CMI Annual Researchers' Meeting

May 12, 2011

Trickle Creek Lodge, Kimberley, BC

We are about to depart on field trips.

Meeting description

Every year CMI members get together to provide updates on their projects (research, field trials, and new initiatives in southeastern British Columbia), network, and catch up on each other's news. It's an informal atmosphere and non-CMI members and post-secondary students are welcome to attend. Our Annual General Meeting is held after lunch.

This year our meeting was on May 12 at Trickle Creek Lodge, at the ski hill in Kimberley. Our meeting definitely had an East Kootenay flavour, with nine presentations and three field trips. The meeting was attended by 41 people.

The following pages include the agenda for the day, and the abstracts and field trip presentations.

A big "Thank You" goes out to…

- CMI Directors Leigh Anne Isaac and Tara Szkorupa who were the key organizers for this event;
- Becky Phillips for running the laptop during the presentations;
- Our presenters and field trip leaders for sharing their time and expertise with us;
- And -- We'd like to thank these companies for their sponsorship.

Tipi Mountain Native Plant Nursery
http://www.tipimountain.com/

Keefer Ecological Services
http://www.keefereco.com/

Interior Reforestation
http://www.intref.bc.ca/

Agenda

Time	Presenter	Page
9:00 a.m.	**Welcome,** by Master of Ceremonies Tara Szkorupa. Thank you to our sponsors: Interior Reforestation, Tipi Mountain Native Plant Nursery, and Keefer Ecological Services.	
9:10	**Connecting the Upper Columbia Valley: Habitat linkages for species at risk,** Ian Adams, Interior Reforestation	4
9:30	**Grassland species at risk action planning,** Leanne Colombo, Grasslands Conservation Council	5
9:50	**Using commercial forestry for ecosystem restoration in sensitive badger habitat,** Melissa Hogg, SFU Master's candidate and Tembec	6
10:10	Poster people say a few words about their projects.	
10:20	Coffee break	
10:40	**Spalding's campion inventory and habitat assessment works 2010,** Alison Kennedy, Keefer Ecological Services	7
11:00	**Vegetation and social response to ecosystem restoration at Radium Hot Springs, BC**, Rick Kubian, Parks Canada	8
11:20	**Bighorn sheep response to ecosystem restoration at Radium Hot Springs, BC,** Alan Dibb, Parks Canada	9
11:40	**Ecosystem restoration: Soil conservation for forest operations,** Lawrence Redfern, Red Fern Consulting	10
Noon	Lunch, provided.	
1:00 p.m.	**CMI Annual General Meeting,** Dr. Brendan Wilson, CMI President.	
1:45	**Rocky Mountain Ecosystem Restoration Program - Progress to date,** BJ Randall Harris, Ministry of Forests, Lands and Natural Resource Operations	11
2:05	**Limber pine restoration in southeast BC,** Randy Moody, Keefer Ecological Services	12
2:25	Closing remarks	
2:30	Field trips leave. • **Managing grasslands for Lewis' Woodpecker and Flammulated Owl,** Randy Harris and Brian Watson • **Fifty years of plant succession in East Kootenay grasslands: Implications for agriculture, wildlife, and forest management,** Tim Ross and Penny Ohanjanian • **Tour of Tipi Mountain Native Plant Nursery,** Valerie Huff	13 14 15

Abstracts for oral presentations

1. Connecting the upper Columbia Valley: Habitat linkages for species at risk

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Since 2009, the Columbia Wetlands Stewardship Partners (CWSP http://www.cwsp.ca) have been engaged in a process to facilitate the linkage of habitats in the Upper Columbia Valley between the communities of Canal Flats and Edgewater, a linear distance of 65 km. Valley bottom lands below 1100m are the main focus. This area represents a mosaic of land use planning. Applications include recovery planning for species at risk, especially habitat restoration and acquisition targets for land conservation organizations.

Work completed to date:

1. Summarize how wildlife habitat is incorporated into various land use plans in the study area.
This varies widely, though the trend is progressive. The most recent OCP is Lake Windermere (2008) which includes significant wildlife habitat measures. Historically, little consideration was given to wildlife habitat.

