

SWISS NEEDLE CAST 2013 FIELD TRIP

JUNE 4, 2013

OLYMPIC PENINSULA AND QUINULT NATION, WASHINGTON

**Hosted by Quinault Nation Forestry (Jim Plampin and Jim Hargrove)
and WA DNR (Dan Omdal and Amy Kroll)**

AGENDA (Lunch not provided!)

800-830am - Meet at Quinault Resort and Casino

78 Washington St. Hwy 115, Ocean Shores, WA 98569.

Discuss symptoms and signs of SNCC vs. other issues - Dave Shaw et al.
Hand lens provided, observations on pseudothecia from samples provided

830am - Depart Quinault Casino (Please refer to map of site locations)

Stop "E": "DNR 33" – Rayonier [47.31472, -123.90925]

Review identification of SNC – Dave Shaw

Discuss DNR aerial survey data – Amy Kroll and Dan Omdal

Stop "B": T20N R12W Sec. 4 Moclips Hwy

Discuss Quinault aerial survey data – Jim Plampin

Stop "C": T20N R11W Sec 6 Moclips Hwy - APHIS SNC tolerance site

(future tree improvement site)

Discuss what time of year trees should be assessed, what is the best protocol for assessing this age stand, any information on contractors who could do the work – Jim Hargrove and Keith Jayawickrama

Stop "D": "Overlook" - looks over landscape [47.233694, -124.169827]

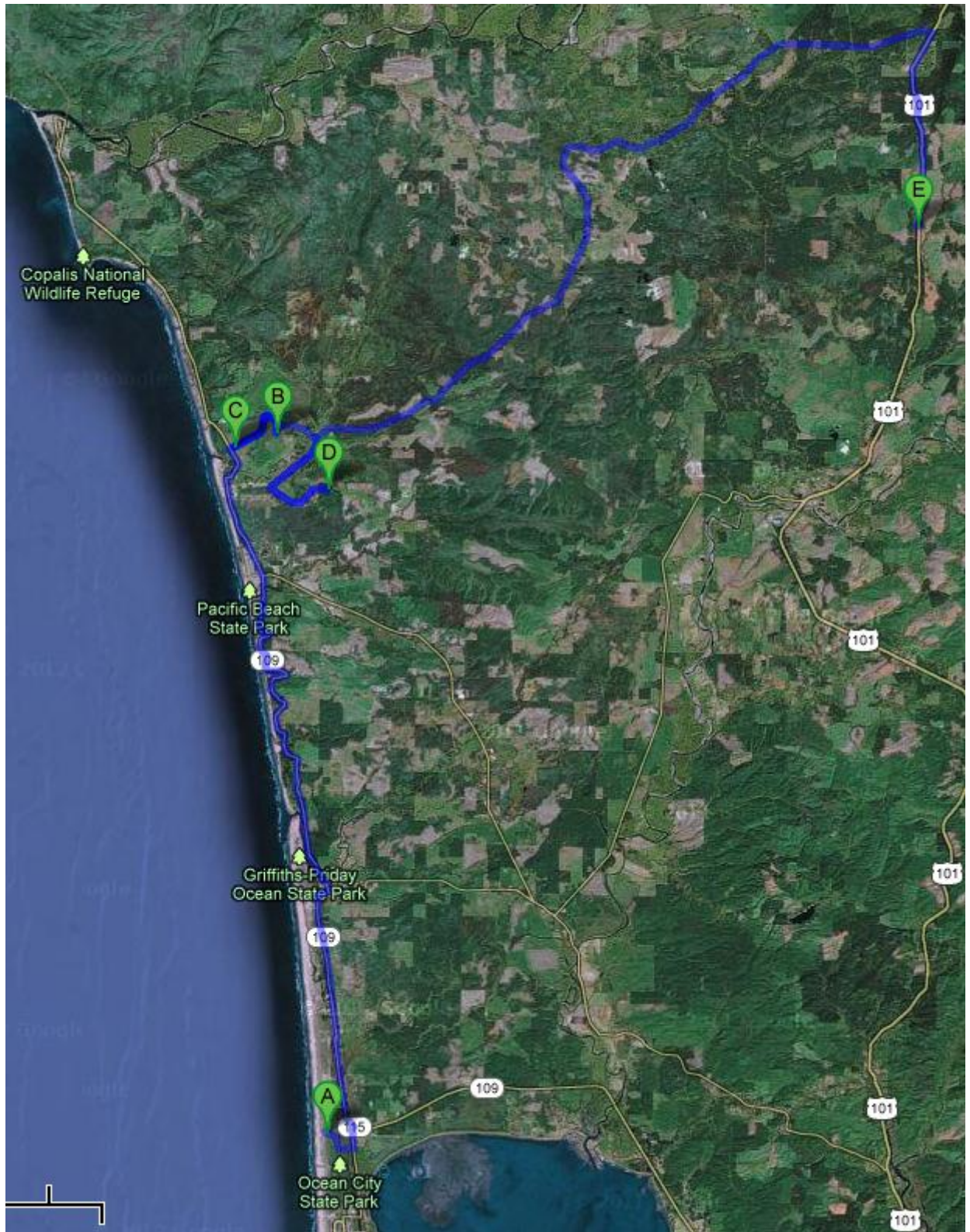
DNR management considerations – Amy Kroll and Dan Omdal

