Identifying High Valuable Forests Technical Offer proposed by ETHZ

Work Plan High Value Forests (HVF) and their uses

Work Plan summary of a collaborative project of FSC International, the Swiss Federal Institute of Technology Zurich (ETH), the French Agricultural Research Centre for International Development, the University of Liège and Biotope to join the global discussion on forests.

Finding a consensus on what "important forests" (high value forests) are and what that means requires an approach that is as objective and value-neutral as possible. Values for a forest are the result of the interaction between the forest and a stakeholder. They are relative, subjective, intangible and fluid. Capturing these requires a process of value elicitation and negotiation. Drawing maps with layers containing information of the subjective values pertaining to different stakeholders that share an interest in these forests requires a novel approach.
We have structured our approach into a set of work packages (WP) (*Grey lines are pending approval*)

WP	Title	Deliverable	Lead
1	Definitions	1a - Initial literature Review 1b - Q-Set survey 1c - HVF definition	C. Garcia
2	Maps	2a - Maps with graphs and tables	J.-F. Bastin
3	Values	3a - HVF Framework	F. Quétier
4	Management	4a - Qualitative synthesis report	P. Waeber
5	Case Studies	6a - Report (Gabon and Canada)	C. Garcia, F. Quétier, J.-F. Bastin, P Waeber
6	Consensus Building	7a -Prototype Open strategy game 7b - Demonstration Workshops	C. Garcia

Deliverables

1. Definition.
   1a - A **classic review** of the literature on HVF.
   1b – A **Q survey** on the HVF concept identifying different narratives over HVF.
   1c - A **definition of HVF** that builds on the common accepted basis of the concept.
2. Map.
   2.a - A **map** of HVF developed on the basis of a counterfactual and its discrepancies with existing forest cover. All GIS files will be made available separately.
3. Value Framework.
   3.a - A **framework** to visualize the different values attached to a particular HVF by different stakeholders, with trade-offs visible.

4. Management options.

4.a - The definition and identification of different management options and their potential impacts on the values identified and described in 3.a.

5. Case Studies.

5a - **Report** on applying the framework to a selection of cases as a proof of concept.

6. Consensus Building.

6a - A **prototype** of a strategy game on HVF management with rules and instructions.

6b - **Demonstrations** to the FSC board of the prototype to serve as a basis for clear and transparent negotiations between FSC members and certificate holders, building consensus in support to the GA 2021.

With FSC's approval, and participation, our aim is to also prepare and publish a peer reviewed scientific **paper** presenting the map, the definitions and the framework.

WP1. Definition

Desktop review of concepts and definitions

We will develop a concept and definition for HVF that builds on comparable or related concepts. Key publications that define these concepts will be reviewed and analyzed to establish the different meanings given to various types of HVF and identify a preliminary set of options for a HVF concept and definition for FSC.

# 22	19,063	TS= (("Primary Forest*" OR "Ancient Forest*" OR "Intact Forest Landscape*" OR "Old growth Forest*" OR "Old-Growth Forest*" OR "Endangered Forest*" OR "hinterland forest*" OR hinterland* OR "intact forest*" OR ("High Conservation Value" AND Forest*) OR "pristine forest*" OR "protected forest*" OR "intact primary forest*" OR "natural forest" OR "undisturbed forest*") OR (Forest* AND "Biodiversity hotspot*") OR "Threatened Ecosystem*" OR "Key Biodiversity Area*" OR "Critical habitat*") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=2005-2020*	Edit
# 21	18,463	TS= (("Primary Forest*" OR "Ancient Forest*" OR "Intact Forest Landscape*" OR "Old growth Forest*" OR "Old-Growth Forest*" OR "Endangered Forest*" OR "hinterland forest*" OR hinterland* OR "intact forest*" OR ("High Conservation Value" AND Forest*) OR "pristine forest*" OR "protected forest*" OR "intact primary forest*" OR "natural forest") OR (Forest* AND "Biodiversity hotspot*") OR "Threatened Ecosystem*" OR "Key Biodiversity Area*" OR "Critical habitat*") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=2005-2020*	Edit

Figure 1: Web of Science returns on search strings containing some of the concepts linked to HVF. The number in blue is the number of articles published. Source: N. Lausberg and S. Savilaakso, in prep.