2. Identify species at risk by habitat type, data and habitat mapping available and any recovery planning:
Species were categorized by Aquatic, Wetland, Grassland, Closed Forest, Generalist habitats and Wide-ranging Carnivore. Over 30 species have been considered, including some which have not been assessed as “at risk”. The most recent work on identifying specific corridors between Stoddart Creek and Edgewater has focused on badger and bighorn sheep.

3. Divide study area into blocks based on land use planning, land tenure and natural boundaries:
This was done for two reasons: it highlights where changes occur in planning guidance, where pinch points or natural barriers may occur. The study area was divided into 5 aquatic / wetland blocks, 9 terrestrial blocks on the west side and 13 terrestrial blocks on the east side.

4. Identify critical areas for linkages or pinch points:
This was a key step in 2010. We looked at north-south linkages along the Rocky Mountain Trench and broad east-west cross-Trench linkages. For aquatic systems, movement is generally unimpeded within the Columbia mainstem. For terrestrial movements, one key barrier was identified on the west side of the

Trench: Toby Canyon and Invermere. On the narrower east side potential barriers / pinch points occur at Canal Flats, Fairmont, Windermere and Radium townsites and surrounding developments.

5. Identify potential linkage corridors:
Possible east-west cross-trench corridors occur at Canal Flats, Akisq'nuk / Hoodoos, Dry Gulch and north of Edgewater. There are good cross-trench options both north and south of the study area. The Dry Gulch corridor appears to be the best option in the congested Invermere – Radium area.

2. Grassland species at risk action planning

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In partnership with the provincial and federal governments, the GCC is collaborating with stakeholders, communities and industries to find ways to effectively implement recovery actions for grassland species at risk, specifically those depending on grassland ecosystems.

This initiative is intended to facilitate the development and implementation of grassland ecosystem-based SAR recovery action plans at the local level. It will also work towards building a broad level of awareness and understanding about species at risk. Further, the initiative will also help to address the land-use pressures that lead to the fragmentation and development of grasslands and species-at-risk habitats.

3. Using commercial forestry for ecosystem restoration in sensitive badger habitat

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The *jeffersonii* subspecies of the American badger (*Taxidea taxus jeffersonii*) is listed as endangered by COSEWIC, and is red-listed in British Columbia. Badgers are found mainly in dry, low-elevation grasslands and open forests with high prey densities and suitable soils for digging. In the East Kootenay, wildfire suppression has led to forest ingrowth and encroachment into historically open areas, threatening badger habitat. In the Rocky Mountain Trench, a comprehensive ecosystem restoration program exists to restore grassland and open forest ecosystems. Ecosystem restoration treatments involve removing forest ingrowth and reintroducing fire through prescribed burning. Commercial forestry can subsidize the cost of restoration work in areas with suitable timber, but the heavy machinery used may damage badger burrows and disturb the soil. Badgers reuse old burrows frequently, and the BC Identified Wildlife Management Strategy account for badgers recommends existing burrows be protected with 20-metre radius machine-free zones during timber harvesting.

The viewscape of a machine operator is limited.

We examined a 350 ha cutblock harvested by Tembec as part of an ecosystem restoration treatment. The treatment area overlapped a badger Wildlife Habitat Area, and there was a high density of badger and ground squirrel burrows throughout the block. Due to operational constraints, harvesting could not be conducted on frozen ground and burrows were therefore vulnerable to disturbance by machinery. Large 20-metre machine-free zones around burrows were not economically feasible and would have interfered with achieving the restoration objectives for the site. We placed burrows in five- to seven-metre radius machine-free zones, and conducted pre- and post-harvest surveys to test the effectiveness of these smaller machine-free zones and to assess the impacts of harvesting on badger burrows. Machine operators were also trained to identify and protect burrows during harvesting, and we used unmarked transects to test the ability of operators to locate burrows.