SNC management strategies

Discuss perspectives on climate change on SNC – Dave Shaw

Return to Quinault Casino ~3-4pm

SNC FIELD TRIP 2013 OLYMPIC PENINSULA & QUINULT NATION



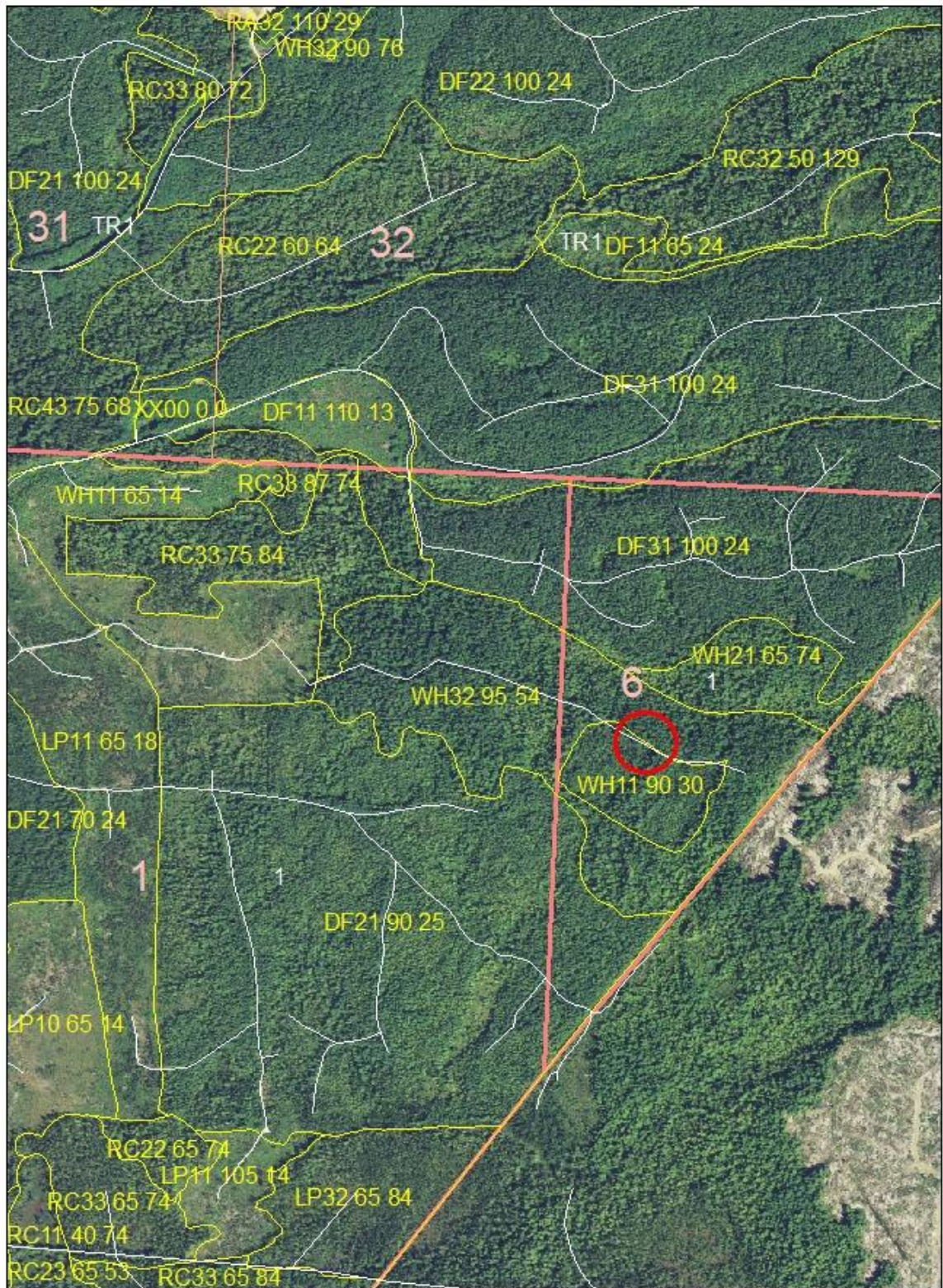
Site "B"

