end product mapping

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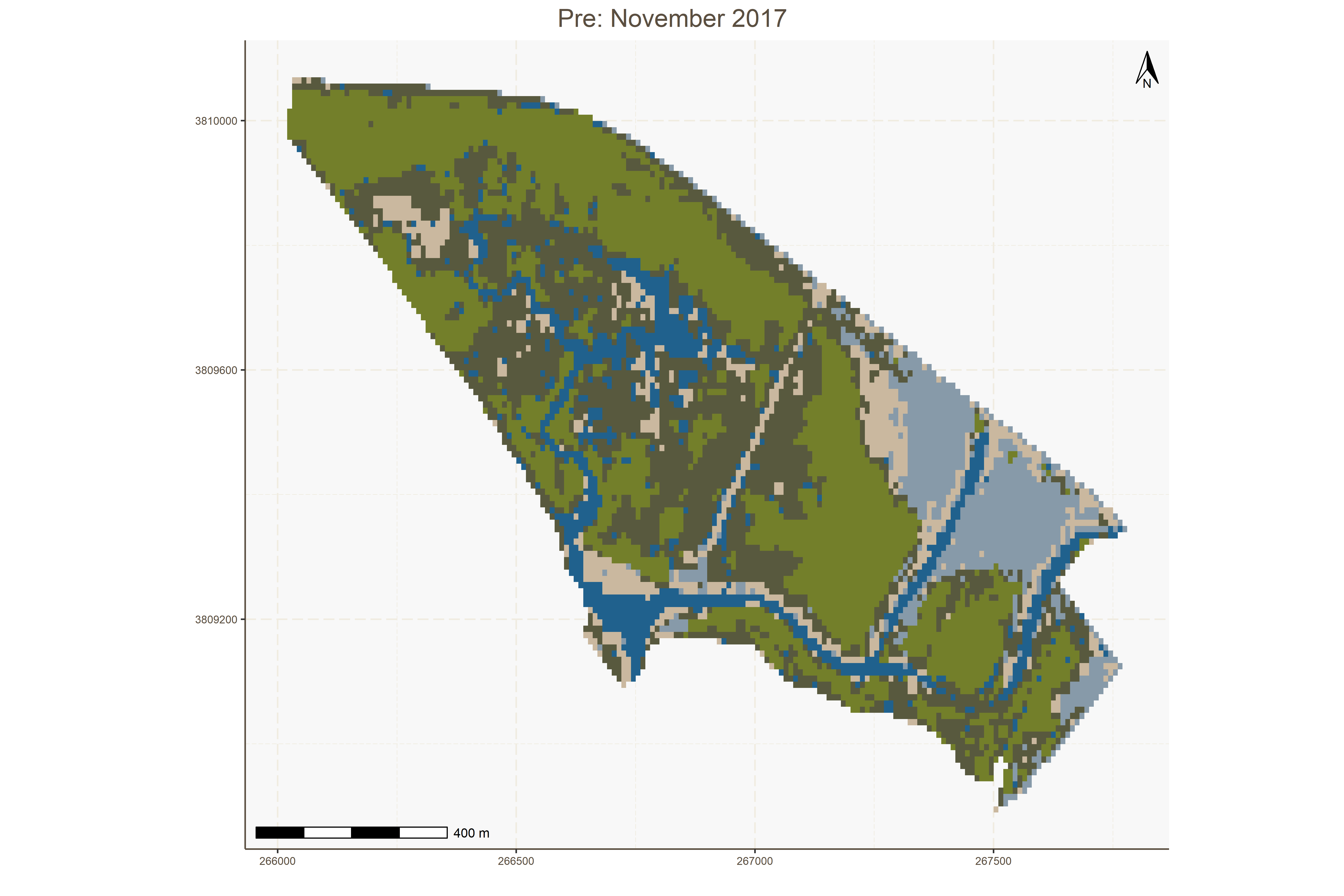
rasterdf <- function(x, aggregate = 1) {  
 resampleFactor <- aggregate   
 inputRaster <- x   
 inCols <- ncol(inputRaster)  
 inRows <- nrow(inputRaster)  
 # Compute numbers of columns and rows in the new raster for mapping  
 resampledRaster <- raster(ncol=(inCols / resampleFactor),   
 nrow=(inRows / resampleFactor))  
 # Match to the extent of the original raster  
 extent(resampledRaster) <- extent(inputRaster)  
 # Resample data on the new raster  
 y <- resample(inputRaster,resampledRaster,method='ngb')  
  
