Report

Laura Becker - 01169357

Benji Berntatz - 01060697

Leonard Sonten - 01653792

Jay Morgan - 11729236

Emily Seiberl - 01008230

812381 Aquatic Habitat Modelling

October 14, 2018

Institute of Hydrobiology and Aquatic Ecosystem Management
Department of Water, Atmosphere and Envrionment
BOKU - University of Natural Resources and Life Sciences, Vienna

Abstract

Abstract about the project

Contents

1 Results

1.1 River2D Modelling

The software program River2D was used to calculate the habitat suitability in a section of the River Ybbs. First a model was created of the River Ybbs. A file containing habitat suitability parameters of brown trout at different age classes was prepared. Choriope information was also entered into River2D. The software then calculated the weighted usable area (WUA) for the age classes at different flow rates ($0.35\,m^3/s$ - $2.16\,m^3/s$ - $6.00\,m^3/s$ - $13.00\,m^3/s$ - $20.00\,m^3/s$). Fig. 1 shows the total WUA of age classes at each flow rate. The 0+ fish have a much higher WUA at low flows, while the larger 2+ fish have almost no WUA at $0.35\,m^3/s$ flow.

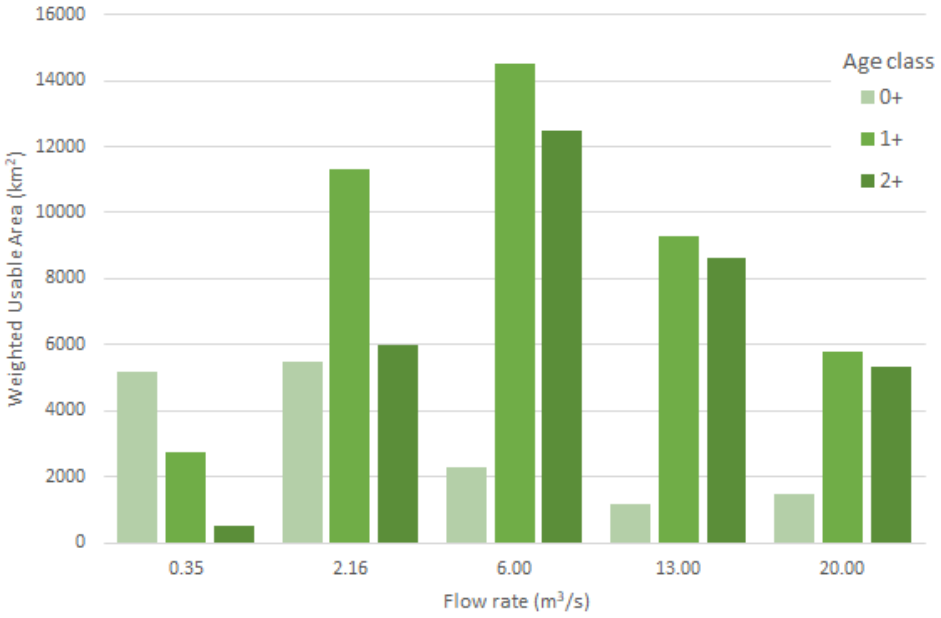


Figure 1. Total weighted usable area by age class and flow rate in the River Ybbs for brown trout as calculated by River2D.

River2D was then used to create maps of the Ybbs showing the combined suitabilty for each age class. At $0.35\,m^3/s$, adult brown trout have very limited habitat available, thus habitat suitability is very low (Fig. 2). Conversely, Fig. 3 shows that a flow rate of $6.00\,m^3/s$ provides an abundance of habitat and near ideal conditions for adult brown trout. See the Appendices for the collection of maps representing the combined suitability of all brown trout age classes at different flow rates.