Site #1 SNC Aerial Survey and DF Stand Infection



Site "C"

Site #2 APHIS Grant Site



SNC Symptoms 2012 Aerial Survey

-  Moderate
-  Severe
-  Ground plots

Area
not
flown



0 5 10 20 30 40 Miles



Incidence and Severity of Swiss Needle Cast in Coastal Washington, 2012

Daniel Omdal¹, Amy Ramsey-Kroll¹, Aleksandar Dozic¹, Ben Smith², and Hannah Peterson¹

¹Washington Department of Natural Resources, Olympia, WA

²USDA Forest Service Forest Health Protection, Sandy, OR



Introduction

The fungus that causes SNC, *Phaeocryptopus gaeumannii*, is found throughout the range of its host, Douglas-fir (Shaw et al. 2011). The disease is most damaging near the coast due to the fungi-favorable climatic and topographic conditions. Swiss Needle Cast can reduce growth of host trees, as well as alter wood properties and affect stand structure and development (Kansake and McWilliams 2011).

In 2012, an aerial SNC survey was coupled with a ground survey in Washington. The objective of the ground survey was to validate the aerial survey and determine how accurately the data collected from the air reflected what was happening on the ground. Our ground data, specifically the percent stomata occluded by fungal pseudothecia, did not accurately reflect the extent of damage detected from the aerial survey, suggesting that ground surveys are necessary to corroborate disease incidence and severity.



Methods

Aerial Survey:

- Flown on May 7, 10, 11, and 14
- From west coastline east until SNC symptoms were no longer visible

Ground Survey:

- 75 total ground sites
- 14 associated with "severe" SNC aerial survey polygons
- 26 associated with "moderate" polygons
- 35 were not associated with any aerial survey polygons (referred to as "other" in the results)
- Stand color, landscape position, elevation, aspect & average tree age were recorded for each site
- Needle retention, diameter at breast height & crown color were recorded for 10 trees along a transect/site
- 1 and 2 yr. old foliage samples were collected from 10 trees/site

Microscopic Analysis:

- 300 stomata on each of 10 needles from each foliage cohort from 10 trees on 75 sites examined for pseudothecia occurrence

Results and Discussion

Aerial Survey:

- Flew 2.7 million acres
- Mapped 228,500 acres of symptomatic Douglas-fir
- 8.5% total acres surveyed were symptomatic

Questions or Comments regarding this project can be directed to Amy Ramsey-Kroll: amy.kroll@dnr.wa.gov or 360.902.3309. Funding for this project provided by USDA, US Forest Service, Forest Health Protection, Project: WCPH-12-01. Poster printed February 2013.

Results and Discussion (cont'd)



Figure 1. Map of 2012 Aerial Survey showing SNC symptoms (Severe, Moderate, Ground plots) and an area not flown.