 # Extract cell coordinates into a data frame  
 coords <- xyFromCell(y, seq\_len(ncell(y)))  
 # Extract layer names  
 dat <- stack(as.data.frame(getValues(y)))  
 # Add names - 'value' for data, 'variable' to indicate different raster layers  
 # in a stack  
 names(dat) <- c('value', 'variable')  
 dat <- cbind(coords, dat)  
 dat  
}  
  
class(rasterdf)

## [1] "function"

nov17 <- drop\_na(rasterdf(raster(x = here("data", "final predictions", "nov\_2017\_envi.envi"), xy=TRUE)))  
jan18 <- drop\_na(rasterdf(raster(x = here("data", "final predictions", "jan\_2018\_envi\_clipped"), xy=TRUE)))  
nov18 <- drop\_na(rasterdf(raster(x = here("data", "final predictions", "nov\_2018\_envi\_clipped"), xy=TRUE)))  
nov20 <- drop\_na(rasterdf(raster(x = here("data", "final predictions", "nov\_2020\_envi.envi"), xy=TRUE)))  
  
nov18 <- filter(nov18, value != 0)  
jan18 <- filter(jan18, value != 0)  
  
nov17 <- nov17 %>%   
 mutate(value = case\_when(  
 value == 1 ~ "Bare Soil",  
 value == 2 ~ "High Marsh",  
 value == 3 ~ "Mid Marsh",  
 value == 4 ~ "Senesced",  
 value == 5 ~ "Water/Subtidal"))  
  
jan18 <- jan18 %>%   
 mutate(value = case\_when(  
 value == 1 ~ "Bare Soil",  
 value == 2 ~ "High Marsh",  
 value == 3 ~ "Mid Marsh",  
 value == 4 ~ "Senesced",  
 value == 5 ~ "Water/Subtidal"))  
  
nov18 <- nov18 %>%   
 mutate(value = case\_when(  
 value == 1 ~ "Bare Soil",  
 value == 2 ~ "High Marsh",  
 value == 3 ~ "Mid Marsh",  
 value == 4 ~ "Senesced",  
 value == 5 ~ "Water/Subtidal"))  
  
nov20 <- nov20 %>%   
 mutate(value = case\_when(  
 value == 1 ~ "Bare Soil",  
 value == 2 ~ "High Marsh",  
 value == 3 ~ "Mid Marsh",  
 value == 4 ~ "Senesced",  
 value == 5 ~ "Water/Subtidal"))