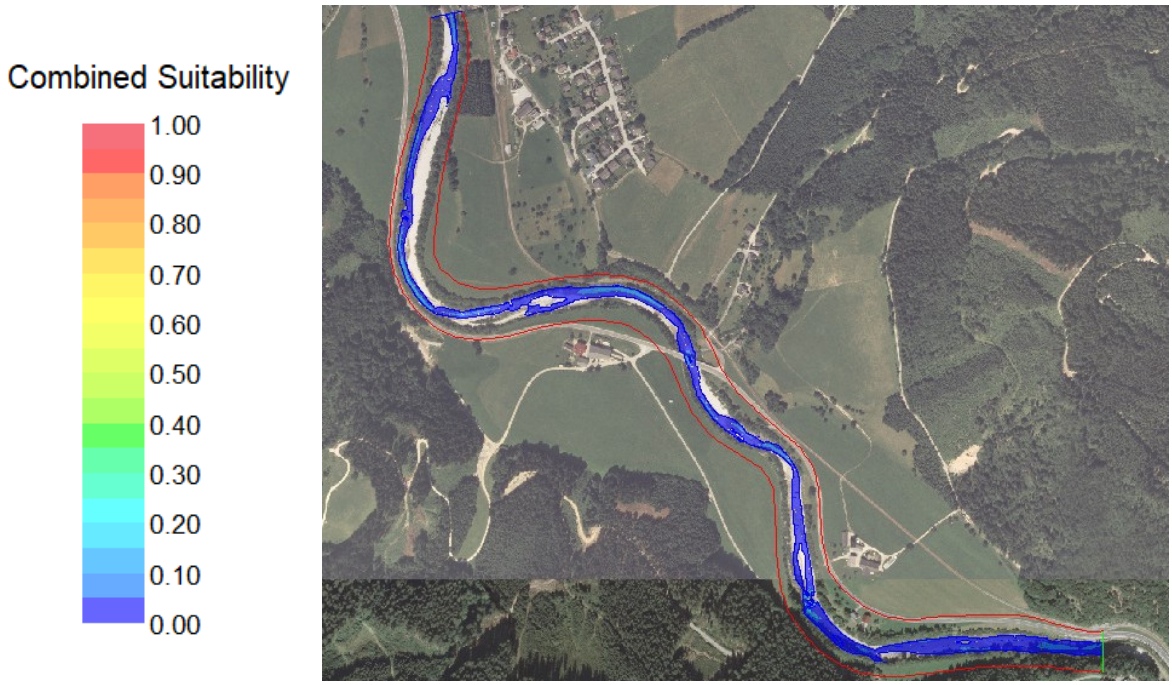
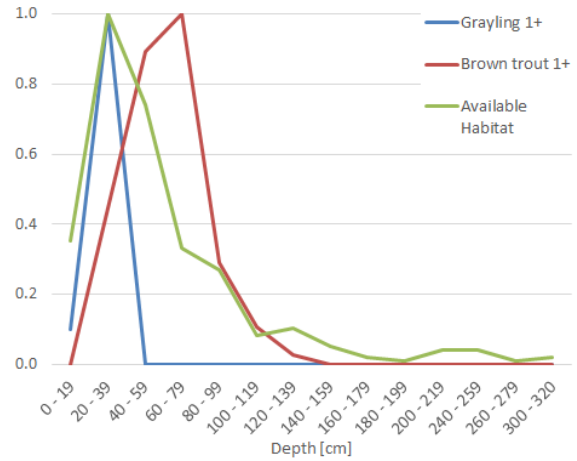
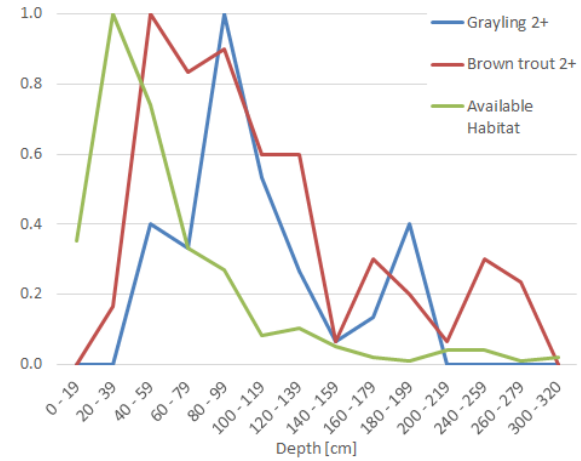


Figure 2. Brown trout (2+ class) combined suitability at $0.35\,\mathrm{m}^3/\mathrm{s}$.

