

2008 *Bridgeoporus nobilissimus* surveys on the Gifford Pinchot  
National Forest



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## Introduction

*Bridgeoporus nobilissimus* (BRNO8) is a fungal species that produces a perennial polypore (conk). The host species is noble fir (*Abies procera*), though one conk on the Olympic National Forest was found on a Pacific silver fir (*Abies amabilis*). The distinctive conks have been found only on very large (> 36-inch DBH, diameter breast height) snags, stumps, and a few green trees within about 4 feet of the ground and up to 6 feet from the base of the host tree growing from the host's root collar and root crown. It has been found in stands with very few large noble fir, in dry to moist areas, and on all topographic aspects (pers. comm. Terry Fennell). Additional information is available in a species fact sheet (Lebo 2007).

The Goat Marsh Research Natural Area southwest of Mount St. Helens on the Gifford Pinchot National Forest has a population of BRNO8. However, relatively few other areas on the Gifford Pinchot NF have been surveyed for BRNO8 though there are other stands of large noble fir. Surveys were conducted in 2006, approximately 100 acres, as part of an effort to evaluate a BRNO8 habitat model developed by Dr. Robin Lesher (Lippert et al., 2006).

The objective of the 2008 survey effort was to inventory large-diameter noble fir stands working away from the known population at Goat Marsh. In particular, we speculated that there may be potential habitat to the northeast of Goat Marsh within the Mount. St. Helens blast zone on remnant noble fir snags and stumps since it has been 28 years since the eruption. Noble fir stands cut about 30 years ago on Salem BLM District have produced BRNO8 conks on the large, rotting noble fir stumps so our hypothesis is that the stumps and snags in the blast zone may be producing BRNO8 conks. Another goal was simply to develop a better understanding of where the large-diameter noble fir stands are or were in the recent past (i.e., stumps) on the Gifford Pinchot NF and to assess the areas for future BRNO8 survey.

## Methods

The first steps were conducted in the office by Darci Rivers-Pankratz pulling together existing BRNO8 known site and noble fir stand information and querying personnel on both the Mount St. Helens National Volcanic Monument and the Cowlitz Valley Ranger Districts.

The BRNO8 habitat model first developed in 2001 for the Survey & Manage Program was examined in ArcGIS. The habitat models were developed for each individual Potential Natural Vegetation (PNV) Ecoregion so there is a separate model for the southern Washington Cascades. Only PNV ecoregion 10010206 was developed for the Gifford Pinchot NF. Variables used in the model include: precipitation at sea level, elevation, mean annual temperature at sea level, temperature lapse rate, cold air drainage effect, mean annual temperature, aspect, solar radiation and plant association group. Mapped habitat classes are: high likelihood, moderate likelihood, low likelihood and not likely. Habitat classes are defined based on the frequency of distribution of known sites used to develop the model within each habitat class: High Likelihood-68% of known sites occur in this class; Moderate Likelihood- includes 27% of the known sites, Low Likelihood- includes 5% of the known sites ; Not Likely- no known sites occur within this map unit. Because only a few known sites within the Goat Marsh population are known in the

southern Washington Cascades, the Gifford Pinchot BRNO8 habitat model narrowly defines potential BRNO8 habitat.

Prior to the 2008 surveys, Robin Leshner who developed the model was questioned further about the model variables. In particular, Robin said that the Gifford Pinchot BRNO8 habitat model keys in on the transition between the western hemlock and silver fir plant associations. Noble fir occurs in these transition zones. It is apparent though that the habitat model does not predict where noble fir occurs so it is of limited utility.

Orthophotos in ArcGIS were examined for the presence of large noble fir crowns. Old-growth noble fir have broad crowns and appear blueish, which often stands out against the darker green of other conifers. Aerial photos taken prior to the Mount St. Helens eruption on May 18, 1980 were not readily available, but could be examined for future surveys.

Potential survey areas were listed and access to those areas examined. A reconnaissance outing was made by Darci Rivers-Pankratz to scout several potential areas. She also revisited the Goat Marsh area with John Parsons who was involved in initial BRNO8 surveys in 1992.

Topographic maps and aerial photos were developed for the areas we intended to survey. The 2008 Survey Protocol for *Bridgeoporus nobilissimus* (Fennell and Van Norman, 2008) was used. Surveys were documented on NRIS Threatened, Endangered, and Sensitive Plants field forms and will be entered into the NRIS TESP database.

## Results

During the planning stages, we realized that many areas in the blast zone are not easily accessible and the areas closest to the mountain had few stumps remaining. The BRNO8 habitat model shows potential habitat in the Pumice Plain, the North Fork Toutle River valley, and from the north side of Spirit Lake over towards Coldwater Lake. We believe the Mount Margaret backcountry may be a good area to survey, but it would require a backpacking outing and close examination of pre-blast aerial photos. Access to the northwestern part of the Monument requires going through Weyerhaeuser lands. Contact was made with the Weyerhaeuser Camp Arnold office in Castle Rock, a map purchased, and a key borrowed. Unfortunately, locating ready access to the Minnie Peak, Vanson Meadow and Miner's Creek areas was unsuccessful, though we think these areas may be suitable for BRNO8 surveys.