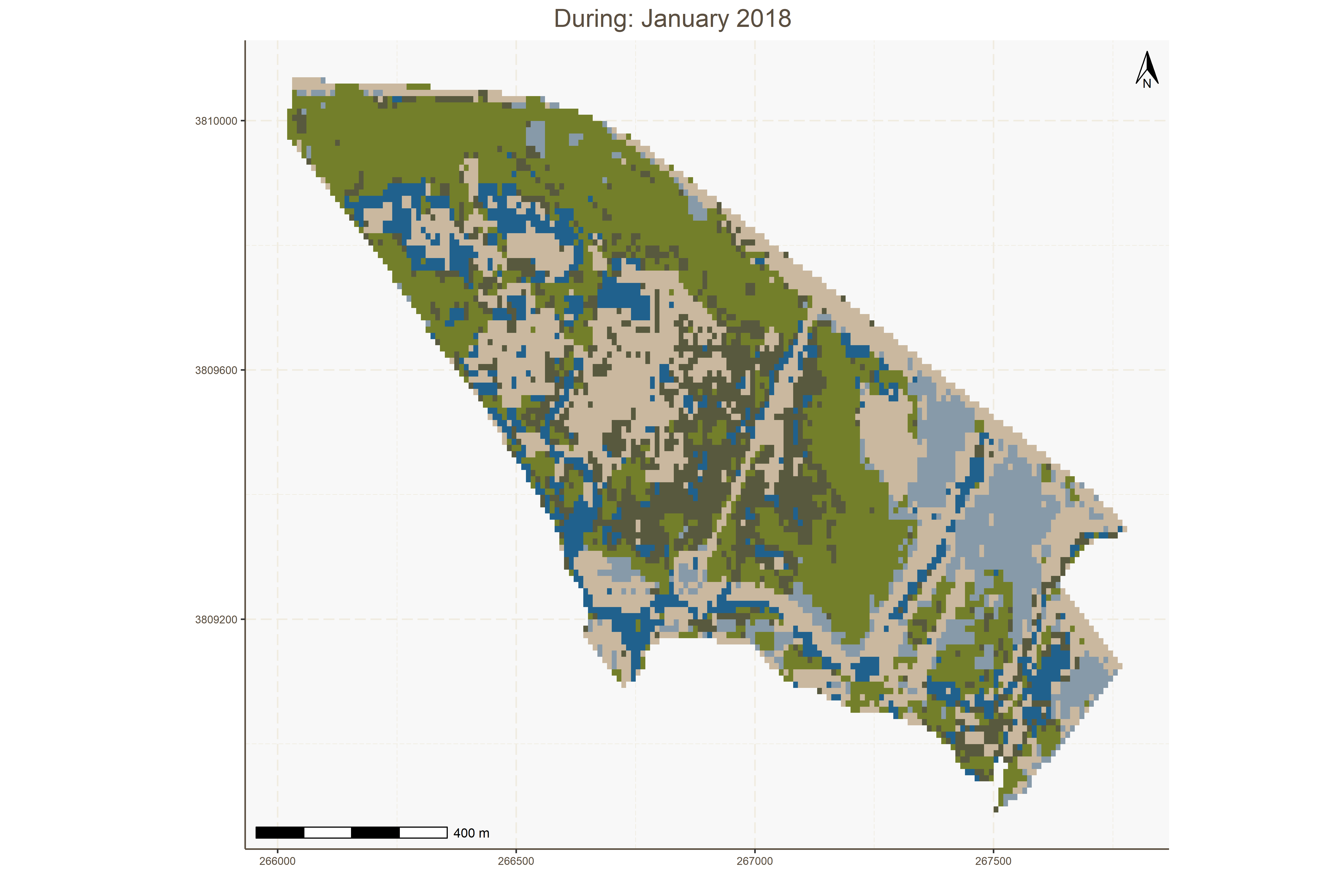
PreM <- ggplot()+  
 geom\_raster(data= nov17, aes(x=x, y=y, fill= value))+  
 scale\_fill\_manual(values= rev(cal\_palette("bigsur2", n=5, type = "continuous")))+  
 labs(title="Pre: November 2017",  
 y="",  
 x="",  
 fill = "Landcover")+  
 coord\_quickmap()+  
 annotation\_scale()+  
 annotation\_north\_arrow(location = "tr", height = unit(.8, "cm"), width = unit(.5, "cm"), style = north\_arrow\_orienteering(text\_size = 6))+  
 theme(legend.position = "none",  
 plot.title = element\_text(color = "#5b4f41", size = 16, hjust = 0.45),  
 plot.background = element\_rect("white"),  
 panel.background = element\_rect("#f8f8f8"),  
 panel.grid = element\_line(linetype= "longdash", color = "#f0ece1"),  
 axis.text = element\_text(color = "#5b4f41", size = 7),  
 axis.title = element\_text(color = "#5b4f41"),  
 strip.background = element\_rect("white"),  
 axis.line = element\_line(color = "#5b4f41"),  
 plot.caption = element\_text(size = 9, hjust = -0.1))  
PreM