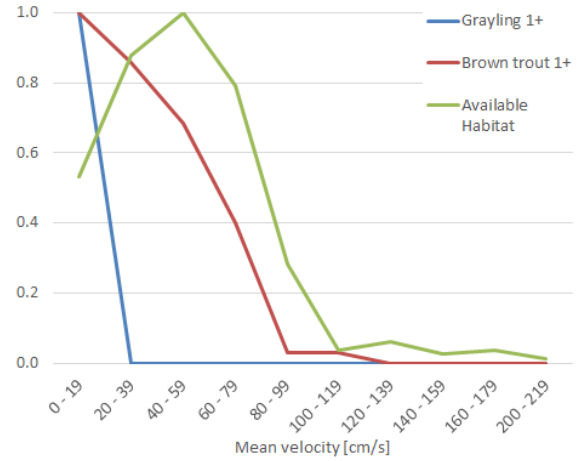
Figure 3. Brown trout (2+ class) combined suitability at $6.00\,\mathrm{m}^3/\mathrm{s}$.



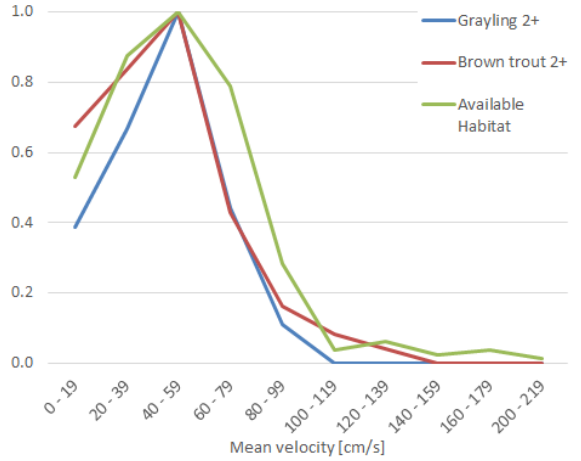
(a) Depth SI for 1+



(b) Depth SI for 2+



(c) Mean velocity SI for 1+



(d) Mean velocity for 2+

Figure 4. Calculated habitat suitability index ratings (SI) of different age classes by depth and mean velocity from the sampled area of the Ois River.

2 References

Melcher, A. H., Lautsch, E., & Schmutz, S. (2012). Non-parametric methods – Tree and P-CFA – for the ecological evaluation and assessment of suitable aquatic habitats: A contribution to fish psychology. Psychological Test and Assessment Modeling, 54(3), 293–306.

Melcher, A. H., & Schmutz, S. (2010). The importance of structural features for spawning habitat of nase *Chondrostoma nasus* (l.) and barbel *Barbus barbus* (l.) in a pre-alpine river. River Systems, 19(1), 33–42. doi:10.1127/1868-5749/2010/019-0033

Melcher, A., Hauer, C., & Zeiringer, B. (2018). Aquatic Habitat Modeling in Running Waters. In S. Schmutz & J. Sendzimir (Eds.), Riverine Ecosystem Management: Science for Governing Towards a Sustainable Future (pp. 129–149). doi:10.1007/978-3-319-73250-3_7

