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1   **Prioritising stakeholder engagement for forest health, across spatial, temporal and**

2   **governance scales, in an era of austerity**

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16

17   Abstract

18   Tree health is a major concern for forest managers as well as others who enjoy the benefits

19   of trees, woods and forests. We know that stakeholder engagement can help define what

20   people find important about forests and woodlands, assist in the development of better

21   management approaches, enhance buy-in of strategies proposed and create a stronger

22   democratic dialogue. However, tree health offers particular challenges for stakeholder

23   engagement because of the wide range of stakeholders potentially involved and budget

24   tightening under economic austerity. Stakeholders are present at different spatial scales

25   (local, place specific; regional; national and international) and need to be engaged cyclically

26   and over different temporal scales, sometimes in immediate decision making but also in

planning over longer timescales, for which decisions have implications for woodlands in the long term future. Hence, we need to know not only with whom we *could* engage, but also with whom we *must* engage. Our research questions are: with whom, why and how should we engage across spatial, temporal and governance scales and with limited resources to achieve philosophical and practical goals regarding tree health? How do we prioritise engagement efforts to obtain 'best value'? We undertook two tree health projects, both using and investigating the concept of 'stakeholder engagement' in the UK: 1) exploring the concept of resilience with tree health stakeholders; 2) exploring how stakeholder engagement could enhance technology development for the early detection of tree pests and pathogens. We carried out interviews and experiential interactive activities and ran workshops and collaborative field trips with a range of stakeholders. We found that mapping stakeholders identified a complex network of hybrid individuals and roles overlaid on a projectscape that spanned multiple research and practice initiatives. It was clear that as well as undertaking discrete engagement activities, it was important to develop ongoing collaborative conversations, facilitated through networks and alliances. Stakeholder engagement was more effective when interactive, innovative or experiential means were employed. There was a tension between recognition of the value of communication and the time and resources required for engagement. Whilst the state is attempting to devolve responsibility, structural constraints, resource restrictions and knowledge gaps are limiting the capacity of others to fulfil these expectations. It was concluded that, despite economic austerity, investment is required to support relationships and networks, promoting normative and substantive forms of engagement and countering the audit culture, rather than focusing merely on instrumental, easily measurable, short term gains.

Highlights

- Stakeholder mapping reveals a complex layering of hybrid roles and spatial variation
- Stakeholder engagement occurs across a convoluted research and practice projectscape
- Interactive engagement, especially experiential, dialogic or fun, is preferred
- A lack of personnel, time, resource and knowledge limits stakeholder capacity
- Investment is required to support relationships and networks for effective engagement

Introduction

Tree health and biosecurity

Tree health has been a global concern especially over the past decade, with increasing globalisation, international trade, climate change and changes in social practice increasing invasion and risk and spread of new pests and pathogens (Marzano *et al.*, 2017). Environmental management requires stakeholder engagement (Blackstock *et al.*, 2007; Reed *et al.*, 2009) and this is especially true for tree health, which requires integration of different kinds of knowledge and has both specific, short term impacts and long term consequences that affect a wide range of stakeholders whose livelihoods, recreation, places or cultures are affected. For example, whilst pest invasions may require action against a new pest or disease to be taken within hours or days (Dandy *et al.*, 2017), subsequent planting decisions can have consequences several decades later as trees mature. In this paper we draw on two tree health projects in the UK to develop insights into stakeholder engagement against a background of multi-level governance, with limited time and resources. With the presumption that resources allocated for engagement will be limited, we seek in this paper to identify how we might prioritise stakeholder engagement across spatial and temporal scales in an era of austerity and audit.

The UK has experienced significant recent pest and pathogen impacts on forests and has responded with increased research (funded by national research councils) and policy (at UK and devolved state levels) initiatives on which we can reflect for future UK and wider geographical contexts. Over the past few years, UK tree health policy has promoted engagement with mainstream stakeholders (DEFRA, 2014) but mapping of tree health stakeholders demonstrates a complex landscape of individuals and organisations (Marzano *et al.*, 2015; Dandy *et al.*, 2017; Marzano *et al.*, in press). Research to date has focused on who has a stake, how stakes can change over time and some impacts of engagement. There is less information suggesting what form of stakeholder engagement is most effective, and how agencies that are suffering significant constraints may allocate limited resources to maximise impact. A combination of fora for collective interaction and group specific tools can support engagement, but individuals express limited opportunity to interact with all engagement opportunities (Marzano *et al.*, in press). Whilst there have been some awareness raising campaigns, these have rarely been evaluated and there is little empirical evidence in

92   the tree health sector to support the belief that face to face contact is key to effective

93   engagement (Marzano *et al.*, 2015).

94   ***Prioritising stakeholder engagement***

95   The practical constraints of spatial, temporal and governance scales, fiscal austerity and audit

96   demands within and across state, agency, organisational and project groups responsible for

97   engagement mean that these groups (including researchers such as ourselves) will need to

98   prioritise and defend engagement strategies that are pragmatic and achieve value for

99   resources. We must make tough decisions about why, who, how to engage; what do we wish

100   from our engagement; how much is enough? This paper explores these challenges using tree

101   health as an area of enquiry.

102   Whilst there is research demonstrating which stakeholders have an interest and responsibility

103   in tree health (Marzano *et al.*, 2015; Dandy *et al.*, 2017; Marzano *et al.*, in press), stakeholder

104   engagement still holds challenges for those with a mandate to engage. In practice, there are

105   resource constraints around management decision making and implementation. The era of

106   austerity in UK has squeezed most public budgets further, demanding that government and

107   public agency staff defend time and cost investment in participation activities. The research

108   impact agenda in UK reflects a demand for socially accountable research, causing more

109   researchers to establish stakeholder communication, or at least active dissemination of

110   results and hence increasing the opportunity for engagement with non-academic

111   stakeholders, but also generating some perverse outcomes and sometimes questionable

112   modes of engagement (Martin 2011).

113   Hence we need to know not only with whom we *could* engage, but also with whom we *must*

114   engage; we need to ask questions not only about why, whom and how we must engage but

115   also explore engagement methods that offer value for money and explore the possibility for

116   shared, integrated forms of stakeholder engagement. These questions are valid both for

117   statutory agencies with an obligation to implement policy and for researchers seeking to

118   widen inquiry regarding tree health theory and practice, as will be discussed later.

119   ***Participation and stakeholder engagement: rationale and challenges***

120   It is widely accepted that participation of relevant stakeholders is desirable in environmental

121   management (Beierle and Konisky, 2000; Stringer *et al.*, 2006; Reed, 2008), but in practice

122   there are challenges in determining optimum forms of participation and in theory there are

123   potential concerns about philosophy, intention and implementation. There has been a shift

124   from top down approaches, dominated by a western scientific paradigm, towards more

125   decentralised modes permitting diverse views of the environment and different management

126   approaches (Beierle and Konisky, 2000; Kapoor, 2001). Participation in environmental

127   decision making is seen to be a democratic right (for example: the 1998 Aarhus Convention

128   on Access to Information, Public Participation in Decision-making and Access to Justice in

129   Environmental Matters), placing an obligation on those developing decisions (policy makers),

130   implementing policy (practitioners and agencies) and producing and exchanging academic

131   knowledge that could inform decisions and management (researchers). Support for

132   participation by these actors derives from the understanding that participation delivers a

133   number of advantages, including instrumental (assisting with practical implementation and

134   defusing conflict), substantive (highlighting multiple perspectives which leads to better

135   understanding and selection of appropriate solutions) and normative (social and individual

136   learning enriches participants and wider society) benefits (Blackstock *et al.*, 2007). However,

137   there has been some disillusionment and critique of participation processes, including a focus

138   on minority interests to the detriment of the wider public (eg (Cooke and Kothari, 2001) and

139   the implementation and management of participation within environmental management

140   can be complex, often requiring pragmatic trade offs (Porth *et al.*, 2015).