## Using plotunit = 'm'



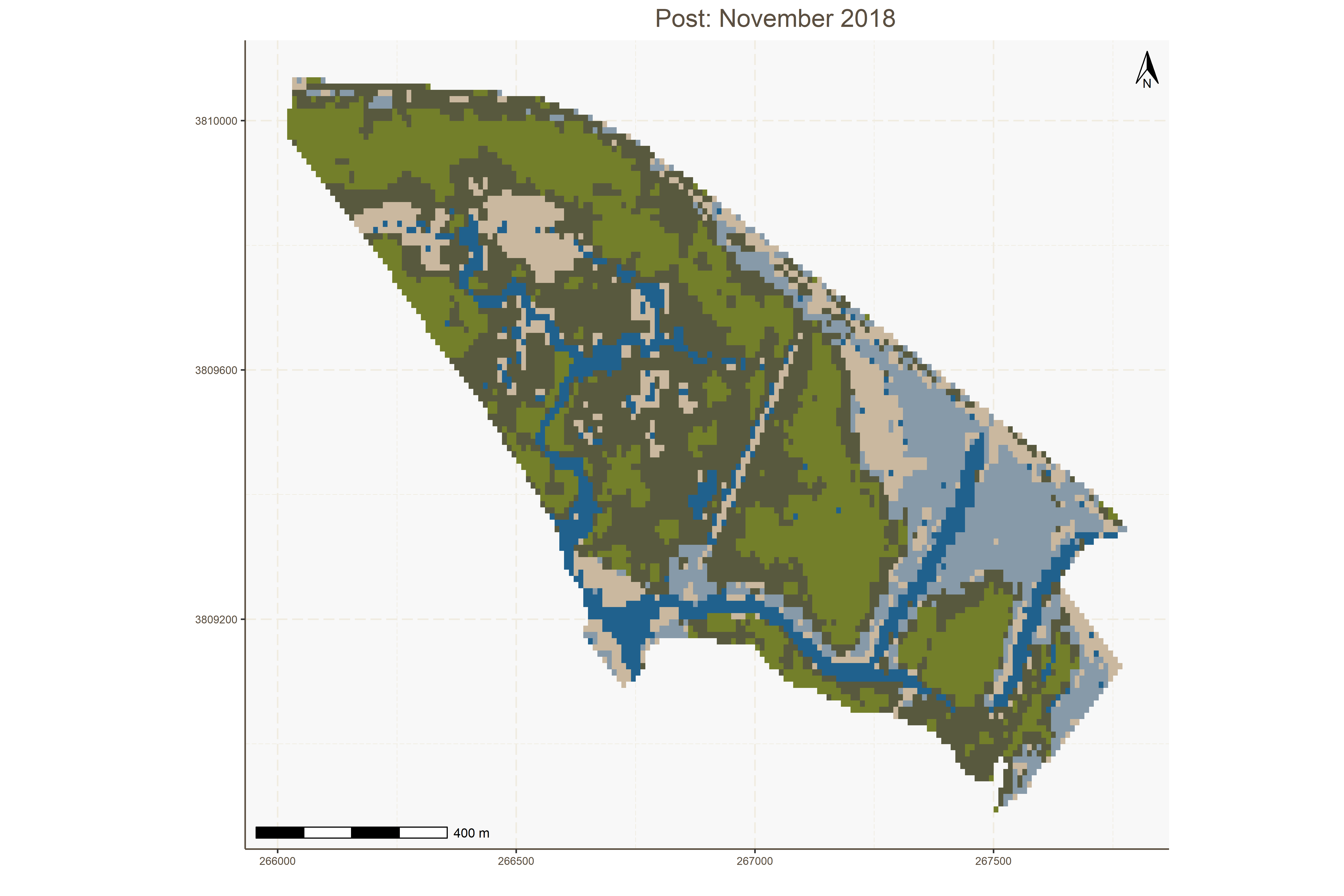
DurM <- ggplot()+  
 geom\_raster(data= jan18, aes(x=x, y=y, fill=value))+  
 labs(title="During: January 2018",  
 y="",  
 x="",  
 fill = "Landcover")+  
 scale\_fill\_manual(values= rev(cal\_palette("bigsur2", n=5, type = "continuous")))+  
 coord\_quickmap()+  
 annotation\_scale()+  
 annotation\_north\_arrow(location = "tr", height = unit(.8, "cm"), width = unit(.5, "cm"), style = north\_arrow\_orienteering(text\_size = 6))+  
 theme(plot.title = element\_text(color = "#5b4f41", size = 16, hjust = 0.45),  
 plot.background = element\_rect("white"),  
 panel.background = element\_rect("#f8f8f8"),  
 panel.grid = element\_line(linetype= "longdash", color = "#f0ece1"),  
 axis.text = element\_text(color = "#5b4f41", size = 7),  
 axis.title = element\_text(color = "#5b4f41"),  
 strip.background = element\_rect("white"),  
 axis.line = element\_line(color = "#5b4f41"),  
 plot.caption = element\_text(size = 9, hjust = -0.1),  
 legend.position = "none")  
DurM