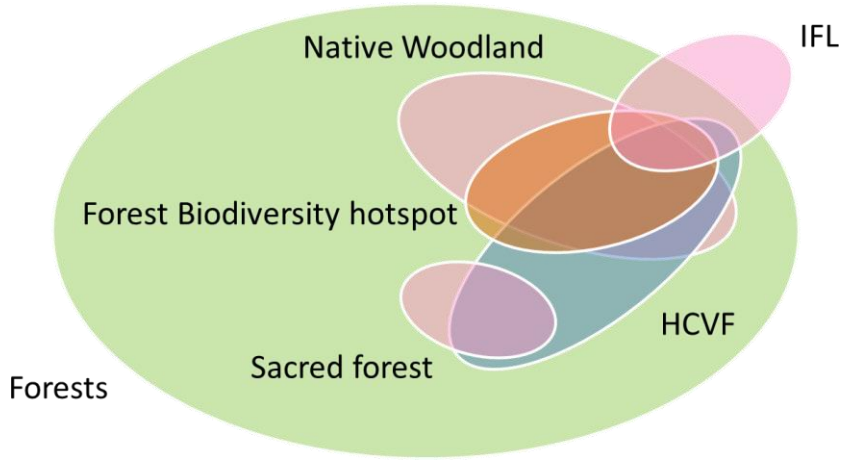

Figure 2: A forest by any other name. We will draw from the existing definitions to propose a concept map of the multiple ways forests and HVF are defined. We shall identify overlaps and discrepancies.

Stakeholder survey using Q Method (narratives)

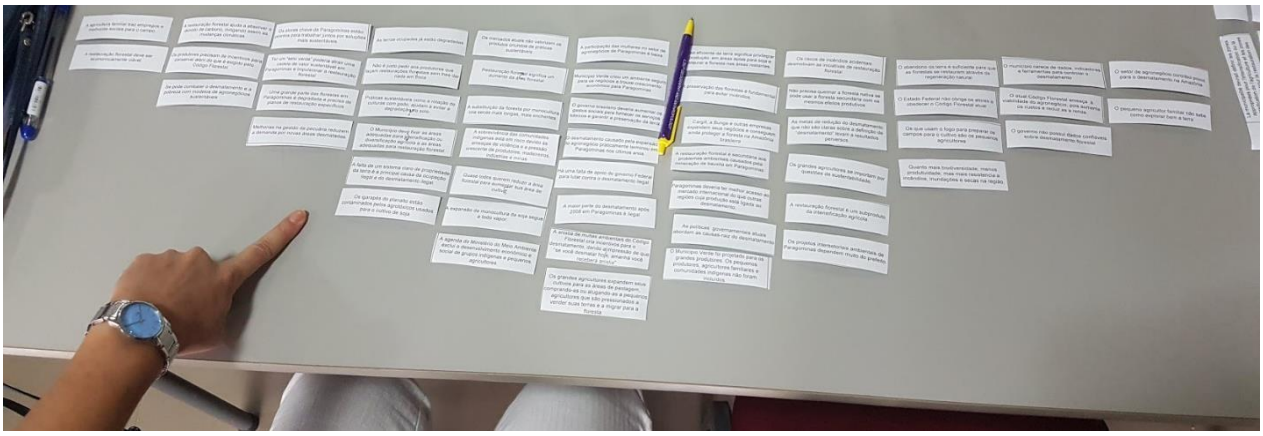

Fig 3: Qset sorted by a stakeholder of a restoration project in Paragominas (Brazil). Source: Forland 2019.

The primary goal of Q methodology is to uncover different patterns of thought, not to count how many people think the way they do (Brown, 2004, p. 1). Participants are asked to rank-order a set of statements (Q set) developed by the researcher along a given dimension – most commonly “most agree” to “most disagree”, providing a model for their perspective about the subject at hand. Following this, the sorted statements (Q sorts) are intercorrelated and subjected to a by-person factor analysis, revealing existing viewpoints (Watts & Stenner 2012). On the basis of the concept as defined in the literature and the narratives developed by stakeholders, we will identify the invariants that will serve as the definition of a HVF.