141   Participation is a concept used to incorporate different forms of engagement within

142   environmental management. Early definitions outlined differences between tokenism

143   (information, consultation), involvement and empowerment as the degree of participation

144   intensified (Arnstein, 1969). Public participation is still understood to span different forms of

145   participation from communication with stakeholders (including general communication with

146   the wider public or specific sectors of the public) to meaningful input by stakeholders (often

147   specific groups) (Rowe and Frewer, 2000). More recently, we have seen diverse forms of

148   empowering participation promoted, such as collaboration (Davies and White, 2012), co-

149   design (White and van Koten, 2016) and partnership (Leach *et al.*, 2002). Broadly, whilst more

150   intense forms of participation may deliver greater empowerment and benefits (Reed, 2008),

151 they are also resource intensive in terms of time and resources (human, institutional and

152 financial) (Kapoor, 2001), both by facilitators and participants. Participation goals may also

153 differ depending on purposes of participation, and on ethical and normative choices as well

154 as practical cost implications (Lynam *et al.*, 2007); whether a project is in design,

155 implementation or dissemination of results phase; whether for research or management; the

156 scale of the project, programme or policy; and the anticipated response (consensus or

157 conflict).

158 Participation can incorporate broad public participation, including participant driven voices in

159 environmental decision making (Rowe and Frewer, 2000). However, 'stakeholder

160 participation' includes more specifically those who are affected by or can affect a decision;

161 and environmental managers and researchers often focus more directly on these groups

162 rather than on the wider public (Reed, 2008). The participants in such initiatives may include,

163 but generally go beyond, 'community participation'. 'Stakeholder engagement' is the active

164 solicitation of participation by those coordinating policy, practice, or research in a particular

165 field. As with the notion of participation, it is not an unproblematic term. The definition of

166 'stakeholder' is complex, the term being developed for business management and generally

167 being understood as an individual or organisation with an interest in an issue; often as

168 affecting or being affected by the issue (Prell *et al.*, 2009; Reed *et al.*, 2009; Dandy *et al.*,

169 2017). However, there has long been debate over the extent to which a stakeholder can be

170 defined only in terms of an instrumental role with an issue or as a moral being with individual

171 views and the propensity to act in relation to an issue (eg (Freeman, 1994)). The latter view

172 thus provokes consideration of whether and how an individual stakeholder acts on their own

173 behalf or represents an organisation or initiative. Interactions among stakeholders or with

174 stakeholders are further complicated by the effects of experience, trust, relationships and

175 understanding (Davies and White, 2012). The term 'engagement' refers to the form of

176 participation solicited, which may vary from information delivery to an empowering form of

177 devolution of power as described under forms of participation above.

178 ***Scale and multi-level governance***

179 Deciding why, who and how to engage can be challenging. Successful stakeholder

180 engagement requires some form of stakeholder analysis, and assessment of who should be

181 engaged can be an ongoing participatory process within engagement activities (see (Reed *et*

182   *al.*, 2009)). Environmental issues often manifest at local, regional, national and international

183   levels. Yet stakeholder analyses do not always specify how we can effectively engage at these

184   multiple levels. Involving local stakeholders across wide spatial scales can cause problems

185   with transferability and comparability, making scaling up difficult, and can increase resource

186   requirements for participation (Stringer *et al.*, 2006) Stakeholder analyses tend to focus on

187   interests, power and responsibilities without explicitly addressing scale, although recognition

188   of a dynamic suite of stakeholders across time is expressed in more normative forms of

189   stakeholder analysis (Reed *et al.*, 2009). Elected decision makers may act for short term

190   outcomes within their jurisdiction, and see their regions as 'closed' systems unconnected to

191   wider constituencies (Bai, 2007; Bai *et al.*, 2010). Spatial and temporal scale mismatches in

192   public participation have been identified in a number of settings, including urban

193   environmental governance, where policy often has to function at a city or regional scale yet

194   link to global initiatives (Bai *et al.*, 2010), and water catchment zones, where participation

195   must negotiate scalar challenges of local stakeholder engagement whilst also functioning

196   effectively at regional and international levels (Jonsson, 2005).

197   Consideration of scale and stakeholder engagement in environmental management is closely

198   linked to the concept of multi-level governance, which can be perceived as creating linkages

199   across centre and periphery, state and society and the domestic and international (Piattoni,

200   2009). A critical part of multi-level governance is the process that permits different actors to

201   participate (Newig and Koontz, 2014). Multi-level governance can actually expose tensions

202   and power effects between the *global* imperative for environmental management and

203   growing views of environmental services and resources being seen as public goods; and the

204   *local* ownership and consequences of environmental management (Adger *et al.*, 2005). Whilst

205   multi-level governance encourages the support of non-state actors in decision making across

206   various scales of governance (Piattoni, 2009), the concept of polycentric governance

207   acknowledges bottom up as well as top down engagement in governance (Newig and Koontz,

208   2014). This complex multi-level environmental governance is often acknowledged to require

209   adaptive management skills and strategies to enable resilience in the face of environmental

210   and social change (Berkes and Folke, 1998).

211   The contemporary neoliberal context has had adverse affects on the natural environment,

212   heralding an era of the increased privatisation of resources, the marketisation of nature, and

213 a government step back from regulation. Alongside this, a prevalent market based set of
214 environmental policies, incorporating an audit culture, has demanded measureable benefits
215 from investment and resource allocation. Neoliberalisation is an uneven process. Tree
216 resources have been a research focus for those studying green neoliberalism (McCarthy 2005;
217 2006, Castree, 2011, Munster & Munster 2012), eco-governmentality (Goldman 2001), green
218 grabbing (Fairhead et al 2012; Devine 2016) and the green economy (Arsel & Buscher 2012;
219 Turhan & Gundoganb 2017). Research in this area has focused mainly on new forms of
220 colonialism in the Global South.

221 Processes of neoliberalisation, combined with the recent recession, have placed severe
222 resource restrictions and pressures on environmental policy making, management, and
223 research activities. Alongside the selling of nature as part of a neoliberal agenda, society has
224 also been adversely impacted by the State offloading responsibility for care, protection and
225 securitisation to its citizens. This has been well documented in the fields of border studies and
226 human migration (eg D'Souza 2015), but less so in the field of plant and environmental health.
227 Many governments have imposed austerity measures, with different spatial manifestations
228 and, in turn, in some respects the financial crisis has strengthened neo-liberal focus (Pugali et
229 al 2014). Hence we explore the nature of stakeholder engagement in natural resource
230 management within this context. The aims of the paper are thus to contribute to theoretical
231 understanding of 'stakeholder engagement' within this contemporary framing, particularly
232 around prioritisation and cost; and to offer practical recommendations to those concerned
233 about the health of our trees, woods and forests.