## Using plotunit = 'm'



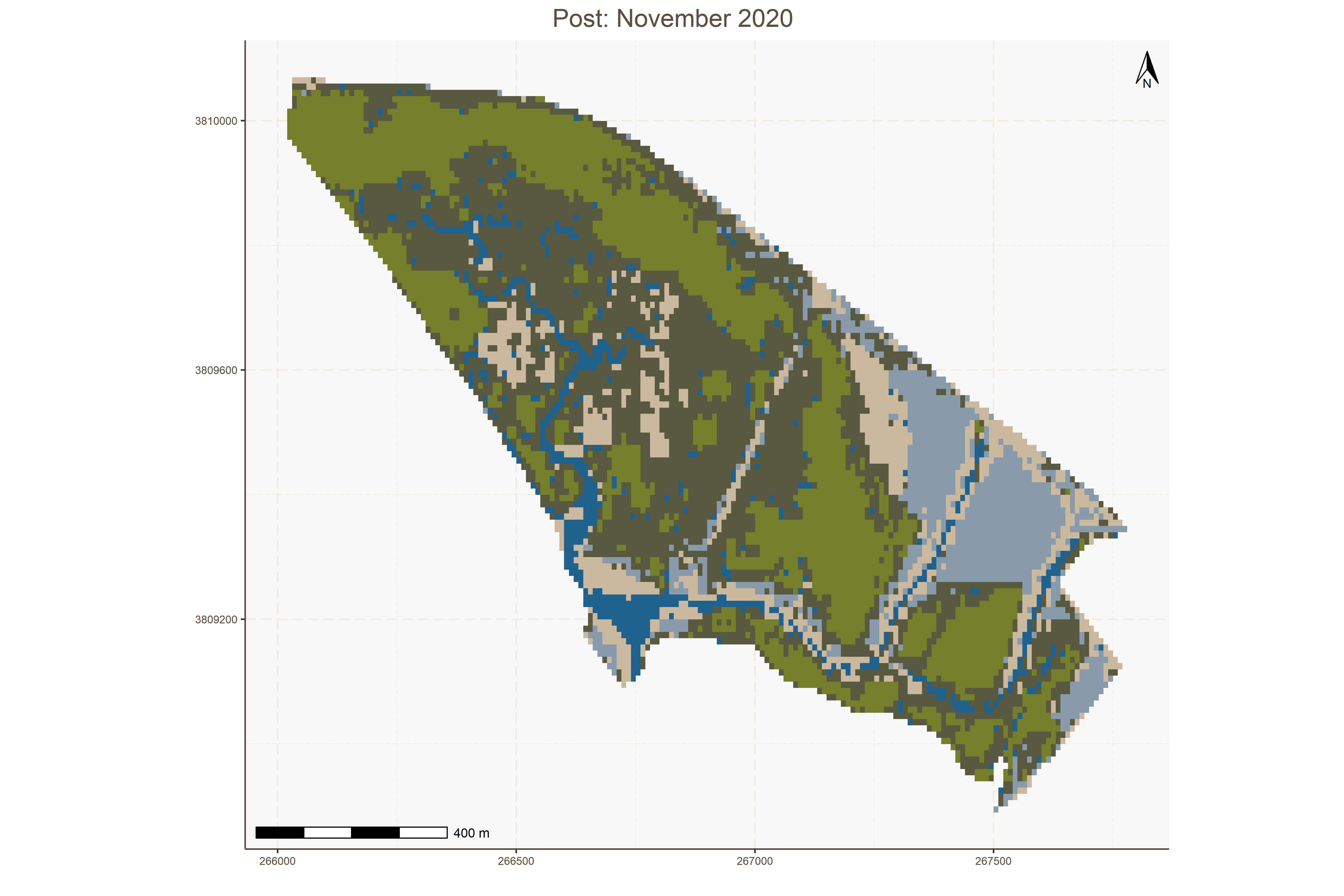
RecM1 <- ggplot()+  
 geom\_raster(data= nov18, aes(x=x, y=y, fill= value))+  
 labs(title="Post: November 2018",  
 y="",  
 x="",  
 fill = "Landcover")+  
 scale\_fill\_manual(values= rev(cal\_palette("bigsur2", n=5, type = "continuous")))+  
 coord\_quickmap()+  
 annotation\_scale()+  
 annotation\_north\_arrow(location = "tr", height = unit(.8, "cm"), width = unit(.5, "cm"), style = north\_arrow\_orienteering(text\_size = 6))+  
 theme(plot.title = element\_text(color = "#5b4f41", size = 16, hjust = 0.6),  
 plot.background = element\_rect("white"),  
 panel.background = element\_rect("#f8f8f8"),  
 panel.grid = element\_line(linetype= "longdash", color = "#f0ece1"),  
 axis.text = element\_text(color = "#5b4f41", size = 7),  
 axis.title = element\_text(color = "#5b4f41"),  
 strip.background = element\_rect("white"),  
 axis.line = element\_line(color = "#5b4f41"),  
 plot.caption = element\_text(size = 9, hjust = -0.1),  
 legend.position = "none")  
RecM1

## Using plotunit = 'm'



RecM2 <- ggplot()+  
 geom\_raster(data= nov20, aes(x=x, y=y, fill= value))+  
 labs(title="Post: November 2020",  
 y="",  
 x="",  
 fill = "Landcover")+  
 scale\_fill\_manual(values= rev(cal\_palette("bigsur2", n=5, type = "continuous")))+  
 coord\_quickmap()+  
 annotation\_scale()+  
 annotation\_north\_arrow(location = "tr", height = unit(.8, "cm"), width = unit(.5, "cm"), style = north\_arrow\_orienteering(text\_size = 6))+  
 theme(plot.title = element\_text(color = "#5b4f41", size = 16, hjust = 0.45),  
 plot.background = element\_rect("white"),  
 panel.background = element\_rect("#f8f8f8"),  
 panel.grid = element\_line(linetype= "longdash", color = "#f0ece1"),  
 axis.text = element\_text(color = "#5b4f41", size = 7),  
 axis.title = element\_text(color = "#5b4f41"),  
 strip.background = element\_rect("white"),  
 axis.line = element\_line(color = "#5b4f41"),  
 plot.caption = element\_text(size = 9, hjust = -0.1),  
 legend.position = "none")  
RecM2