Differences among site characteristics from the ground survey varied across site type. The percentage of Douglas-fir in the stands was greatest in the "other" and "moderate" sites, with significantly less in the "severe" sites (Figure 2). The average needle retention, in years, was significantly less in the "severe" and "moderate" sites when compared to the "other" sites (Figure 3).

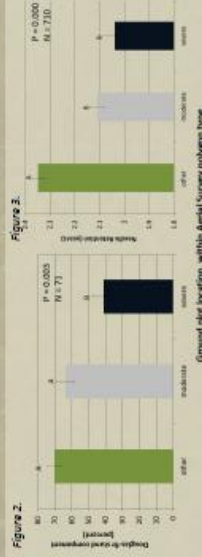


Figure 2. Percentage of Douglas-fir in the stand for the other, moderate and severe ground plots. The error bars are shown for each. Significant differences are indicated by different letters above each bar.



Figure 4. Plot with Douglas-fir, western hemlock and sitka spruce.



Figure 3. Douglas-fir with low needle retention.

Results and Discussion (cont'd)

Since crown color is the characteristic used to detect SNC symptoms, significantly more yellowing in the "severe" sites was expected (Figure 6), but a significantly less Douglas-fir component in the "severe" sites was not (Figure 2).



Figure 6. Average crown color of Douglas-fir in the surveyed stands. The error bars are shown for each. Significant differences are indicated by different letters above each bar.

Phaeocryptopus gaeumannii incidence was greater than 90% in both the 2011 and 2010 foliage across all sites, except for the "severe" sites. The "other" sites had significantly greater pseudothecia incidence than the "moderate" and "severe" sites (Figure 7). The "severe" sites had the lowest percent of pseudothecia occluded stomata in the 2010 foliage (Figure 8). The percent pseudothecia occluded stomata data does not reflect the results from the aerial survey.

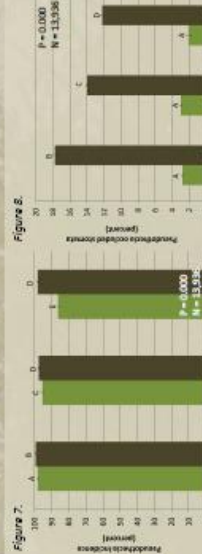


Figure 7. Average incidence of *Phaeocryptopus gaeumannii* in the surveyed stands. The error bars are shown for each. Significant differences are indicated by different letters above each bar.

Caution should be advised when interpreting aerial survey data. The SNC survey should be considered a conservative estimate of the acreage affected by SNC because aerial observers can only map areas where disease symptoms have developed enough to be visible from the air. SNC aerial survey can be used to coarsely document trends in damage over time. The ground data shows that SNC is present in areas that were not mapped during the aerial survey. While the aerial survey can be used as a guide for identifying areas impacted by SNC, on the ground surveys should be conducted in stands of interest before SNC mitigating management decisions are made.

Table 1: Data for Figure 1. Map of 2012 Aerial Survey showing SNC symptoms (Severe, Moderate, Ground plots) and an area not flown. The table lists the number of acres surveyed for each category: Severe (228,500), Moderate (228,500), Ground plots (228,500), and Area not flown (2,700,000).