234

235 **Methods**

236 We draw here on two projects. The first, Early Detection Technologies, aimed to explore new
237 technologies for the early detection of tree pests and pathogens[1], working on the premise
238 that stakeholder engagement would enhance socio-technological innovation. We mapped
239 stakeholders using previous research (Marzano *et al.*, 2015; Dandy *et al.*, 2017), project team
240 contacts, snowballing, and open and specialist invitations. We reached near saturation after

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[1] Project title: New approaches for the early detection of tree health pests and pathogens. Funded in the UK through the LWEC Tree Health and Plant Biosecurity Initiative (THAPBI).

241 two years, with only a few new individuals continuing to come forward. Our database of
242 stakeholders showed that some individuals held multiple roles and that a stakeholder might
243 be listed as an interested individual or as a representative of a relevant organisation, with
244 'representation' not always being official. Individuals held relevant roles at local, regional
245 and/or national scales. The diversity of types of stakeholder in the database was high, ranging
246 from specialist inspectors with statutory and professional interests in tree health, to members
247 of the public with relevant interests in, for example, gardening (see Figure 1). Our focus in
248 this project was on engagement of stakeholders with a more clearly defined role in using
249 technologies, such as inspectors, foresters and horticulturalists. Our aim for stakeholder
250 engagement was to create a Learning Platform (Marzano *et al.*, in press), similar to a Learning
251 Alliance (Sutherland *et al.*, 2012). We made opportunities for co-design, learning, and
252 exchange through annual workshops using innovative tools such as Dragon's Den, Pecha
253 Kucha, a technology fair, videos of research in the field, visioning and group discussions. We
254 also encouraged Socio-technological Learning Laboratories (SLLs) at which the project team
255 met key stakeholder groups in their places of work (for example Heathrow airport,
256 Southampton docks, nurseries) to develop better understandings of technology needs and
257 constraints in practice.

258 We developed a detailed Stakeholder Analysis and Engagement Plan Template (SAEPT) for
259 project scientists to record stakeholder engagement. Finally, we (RMW and MM) undertook
260 one or two semi-structured interviews with each leading technology scientist (N = 10 in total)
261 and with a broad range of stakeholders including individuals from public and private sector
262 forestry, conservation, industry (specifically nurseries), policy, and community woodlands
263 (N=21). Questions tackled project engagement as well as barriers and opportunities for the
264 use and development of technologies. Interviews (30-90 minutes) were professionally
265 transcribed and coded using both inductive and deductive coding against themes and
266 stakeholder group. Interviews were coded as scientist (S) with each individual allocated a
267 number and each interview a letter (hence S1a to S7b) or stakeholder (SH), hence SH1-SH21.
268
269 The second project, PROTREE, aimed to measure the variability and adaptability of trees to
270 pests and diseases, and to find ways to get people involved in healthier pine forests. The
271 project focussed on three important threats to Scots pine: *Dothistroma* needle blight, the

272   pinetree Lappet moth (*Dendrolimus pini*) and pine pitch canker (*Fusarium circinatum)* [2]. A key

273   part of the project was to ensure the research addressed the needs of stakeholders and

274   produced practical results that could be implemented on the ground. As such, research was

275   undertaken to assess the values and understandings that stakeholders assigned to Scots Pine,

276   management of its threats , and options/barriers to changing practices. We also mapped the

277   socio-cultural, political, economic, and environmental contexts influencing how different

278   stakeholders understand and make decisions by assessing the values and trade-offs

279   motivating choice. Following a detailed stakeholder mapping (similar to the Detection

280   project) and assessment of current policy frameworks, the project created a Science-Policy-

281   Practitioner Interface (SPPI) for increased dialogue, knowledge exchange and validation of

282   project activities and outputs.

283

284   Three focus groups were carried out in December 2015 with policy and societal actors with

285   an interest in tree health. The focus group participants were policy actors with an interest in

286   tree health in the Scottish context who had been invited to a workshop to inform on progress

287   of the PROTREE project. The aim of the three focus groups was to discuss the understanding

288   of the term 'resilience' in relation to tree pests and health. Each focus group discussion lasted

289   15-20 minutes, included seven people and was facilitated by two of the authors (MM and JY)

290   Following on from the focus groups the authors developed a semi-structured interview guide

291   aimed at national level policy actors responsible for developing and/or implementing tree

292   health resilience. Twelve high level policy actors in England, Scotland and Wales were

293   identified and interviewed (March and-August 2016). The aim was to avoid duplication of

294   work, and fill key knowledge gaps, namely the understanding of resilience among national

295   policy-makers, the effectiveness of existing policy tools, and the current boundaries and social

296   acceptability of different management options. All stakeholders interviewed had detailed

297   knowledge at the national scale of the process of developing and/or implementing guidance

298   on resilience in the forest sector. Semi-structured interviews were carried out by two of the

299   authors (JY and MM). All interviews, excepting one, were carried out over the telephone.

300   Interviews took between 25-60 minutes and were transcribed in their entirety. Results were

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301 coded in NVivo 9 using a grounded theory approach (Starks and Trinidad 2007) in which issues

302 raised by participants were organised following the general themes of the interview guide.

303 **Table 1.** Distribution of PROTREE interviewees according to background.

INTERVIEWEE GEOGRAPHIC FOCUS	NUMBER OF INTERVIEWEES	INTERVIEWEE CODES
ENGLAND	5	PE1-PE5
SCOTLAND	4	PS1-PS4
WALES	1	PW1
CROSS-BORDER	1	PCB1
TOTAL	**12**	

304

305 We present the results from stakeholder engagement in these two projects below, addressing

306 the aims of the paper in drawing out lessons on with whom, why and how we should engage

307 with stakeholders across spatial, temporal and governance scales to support tree health and

308 how we prioritise engagement to obtain value in a time of resource constraints.

309

310 **Results and discussion**

311 *With whom should we engage?*

312 In both projects we identified a wide range of possible stakeholders. These varied from people

313 with professional and immediate interest in the research (e.g. inspectors in Early Detection

314 Learning Platform Project; forest managers in the PROTREE project) to diffuse groups such as

315 gardeners and recreational cyclists, to 'the public' (engaged in the PROTREE project). It was

316 clear that certain stakeholders had a greater responsibility and interest than others. For some,

317 there was a strong professional obligation to be aware of specific developments in tree

318 health; for those stakeholders with less interest and responsibility, there was a need for the

319 forestry and biosecurity professionals to engage them for general awareness and engagement

320 in plant security, although there were existing wider interests in woodlands and forests in

321 relation to culture, heritage, place and activity.