WP2. Map of the world’s high valuable forests

2.1. Review of existing maps

Our position is that using one global map for decision-making would be a top-down solution that risks alienating the plurality of views represented by the many different stakeholders who have an interest in forests. As an alternative, we propose the use of counterfactual—a proposition that is contrary to facts, yet validated by peer reviews - maps of potential tree cover as a base for scenario-building with multiple stakeholders.

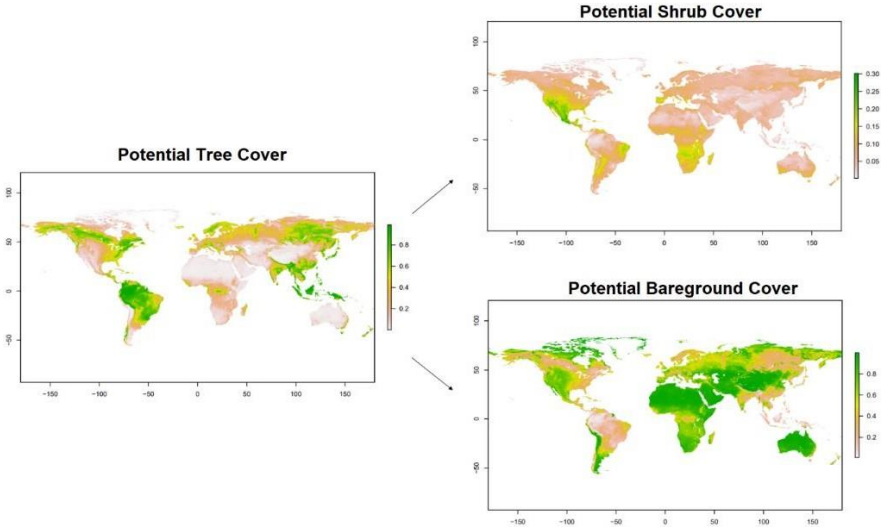

Figure 4. Illustration of the counterfactual maps that will be generated on potential natural state of the ecosystems. Here we show an example with 3 layers of information per pixel: the potential tree cover, the potential shrub cover and the potential bare ground cover. Each layer produces a different map.

A scan of the available literature that presents maps of forest values shows a large body of potential maps to be considered from different viewpoints. We are not proposing to combine these, because they do not form a comparable set of sources due to the differences in their objectives, scrutiny of analysis, spatial and temporal resolutions. We suggest that using one particular forest value map risks undermining the attempt of FSC to be inclusive across sectors and viewpoints.