## Using plotunit = 'm'



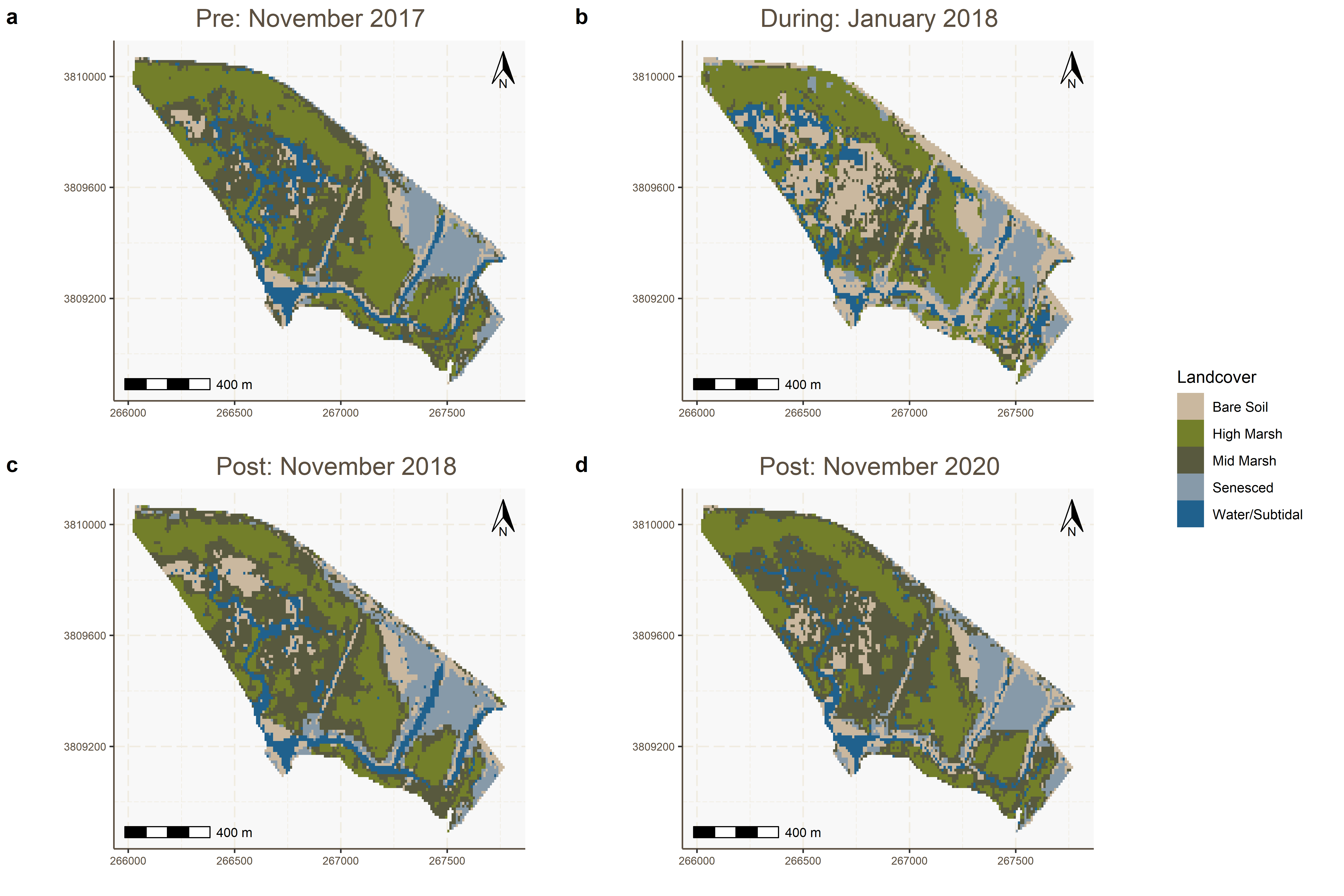
legend <- get\_legend(RecM2+  
 guides(color = guide\_legend(nrow =1))+  
 theme(legend.position = "right"))

