

ES1304: ParrotNet

Final Achievement Report WG2 Summary

MOU objective: A virtual EMC will be created for monitoring spread of parakeets and the other alien parrot species established in Europe and predicting their future impacts on European agro-economy, society and wildlife. This Centre will facilitate characterisation of '*risk-profiles*' at both national and European scales to inform key EC policy areas such as 'Agriculture and Environment', 'Climate Change' and 'Rural Development'. The Centre will develop and produce scenario-based projections of parakeet spread and subsequent impacts, and will formulate key recommendations for IAS policy. WG2 will comprise database managers of existing IAS online resources, web resource developers, natural and social science experts and conservation planners.

Working Group 2 Summary report

Task 1: Identify core datasets and data types (from WG1 and WG3) required to effectively monitor change in parrot distribution, density and impacts.

Milestone 1: Summarise core datasets required for long-term monitoring and measurement of impacts.

Task 1 and Milestone 1 have been completed via the employment of two STSMs in collaboration with WG3. Rachel White (University of Brighton) and Liviu Parau completed simultaneous STSMs at the Max Planck Institute of Ornithology hosted by Julia Schroeder and compiled extensive spreadsheet databases summarising the extant core datasets regarding parrot distribution in Europe. This summary includes data held by individuals, ornithological institutions, invasive species databases, governmental institutions and citizen science websites. These two STSMs also led to the creation of a library of literature and resources available for all ParrotNet participants to access via the ParrotNet Google Drive (ParrotNet Library).

Task 2: Explore innovative approaches to analysing trends and patterns of parrot spread that integrate measures of impact, and compare suitability of different existing IAS platforms for use by EMC (linking to WG1). Identify and align STSMs accordingly.

Milestone 2: Compare different approaches for analysing trends and prioritise most appropriate IAS platforms.

Task 2 and Milestone 2 have been achieved through a combination of workshops, technological development and STSMs. A workshop "Information Gathering for Technology" was held in Zielona Gora, Poland during March 2014 to discuss the creation of the ParrotNet website and the utility of a

mobile phone application for information dissemination. Two MSc students from the University of Kent were tasked with creating the mobile phone application as part of their assessed degree project. It was agreed that this app should be used for dissemination purposes. The source code is now available for future use (with additional financial investment and development). A WG2 meeting was also held in Bulgaria in July 2015 on using citizen science data to analyse trends in the distribution and spread of invasive parrots.

Two STSMs were conducted by Liviu Parau an ECR, hosted at the University of Hiedelberg. These STSMs are linked to objectives in both WG2 and WG3). These STSMs utilised the ParrotNet network to obtain demographic data, in combination with the EMC data to explore trends of parrot growth and spread in 190 non-native parrot populations across Europe (Parau *et al.* 2016). A further STSM was conducted in July-December 2016 by Laura Cardador, an ECR from Spain, hosted by the Centre d'Ecologie Fonctionnelle & Evolutive (CEFE-CNRS) in Montpellier, France. This STSM examined and compared methodological approaches for characterising spatio-temporal trends in invasive parrot growth and spread across Europe (with outputs linked to both WG2 and WG3).

Task 3: Develop EMC as integrated online resource building upon and integrating parrot data from DAISIE, ISC, NOBANIS and GISD repositories.

Milestone 3: Combine available data from existing information-systems with updated parrot information.

Task 3 and Milestone 3 have been achieved by the creation of the European Monitoring Centre (EMC) which is hosted by the University of Kent on the ParrotNet website <http://www.kent.ac.uk/parrotnet/map.html>. This resource presents records of occurrences of non-native parrots across Europe and enables policy-makers and the general public to contribute their own observations. The creation of the EMC was facilitated by an STSM by Rachel White, an ECR, (UK to Germany) and has been regularly populated and updated with data from 14 national monitoring schemes across Europe including the British Trust for Ornithology (BTO), the Global Biodiversity information Facility (BGIF) and eBird. The EMC has the functionality to visualise temporal patterns of spread from 1967-2015 (see 'timeline' on EMC toolbar), for 18 different non-native parrot species across 18 European countries, and can show occurrence counts, and/or density heatmaps. The development of the EMC has also resulted in a strong collaborative working relationship with the BTO (British Trust for Ornithology, UK), one of Europes foremost ornithological agencies which will enable continued data sharing. In May 2015, the Action Chair had a meeting with the BTO in Thetford, UK to collaborate and share invasive parrot distribution data.

