

# The effect of flood protection measures on riparian vegetation

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## Why is this interesting

Many of Norway's rivers have been secured against floods. Flood protective measures could have a negative effect the riparian Vegetation<sup>1</sup>. Riparian vegetation plays an important part of the ecosystem in and along the river, as it is a provider of both habitat, shelter and food for various organisms both on land and in Water<sup>5</sup>. Because of this, I have investigated how riparian vegetation was affected by flood protecting measures done in the lower parts of Dale River between 2013-2014.

## Hypothesis

- Some of the riparian vegetation was removed when the flood protective measures were made.
- The riparian vegetation will grow back within a few years as long as soil is available by the river

## How was the study conducted

Parts of Ortofoto Voss og Vaksdal 2008, Ortofoto Nordhordland 2015 and Ortofoto Vaksdal Modalen 2021 was georeferenced into QGIS<sup>2-4</sup>. QGIS was then used to measure the length of the riparian vegetation in terms of larger shrubs and Trees<sup>6</sup>.

## Findings

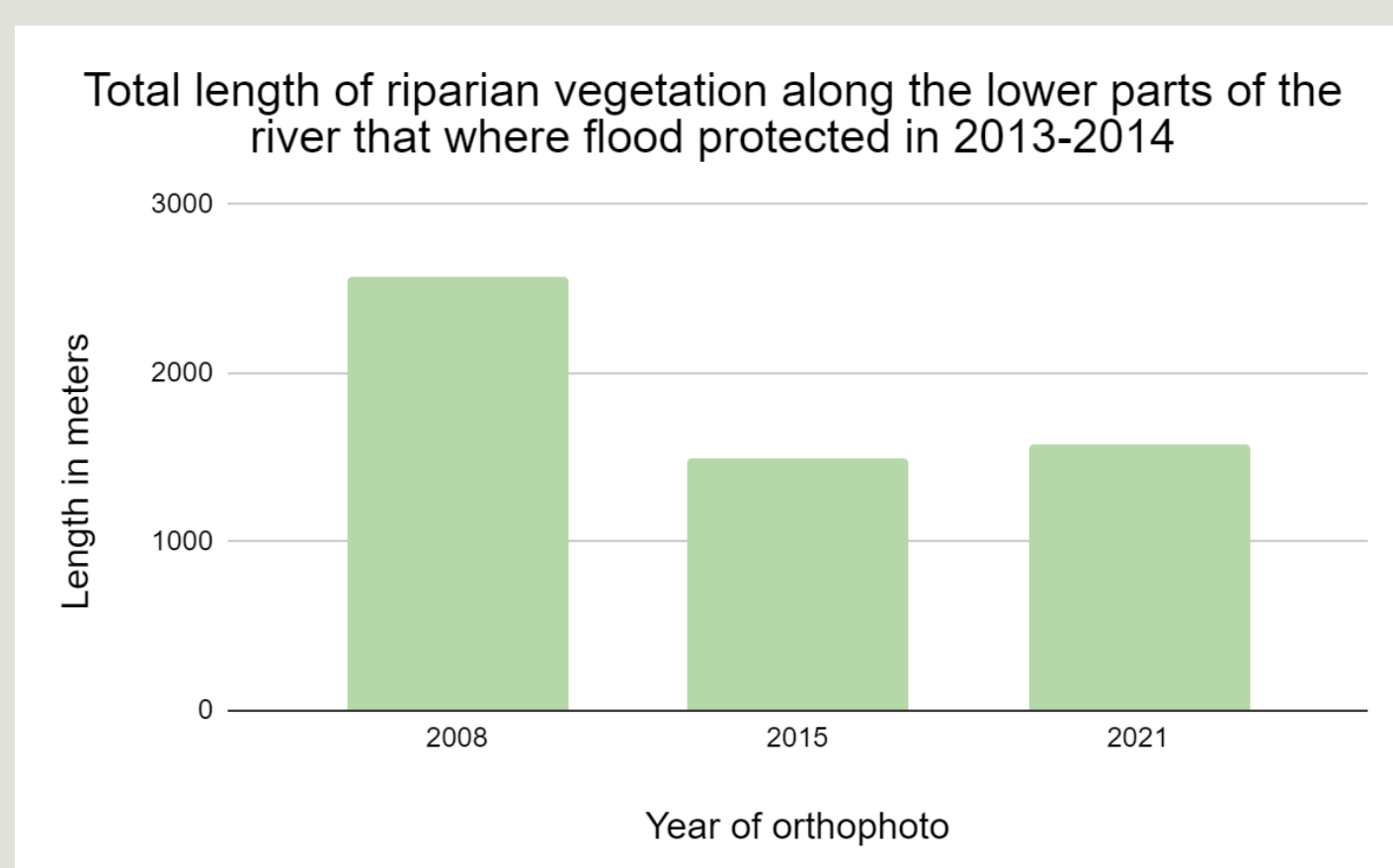


Figure 1: Length of riparian vegetation in lower sections that were flood protected in 2013-2014