## Using plotunit = 'm'

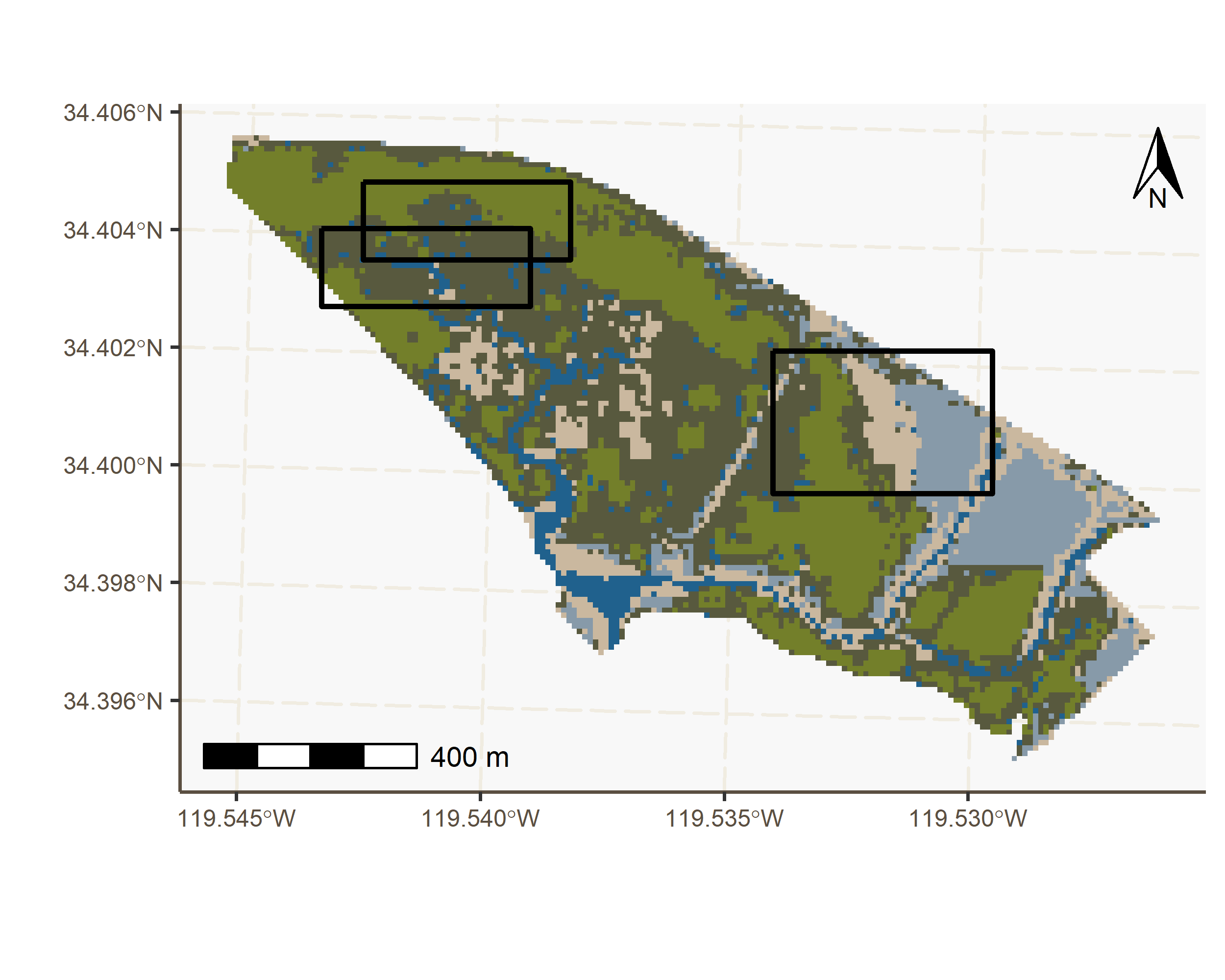
combined\_plot <- plot\_grid(PreM, DurM, RecM1, RecM2, ncol = 2, labels = "auto", rel\_widths = c(2,2,2,2))

## Using plotunit = 'm'  
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plot\_grid(combined\_plot, legend, ncol = 2, rel\_widths = c(5.5,1))