Appendix A

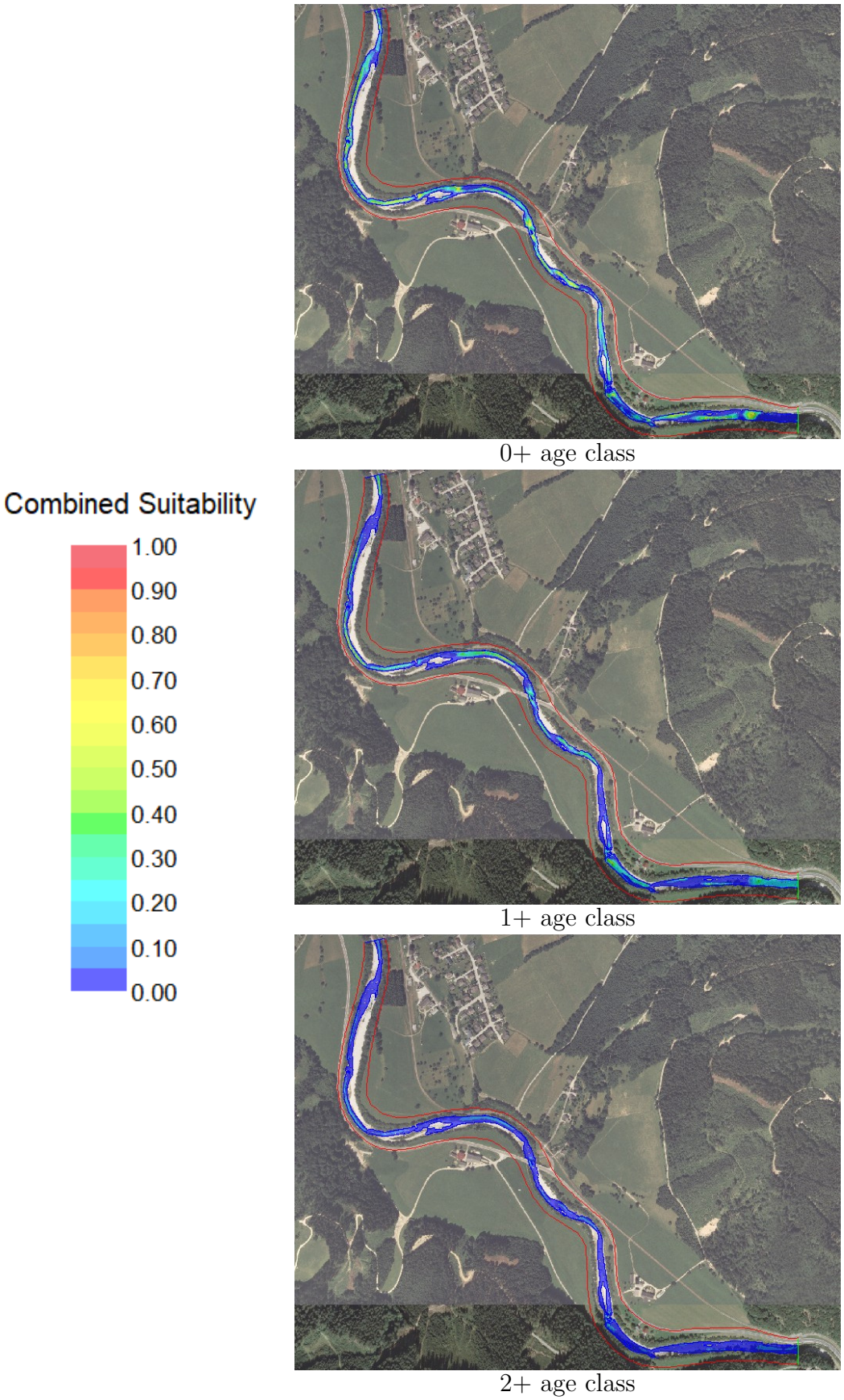


Figure A.1. River2d models of the Ybbs river at $0.35\,\mathrm{m}^3/\mathrm{s}$.

