



United States  
Department of Agriculture

Forest Service

Shasta-Trinity National Forest  
Headquarters

3644 Avtech Parkway  
Redding, CA 96002  
(530) 226-2500  
(530) 226-2490 – TDD  
[www.fs.fed.us/r5/shastatrinity](http://www.fs.fed.us/r5/shastatrinity)

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**Date:** September 22, 2006

**Route To:**

**Subject:** Port-Orford-cedar Root Disease In The Clear Creek Watershed (FHP Rept. No. N06-06)

**To:** Alan Vandiver, Happy Camp District Ranger  
Peg Boland, Klamath National Forest Supervisor

On August 9-10, Dave Schultz (entomologist) and I hiked approximately 30 miles down the Clear Creek National Recreation Trail from the Young's Valley trailhead to the Clear Creek trailhead. The majority of the trail is in the Siskiyou Wilderness Area. The purpose of our trip was to check for insect and disease activity, with a focus on looking at Port-Orford-cedar (POC) for Port-Orford-cedar root disease, caused by the exotic pathogen *Phytophthora lateralis*. As a result of what we found, Dave repeated the trip with Carol Sharp on September 6-7 to show her what we had seen, and to discuss potential management options.

Through the years, Forest Pest Management Suppression/Prevention funds have been used for improvements at each trailhead (as well as the nearby Doe Flat trailhead) to help prevent the introduction of the root disease to the area. However, while Dave and I had walked limited distances from each trailhead, until that time we had not checked the entire trail. Because we had never had any reports of unusual disease activity in the area (except for one report that was checked out by Max Creasy and found to be amethyst cedar borer), we fully expected to find no POC root disease in the area. In addition, because POC root disease is typically introduced when infested mud is carried in by vehicles, we felt that the remoteness of the area, together with the lack of motorized vehicles, would make the presence of the pathogen very unlikely. Unfortunately, as you know, we found several areas with dead and dying POC, and the pathogen appears to be well established in the watershed. This represents the first time that POC root disease has been identified on the Klamath National Forest.

Dead and dying POC were found in several locations near the trail. Presence of POC root disease in each location was confirmed by removing the bark from the roots and lower bole of off-color (newly infected) trees and checking for the diagnostic cinnamon-brown discoloration coming up from below. The first infested area was found approximately 6.3 miles down from the Young's Valley trailhead (GPS Waypoint 40 in the table below). Additional infestation areas continue downstream from there. The infestation at Waypoint 44 was the last point where POC root disease was identified immediately adjacent to or very close to the trail. However, additional areas of dead and dying Port-Orford cedar, presumably killed by *P. lateralis*, were seen from the trail in several areas where the trail is well above Clear Creek. Accessibility and time considerations prevented further investigation and documentation. The location of several of



these areas is included in the table below. A map showing the GPS waypoint locations of POC root disease from the two trips will be provided shortly.

It is impossible to know exactly how *P. lateralis* was introduced into the Clear Creek watershed. This has been a subject of much speculation over the past several weeks. However, it appears that POC root disease is well established and may well be present all the way down to and beyond the canyon near the Clear Creek trailhead. Additional searching was done by Dave and Carol during the second trip to see if any additional root disease infestations could be found upstream from the initial infestation at Waypoint 40. The area in and around Young's Valley received particular attention, but no additional POC root disease was found between the Young's Valley trailhead and Waypoint 40. Detailed investigation of existing aerial photos may provide a cost-effective way to gain additional insight regarding the distribution of the disease.

In addition to the areas with POC root disease, several segments of trail were noted that appeared to always be wet, either because the segment had poor drainage, was located along a seep, or both. These perennially wet trail segments, when they occur within a POC infestation area, can serve as focal points for disease spread, where the pathogen may be picked up by humans or animals in infested mud and transported elsewhere. In contrast, areas like these that are not infested are perfect for the establishment of new infestations, where pathogen-laden mud may be washed off of boots or animals' feet near enough to a susceptible host to start a new disease pocket. Several of these areas are included in the table below.

### Management Recommendations

The individual management options and their prioritization are the result of several discussions between Dave, Carol and me, both during our visits to the Clear Creek Trail and after. Currently, the disease appears to be too widespread and well established in the Clear Creek watershed for complete eradication of *P. lateralis* to be considered as a viable management option. However, several actions may be taken that will help to limit further spread of the disease. In particular, additional protection of areas upstream from the first infestation along the trail at Waypoint 40 may be reasonably accomplished and would help to keep the pathogen out of the upstream area between Waypoint 40 and the Clear Creek headwaters. GPS coordinates, observations, management recommendations and treatment prioritization for important individual locations are given in the table below. Prioritization considers both the need to protect the upstream portion of Clear Creek and the need to reduce disease spread and intensification in infested areas downstream:

Management Priority	GPS Waypoint # & Coordinates	Presence of POC Root Disease	Comments & Management Recommendations
1	40 N41°51.558' W123°38.207'	Y	Approx 6.3 miles from Young's Valley trailhead. Positive ID of <i>P. lateralis</i> . POC RD is running as a stripe of mortality from about 100 feet above the trail to the floodplain and creek about 100 ft below the trail. Removal of all POC (infected and non-infected) from the top of the infestation to about 50-feet below would reduce inoculum levels near the trail and reduce the potential for disease spread. If evidence of camping or other repeated human activity is found in the floodplain below the trail, then additional POC will need to be removed where that occurs as well. Minimum treatment would cover about 0.6-1.0 acres, though additional removals would provide additional protection. On the second trip, Dave showed Carol the boundaries of a suggested treatment area.
2	<u>Between WP 48</u> N41°46.186' W123°38.048'  <u>And WP 49</u> N41°46.115' W123°38.065'	Y	Between WP 48 and WP 49 is another POC root disease infection center located around a wet area adjacent to the trail. <i>P. lateralis</i> was identified in 2 small pole-sized POC. This is probably the result of a relatively disease introduction from the trail. Rerouting of the trail into the uninfested area above the current trail (around the infestation) is recommended to reduce potential for additional human-caused disease spread. The uninfested south and north ends of proposed trail reroute are at Waypoints 48 and 49, respectively.
3	45 (recorded GPS coordinate incorrect)	N	Approximately 0.5 miles down the trail from the old Young's Valley Trailhead. High in the Clear Creek drainage. Water runs on the trail with small POC growing in and alongside trail. This area would benefit from drainage improvement and addition of rock onto trail to separate hikers from wet area. May be near enough to the Young's Valley trailhead to bring in rock. Otherwise, local native materials may be used.
4	47 N41°51.531' W123°38.174'	N	Located between a the known infestation area on the trail (Waypoint 40 ) and a creek crossing, this is a wet spot on the trail where water runs down trail with POC right next to it. This segment of trail would benefit from drainage and trail improvement (place rock over the trail or build a bridge over the wet area using native materials) or a trail reroute around the wet trail segment.
5	---	----- -----	At least 10 seeps/wet spots in the trail with adjacent POC were seen between the one at Waypoint #47 and the trail crossing at Bear Paw Creek. These spots varied in size, but may be addressed by improving drainage and/or installing bridges with native material over the wet spot, or by implementing minor trail rerouting. Larger wet spots

			should receive treatment priority over small ones.
6	37 N41° 52.928' W123° 38.217'	N	Stream running through trail with small POC growing in trail. High in the Clear Creek drainage. Would benefit from trailside sanitation (removal of POC) and drainage improvement. This trail segment is already armored with rock.
7	38 N41° 52.863' W123° 37.700'	N	Approx 2.7 miles from Young's Valley trailhead. High in the Clear Creek drainage. Water runs through the trail with small POC right next to it. Would benefit from trailside sanitation (removal of POC) and drainage improvement. This trail segment is already armored with rock.
8	44 N41° 45.639' W123° 38.171'	Y	POC with older POC root disease alongside the trail. Only a few living POC remain. The disease has already run it's course near the trail and is now in decline. Evidence of high creek level in the past, but no standing water is currently on trail. Limited value for disease control due to the few remaining living POC.
RD noted, but too far from the trail for management actions to be of value.	42 (recorded GPS coordinate incorrect)	Y	Approximately 0.5-miles below Wilderness Falls. 3 large dead/dying POC and one small Pacific Yew. <i>P. lateralis</i> confirmed in Pacific Yew about 100 feet below the trail. More dead/dying POC were seen further down the canyon. This infestation appears to be widespread and well established. However, the distance of infested POC away and <u>down</u> from the trail limits the value of any disease control measures.
RD noted, but too far from the trail for management actions to be of value.	46 (recorded GPS coordinate incorrect)	Y	Positive ID of <i>P.lateralis</i> well below the Clear Creek Trail near Rattlesnake Meadow trail, approximately 1/2-mile downstream from Waypoint #40. Many infested areas with dead/dying POC were seen well below the trail from this point all the way to Wilderness Falls. Distance of infested POC away and <u>down</u> from the trail limits the value of any disease control measures.

As you know, it is imperative that the higher-priority treatments be implemented as soon as possible, so that the root disease spread may be kept to a minimum. Carol has mentioned that efforts are already underway to try and implement the recommended POC removals at Waypoint 40 this fall. Please let Dave and me know if there is anything we can do to help make this happen. Because of the importance and time-sensitive nature of this disease situation, it may be possible to obtain some emergency Forest Pest Management Suppression/Prevention funds to help with this effort. I'll contact the appropriate people and see if this is possible.

I'm sure that we will be working closely together on this new situation. Please contact me if you have additional questions or need more information.

/s/ Pete Angwin  
Plant Pathologist

cc: Dave Schultz  
Carol Sharp  
Max Creasy  
Deems Burton  
Dan Blessing  
Roger Siemers  
Chuck Frank  
Mary Kay Vandiver  
Dave Webb  
Roy Bergstrom  
Julie Lydick  
Sheri Smith  
Frank Betlejewski  
Jody Thomas