We monitored compliance with the machine-free zones, and the effectiveness of those zones in protecting burrows. We found that 5-7metre radius machine-free zones provided good protection for burrows and compliance was high. The pre-work training of machine operators meant that more burrows were protected: operators were able to protect 21% (n=38) of unmarked test burrow complexes during

harvesting, and created an additional 27 machine-free zones around 63 burrows that had not been identified in pre-harvest surveys. Operators found that the additional time required to protect burrows was not prohibitive, and they enjoyed the challenge. For future ecosystem restoration treatments in badger habitat, we suggest that five- to seven-metre machine-free zones are sufficient to protect badger burrows, and should be combined with education to train and engage machine operators.

4. Spalding's campion inventory and habitat assessment works 2010

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Keefer, M. and A. Kennedy, 2011.

Spalding's campion

Spalding's campion (*Silene spaldingii*) is a rare and endangered herbaceous plant endemic to the encroached grasslands of BC. The only known population in Canada exists on the Tobacco Plains Indian Reserve. Keefer Ecological Services Ltd. has conducted inventory and recovery work on Spalding's campion for the past three years. Previously the population was thought to consist of approximately 250 individuals. Field work in 2010 included establishing permanent transects for long-term monitoring, re-visiting individual plants that were monitored over the previous two years, random sampling the entire reserve, and documenting a leafy spurge infestation that is present amongst a large number of Spalding's campion plants. Results from 2010 field work include the known population of Spalding's campion on the reserve doubling to 558 plants. As well, ecosystem information gathered in 2010 was used with the random sampling data to create a predictive habitat model for the reserve, update the Canadian population estimate, and provide a clear picture of the habitat preferred by Spalding's campion. This predictive model is an excellent tool for land management, and can also be extrapolated and applied to land surrounding the reserve to facilitate rapid and cost-effective surveys. Work in 2011 will consist of monitoring plants along permanent transects, re-visiting individual Spalding's campion plants, treating the leafy spurge infestation, and establishing plots to monitor herbicide efficacy and any damage to Spalding's campion plants. It is hoped that a survey of lands adjacent to the reserve will also take place.

Biographical notes
Alison Kennedy is a Plant Scientist with Keefer Ecological Services Ltd., in Cranbrook BC. She has worked with the company for the past year, and other projects Ali has worked on include many different reclamation projects in mining environments and the revegetation of hydroelectric reservoirs. Ali also heads the Client Relation department at Tipi Mountain Native Plants Ltd., the leading native plant nursery in the southern interior of BC.

5. Vegetation and social response to ecosystem restoration at Radium Hot Springs, BC

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A multi-objective ecosystem restoration project was initiated near Radium Hot Springs in 2002. The Redstreak Restoration Project involved restoration treatments of thinning and subsequent burning aimed at restoring open forest/grassland vegetation types. To date over 250 hectares of closed forest have been treated. We report on the treatment process, vegetation response and social response. Vegetation monitoring has occurred at several time steps through the process. The general trajectory for key native species including a suite of bunchgrass species indicates a positive response. After initial increases associated with treatment non-native vegetation response appears to be static. Social response has also been generally positive with key challenges around smoke management. We will consider how results to date will affect the setting of future restoration objectives for the site.

Valley bottom in 1906 and 2004, showing increase in forest.

Biographical notes
Rick works as a Fire/Vegetation Specialist for the Lake Louise, Yoho, and Kootenay Field Unit. Rick is responsible for fire and vegetation management including wildfire suppression, prescribed fire, forest insect and disease, and invasive vegetation programs. He has worked for the Parks Canada Agency in resource conservation since 1990 based in Jasper National Park and the Western Canada Service Centre in Calgary. Rick is active in the broader fire management program serving in Parks Canada's organization as a Type I Incident Commander. Rick is currently working towards a Master's of Science at the University of Victoria with a focus on establishing a better understanding of mixed severity fire in Kootenay National Park.