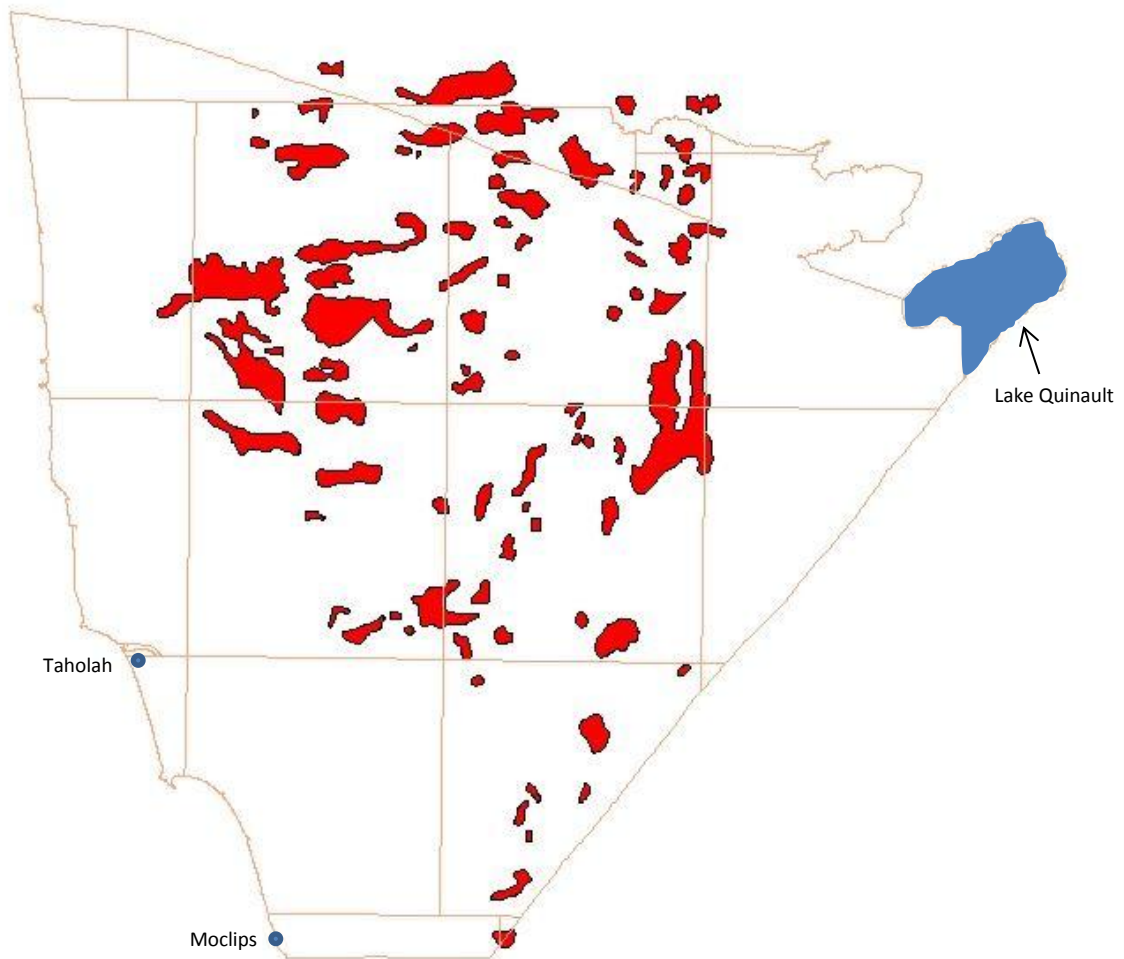
May 2001 SNC Survey for Quinault Tribal Lands

<i>Count of Stands Surveyed</i>	275
<i>Count of Stands with Bear Damage:</i>	109
<i>Count of Stands with Light SNC Damage</i>	66
<i>Count of Stands with Heavy SNC Damage</i>	22
<i>Sum of Acres Surveyed</i>	10621.69
<i>Sum of Acres with Light SNC</i>	3081.314
<i>% of Surveyed Acres with Light SNC</i>	29.0%
<i>Acres of Largest Stand with Light SNC</i>	352.37
<i>Sum of Acres with Heavy SNC Damage</i>	1157.367
<i>Percentage of Surveyed Acres with Heavy SNC</i>	10.9%
<i>Acres of Largest Stand with Heavy SNC</i>	228.328

May 2012 SNC Survey for Quinault Tribal Lands

<i>Count of Stands with Medium SNC Damage</i>	181
<i>Count of Stands with Heavy SNC Damage</i>	5
<i>Sum of Acres with Medium SNC</i>	9,123
<i>% of Surveyed Acres with Medium SNC</i>	30.0%
<i>Acres of Largest Stand with Medium SNC</i>	806
<i>Sum of Acres with Heavy SNC Damage</i>	581
<i>Percentage of Surveyed Acres with Heavy SNC</i>	2.0%
<i>Acres of Largest Stand with Heavy SNC</i>	269

2000 SNC Flight



2012 SNC Flight