322 The nature of the Early Detection project was to engage stakeholders in technology

323 development, therefore self declaration of interest was a major aspect of stakeholder

324 identification and it was not appropriate to carry out a formal stakeholder analysis beyond

325 that undertaken by Dandy *et al.* (2017) and Marzano *et al.* (2015). This project did not aim

326 to establish a stakeholder management group, hence we were less concerned about 'power'

327 in our stakeholder identification than we might have considered for the establishment of a

328 formal coalition. However, knowledge, experience and representation were considered

329 critical in stakeholder identification. New stakeholder groups emerging included research

330 and commercial funders. Engagement was focused more around roles and sectors than

331 locations and spatial scale, although there was explicit emphasis on trying to obtain Scottish

332 and Welsh representation as well as English perspectives. We had no engagement

333 specifically with stakeholders from Northern Ireland or the Republic of Ireland (across the

334 island of Ireland) in this study. Whilst we acknowledge their relevance, the separated land

335 mass (creating a barrier to some pest spread) and partially devolved biosecurity practices

336 create a slightly different context with regards to tree health. However, whilst we focused in

337 this project on specialist groups of stakeholders for the Early Detection project, our

338 participants suggested that the public does have influence in affecting and implementing

339 tree health measures. One Early Detection participant commented that "*You know there*

340 *almost seems to be the campaigns aimed at the professionals behind the scene, yet the*

341 *greatest influence is always with the public*" (SH11). Certain key groups proved hard to

342 engage; one Early Detection participant noted that: "…*Industry engagement is quite difficult*

343 *because you do find that time is very precious to industry people and unless they can see*

344 *some pounds in it for them, their engagement is always going to be limited*". (S7a)

345 We had anticipated issues around representation (Davies and White, 2012), with individuals

346 perhaps not being representative of particular organisations or institutions, but in fact the

347 situation was much more complex than this. Firstly, the Early Detection project identified

348 several individuals with long careers in forestry, moving between roles and organisations and

349 therefore pollinating new positions with knowledge and experience from previous roles. This

350 meant that individuals could not be associated only with one organisation (eg SH5). Whilst

351 some individuals were specialists, others were recognised for a valuable breadth of

352 knowledge. One Early Detection participant commented that, "*We need people who are GPs*

353 *[general practitioners], who have got a wide knowledge across a wide range of fields, who can*

354 *spot the symptoms and point people to the right specialists. And we need the specialists as*

355 *well*" (SH15). They suggested that we had less generalists now than in the past.

356 Secondly, although the field of tree health and the stakeholder database was complex and

357 wide ranging, there was a degree of 'who you know' evident, with a common core of

358 individuals recognised to be experienced and well connected and who interacted across

359 different organisations.

360 Thirdly, organisations were more hybrid and complex than anticipated. Few stakeholder

361 groups could be clearly defined, nor could their spatial and governance influence be bounded.

362 For example, one Early Detection agency participant declared "*we are the Government's*

363 *expert on forestry matters*" (SH5). There was not a binary separation between academic

364 researchers and agency practitioners, because some agencies also undertake research, such

365 as "*[x Organisation], who are my experts, if you like*", said the same Early Detection

366 participant. In some cases organisations spun off into other organisations over time, creating

367 a dynamic network of organisations rather than a static arrangement of structures. For

368 example, one Non Governmental Organisation (NGO) was associated with the development

369 of another active NGO and associated social initiatives. In other cases the organisation was so

370 large that one individual could not respond on behalf of all sections. An Early Detection

371 participant commented that: "*we are quite a big organisation….. so what it might identify is*

372 *that there are other colleagues it would be worth you speaking to to get a fuller picture*" (SH1).

373 However, despite this complexity, some organisations maintained more internally consistent

374 views on tree health. PROTREE participants stated that certain organisations each had "*a*

375 *common vision […] working together*" within the organisation. In some cases a stakeholder

376 was not who they appeared to be on first contact. For example, one forest appeared to be

377 owned by a public body, but when pursuing permission to work in this forest, one Early

378 Detection participant reported that several enquiries were required to track down the

379 landowner: a '*woodland management company*' (SH15). In other words, some environmental

380 goods (forests) were actually leased out, sub contracted and managed separately very much

381 in line with neoliberal, market driven goals. This form of woodland governance differs widely

382 from the notion of community woodlands described by other participants (eg SH2).

383 The lack of specific roles linked to specific locations complicates the implementation of multi-

384 level governance, but at the same time ensures a stronger structure, since levels are not

385 wholly separated, but are bridged by organisations or individuals acting at more than one

386 level.

387 Fourthly, there were existing interactions, fora and groups at which stakeholders already

388 interacted and met, creating a network of groups overlaid on the suite of organisations. The

389 Landscape Institute (the professional body for landscape architects in UK) was an example of

390 an umbrella organisation identified as important by Early Detection participants (eg SH5). The

391 Scottish Tree Health Advisory Group, including Forestry Commission Scotland, Scottish

392 Natural Heritage, Woodland Trust, CONFOR, the Landscape Institute and local authorities,

393 was an example of good organisational level engagement mentioned by PROTREE

394 participants. However, these networks were not always proactive in pursuing tree health. An

395 Early Detection participant complained that "…*I find it really frustrating that somehow nobody*

396 *has taken a lead in terms of providing that concerted practical guidance for managing some*

397 *of these issues, in a way that they should have done. …. So…I really would like to see some of*

398 *the relevant professional bodies getting actively involved with that*" (SH10). Such networks

399 enable stakeholders to develop trust and relationships and share knowledge horizontally, as

400 a precursor to engagement by those concerned specifically with tree health.

401 Finally, participants themselves asked for wider circles of interaction, suggesting in the

402 PROTREE project that we should see further engagement with "*the people collecting the seed,*

403 *the people growing the trees, the NGOs who might be supplying those and the major*

404 *landowners, [……..] for example*" (PE1).

405 There were some stakeholders who were not successfully engaged during these projects.

406 Whilst the Early Detection project did attempt to engage with nurseries and tree suppliers, it

407 was suggested that these stakeholders had not been sufficiently engaged by tree health

408 initiatives in the past, limiting the potential for biosecurity response and resilience. The

409 PROTREE project found that "*you've got to engage with industry to be able to gather the*

410 *necessary data to say first of all that there is a significant level of trade and secondly, that*

411 *there is a known threat associated with that trade.*" (PCB1). Other missing PROTREE

412 stakeholders were those on the agri-environment side: "*I do know from discussions with*

413 *colleagues that there seems to be a bit of a gap in our knowledge of agri forestry schemes like*

414 *where are they, what's being planted there?*" (PE1) and small woodland owners: "*there's such*
415 *a huge number of small woodland owners, some of whom have woodlands on their land that*
416 *they don't really engage with and others are happy being with their small bits of woodlands,*
417 *messing around with it as it were, getting on with what they want to do. But I do think it's*
418 *very hard for them to engage, there's so much regulation on woodlands and I know that*
419 *landowners complain a lot about that*." (PE5) Hence we can see that stakeholders can be
420 defined not only as individuals, as organisations and by spatial scale of influence, but also by
421 sector. A caveat identified in the PROTREE project was that the identification of stakeholders
422 "*partly depends on the particular area of focus [...] But it is also thinking about who's best*
423 *placed to deliver and to act on some of these things.*" (PE4)

424 Even from stakeholders themselves the issue of not engaging with all possible stakeholders
425 emerged from an agency respondent in the Early Detection project: "*In terms of my*
426 *experience of working on projects themselves...I think it's quite important that you make sure*
427 *that the number of stakeholders involved is appropriate*..." because dealing with more
428 stakeholders increased "*the number of tangents that you can go off with*" that could not be
429 addressed within the particular project underway (SH10). There was thus a sense of needing
430 to engage stakeholders to understand different perspectives but also of realizing that too
431 many diverse views could detract from the task at hand.