2.2. Using the distance to the potential tree cover as an indicator of intactness

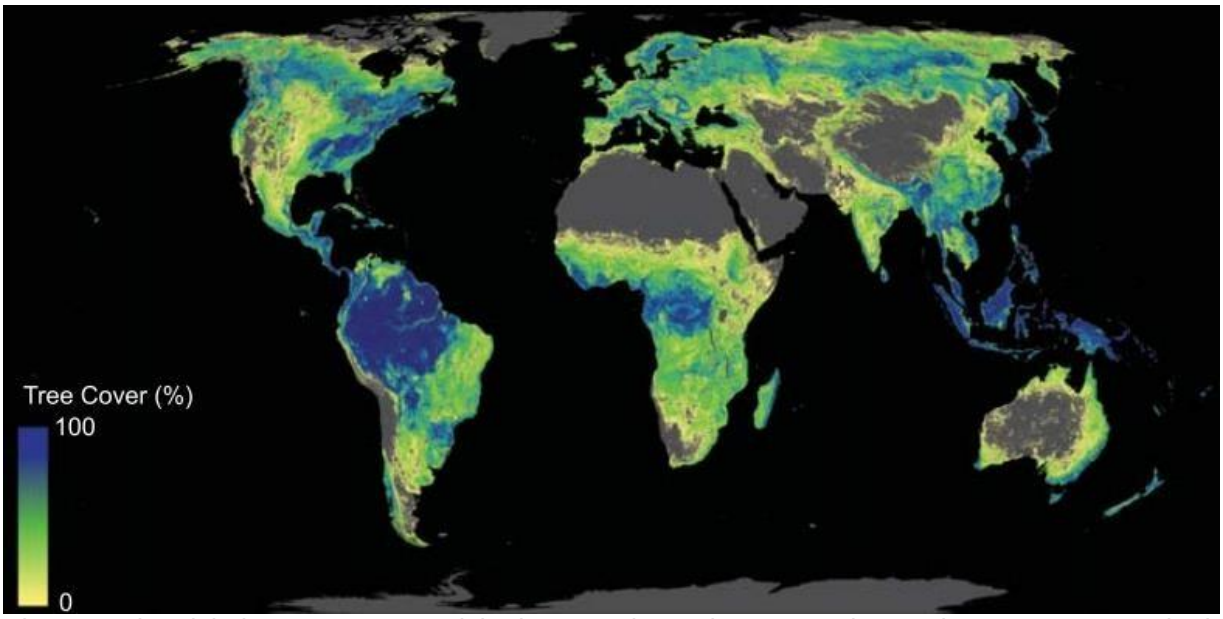

Figure 5. The global tree cover potential. The map shows the expected natural tree cover on each pixel, according to Bastin et al. (2019) model.

We propose a map that describes "forest value" as an index quantifying the difference between current forest ecosystem state and potential natural forest ecosystem state in terms of tree cover. This map will quantify how far each pixel is from the potential state of the ecosystem in terms of tree cover. We propose to derive this deviation from an improved version of the map published as Figure 2A in Bastin et al. (2019) (Figure 5), by subtracting the current tree cover in the most recent global tree cover map (Sexton et al. (2013)) from the expected natural tree cover (Figure 5).

WP3. Forest value framework

HVF are valued differently by different stakeholder groups, and for different reasons. We will use the concepts of ecosystem services (De Groot et al. 2010) and nature's contributions to people, developing a novel forest value framework (Figure 6) adapted from our work on complex agroforestry landscapes.