Task 4: Develop and propose standardised approaches to predict future impacts by parrots, and formulate key recommendations for IAS policy-makers.

Milestone 4: Publish and present through EMC predictions of future impacts of parrots at different spatial (local, national, pan-European) and temporal scales.

Approaches for predicting future impacts have been achieved through WG collaborations which have led to a number of ParrotNet publications, including the use of niche dynamics and trade data to predict the distribution and future spread of parrots across Europe (Strubbe *et al.* 2015, Cardador *et al.* 2017). The use of demographic, ecological and trade data to predict invasion success (Luna *et al.* 2017), and population genetics in combination with trade data and climatic data to predict invasion success (Jackson *et al.* 2015)

To develop the ParrotNet Policy brief, two workshops were held during WG meetings in Porto, October 2016 and Israel, March 2017, led by Hazel Jackson (WG2 leader) and Diederik Strubbe (WG4 leader and Vice Action Chair). During these workshops members of each WG extrapolated key findings on growth, spread and impacts of invasive parrot populations around Europe to be combined within the final policy brief. This policy brief (in print) **will be** distributed around European policy makers and invasive species managers.

Output summary.

Workshops:

Information for Technology. Zielona Gora, Poland. 27th March 2014. Attended by six participants from four countries.

Hazel Jackson and Deiderik Strubbe led two workshops at the WG meetings in October 2016 in Porto and March 2017 in Israel to develop the ParrotNet policy brief.

5 STSMs:

Two STSMs were conducted in a collaborative fashion between WGs two and three. Rachel White and Liviu Parau visited Julia Schroeder at Max Planck Institute to gather summary data regarding datasets on invasive parrots and to populate the ParrotNet library.

Liviu Parau also conducted another 2 STSMs which were applicable to both WG2 and WG2, and were hosted by Prof. Micheal Wink and Dr Micheal Braun at the University of Heidelberg to combine demographic data with EMC data to assess the growth and spread of some 190 populations of ring-necked parakeets across Europe.

Associated publications:

Pârâu, L.G., Strubbe, D., Mori, E., Menchetti, M., Ancillotto, L., Kleunen, A.V., White, R.L., Luna, Á., Hernández-Brito, D., Louarn, M.L. and Clergeau, P., 2016. Rose-ringed Parakeet *Psittacula krameri* populations and numbers in Europe: a complete overview. *The Open Ornithology Journal*, 9. 1-13

Strubbe, D., Jackson, H., Groombridge, J. and Matthysen, E., 2015. Invasion success of a global avian invader is explained by within-taxon niche structure and association with humans in the native range. *Diversity and Distributions*, 21(6), pp.675-685.

Cardador, L., Carrete, M., Gallardo, B. and Tella, J.L., 2016. Combining trade data and niche modelling improves predictions of the origin and distribution of non-native European populations of a globally invasive species. *Journal of Biogeography*, 43(5), pp.967-978.

Luna, A., Franz, D., Strubbe, D., Shwartz, A., Braun, M.P., Hernández-Brito, D., Malihi, Y., Kaplan, A., Mori, E., Menchetti, M. and van Turnhout, C.A., 2017. Reproductive timing as a constraint on invasion success in the Ring-necked parakeet (*Psittacula krameri*). *Biological Invasions*, 19(8), pp.2247-2259.

Jackson, H., Strubbe, D., Tollington, S., Prys-Jones, R., Matthysen, E. and Groombridge, J.J., 2015. Ancestral origins and invasion pathways in a globally invasive bird correlate with climate and influences from bird trade. *Molecular ecology*, 24(16), pp.4269-4285.

Conferences:

Simon Tollington was funded to attend the International Ornithology Conference in Tokyo, Japan where he presented the work that ParrotNet is doing.

Simon Tollington also attended a meeting of COST Action TD1209 Alien Challenge to form cross-Action collaborations.

Simon Tollington, Jim Groombridge and Hazel Jackson also attended a meeting held by the London Invasive Species Initiative on 4th September where Jim Groombridge presented the work of ParrotNet.

Dissemination:

The ParrotNet website is now live and is regularly updated. The website hosts the European Monitoring Centre (EMC). The mobile phone app is developed, and the source code is available for future development and use.

Policy Brief:

Diederik Strubbe and Hazel Jackson designed and created a Policy brief to be distributed to European Policy Makers. This contains key messages on invasive parrot distribution, spread, growth and impacts from the results of this COST Action, along with key management and policy recommendations.