432 This analysis of who we should engage thus identified the complexity of individuals layered
433 over organisations, multiple roles, and an endless set of ever widening circles of people,
434 indicating *potential* but not *priority* stakeholders. The last point perhaps begins to suggest a
435 strategy: that we develop and invest in a stakeholder map for the field of tree health, update
436 this regularly to capture movement of individuals and the emergence of new organisations
437 and networks, but that we target stakeholders and particular networks for particular issues.
438 We thus develop long term investment in general engagement and short term intensive effort
439 in particular engagement. This strategy is supported by previous research (Dandy *et al.*, 2017),
440 but we emphasise that a balance should be maintained despite resource constraints.

441 A further question emerging from discussion of whom we should engage is who is doing the
442 engaging? Government has a responsibility to engage stakeholders around particular issues
443 and indeed this forms part of their strategies (DEFRA, 2014). However, such responsibilities
444 are sometimes devolved to collaborations, networks or management groups, a common

445   strategy of State fallback evident in the neoliberal era (Davies and White, 2012). In the field

446   of tree health, for example, the Tree Health Advisory Group could seek more diverse and

447   particular forms of engagement in response to specific contexts and engagement

448   requirements. As stated above, the division between academic researcher and government

449   practitioner is not clearcut. Our teams included university academics, academics from

450   research centres partially funded by government and researchers from partially funded

451   agencies, with practitioner organisations represented on expert advisory groups. Our project

452   goals were practical as well as seeking new theoretical understandings of tree health

453   management. The potential problem of stakeholder engagement only for research and not

454   for practical outcomes was thus at least partially ameliorated. However, a different issue

455   emerged in that stakeholder engagement is often associated with projects rather than

456   people. Early Detection participants commented on the challenges of project specific

457   engagement: " *continuity is important…. Otherwise ….what happens is these projects come*

458   *and go, and nothing materialises*" (SH8). On the other hand, sometimes engagement was

459   intended to be project specific but actually for Early Detection researchers there was some

460   continuity: "*quite often it's not even, not necessarily a nice discreet project. You know things*

461   *overlap and you end up combining experiences from several projects*" (S5a). The resource and

462   knowledge constraints for individual academics seeking stakeholder engagement will be

463   discussed below.

464   In some cases engagement was seen to be a shared responsibility, and would be undertaken

465   not only by researchers, government or agencies but also by relevant NGOs. In the PROTREE

466   project it was noted that: "*there's a lot of community woodlands out there now, you've got*

467   *NGOs like the XX doing a sterling job of handing out tree packs to schools, to small woodland*

468   *groups, we get them free, they're brilliant. They do some of the work for you so obviously*

469   *they're now doing more of the behind the scenes biosecurity, they're doing some of the work*".

470   (PE1)

471

472   **Why engage with stakeholders?**

473   As described above, stakeholder engagement can strengthen environmental management

474   through instrumental, substantive and normative outputs (Blackstock *et al.,* 2007). In the

475 Early Detection project, instrumental outputs included modifications in technology

476 development (Marzano *et al.*, in press). Instrumental consequences identified in the PROTREE

477 project included improved decision-making, especially through engagement with people who

478 might not necessarily agree with decisions taken: "*you need somebody at the other end of the*

479 *spectrum to say "Why are you doing this?" you know, otherwise you get the wrong decisions.*

480 *I mean, I've always been a believer, to get the right decisions, you need advocates at both*

481 *ends of the spectrum*".   Another instrumental aspect was considering potential for

482 collaboration: "*it's about thinking about where the strengths and opportunities will be within*

483 *the stakeholder landscape and how we can best work together on those areas of interest*".

484 PROTREE participants also acknowledged that stakeholder engagement enables "joined up

485 thinking" and can fill "gaps in our knowledge".

486 Many PROTREE interviewees outlined the substantive nature of stakeholder engagement, in

487 terms of enhancing buy in and enabling environmental strategy implementation. As one

488 participant commented: "*You know, no matter how much you tell people or how much*

489 *money you throw at it, it might not happen if they don't want it to happen*" (PS2); another

490 stated that "*you're not going to find a solution that everybody thinks is marvellous but at*

491 *least if everybody is bought into it, then you can go forward.*" (PS1) An Early Detection

492 respondent also supported the need for engagement to increase buy in to appropriate

493 biosecurity action: "*…I do feel really really strongly we should never ever shy away from*

494 *doing the right thing... Once people are informed, and you talk to people and you actually*

495 *explain what it's all about, you know, 99% of people will be more than happy to accept that.*"

496 (SH10)

497 There was less evidence of specifically normative consequences of stakeholder engagement.

498 Stakeholders claimed social and knowledge benefits, and as we argued above, tree health is

499 a societal concern, hence it might be argued that there is an indirect normative effect of

500 engagement around tree health.

501

502 **How to engage stakeholders?**

503 One challenge mentioned by most interviewees was how best to engage, or as one PROTREE

504 participant put it, "*how do you get all those people together?*" (PS2) Each project had diverse

505   and multiple modes of engagement with different stakeholders and for different reasons,

506   with collective workshops, individual interviews, and innovative means of gathering cross-

507   role groups for knowledge sharing. The projects thus spanned much of the participation

508   spectrum (Arnstein, 1969). However, resource constraints were cited at all levels of

509   engagement.

510   Even information provision and awareness raising efforts were seen to be important and

511   difficult to design effectively. One PROTREE interviewee mentioned that "*the real challenge*

512   *is to ….. come out with simple messages, not simplistic messages, before you go out wider*"

513   (FG1). 'The message' about tree health was seen to be important; priorities for one PROTREE

514   participant were "*have the organisations getting the clear message and having the resources*

515   *to do it*" (PS3). 'The message' was expected by a PROTREE participant to derive from

516   government, so that, "*there has been probably a lead from government but then*

517   *organisations pick them up and they retweet them or reinforce the messages and try and get*

518   *the messages over to their members*" (PS1).

519   The timescale between engaging people to increase awareness level and changing behaviours

520   was questioned. One PROTREE participant warned, "*It's the same as public awareness …. It*

521   *might well have turned the corner and people are starting to change behaviour, but anybody*

522   *who thinks it's going to happen overnight is [in]…cloud cuckoo land!*" (PS2).

523   Attempts to engage more at the empowering end of the participation spectrum were not

524   always welcome. One PROTREE participant commented that, "*people want to be told what to*

525   *do – that's the problem we've got*" (PS2). In part, reluctance to 'be empowered' and take

526   more control of tree health in some areas may be due to structural issues, resource

527   constraints or a lack of knowledge. For example, another PROTREE policy stakeholder and

528   woodland owner felt that there was a definite need for improved knowledge exchange on

529   forestry in terms of resilience, "*gaps are forming and there isn't that kind of body or that*

530   *group or that mechanism for transferring information and putting things into practice*" (PE1).

531   The source of knowledge was seen to be critical.

532   Another PROTREE participant mentioned the importance of peer to peer networks, as well as

533   individuals championing ideas and concepts: "*I actually think that those peer to peer networks*

534   *are more influential than anything else. A member of my previous team […] has been*

incredibly influential because basically …. he's been quite passionate about it and that's
probably the most influential thing that's happened" (PE2). This participant also said that "*the*
availability of trusted advice was really important and what your peers were doing was also
really important".