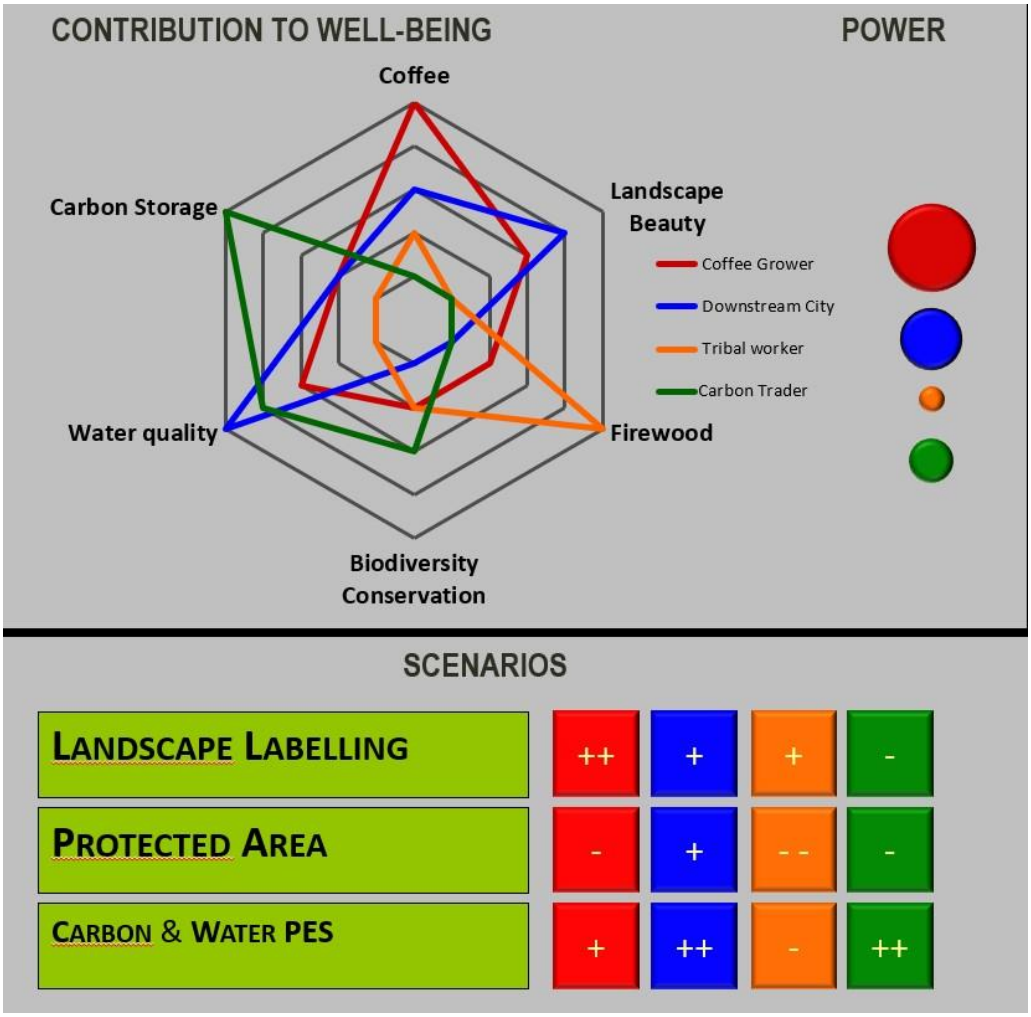

Figure 6: Ecosystem values framework. This model teases out the provision of the ecosystem services by the landscape and the delivery to the beneficiaries. The different stakeholders each derive a different contribution to their well-being from the ecosystem services generated by the landscape. This is based on their interests, beliefs, and livelihood strategies, and is the result of the biophysical trade-offs between the services themselves. The benefits that are effectively derived will depend on the power relations between the actors. These will dictate who has access and rights to the resources, goods and services. With this filter it becomes possible to compare different management scenarios to identify who will stand to win and lose from any particular scenario. The example given relates to a coffee agroforestry landcape in the Western Ghats (India) and will be adapted to case studies relevant to the high value forests discussion.

Addressing such trade-offs requires a different approach that places human agency – our capacity to act independently and to make their our free choices - centre stage (Garcia et al. 2020). The valuation of HVF must be done by those concerned through a democratic process, and not established by consultants. Doing so collectively, through an appropriate participatory process, will make different strategies and their outcomes immediately visible and enable changes in behavior to be discussed, especially between different scales of decision-making, from the village council to the general assembly of the FSC.

WP4. Management of HVF (pending approval)

Management approaches: An overview table will summarize each management approach. We will produce a review that outlines the various management concepts (e.g., certified or RIL-based

management). The table will link the management options to the services identified by the different stakeholders, fleshing out the second part of the forest value framework (cf. Burivalova et al. 2016).

WP5. Case studies (pending approval)

The challenge is to not only do an academic exercise, but to also make this approach operational in the field. The FSC Board of Directors will consider deploying it in two locations – one as an example of a tropical forest landscape; and one as an example of a boreal forest landscape. We will invite stakeholders to test the framework and reach through these trials a proof of concept stage.

WP6. Consensus building approach (pending approval)

Conditions for more constructive discussion between key stakeholders engaged in the HVF discussion within FSC and boundary partners can be created in preparation for the FSC General Assembly 2021. We propose to organize strategic conversations between the parties of interest over the proposed set of definitions of HVF, the framework to elicit values and the proposed management interventions.

Our method associates facilitation techniques with open strategy games—similar to the MineSet model (Figure 7)—as a discussion support tool. We have used this technique with success in support of the FSC programme for the Congo Basin, helping the stakeholders engaged in the discussion for intact forest landscapes to agree on the definition of regional indicators. We will design, test, and propose a demonstration of these open games to the FSC Board.

> What is an open game?
> Closed games have fixed rules, players, alternatives and outcomes. They are the most classical game theory models. Open games allow for rule revisions, redefinition of roles or the creation of new ones. Our games are open and the decisions to change rules are based on consensus.