Appendix B

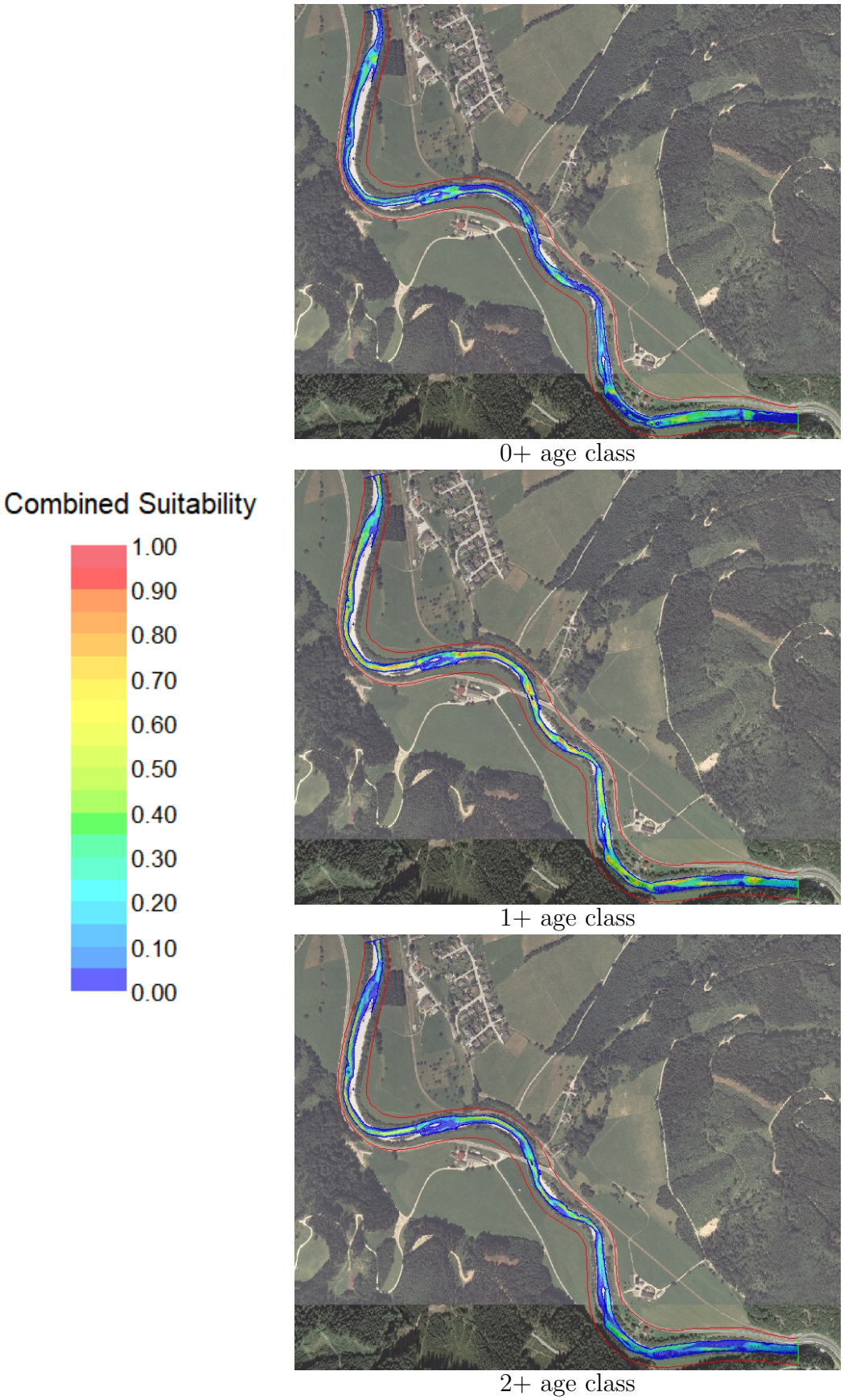


Figure A.1. River2d models of the Ybbs river at $2.16\,\mathrm{m}^3/\mathrm{s}$.