It was not only important who exchanged knowledge but also how. In the Early Detection
project it was commented that face to face interaction was useful to facilitate exchange and
also clarify 'the message': "*I would always encourage a dialogue ... if you think it's important*
for stakeholders to buy into something, rather than just you know sort of another email,
because it is sometimes difficult to pick out the really important stuff" (SH10).   It was
suggested that "… *sometimes a phone call is just so much better, cos you can express …. a*
subject or a topic…in a lot more detail and you can grasp that relevance, just from the
conversation than you can in e-mails" (SH5). However, modern technology still makes
dialogue possible, for example, when travel across areas for face to face meetings is difficult.
One Early Detection participant commented that "*we video conference here all the time"*
(SH10).

One PROTREE participant did acknowledge the importance of more collaborative governance
as opposed to top down initiatives: "*something that is co-designed, that we work in*
partnership, it's co-delivered. These are problems that are collectively owned and it's
important that we have collective solutions for those, and in order to develop those collective
solutions it's absolutely critical that we work in partnership" (PE4). Within this vision, there
was a role for government, in terms of "*setting out at a national level using the different levers*
that we're best placed […] to use in terms of thinking about government's role in terms of
facilitation capacity and that type of thing." (PE4). The same participant also emphasised the
need for multiple perspectives and partnership in such a process: "*But it is, very much a case*
of needing to look at this issue from multiple different perspectives and understand how best
we can collectively collaborate to deliver….. By doing it that way it will be about co-owning
the issues and then co-developing the solutions, and tapping into the right expertise that's
available."

Our two research projects analysed here expanded the modes of engagement normally used
by government. Participants applauded some of the practical engagement approaches and
tools, such as, in PROTREE, "*conferences, meetings, discussions is a really new way and I think*

566 *it's probably undervalued within the government sector*" (PE5). The same participant

567 positively commented on joint fieldtrips whilst discussing the concept of resilience in forestry:

568 "*having seminars and conversations and chats and standing in a wood and looking at it*

569 *together and talking, so that that idea can evolve*". In the Early Detection project, several

570 participants praised the attempts to create innovative interactive activities within workshops

571 and it was commented that some of them were even 'fun' (e.g. rapid marketing pitches

572 following the format of a popular television programme).

573 There was also the issue of tailoring engagement to different stakeholders in PROTREE: "*if*

574 *you're a member of the general public … do you actually care whether it's oak, beech,*

575 *sycamore or do you just care that there's trees there and actually what you don't want is the*

576 *trees to be chopped down?*" (PE1). Guidelines need to be repeated and maintained; they

577 cannot be delivered once and then engagement be 'ticked off'. One Early Detection

578 participant commented that "*I think it's just a case of keep churning that stuff out, you*

579 *know…... So the kind of very basic 'these are the things, these are some of the major pests,*

580 *this is what to look for, this is who to talk to', and have a really clear sort of you know, a)*

581 *pictures of what to see, and b) contact details for what you do if you find it*" (SH2).

582 For forest managers, one PROTREE participant suggested "*early engagement with them in*

583 *understanding what their challenges are and how they operate is essential if you're going to*

584 *design, say you're going to redesign your woodlands to make them more resilient*" (PE1). In

585 the Early Detection project, certain stakeholders were engaged through visiting or

586 interviewing them rather than expecting them to attend conferences; particularly commercial

587 stakeholders, for example, plant nurseries and forestry consultants.

588 Hence we see that the most effective ways to engage stakeholders vary, with engagement

589 across the participation spectrum being important. Whilst effective awareness raising

590 schemes are critical, and we need to acknowledge that they take time to have effect, it is also

591 important to facilitate more empowering forms of engagement through co-design and co-

592 production of solutions. However, such intensive forms of engagement require resources and

593 structural compatibility, including mechanisms to produce and share knowledge effectively.

594 Engagement should itself be seen as a process of knowledge exchange rather than one way

595 information provision, but knowledge will be more likely to be accepted if the source of

596 knowledge is trusted and particularly if disseminated by charismatic individuals. Engagement

597 can be facilitated by interactive and novel methods such as fieldtrips, conferences, and
598 individual tools; and these methods should also permit time and space for critical reflection
599 by all participants. Specific engagement methods may be required to reach different groups
600 of stakeholders and the timing of engagement is important, for a stakeholder and within the
601 wider context.

602 *What spatial and temporal scales of engagement were evident?*

603 Spatial scales of activity in the Early Detection project ranged from involvement only with one
604 woodland, to regional positions in forestry, to devolved state roles (in Wales or Scotland) to
605 national level responsibility with high levels of engagement with European partners, for
606 example through the European Plant Protection Organisation. In the PROTREE project, there
607 was also spatial variation from woodland to UK level.

608 Local connection to place was evident in expert volunteers within a citizen science activity, in
609 which participants mostly lived close to or in the woodlands they were monitoring. These
610 volunteers were loosely connected horizontally within the project and two indicated a
611 request for deeper connection. There was concern voiced by some Early Detection
612 participants about the lack of monitoring within specific forests; not merely scheduled
613 scientific assessment but frequent, serendipitous observation, knowledge of place and
614 presence in the woodlands: *"the old fashioned way… going and looking at things in a*
615 *forest…community woodlands … XX[organisation] has qualified foresters but they sit in X*
616 *TOWN which is 10 hours' drive away, and then come and look at the forest"* (SH2).

617 Scaling was a challenge within organisations, with some organisations themselves being too
618 big to capture or focus on issues of major concern in tree health as identified by Early
619 Detection participants: *"XX organisation is so big…. the trees are such a tiny part of it"* (SH10).
620 The challenge appeared to be less the size of organisations or scale, but rather the ability to
621 coordinate and effectively share knowledge: *"the other thing I think is frustrating is a lack of*
622 *consistency between government organisations in terms of their approach to managing some*
623 *of these things [tree pests]"* (SH10).

624 Temporal scale was noted mainly in terms of the long timescales taken to achieve goals, such
625 as behaviour change as discussed above, but also practical outputs. In the Early Detection
626 project, one researcher was slightly frustrated by expectations of stakeholders: *"if you are*

627 *truly serious about this technology, you have to understand the timeframes*" (S7a). Whilst
628 stakeholders emphasised both short and long term goals and decision making needs in tree
629 health, there was less discussion of investment in relationships and collaborations for the long
630 term and more comment on the need for immediate knowledge exchange. Temporal aspects
631 were also evident in the recognition of the need to continually repeat communication and
632 messages to certain audiences. For example, an Early Detection participant said that: "*you*
633 *can never keep saying those things [basic tree pest information] too often"* and suggested that
634 "*it's the sort of [message]…that [X network] need to keep pumping out to their members and*
635 *so on*" (SH2).

636 It was evident during the Early Detection project that scaling occurred within the research
637 context as well as within stakeholder engagement, creating an overlay of projects (such as
638 Early Detection or PROTREE), programmes (such as THAPBI) and regulations (such as statutory
639 requirements around imported tree quarantine) within which stakeholders were engaged at
640 different governance and temporal scales. Projects and programmes were often shared
641 across partners of different types, academic and non-academic, commercial and public sector
642 (eg SH1) so "*you end up combining experiences from several projects*" (S5a).

