Nordic Forest Research
Co-operation Committee (SNS)

Send the report to SNS-secretary Mimmi Blomquist (SNS@slu.se)

ANNUAL STATUS REPORT for PROJECT

YEAR:

Please notice that the size of text sections in the form can be adjusted if needed.
The length of the report should not exceed 3 pages. **Supplementary information can be attached**

1. Project titel	Assessing the role of climate factors in association with spread of invasive Phytophtora species in forests and from urban landscapes
2. Project leader (name, address, telephone, e-mail)	**Michelle Cleary**, Researcher, Swedish University of Agricultural Sciences, Southern Swedish Forest Research Centre, Sundsvägen 3 SE-23053, Alnarp, SWEDEN, (+46) 40 415181, Michelle.Cleary@slu.se
3. Duration	2016-2019
4. Project status	During the first year, the project has developed according to plans. Activities related to subproject 1: mapping the distribution and diversity of *Phytophthora* species affecting host trees in various countries continues alongside other research endeavours. The project deviates from the originally planned subproject 2. At the first kick-off meeting project participants found a common research interest in establishing a collaborative project that will characterize the *Phytophthora* populations across a soil-climate gradient in the Scandinavian-Baltic region. The results of the collaborative research project will have a more direct input on proposed subproject 3 related to risk assessment of forest *Phytophthora* pathogens and climate change for Nordic and Baltic countries.

5. Activities during the reporting year	A kick-off meeting was held in April 8, 2016 in Malmö, and was attended by participants from Sweden, Finland, Estonia, Lithuania, Norway and Denmark. The aim of the meeting was to launch the new SNS project aimed at understanding the potential impacts of *Phytophthora* in Nordic and Baltic countries under changing climatic conditions. The meeting was initiated by presentations of current updates of *Phytophthora* research in the six countries. The afternoon was devoted to a designing a joint *Phytophthora* project to be carried out in the participating countries. Since the initiation of this project, even more participants were welcomed from Finland, Sweden and Lithuania. The collaborative research project was initiated during 2016. The research project is aimed at determining *Phytophthora* species distribution and diversity across a soil-climate gradient in the Scandinavian-Baltic region, targeting two broadleaved host genera common to these regions, namely birch (*Betula* spp.) and alder (*Alnus* spp.). The Estonian team help to design field sampling and lab protocols for all the participants in the project. Newly designed oomycetes species specific primers and associated protocols (Riit et al. 2016) were taken into account in the analysis for the project. **ALL** project participants from **ALL** participating countries were involved in the field sampling; this involved a systematic sampling of soil in each country in known or suspected areas of infestation (e.g. in forests, parks, amenity plantings) where birch and alder may be affected and uses a DNA metabarcoding approach to determine *Phytophthora* community composition and structure. DNA were extracted and sent to the Southern Swedish Forest Research Centre laboratory, SLU Alnarp for further processing. Through the research visit of SNS project participant **Diana Marčiulynienė**, all samples (in total 112 from all countries) were further prepped for sequencing.
6. Results achieved during the reporting year	Results of sequencing soil samples across a climate gradient in the participating countries are expected later in 2017. *Other relevant results:* **In Finland**, a single *P. uniformis* (-like) isolate was isolated from an alder seedling purchased for outplanting (this is the 1st detection of alder *Phytophthora* in Finland). Successful inoculation tests were performed on both alder and silver birch. **In Estonia**, surveys were conducted related to subproject 1 (mapping the distribution and diversity of *Phytophthora* species). Samples were collected from streams and rivers on *Alnus incana* (63 samples), *A. glutinosa* (1 sample), *Betula* sp. (5 samples) and *Salix* sp. (2 samples). A manuscript is currently in preparation. **In Denmark**, surveys in alder led to a new first report publication. **In Sweden**, surveys continue in both protected and managed forest areas, nurseries, parks and urban landscapes and continued development of Citizen Science initiatives as part of a larger FORMAS-funded project.