Appendix C

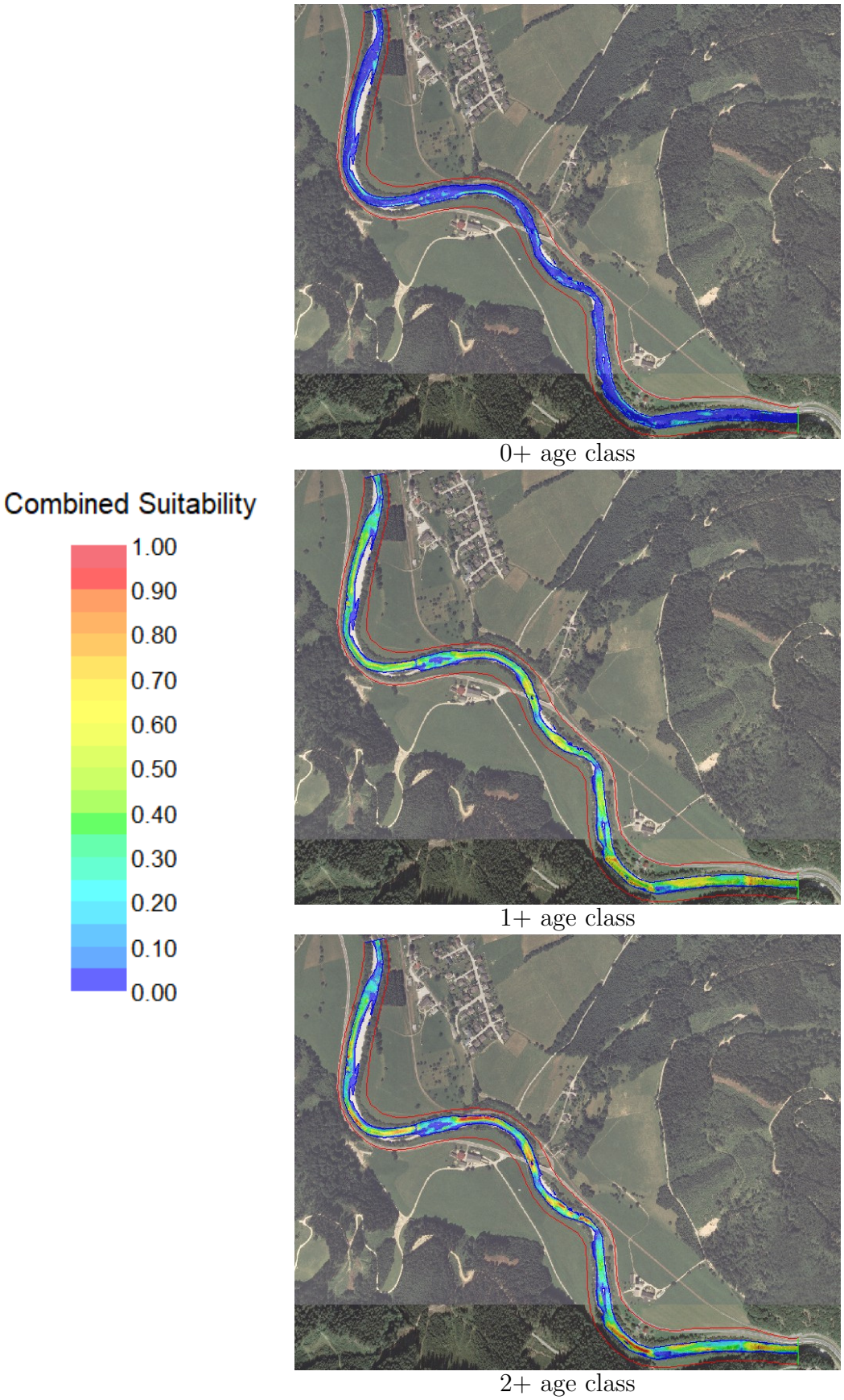


Figure A.1. River2d models of the Ybbs river at $6.00\,\mathrm{m}^3/\mathrm{s}$.