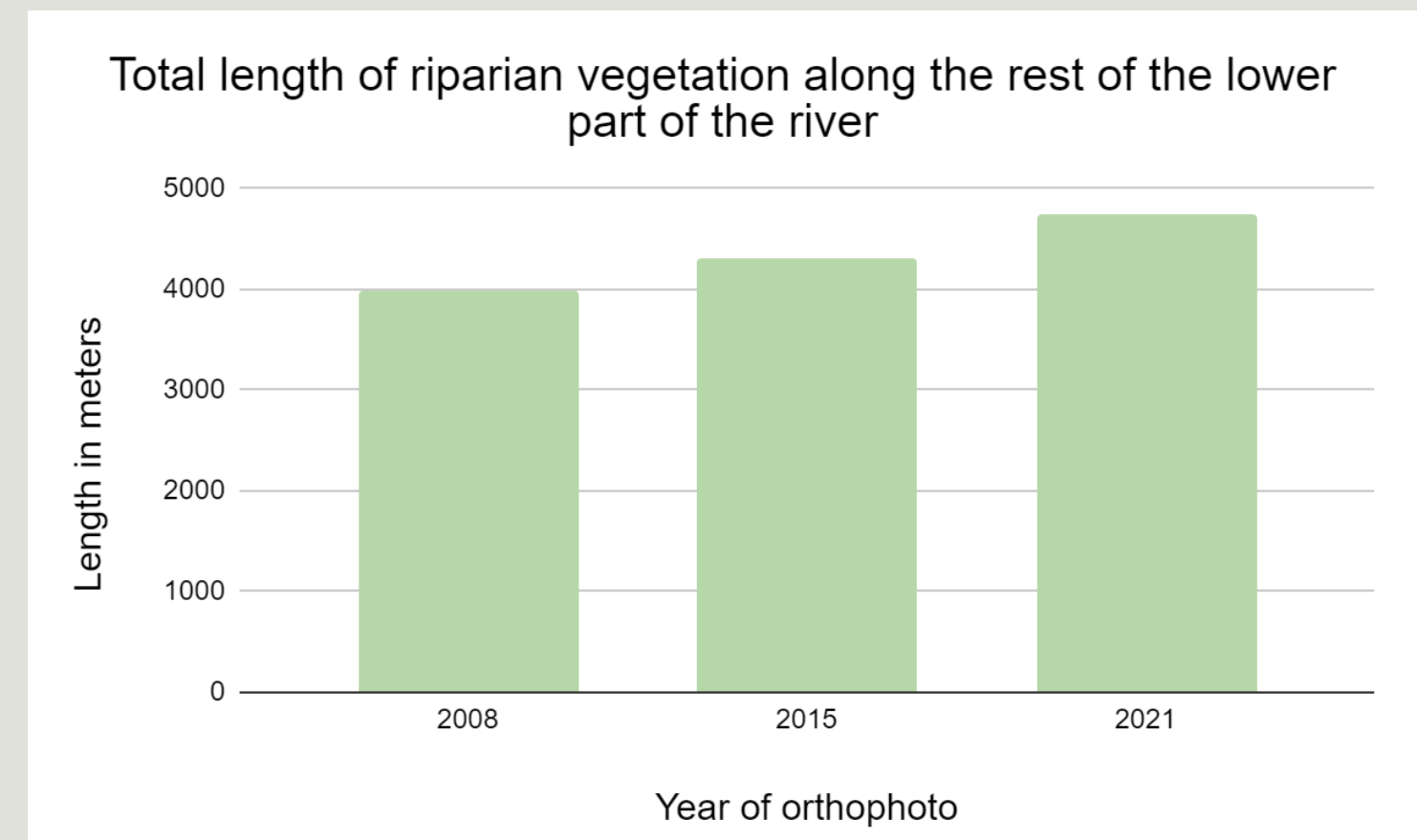


Figure 2: Length of riparian vegetation in lower sections that were not flood protected in 2013-2014



Figure 3: Orthophoto of a section of the river from 2008, before the flood protective measures from 2013-2014<sup>4</sup>.