Figure 7. Key components of the MineSet game, that enables players to understand the behaviour of other stakeholders in the landscape and explore solutions. These include the location and management of HCF and other landscape components.

Work Plan Engagement plan for FSC members and stakeholders

FSC International, the Swiss Federal Institute of Technology Zurich (ETHZ), the French Agricultural Research Centre for International Development (CIRAD), the University of Liège and Biotope are pleased to announce their collaboration to join the global discussion on forests.
In particular, the collaboration will explore forest landscapes, forest climate, forest biodiversity and forest peoples' resilience. To do this, the group will seek a data-driven approach to identify high value forests, their values, and their proposed management.
To ensure that the work is understood and supported, the following plan to engage members is foreseen. Note that this is an engagement plan for one year, 2021, which will be evaluated for usefulness and reception.

1. **Members survey (January 2021)**

We will ask all members to share their expectation through a targeted set of a few questions. The outcome will be mapped and shared with members. It will be transparent about what can be considered in the work plan.

- Purpose of the survey:
  - information sharing, expectation management, targeted approach to outcome definition. We want to ensure that members' opinions are considered, and the voice of members is included in the project.
  - Understanding the different levels of interest of members in the process,
  - identification of people to further interview (this will be a group of no more than 20 people, and will possibly include non-member experts)

- What will we ask?
  - The survey will ask members and stakeholders to share:
  - Their expectations of the outcome of this project, for FSC and for the world's forests
  - What kind of solutions for high value forests could FSC help achieve?
  - What opportunities outside the research plan deserve attention to help FSCs interventions for high value forests make a difference?
  - Members and stakeholders are also asked where they see themselves in the discussions on high value forests, as values in forests are different for different stakeholders. We will use this self-assessment to make sure we design an inclusive sample for the interviews in the project.
  - The survey will be a combination of multiple-choice questions and open comment boxes.
  - The survey gives the possibility to express interest to be interviewed by the researchers. Note that we will interview up to 20 people

- How will we engage for the survey?
  - All FSC members will receive a mail with a link to a survey.
  - The survey link will also be published in FSC newsletters (such as News and Views, members newsletter, regional newsletters, national offices newsletter)
  - The link leads to an online survey that can be completed within 3 weeks.
  - Results of the survey will be mapped out and shared with members and stakeholders through the same FSC newsletters.

2. **A 6-8 weekly update on this project for those subscribing**

The topic of high value forests is a hot topic amongst our members, sometimes calling for regular updates on progress. To address this, FSC invites interested members and stakeholders (non-member) to subscribe to the newsletter of the project. This can be done at the end of the survey.

- Purpose of the project update:
  - information sharing, expectation management, adaptive approach to outcome definition
  - having early warnings of what key discussion points are in the work plan for our members and stakeholders

- What do we share?
  - A 6-8 weekly update on progress of the work of the researchers
  - We can invite reflections of members and stakeholders on the work being done in the consortium

- How do we share?
  - You need to subscribe to the project news in the survey, or through the FSC Members Portal
  - A 6-8 weekly update is developed between researchers and FSC staff, possibly with guest writers
  - Subscribers get a simple mail with a link to a document, provided by the FSC Secretariat.
  - You can react to articles in the newsletter directly to the researcher and the FSC Stakeholder Solution Director by email or (if this is technically achievable) through a reaction chat under the document

Cited references

Andersen, I., Ishii, N., Brooks, T., Cummis, C., Fonseca, G., Hillers, A., ... & Steer, A. 2020. Defining "Science-based Targets". National Science Review.

Bastin J.F., Finegold, Y., Garcia, C., Mollicone, D., Rezende, M., Routh, D., Zohner, C.M. & Crowther, T.W. 2019. The global tree restoration potential. Science **365**: 76–79.

BirdLife International. 2018. World Database of Key Biodiversity Areas. Developed by the KBA Partnership: BirdLife International, International Union for the Conservation of Nature, Amphibian Survival Alliance, Conservation International, Critical Ecosystem Partnership Fund, Global Environment Facility, Global Wildlife Conservation. http://www.keybiodiversityareas.org/

Brooks, T.M., Mittermeier, R.A., da Fonseca, G.A., Gerlach, J., Hoffmann, M., Lamoreux, J.F., Mittermeier, C.G., Pilgrim, J.D. & Rodrigues, A.S. 2006. Global biodiversity conservation priorities. Science **313**: 58–61.