6. Bighorn sheep response to ecosystem restoration at Radium Hot Springs, BC

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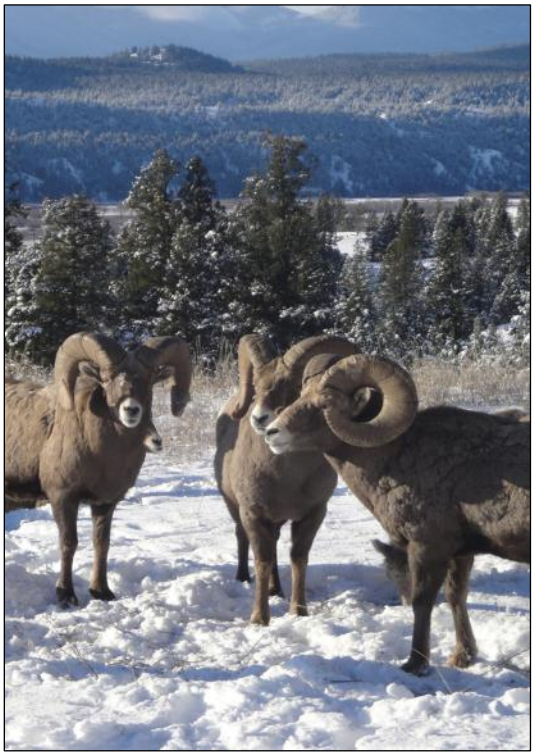

Bighorn sheep near Radium Hot Springs

Bighorn sheep use of residential areas, golf courses, and roadside habitats in and near the Village of Radium Hot Springs makes the Radium herd highly vulnerable to animal-vehicle collisions on roadways. Between 2003 and 2009 we conducted a series of restoration treatments within historic winter range at Redstreak Mountain for the purpose of providing habitat options that are safe from highways. We monitored bighorn sheep response to these treatments by deploying GPS radio collars on 10 sheep each year from 2002 to 2009 and collecting daily location points for each animal. Study animals increased their use of the treated area from 1.0% of daily locations in 2002 (pre-treatment) to an average of 4.8% of daily locations in 2004 through 2009 (post-treatment). Use of the treated areas was mostly in March through May and in October, suggesting that bighorn sheep used the area as transitional range between winter and summer ranges. Our results point to the need for additional restoration work on south and west facing slopes within or close to escape terrain. Bighorn monitoring has also identified specific seasonal migration corridors that are strong candidates for prescribed burning to reverse forest encroachment trends over the past several decades.

Biographical notes

Alan is the Wildlife Specialist for the Lake Louise, Yoho, and Kootenay Field Unit of the Parks Canada Agency, where he has responsibility for a program of wildlife research, monitoring, restoration and human-wildlife conflict management. Recent research projects include road ecology studies on the Trans-Canada Highway and Highway 93S, caribou habitat and recovery in Banff National Park, and bighorn sheep habitat and response to restoration at Radium Hot Springs, BC. Alan holds a B.Sc. from UBC and an M.Sc. in Wildlife Spatial Ecology from the University of Calgary. He has worked for the Resource Conservation program of Parks Canada since 1982 in Banff, Waterton Lakes, Yoho, Kootenay, Glacier, and Mount Revelstoke National Parks.

7. Ecosystem restoration: Soil conservation for forest operations

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Soil conservation measures mandated under BC's *Forest and Range Practices Act* are to protect soil productivity and hydrologic function. Development of harvesting strategies that allow economic extraction of timber is beneficial to implementing ecosystem restoration work in many areas. Spring harvesting, for example, has been identified as economically advantageous in allowing ecosystem restoration treatment of areas with low timber values. Soils in many ecosystem restoration areas are sensitive to disturbance—particularly in spring—necessitating specific attention to soils when planning harvesting activities.

The primary soil conservation issue relates to soil compaction resulting from machine traffic. Soil compaction alters soil physical properties such as water infiltration and soil gas exchange rates, among others. These alterations of soil properties are documented for soil disturbance types common during ecosystem restoration forestry operations but currently not all of these disturbance types are assessed as ”counted” towards cumulative, allowable disturbance limits during post-harvest soil disturbance surveys. Reductions in tree growth, root egress, and increased surface water flow (runoff) as a result of changes in these properties due to compaction are well documented for most “counted” disturbance types—for forestry applications.

Uncontrolled traffic leading to unnecessary detrimental soil disturbance.