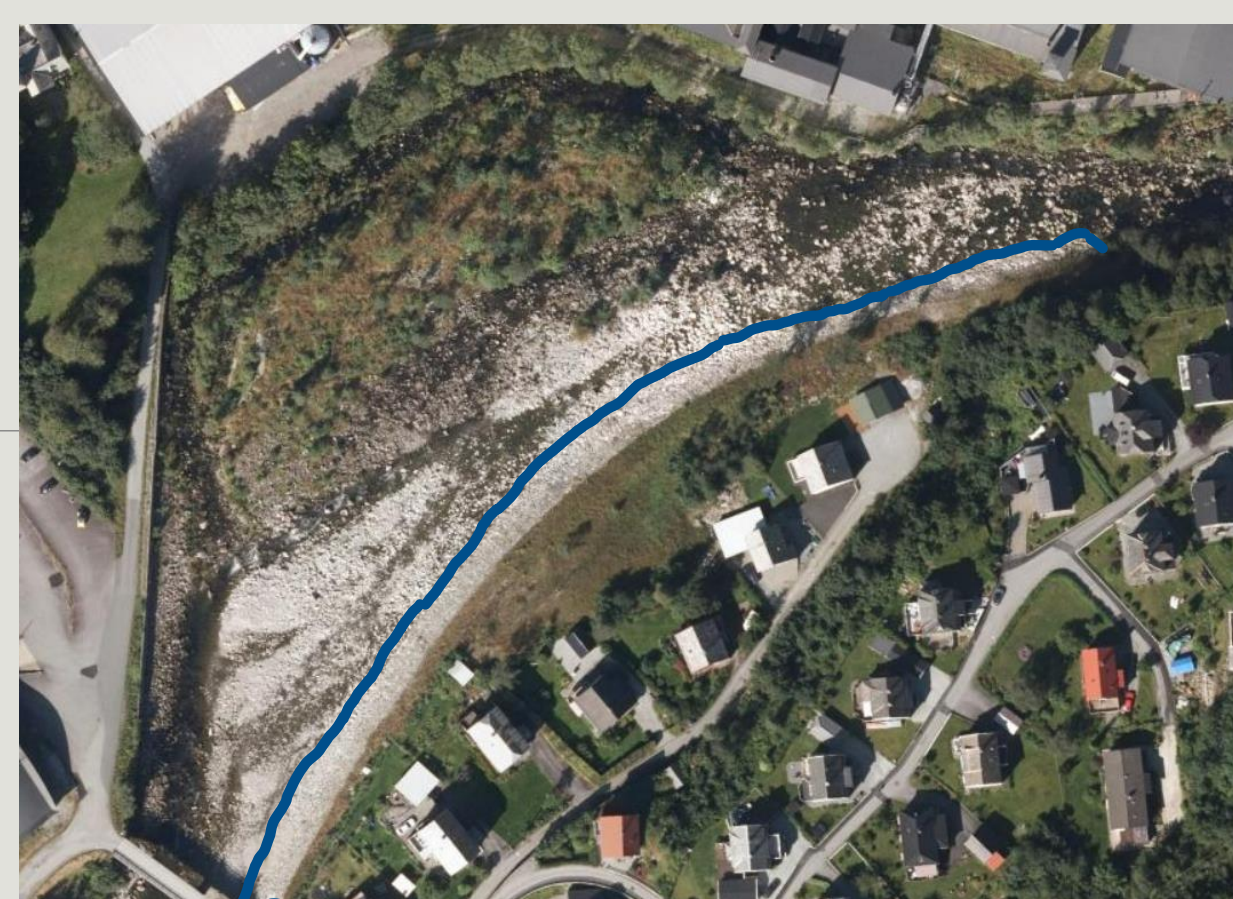


Figure 4: Orthophoto of the same section from 2015 after the last flood protective measures were made<sup>2</sup>. The blue line marks the riverbank revertments.