Surveys were conducted for three days from September 2-4, 2008 by a crew of 6 people. Six areas were surveyed. No new populations of BRNO8 were found.

We searched within several miles to the east of the Goat Marsh population on days 1 and 3, and on day 2 we scouted several areas where we thought there would be large noble firs or remnant noble fir to the northeast of Mount St. Helens. The slope to the west of Meta Lake was protected from the blast by a ridge and snow so we thought perhaps there were remnant noble fir, but the trees appeared to be too young and predominantly Pacific silver fir. We visited this area, but did not conduct a survey. Towards the end of the day, we also visited Yellowjacket Creek where there is a report of the largest noble fir on record according to the Gymnosperm Database

(<http://www.conifers.org/pi/ab/procera.htm>). Unfortunately, we did not have an accurate location and did not find the noble fir stand. Later communication with Robert VanPelt revealed that the area was a noble fir botanical area as recently as 1960, but was subsequently logged except for 2 noble fir at the edge of the stand, one of which is the record-holder tree.

Below is a brief discussion of results encountered by areas searched.

Butte Camp Dome south, 9/2 – We surveyed this stand of large noble fir and western hemlock on a bench located at the toe of a steep section on the south side of Butte Camp Dome. The Toutle Trail (#238) passes through the stand. The overstory is dense and the understory is sparse. There are abundant large noble fir.

Butte Camp Dome east, 9/2 – We hiked up Butte Camp Trail 238A to the area where the trail switchbacks, east of Butte Camp Dome. Along the switchback sections there is a stand dominated by moderate to large sized noble fir; the stand is single canopy, with sparse understory, including *Claytonia sibirica*, *Xerophyllum tenax*, *Vaccinium membranaceum*, *Valeriana sitchensis*, and *Rubus lasiococcus*. In comparison to the Goat Marsh BRNO site, this stand felt dry (slope was southwest facing, so not surprising). We then hiked across a number of steep draws/avalanche chutes, and following some veins of very large noble fir toward the top of Butte Camp Dome. Although these noble firs appeared older, we did not see any conks growing on them. These veins of very large old noble fir were located along the edge of steep draws.

Ghost Lake, 9/3 – The hillside just west of Ghost Lake is a remnant stand within the blast zone. There are large Douglas-fir and western hemlock with abundant Pacific silver fir. Only one large noble fir tree was located.

Greenhorn Creek, 9/3 – The Gifford Pinchot's noble fir seed orchard, on the north side of French Butte, is located in an area chosen for its noble fir, which is why we targeted this area. We surveyed the Greenhorn Creek area to the east which looked like probable habitat for larger diameter noble fir. Most of the area seems to be somewhat young and even-aged (part of the 1918 Cispus Burn?). The stand we examined had abundant Pacific silver fir with western hemlock. Noble fir were present in the stand but probably too small to host BRNO8 conks.

Ape Canyon, 9/4 – We hiked along the Ape Canyon Trail until the trees ran out. Along the first portion of the trail, there were few noble firs - the big trees tended to be Douglas-fir. As we progressed, we saw lots of large silver fir, and a few noble fir, and no subalpine fir. At a certain point, noble fir became the dominant overstory, and in some places, the exclusive overstory (I took a UTM reading in one of the first patches of noble fir and it is easting 0568977, northing 5114562). The trees were large, and appeared to be thriving. I commented to John that I felt that this forest - though very old and the trees very large - really showed few signs of the decay that one usually associates with old growth. There were few snags in the forest, and few conks (I don't recalling seeing a single conk on noble fir). We searched the boles of quite a number of trees, especially in the mid section of the trail where noble fir became dominant, but as we progressed, we were overwhelmed with the number, and didn't have time to search them all. Since the trail is on a ridgeline, we felt that we had a good view into the stands in many places, and the trees seemed universally healthy and thriving. Interestingly, we ran into some *Acer glabrum* (rocky mountain maple) in a few different places along the ridgeline - this was

unexpected, since it is usually found much more to the east. Overall, the forest seemed fairly dry. Common understory plants included *Acer circinatum*, *Achlys triphylla*, *Tiarella trifoliata* v. *unifoliata*, *Clintonia uniflora*, *Adenocaulon bicolor*, *Polystichum munitum*.

Ptarmigan Trail-Loowit Trail-June Lake Trail, 9/4 – We hiked up the Ptarmigan Trail (trail 216A) from Climber's Bivouac through Pacific silver fir. We did not encounter noble fir until we were on the Loowit trail (trail 216) heading east. Along the Loowit trail we encountered 3 sites sparsely populated with clusters of noble fir, with an average of 4 live noble fir per site. In the area above June Lake large noble fir are more abundant in the stand as well as large Douglas-fir that appeared to be the same size class. It is a climax western hemlock forest. All noble fir that we encountered were greater than 40" dbh. There were few noble fir snags.