Appendix D

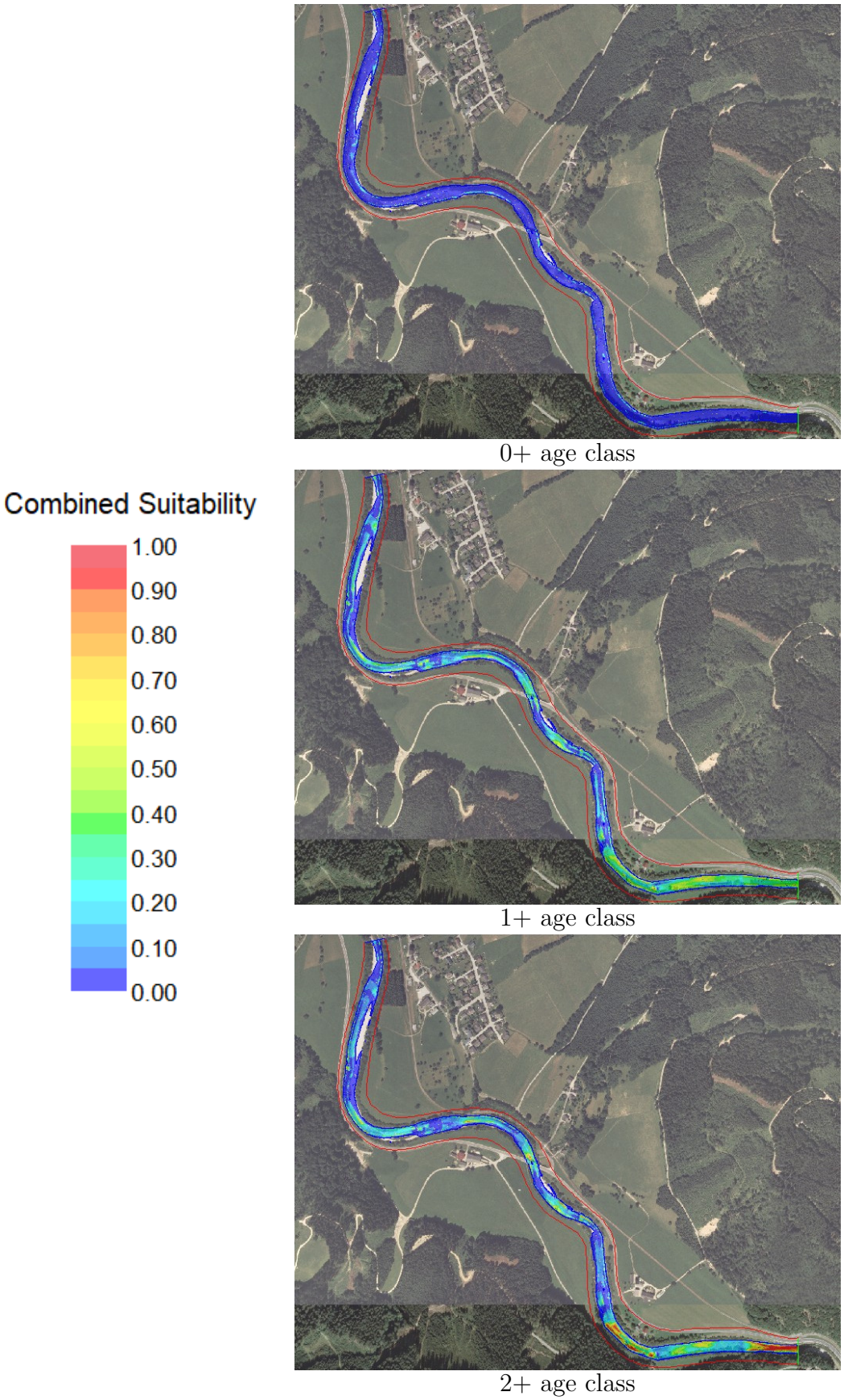


Figure A.1. River2d models of the Ybbs river at $13.00\,\mathrm{m}^3/\mathrm{s}$.