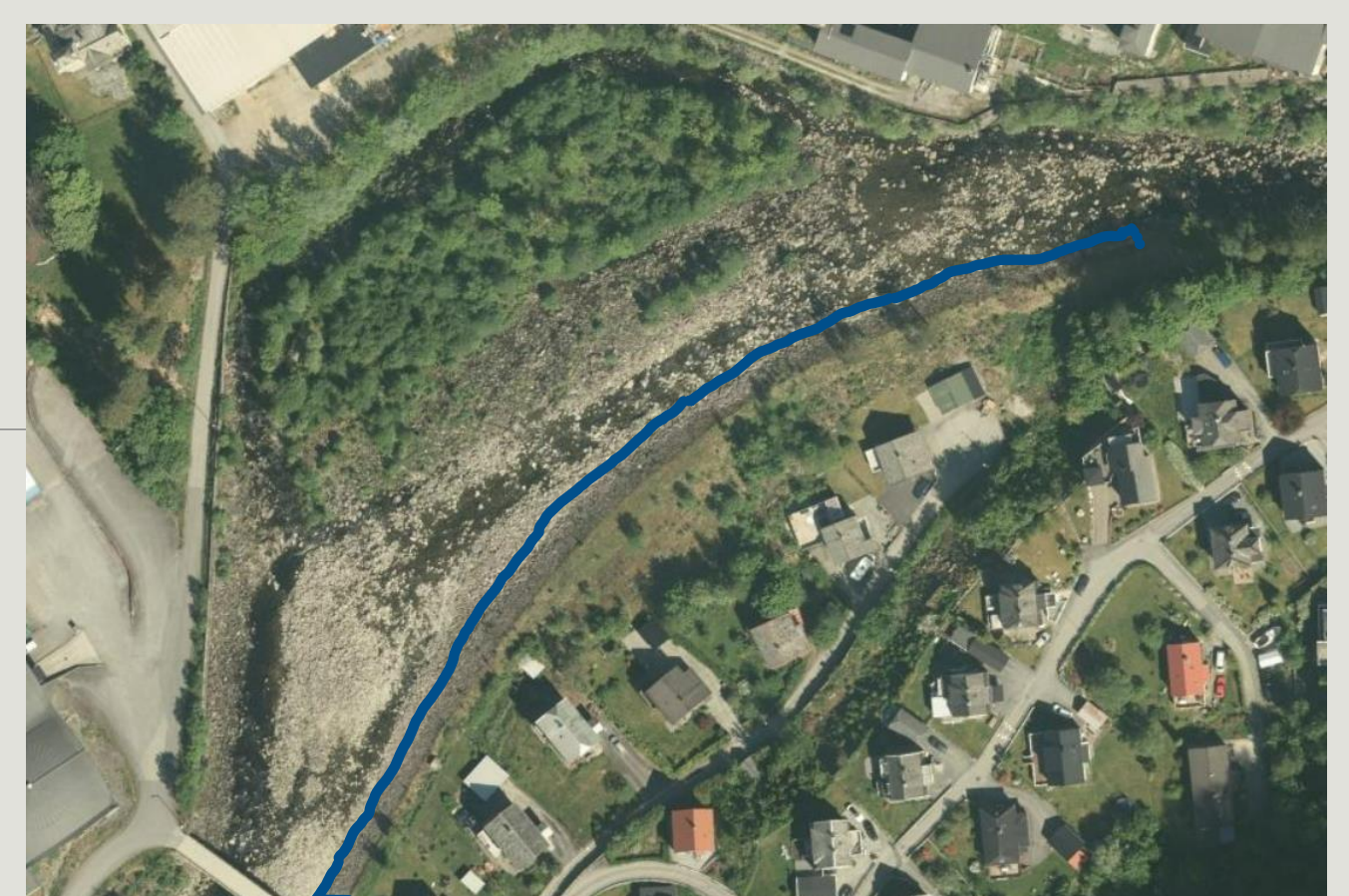


Figure 5: Orthophoto from 2021 six years after the orthophoto from 2015<sup>3</sup>.

## Discussion

The results indicate a significant removal of riparian vegetation when the flood protective measures were implemented. Some of the vegetation seems to have regrown in the period from 2015 to 2021. This did however account for less than one tenth of the removed vegetation. In parts of the river riverbank revertments up to a few meters wide had been made. These stone structures could hinder vegetation from regrowing right up to the river. Moving the riparian vegetation further away from the river could possibly reduce nutritional input and shelter provided by the riparian vegetation for aquatic organisms

## Conclusion

- Flood protection measures made from 2013 to 2014 lead to a significant removal of riparian vegetation.
- Less than one tenth of the removed length of riparian vegetation grew back between 2015 and 2021.
- Riverbank revertments could inhibit vegetation from growing right up to the river.

## References:

1. Kantvegetasjon mot vassdrag, til glede og besvær (2021) Norsk Landbruksrådgiving. Available at: <https://www.nlr.no/fagartikler/grovfor/nord/kantvegetasjon-mot-vassdrag-til-glede-og-besvaer> (Accessed: 14 May 2024).
2. Kartverket (2015) Ortofoto Nordhordland 2015. Geonorge. <https://kartkatalog.geonorge.no/metadata/ortofoto-nordhordland-2015/99df75d8-1adc-4e17-9907-738a40256e83?search=nordhordland>
3. Kartverket (2021) Ortofoto Vaksdal Modalen 2021. Geonorge. <https://kartkatalog.geonorge.no/metadata/ortofoto-vaksdal-modalen-2021/13c3476c-6261-4ef5-928f-3bab0ae8e6b5?search=vaksdal>
4. Kartverket (2008) Ortofoto Voss og Vaksdal 2008. Geonorge. <https://kartkatalog.geonorge.no/metadata/ortofoto-voss-og-vaksdal-2008/77cf18cb-3df0-4a75-895f-cb7dd4e5d33b?search=voss>
5. Staubo, I., Carm, K. et al. (2019) Kantvegetasjon langs vassdrag, NVE veileder, (2). <https://www.nve.no/nytt-fra-nve/nyheter-skred-og-vassdrag/ny-veileder-om-vegetasjonen-langs-vassdrag/>
6. QGIS.org (2024). QGIS Geographic Information System. Open Source Geospatial Foundation Project. <http://qgis.org>