Rocky Mountain Trench soils are often at or near threshold values for critical soil properties such as bulk density and aeration porosity. This indicates these soils may be particularly sensitive to disturbance. There is a lack of knowledge regarding how harvesting-related soil changes will affect ecosystem restoration objectives such as grass establishment and growth. It is also unclear how long compaction will persist in soils under an ecosystem restoration management regime, but it is known that soil compaction is persistent and can be further exacerbated by heavy animal traffic.

Harvest operations can employ numerous strategies to minimize, control, and mitigate potentially detrimental soil disturbance. Control and management of machine traffic through the use of well-placed designated skid trails will confine significant disturbance within narrow corridors and help to avoid the

more sensitive steeper or wetter areas. (Ideally, whenever possible, harvest on the most sensitive soils during periods when the ground is sufficiently frozen or dry, or with sufficient snow depth, which are the best choices for those soil conditions.) Operator training and diligence can achieve significant gains over the tens of thousands of hectares of ground scheduled for restoration treatments. Examples would be staying in sync with landing operations to avoid “cold decking” logs in the bush only to have to retrieve them again; recognizing when they can wander off trails with minimal damage; turning mainly on trails; and avoiding short-cutting on steep slopes or across wetter, more sensitive soils.

Careful identification of soil conditions and how they vary across a harvest site, and explaining this and other practical soil knowledge to planners, supervisors, and operators is the "low hanging fruit" that can pay dividends in terms of soil conservation in ecosystem restoration applications. There is a clear need for research specific to the ecosystem restoration geographic area and objectives; currently much—perhaps too much—is unknown. With only 10% of the soil-specific expertise available today as compared to 10 years ago it is imperative that all those involved take it upon themselves to ensure soil management needs are met.

Biographical notes
Lawrence Redfern's university education focused on forest soil conservation and management. He previously worked for Crestbrook Forest Industries/Tembec Inc. in the East Kootenays and now operates as an independent consultant based in Castlegar. Over the past four years he has assessed soil impacts and assisted in the development of management strategies for soil conservation in ecosystem restoration harvest operations.

Mike Curran has been involved in BC Forest Service research since 1983, first focusing on forest nutrition and fire effects on the coast, and then from 1988 on, soil disturbance based out of Nelson. Recent work includes re-measuring old skidtrail rehabilitation trials, 10-year measures on the long-term soil productivity trials, and continued work on guidance documents.

8. Rocky Mountain Ecosystem Restoration Program - Progress to date

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Randy presented an overview of this ecological restoration program. For more information, read the 2006-2009 update at: http://trench-er.com/images/uploads/newsletter-er-update-2006-09.pdf

Visit the website of the Rocky Mountain Trench Ecosystem Restoration Program at: http://trench-er.com/about/trench/ . This site contains:

- Over 300 publications, maps and historic photos in searchable database
- Links to other ecosystem restoration sites
- Newsletters, news releases
- Five year plan

Biographical notes
Randy Harris is the Team Leader - Ecosystem Restoration with the Ministry of Forests, Lands, and Natural Resource Operations, Rocky Mountain Resource District in Cranbrook, BC. Randy has 32 years of experience with forestry and environmental jobs with various ministries before being hired in November 2006 for this position.

9. Limber pine restoration in southeast BC

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Limber pine (*Pinus flexilis*) is a blue-listed species in British Columbia and is likely the rarest tree species in the province. It occurs from the floor of the Rocky Mountain Trench to 1800 m where it coexists with whitebark pine on some sites. It is known to occur in three main populations in the Crowsnest Pass region, between Canal Flats and Invermere, and the Kicking Horse Canyon east of Golden. Limber pine is primarily threatened by the introduced white pine blister rust (*Cronartium ribicola*), mountain pine beetle (*Dendroctonus ponderosae*) and urban development in the Rocky Mountain Trench. In 2010 a multi-year project was initiated with long-term goals to:

1. Enhance limber pine recruitment;
2. Gather information about and document existing occurrences of limber pine;
3. Document any rare species that may grow in association; and
4. Raise awareness and disseminate information regarding limber pine.

Limber pine.