643

644 *What resource constraints to engagement were cited?*

645 Our premise was that whilst stakeholder engagement was advantageous, there would be
646 resource constraints limiting the type or extent of engagement not only within our projects
647 but also more widely for the organisations involved. Indeed, participants confirmed this
648 perspective. One Early Detection project team member indicated that "*it seemed that nobody*
649 *had the time*" of the stakeholders we tried to involve around technology based SLLs. Cost and
650 resource constraints were mentioned by Early Detection participants with regards to tree
651 health management: "*diminishing resources and diminishing available money*" (SH9) and "*we*
652 *have a fixed budget… so it will be about prioritising [for early detection]*" (SH9). There was
653 some despair: "*I was in the cost cutting scene in the middle of a development plan*" (SH13)
654 but cost was also seen as an accepted and obvious constraint: "*You have an issue of cost*
655 *obviously…..price would be important, and also accessibility*" (SH1) and specifically in relation
656 to detection technologies: "*it's all going to be down to cost, accuracy with it*" (SH12).

657   In some cases there was disagreement amongst stakeholders over the use of limited

658   resources. One Early Detection participant said, "*seven million [pounds]! I think, ooh, that's a*

659   *lot of Rhododendron clearance for that!*" (SH12). There was recognition in the Early Detection

660   project of the need for accountability and value from the limited resources: "*what's the*

661   *greater good …. for the public …?*" (SH12); "*it's where you get your value for money, isn't it?*"

662   (SH12). In some cases the resource available was not fully matched to the implementation

663   requirement across governance scales: "*the plant health… activity is devolved to us but the*

664   *budgets are not*" (SH13).

665   Resource was not only about money but also personnel, as discussed by a participant in the

666   Early Detection project, "*I think we only had something like eight or ten people in the tree*

667   *health team, and they are down to four now….. they've sort of been scaled down so much*"

668   (SH13). People are not all seen to be of equal utility or merit when it comes to resource for

669   tree health. Whilst it was suggested in the Early Detection project that community members

670   could help monitor tree health "*there is a resource there of people, doing you know, in the*

671   *woods interested about the trees and then willing to look at them and report what things they*

672   *might see*" (SH2) there was also scepticism from stakeholders about the capacity of

673   community members to spot a healthy tree and therefore a diseased tree

674   A challenge identified by a PROTREE participant was that even if identified, not all relevant

675   stakeholders might be able to engage, and stakeholders had to prioritise decisions to engage

676   and to subsequently act on tree health based on resource, time and interest: "*I'm sure there*

677   *will be some groups that it will be difficult to engage with. I think there'll be a range of issues*

678   *as to why it will be difficult to engage with us, and those issues will be around competing*

679   *priorities, competing resource constraints, all of those types of things*" (PE4). Another

680   interviewee identified the same problem: "*you need to engage with those people and try and*

681   *help them to understand what would be really good and again, you can tell them, you can't*

682   *make them but you can try and engage their interest and hope that somebody who wants to*

683   *own a woodland cares something about the woodland*" (PE5).

684

685   **General discussion**

686   *Prioritising stakeholder engagement outcomes*

687　Public participation and stakeholder engagement for environmental planning can deliver
688　many benefits, strengthening the value base of decision making, reducing conflict, and
689　increasing trust in each other and in the public agency (Beierle and Konisky, 2000). In this
690　study and in related papers from the projects concerned, we document various benefits of
691　stakeholder engagement as described by Blackstock *et al.* (2007): instrumental (such as
692　technology adaptations), substantive (better understanding, relationships) and normative
693　(enhanced trust and understanding) (Marzano *et al.*, in press); Young and Marzano in review,
694　this special issue). However, it is not clear how engagement can be better fostered and
695　facilitated and which outcomes can be prioritised. The long term results from some activities
696　discussed above (e.g. changing behaviour, technology deployment) indicate that the
697　normative outcomes, generating trust and understanding, should not be neglected in favour
698　of more instrumental approaches, as have been favoured to date by state initiatives around
699　tree health (Dandy *et al.*, 2017). Whilst it takes resources to create face to face or interactive
700　engagement opportunities and to build relationships, the rapidity of movement of individuals
701　across roles outlined in our projects means that such efforts may be limited if they are too
702　directed. There thus needs to be an overlay of networks.

703　*Prioritising means of engagement and stakeholders*

704　Our project participants recognised the value of awareness raising, and described how 'the
705　message' (such as a particular caution or action) could be cascaded within and from groups
706　and organisations. Perhaps paradoxically, it thus seems advantageous to invest limited
707　resources in the development of networks and knowledge exchange opportunities and then
708　to pursue and encourage the dissemination of clear messaging around an environmental
709　issue. The mode and extent of stakeholder engagement has changed dramatically over the
710　past 20 years, and engagement is now less by the state and more by other actors. The
711　tendency for reduced government and agency staff and the combination of centralised
712　control and devolved responsibility cited by our participants demonstrate a more complex
713　picture for multi-level governance than we initially painted. 'Government' is present at
714　multiple scales and in hybrid forms, and large NGOs, agencies and commericial entities also
715　contribute to governance across multiple spatial scales. This creates increased pressures for
716　stakeholder engagement but with less capacity and resources.

717   It may be that engagement will be made through more strategic alliances. The difficulty lies

718   in prioritising immediate benefits versus investment in alliances that support longer term

719   partnerships but with unknown future returns on investment. Such decisions are more

720   difficult when such alliances have to balance institutional emphasis (e.g. on a role) with

721   support for personal relationships and the building of trust.

722   Communication technologies have vastly changed, enabling rapid cascading of 'the message'

723   via social media across organisations and their constituencies and facilitating video

724   conferencing and other dialogical exchange within and across organisations. This shift from

725   boots on the ground in the woods to video conferences, video clips and social media tweets

726   offers potential to greatly amplify communication. Such campaigns and practices enable

727   individuals and local groups to opt into action through interest and choice; personal as well

728   as institutional engagement is thus important. However, despite the critical role of modern

729   communication technologies in stakeholder engagement, fieldtrips, face to face meetings and

730   interactive activities were still seen to be critical engagement methods. These approaches

731   should thus not be replaced only by social media and other technological messaging methods.

732   In addition, it is not always clear that 'the message' can induce real change where it is

733   required.

734   The issue of who to engage is also now more complex, because organisations span

735   governance levels, organisations are often hybrid in form and existing networks have formed

736   that can be included and contribute to engagement efforts. In this project, we also highlighted

737   that in tree health the entities seeking stakeholder engagement are no longer clearly defined.

738   Stakeholder engagement in relation to tree health is desired by government, by advisory

739   groups or networks, by researchers and by agencies. 'Researchers' are no longer merely

740   academics removed from practice and situated in an 'ivory tower', but can also be embedded

741   in government, agency, NGO, commercial and hybrid organisations and institutions.

742   Engagement by individuals and organisations is further complicated by the projectscape –

743   overlapping, sometimes discontinuous projects across multiple organisations that may target

744   more specific or more general aspects of tree health or other environmental issues. The

745   general shift towards a more participatory form of knowledge production (Gibbons *et al.*,

746   1994) also enables a more nuanced landscape of stakeholders and activities. However,

747   despite the positive aspects of engaging non-academics in research and research application,

748 we are reminded that when we seek participation we need to acknowledge and adapt to

749 power differences to avoid creating or exacerbating inequalities (Kapoor, 2001).