## **Discussion**

We suspect the Goat Marsh BRNO8 population is larger and should be more thoroughly surveyed and mapped including through the Blue Lake and Huckleberry Saddle areas over to Sheep Canyon as well as at the foot of Goat Mountain on the east and west sides. We did not focus on extending our knowledge of this population in the interest of trying to extend the distribution of the species on the Gifford Pinchot NF.

Further data sources that should be checked are the stand exams, querying specifically for noble fir and year of origin. These data could be used to identify plantations with large noble fir stumps. Many BRNO8 sites on the Salem District BLM are known from remnant large noble fir stumps in 30-50 year old plantations. Another source of information that could be examined is the genetic select tree layer.

There are certainly potential areas to survey for BRNO8 in the blast zone. It will require greater planning and effort than we had anticipated to identify potential areas and conduct those surveys.

As part of our effort to identify areas with large noble fir, personnel on the Forest who may encounter the trees as part of their regular work were contacted such as those who administer noble fir bough sale contracts and the climbing/backcountry rangers. We shared the BRNO8 survey protocol with these folks and hope that they will look for BRNO8 conks as they go about their work.

A method to sample trees for BRNO8 DNA is currently being developed. Depending on what is found with this methodology within BRNO8 populations such as if BRNO8 is present in trees that do not have conks, we think it may be of interest to sample the large noble firs around Butte Camp Dome, above June Lake, and along the Ape Canyon Trail. We do not know what triggers conk production. It may be that BRNO8 is present in these stands, but not producing conks.



a



b



c



d

Figure 1

- a) A large noble fir tree crown is apparent among other trees in the stand.
- b) Two large noble firs.
- c) A stand containing small clusters of large noble fir trees along the Loowit Trail east of the Ptarmigan Trail (looking west from the Loowit Trail).
- d) Meta Lake

### **Literature Cited**

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- Lippert, J., R. Leshner, A. Reger, J. Ziegler, D. McConnell, T. Fennell, C. Hibler, A. Ruchty, J. Scott, D. Lebo, A. Smith, and M. Roantree. 2006. *Bridgeoporus nobilissimus* Model Calibration. Unpublished report. Interagency Special Status/Sensitive Species Program. USDA Forest Service and USDI Bureau of Land Management, Portland, OR.

**Appendix A:** List of potential noble fir areas to survey for BRNO8 on the Gifford Pinchot NF (not all inclusive)

**Mount St. Helens National Volcanic Monument Ranger District**

<b>Place</b>	<b>Road access</b>	<b>Legal</b>	<b>notes</b>
Snyder Pasture	FS2551	T9N R7E s15/14	End of 2551, trail #80A
Mt. Margaret Backcountry	FS26	T10N R5/6E	Backcountry rangers will be monitoring
Blue Lake trail #283	FS8123	T8N R4E s13,12,1	Huckleberry Saddle
Fossil Trail #242	FS8117	T8N R4E s15	West and north side of Goat Mtn.
Vanson Meadow	Weyco 26	T11N R5E s27	North end of legislated Monument
Miner's Creek	Weyco 26	T10N R5E s5 T11N R5E s32	
Sheep Canyon	FS8123	T8N R4E s1	Loowit to S. Fork Toutle
Snagtooth	FS9341	T9N R8E s21,16	Trail #4 to Boundary Trail #1

**Cowlitz Valley Ranger District**

<b>Place</b>	<b>Road access</b>	<b>Legal</b>	<b>notes</b>
Yellowjacket Ck.	FS2810		VanPelt location data
Dark Meadows *	FS2325?	T10N R9E s31	
East Canyon Ridge *	FS2328	T10N R9E s28/33	
Blue Lake Trail #119	FS7808	T11N R9E s33/34	Trails 119->271->272->274
Council Lake *	FS2334	T9N R9E s13/14	
FS road 22, Walupt Lake?	FS22	T11N R10E s8/16/22	
Lookout Mtn.	Rd. 52 to 5230	T14N R8E s15	Lookout Mtn SW (Old-growth NF)
Skate Mtn	FS4720 and FS4745	T14N R8E s33 T13N R8E s2	From Packwood – FS52 to 47 to 4720 and also 4745
Rd 45	FS45	T14N 10E s23	
Kincaid trail #42	FS4510	T14N R11E s5 T15N R11E s33	
Jug Lakes, trail #43	FS4510	T14N R11E s9	William O Wilderness trail 44 to 43
Rd 4510 – Carlton Ridge	FS4510	T14N R10E s12	Trail #42 to Kincaid Lake

\* these locations are where the three ranger district boundaries join.

**Mt. Adams Ranger District**

<b>Place</b>	<b>Road access</b>	<b>Legal</b>	<b>notes</b>
Saddle Camp	FS2480	T7N R8E s2	Between East and West Twin Butte