Brown, S.R. 1993. A primer on Q methodology. Operant Subjectivity **16**: 91–138.

Brown, S.R. 2004. Illuminating patterns of perception: an overview of Q methodology. The Software Engineering Institute, Carnegie Mellon University.

Bryant, D. G., Nielsen, D. & Tangley, L. 1997. The last frontier forests: ecosystems & economies on the edge. Vol. 31. World Resources Institute, Forest Frontiers Initiative. https://files.wri.org/s3fs-public/pdf/lastfrontierforests.pdf

De Groot, R.S., Alkemade, R., Braat, L., Hein, L. & Willemen, L. 2010. Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. Ecological Complexity **7**: 260–272.

Finisdore J., Rhodes C., Haines-Young R., Maynard S., Wielgus J., Dvarskas A., Quétier F., Houdet J., Lamothe K., Ding H., Soulard F., Van Houtven G., Rowcroft P. 2020. The 18 benefits of using an ecosystem services classification system. Ecosystem Services **45**: 01160 (in press).

Garnett, S.T., Burgess, N.D., Fa, J.E., Fernández-Llamazares, Á., Molnár, Z., Robinson, C.J., Watson, J.E., Zander, K.K., Austin, B., Brondizio, E.S. & Collier, N.F. 2018. A spatial overview of the global importance of Indigenous lands for conservation. Nature Sustainability **1**: 369–374.

Grantham, H.S., Shapiro, A.C., Bonfils, D., Gond, V., Goldman, E., Maisels, F., Plumptre, A., Rayden, T., Robinson, J., Strindberg, S. & Stokes, E. 2020. Spatial priorities for conserving the most intact biodiverse forests within Central Africa. Environmental Research Letters **15**: 0940b5

Hansen, A.J., Burns, P., Ervin, J., Goetz, S.J., Hansen, M., Venter, O., Watson, J.E., Jantz, P.A., Virnig, A.L., Barnett, K. & Pillay, R. 2020. A policy-driven framework for conserving the best of Earth's remaining moist tropical forests. Nature Ecology & Evolution **4**:1377–1384.

Hansen, A., Barnett, K., Jantz, P., Phillips, L., Goetz, S.J., Hansen, M., Venter, O., Watson, J.E., Burns, P., Atkinson, S. & Rodríguez-Buritica, S. 2019. Global humid tropics forest structural condition and forest

structural integrity maps. Scientific Data **6**: 232.

Hansen, M.C., Potapov, P.V., Moore, R., Hancher, M., Turubanova, S.A., Tyukavina, A., Thau, D., Stehman, S.V., Goetz, S.J., Loveland, T.R. & Kommareddy, A. 2013. High-resolution global maps of 21st-century forest cover change. Science **342**: 850–853.

Ibisch, P.L., Hoffmann, M.T., Kreft, S., Pe'er, G., Kati, V., Biber-Freudenberger, L., DellaSala, D.A., Vale, M.M., Hobson, P.R. & Selva, N., 2016. A global map of roadless areas and their conservation status. Science **354**: 1423–1427.

IUCN 2020. IUCN Policy Statement on Primary Forests Including Intact Forest Landscapes. https://www.iucn.org/sites/dev/files/content/documents/iucn_pf-ifl_policy_2020_approved_version.pdf

Kleinschroth, F., Laporte, N., Laurance, W.F., Goetz, S.J. & Ghazoul, J. 2019. Road expansion and persistence in forests of the Congo Basin. Nature Sustainability **2**: 628–634.

Krueger, R. & Robbins, P. 2000. Beyond bias? The promise and limits of Q method in Human Geography. Professional Geographer **52**: 636–648.

Laurance, W.F., Clements, G.R., Sloan, S., O'connell, C.S., Mueller, N.D., Goosem, M., Venter, O., Edwards, D.P., Phalan, B., Balmford, A. & Van Der Ree, R. 2014. A global strategy for road building. Nature **513**: 229–232.

