is teaching a six week long class on permaculture here in Haines is going to bring her class to see the greenhouse in late April. I also spoke to my neighbor Carol Tuynman, who is the heir to the historic Nelson Homestead. She is interested in using her property for community agriculture, and I have agreed to consult with her on the construction of a large greenhouse for fruit and vegetable production.

It is my hope that my project will be successful in showing that fruit can be grown in Alaska. As the cost of shipping food in from Outside increases, growing food here in Alaska will become more important. I think large scale, greenhouse fruit and vegetable production is very possible in the Matanuska Valley, the Kenai Peninsula and other areas of the state.

Thank you for your support.