Appendix E

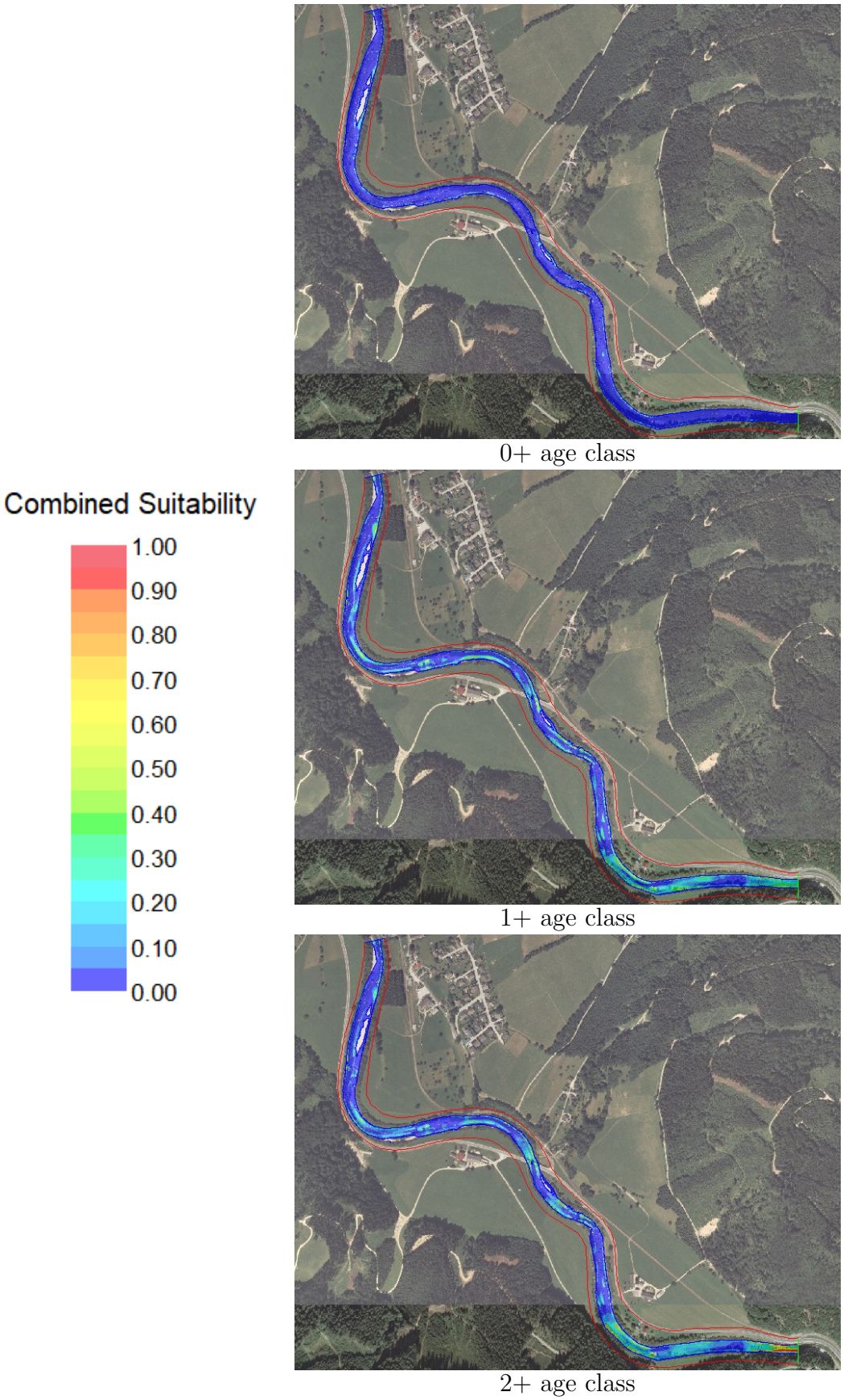


Figure A.1. River2d models of the Ybbs river at $20.00\,\mathrm{m}^3/\mathrm{s}$.