Margono, B.A., Potapov, P.V., Turubanova, S., Stolle, F. & Hansen, M.C. 2014. Primary forest cover loss in Indonesia over 2000–2012. Nature Climate Change **4**: 730–735.

Maron M, Simmonds JS, Watson JEM. 2018. Bold nature retention targets are essential for the global environment agenda. Nature Ecology & Evolution **2**: 1194–1195.

Myers, N., Mittermeier, R.A., Mittermeier, C.G., Da Fonseca, G.A. & Kent, J. 2000. Biodiversity hotspots for conservation priorities. Nature **403**: 853–858.

Pascual, U., Balvanera, P., Díaz, S., Pataki, G., Roth, E., Stenseke, M., ... & Maris, V. (2017). Valuing nature's contributions to people: the IPBES approach. *Current Opinion in Environmental Sustainability*, *26*, 7-16.

Pimm, S.L., Jenkins, C.N., Abell, R., Brooks, T.M., Gittleman, J.L., Joppa, L.N., Raven, P.H., Roberts, C.M. & Sexton, J.O. 2014. The biodiversity of species and their rates of extinction, distribution, and protection. Science **344**.

Potapov, P., Hansen, M.C., Laestadius, L., Turubanova, S., Yaroshenko, A., Thies, C., Smith, W., Zhuravleva, I., Komarova, A., Minnemeyer, S. & Esipova, E. 2017. The last frontiers of wilderness: Tracking loss of intact forest landscapes from 2000 to 2013. Science Advances **3**: e1600821.

Powers, R.P., Coops, N.C., Nelson, T., Wulder, M.A. & Drever, C.R. 2013. Integrating accessibility and intactness into large-area conservation planning in the Canadian boreal forest. Biological Conservation **167**: 371–379.

Pullin, A. S., & Stewart, G. B. (2006). Guidelines for systematic review in conservation and environmental management. *Conservation biology*, *20*(6), 1647-1656.

Risdon, A., Eccleston, C., Crombez, G. & McCracken, L. 2003. How can we learn to live with pain? A Q-methodological analysis of the diverse understandings of acceptance of chronic pain. Social Science & Medicine **56**: 375–386.

Sanderson, E.W., Jaiteh, M., Levy, M.A., Redford, K.H., Wannebo, A.V. & Woolmer, G. 2002. The human footprint and the last of the wild: the human footprint is a global map of human influence on the land surface, which suggests that human beings are stewards of nature, whether we like it or not. BioScience **52**: 891–904.

Sexton, J. O., Song, X.-P., Feng, M., Noojipady, P., Anand, A., Huang, C., Kim, D.-H., Collins, K.M., Channan, S., DiMiceli, C. & Townshend, J.R.G. 2013. Global, 30-m resolution continuous fields of tree cover: Landsat-based rescaling of MODIS vegetation continuous fields with lidar-based estimates of error. International Journal of Digital Earth **6**: 427–448.

Simmonds, J.S., Sonter, L.J., Watson, J.E.M., Bennun, L., Costa, H.M., Edwards, S., Grantham, H., Griffiths, V.F., Jones, J.P.G., Kiesecker, J., Possingham, H., Puydarrieux, P., Quétier, F., Rainer, H., Rainey, H., Roe, D., Souquet, M., ten Kate, K., Victurine, R., von Hase, A. & Maron, M. 2020. Moving from biodiversity offsets to a target-based approach for ecological compensation. Conservation Letters **12**: e12695.

Turubanova, S., Potapov, P.V., Tyukavina, A. & Hansen, M.C. 2018. Ongoing primary forest loss in Brazil, Democratic Republic of the Congo, and Indonesia. Environmental Research Letters **13**: 074028.

Tyukavina, A., Hansen, M.C., Potapov, P.V., Krylov, A.M. & Goetz, S.J. 2016. Pan-tropical hinterland forests: mapping minimally disturbed forests. Global Ecology and Biogeography **25**: 151–163.

Watts, S. & Stenner, P. 2012. Doing Q Methodological Research: Theory, Method & Interpretation. Sage Publishing, London.