750 Multi-level governance can emphasise horizontal or vertical relationships (Eckerberg and

751 Joas, 2004). In tree health this means, for example, maintaining horizontal learning

752 opportunities across regional tree health managers' meetings; retaining inspector specific

753 fora; and creating local learning groups within the overall learning platform as well as vertical

754 linkages across local, regional and national levels. In practice, the contemporary focus on

755 projects demands that project engagement processes be linked and collaborative, whether

756 these projects deliver research, practice or both kinds of outputs. Such vertical and horizontal

757 engagement can highlight tensions between, firstly, representative democracy and, secondly,

758 partnerships and deliberative forms of democracy that must be managed (Eckerberg and Joas,

759 2004).

760

761 *Prioritising stakeholder engagement in an era of austerity*

762 Our results show that state is keen to pass on responsibility to community and other non-

763 governmental groups; but these groups cite a lack of knowledge and capacity. We agree with

764 Davies and White (2012) that we need resource to invest in 'empowerment' and building

765 capacity.

766 The era of austerity not only creates resource limitations, overburdens staff and impacts on

767 time for task completion, but also is characterised by an audit culture. The demand for

768 accountability and appraisal is intended to deliver increased productivity, value for money,

769 efficient management, and transparency. However, this can clash with a culture that

770 promotes the facilitation of serendipitous encounters, adaptive approaches and mutual

771 learning, creating a paradox for managers (White, 2004). Participation is a shift towards

772 decentralised, community oriented, diverse perspectives forms of environmental

773 management (Kapoor 2001), yet we see environmental management increasingly influenced

774 by the pressures of neoliberal practices, making it more difficult to maintain participation. It

775 has already been suggested that government may favour instrumental outcomes from

776 stakeholder engagement (Dandy *et al.*, 2017) and there is thus a risk that the substantive and

777 normative outcomes of engagement will be reduced. 'Value for money' should include an

778 appreciation of the benefits of capacity building, investment in partnership, institutional
779 memory and processes (Meagher *et al.*, 2008). There is a need to also value learning, trust
780 and relationships as the basis for effective current and future interactions. However, whilst
781 participation can build trust and reduce conflict, in practice it is often small groups engaged
782 without good representation across wider socio-economic bands and possibly excluding
783 those with strongly conflicting views (Beierle and Konisky, 2000).

784 There is a view that stakeholder participation should be institutionalised (Kapoor, 2001; Reed,
785 2008). As described above, we need to move beyond separate institutional fora towards a
786 learning platform across which knowledge can be exchanged and engagement facilitated as
787 new projects or problems emerge. This more nuanced view is representative of the
788 epistemological shift required in environmental management as we move towards more
789 democratised, interactive and adaptive modes of environmental science and management
790 (Gibbons *et al.*, 1994; Costanza, 2003; Carolan, 2006).

791 In this contemporary framing, the role of those engaging has also changed. This study
792 highlighted the hybridity of roles of individuals and within organisations, including agency
793 staff/researcher, researcher/activist. Whilst such hybridity aligns with shifts from government
794 control to democratic governance, learning platforms were said by our participants to require
795 resourcing. Statutory requirements for engagement and collaboration have been shown to
796 require governmental support (Davies and White, 2012). This study demonstrated that NGOs
797 can contribute to awareness raising and engagement, but they will not do so unless it aligns
798 with their topics of interest. Hence we need to consider who resources the learning platform
799 described above and how this is undertaken. For example, supporting networks and events
800 such as annual conferences would be an effective use of funds to underpin shorter term
801 specific engagement needs. In this way we can rethink stakeholder engagement as, firstly, a
802 network of people, policies and practices; secondly, as an essential thread linking cycles of
803 knowledge production (through research and in practice), exchange (research dissemination,
804 capturing TEK, knowledge integration, translating knowledge into policy) and implementation
805 (management); and, thirdly, as a mechanism for deliberative decision making. In this way
806 stakeholder engagement moves beyond project specific functionality towards the support of
807 communities of practice (Wenger and Snyder 2000) and of social learning as well as skills and
808 information exchange.

809   Supported by this learning platform, we would have specific stakeholder engagement
810   processes. In each case it may be useful to explicitly outline who is engaging, why and how;
811   how engagement will change over the stage of the project/programme/initiative; what length
812   of time is envisaged for the initial process and for the maintenance of ongoing engagement
813   (ie lifespan and interlinked engagement across projects). In line with Reed (2008), we agree
814   that it is important to define expected outcomes in a specific case, but we do not concede
815   that aiming for empowering forms of participation at the top of Arnstein's ladder is always
816   best; this depends on the required outcomes.

817   The role of 'the public' is interesting. Notwithstanding the fact that the public is a
818   heterogeneous and poorly defined group, one participant felt that more effort engaging the
819   public in general would lead to significant advances in biosecurity. Research projects rarely
820   have more than a token impact on the public, and NGOs and government tend to undertake
821   specific campaigns, but perhaps there is a role to engage more in school and tertiary
822   education and in community settings. Galvanising 'the public' may also generate support or
823   even lobbying for drastic biosecurity responses, such as those seen by (Porth *et al.*, 2015), and
824   could allow us to think beyond today's needs to those of future generations.

825

826   ***Conclusions***

827   We promote stakeholder engagement for the strengthening of both ecological and political
828   literacies, for social learning and for the production, exchange and implementation of
829   knowledge that can benefit tree health. However, we need to heed the warning that
830   inappropriate participation can actually maintain the monopoly of capital, dominant western
831   knowledge systems, and exacerbate social inequalities and biases (Kapoor, 2001). The current
832   neoliberal context, incorporating fiscal austerity and audit control, cause us to re-define and
833   more carefully plan and priorirtise our stakeholder engagement. However, this study
834   demonstrates the need to also integrate serendipitous encounters together with targeted
835   learning outcomes. We thus see stakeholder engagement not as process of linear
836   communication, but rather as creating a network of relationships, knowledge flow and
837   decision making opportunities across a complex map of hybrid forms of stakeholders and
838   within a complex projectscape.

839 We found that people prefer human interactions; whilst face to face communication is

840 favoured, video conferencing can help facilitate collaboration, especially when reduced staff

841 are situated further away from each other. Even telephone permits interaction, rather than

842 one way delivery of information hidden within the email inbox. In order for engagement to

843 be ranked as a priority by time-poor individuals, forms of engagement have to include fun,

844 shared, experiential, relevant chances to exchange knowledge.

845 These approaches may deliver genuine stakeholder engagement rather than see a retreat of

846 participation to offer lip service and gloss to decisions made by centralised, powerful bodies.

847 We need further research to demonstrate the 'value for money' of investment in alliances,

848 networks and communities of practice across hybrid forms of stakeholders in facilitating more

849 successful forms of state devolution of responsibility. It is concluded that, despite economic

850 austerity, investment is required to support relationships and networks, promoting normative

851 and substantive forms of engagement and countering the audit culture, rather than focusing

852 merely on instrumental, easily measurable, short term gains.

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