In the first year of the project we collected an estimated 32,000 seeds from four stands, identified four new occurrences of limber pine, and due to locating limber pine in the Elk Valley, this species is now being incorporated into mine reclamation plans. In 2011 we will be implementing a range of restoration activities with private landowners and in conjunction with interface fuels reduction activities on crown lands.

For more information:

Whitebark Pine Ecosystem Foundation of Canada
http://www.whitebarkpine.ca/

Whitebark Pine Ecosystem Foundation (Missoula)
http://www.whitebarkfound.org/

Biographical notes

Randy is an ecologist for Keefer Ecological Services of Cranbrook, BC. He specializes in whitebark pine recovery, ecosystem mapping, and ecological restoration. Randy holds a Masters degree in Forest Sciences as well as a Bachelor degree in Natural Resources Conservation from UBC. He is a Registered Professional Biologist with the BC College of Applied Biology. He has worked on whitebark and limber pine restoration projects throughout BC. He is Chairperson and co-founder of the Whitebark Pine Ecosystem Foundation of Canada a non-profit society dedicated to the conservation of whitebark pine.

Field trips

Field trips were concurrent.

Managing Grasslands for Lewis' Woodpecker and Flammulated Owl

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This trip visited two recent grassland ecosystem restoration projects. The first showed manual thinning to maintain aspen copses and reduce conifer encroachment on the Pine Butte property, which is partly crown land and part a Nature Conservancy Canada holding. Trees have been modified to create living snags; trimmed and injected with heart rot to create nesting habitat for cavity nesters with Lewis' Woodpecker as a focus.

The second stop was a brief walk through an area recently logged to open range standards on the Saint Mary's Indian Band Reserve. The area is an excellent example of employing both the dispersed and grouped retention silviculture systems. Group reserves are anchored around large legacy ponderosa pine and Douglas-fir snags. Confirmed sightings of the Flammulated Owl have been recorded within the logging block in 2010. This area fits in with other ecosystem restoration projects on the landscape that have been initiated by other partners in the last 2 years. This project is consistent with federal regulations. An interesting conversation around partnerships and the inclusion of the Ktunaxa Nation into the management of forests within the Ktunaxa traditional territory is sure to occur. The four partners on the project include the St. Mary's Indian Band, Tembec Ministry of Natural Resources Operations, Nupqu Development Corporation and Indian and Northern Affairs Canada.

Biographical notes
BJ Randall Harris is a Registered Professional Forester with the Ministry of Forests, Lands, and Natural Resource Operations in Cranbrook BC. He has 35 years of experience in forestry, land management, and biology, a Bachelor's of Science in Forestry from University of Alberta and currently co-ordinates the Rocky Mountain Trench Ecosystem Restoration Program

Brian Watson is the Forestry Manager with Nupqu Development Corporation. He has been living in the East Kootenays for seven years. Brian works on behalf of the Ktunaxa Nation to broaden its involvement in the forestry sector.

Fifty years of plant succession in East Kootenay Grasslands - Implications for Agriculture, Wildlife and Forest Management

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The Skookumchuck Historical Exclosure was constructed in 1951 and sampled at about 10 intervals from 1960 to 2009. This exclosure is a valuable resource, not only for grazing management, but because it serves as an indicator of the complexity of resource management as a whole in the East Kootenay.

Improved livestock and wildlife management are essential for recovery and long-term sustainability of range resources. Equally important is bringing management of those two resource values into balance with other values on grassland/open forest range such as soils, water, small mammals, insects, birds, recreation, timber, and visual and cultural values. The most important objective for the sustainability of integrated resources is land management. Landscape units should be managed holistically with livestock, wildlife and forest resources considered as components of the system.

This field trip summarized the implications and difficulties of grazing management involving multiple ungulate species, the needs of species at risk, such as the long-billed curlew and sharp-tailed grouse, evaluate solutions such as ecosystem restoration that have been applied so far, and discuss additional techniques based on what we have learned.

Tim Ross speaking at a field trip stop.

Tour of Tipi Mountain Native Plant Nursery

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Participants toured the facility and gained an understanding of the inner workings of a native plant nursery that focuses on providing plant stock for ecological restoration.

Tipi Mountain Native Plant Nursery is raising limber pine seedlings