7. Publishing and communication during the reporting year International scientific peer reviewed journals, other scientific publications, short communications, web etc.)	*Publications (peer-reviewed journals and popular science)* **Blomquist, M.** 2016. Invasive *Phytophthora* spp. affecting important broadleaved trees species in southern Sweden. Masters thesis. Southern Swedish Forest Research Centre, SLU Alnarp. **Blomquist, M., Cleary, M., Witzell J.** 2016. *Phytophthora* på frammarsch i sydsvenska lövskogar. Ekbladet. 31: p. 19-24 (popular science article in Swedish) **Cleary, M., Blomquist, M.,** Vetukuri R.R., Böhlenius, H., **Witzell, J.** 2017. Susceptibility of common tree species in Sweden to *Phytophthora cambivora*, *P. plurivora* and *P. cactorum*. Forest Pathology [*in press*]. **Cleary, M., Blomquist, M.**, **Ghasemkhani, M.,** and **Witzell, J.** 2016. First report of *Phytophthora gonapodyides* causing stem canker on European beech (*Fagus sylvatica*) in southern Sweden. Plant Disease. 100:2174 **Drenkhan, R.** et al. (manuscript in prep). Survey of *Phytophthora* species in Estonia. Redondo, M.Á., **Thomsen I.M., Oliva, J.** 2017. First report of *Phytophthora uniformis* and *P. plurivora* causing stem cankers on *Alnus glutinosa* in Denmark. Plant Disease. 101(3), 512. **Poimala A**, Werres S, Pennanen T, **Hantula J.** 2017. Alder Phytophthora detected in Finland; also able to infect birch. Plant Disease, *submitted manuscript*. **Van Tour, A.,** 2016. Invasive *Phytophthora* spp. affecting beech (*Fagus sylvatica*) in Söderåsen National Park. Masters thesis. Southern Swedish Forest Research Centre, SLU Alnarp. **Witzell, J., Cleary, M.** 2017. Hantering av *Phytophthora* i sydsvenska lövskogar. (report to Skogssällskapet in Swedish) https://www.skogssallskapet.se/download/18.2ebe46a615a36cbb4313972/1486989798017/1314-124+165-9+Hantering+av+Phytophthora.pdf *Other relevant communications:* • **Daiva Burokiene** presented Phytophthora work for her research group in "Annual Report 2016. Activities and Prospects"; and presentation of "*Phytophthora* diseases on *Alnus*, *Quercus*, *Rhododendron*" (group members: Norkutė G., Sivickis K., Čepukoit D., Kriaučiūnaitė A.) to Nature Research Centre (NRC) as representative of Laboratory of Phytopathogenic Microorganisms, Institute of Botany at the NRC. • **Johanna Witzell** presented *Phytophthora* project work in Sweden during 6 invited presentations with stakeholders/associations/practitioners, 2 invited field excursions/inspections, four educational seminars, and through Citizen Science initiatives. • **Jesper Witzell** presented the project work that is done in the Söderåsen National Park in the meeting of the European Beech Forest Network, Isle of Vilm, Germany, 1.-5. December 2016. The presentation resulted in recognition of *Phytophthora* by the network as a threat to beech forests, ending up as a point in the meeting's official resolution under "Recommendations for conservation policy and management". The resolution was signed by 30 experts from 14 countries (http://wilderness-society.org/vilm-resolution-2016-of-the-european-beech-forest-network/).

10. Short economic report (overview) of the reporting year	SNS annual allocation, -313000.00 SEK Surplus obtained from N2014-05, -46475.17 SEK Norway, 75000.00 SEK Denmark, 33000.00 SEK Finland, 75000.00 SEK Sweden, 25000.00 SEK 1st project meeting, 12219.96 SEK Lab costs (also including DNA kits/lab materials/pocket diagnostics for Estonia and Lithuania and for Norway samples processed at Alnarp), 23809.71 SEK other project related salary, travel & OH, 107736.44 SEK Total project costs = 351766.11 New Surplus -7709.06
11. Date and signature	Date: Signature of project leader:  March 1, 2017 Dr. Michelle Cleary