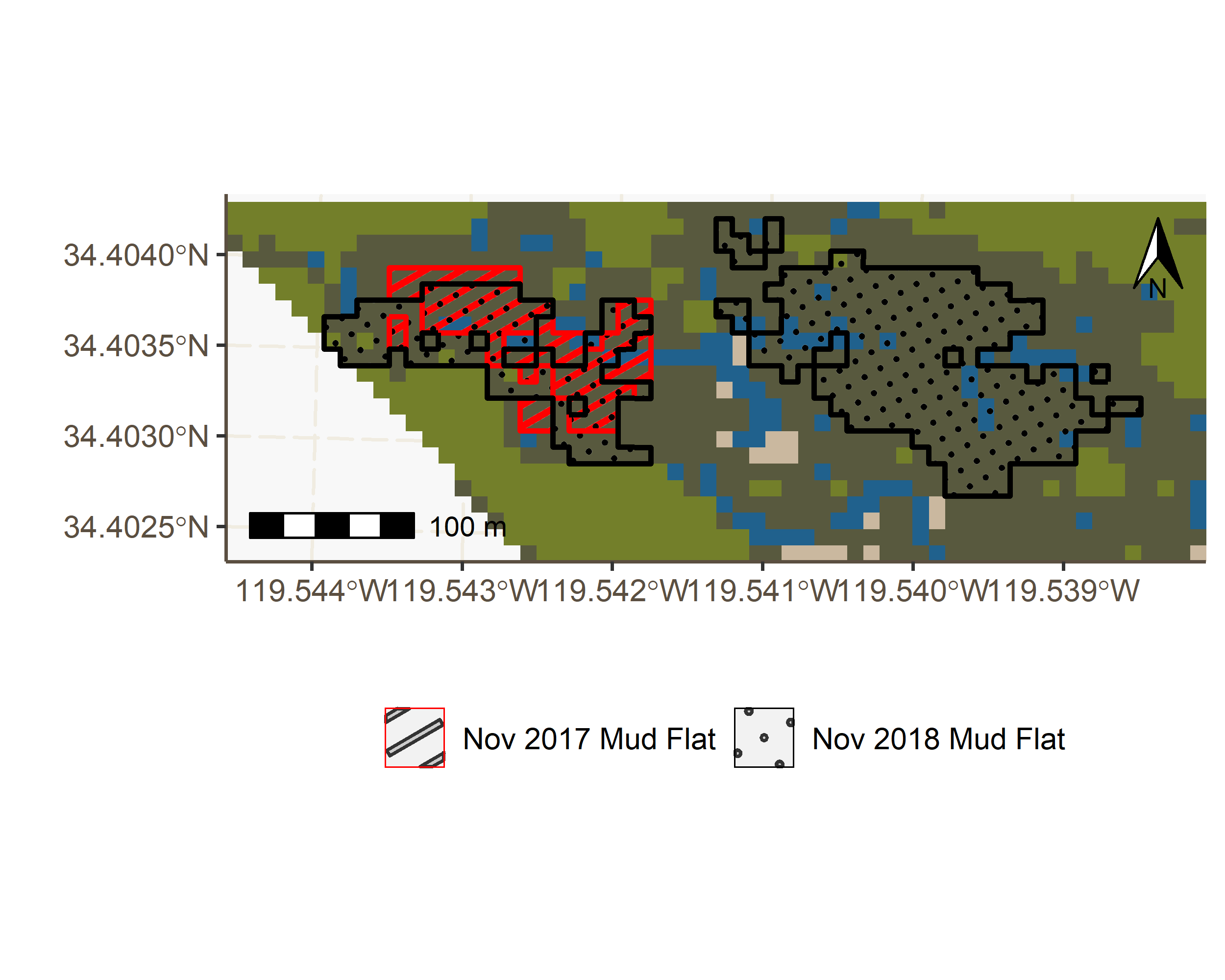


indicators <- read\_sf(here("End Products", "Indicators.shp"))  
  
mudflat <- read\_sf(here("End Products", "Mud flat extent.shp")) %>%   
 filter(Year\_Type != "Jan\_2018\_Mud\_Flat") %>%   
 mutate(Year\_Type = case\_when(  
 Year\_Type == "Nov\_2017\_Mud\_Flat" ~ "Nov 2017 Mud Flat",  
 Year\_Type == "Nov\_2018\_Mud\_Flat" ~ "Nov 2018 Mud Flat",  
 ))  
  
high\_marsh <- read\_sf(here("End Products", "High Marsh Extent.shp")) %>%   
 mutate(Year = case\_when(  
 Year == 2017 ~ "2017 High Marsh",  
 Year == 2020 ~ "2020 High Marsh"))  
  
pre\_debris <- read\_sf(here("End Products", "Pre Debris Extents.shp")) %>%   
 filter(Year %in% c("Nov\_2017\_Soil", "Nov\_2017\_Mid\_Marsh")) %>%   
 mutate(Year = case\_when(  
 Year == "Nov\_2017\_Soil" ~ "Nov 2017 Soil",  
 Year == "Nov\_2017\_Mid\_Marsh" ~ "Nov 2017 Mid Marsh"  
 ))  
  
post\_debris <- read\_sf(here("End Products", "Pre Debris Extents.shp")) %>%   
 filter(Year %in% c("Nov\_2020\_Soil", "Nov\_2020\_Mid\_Marsh")) %>%   
 mutate(Year = case\_when(  
 Year == "Nov\_2020\_Soil" ~ "Nov 2020 Soil",  
 Year == "Nov\_2020\_Mid\_Marsh" ~ "Nov 2020 Mid Marsh"  
 ))  
  
ggplot()+  
 geom\_raster(data= nov20, aes(x=x, y=y, fill= value))+  
 geom\_sf(data = indicators, color = "black", fill = "NA", lwd = 0.75)+  
 scale\_fill\_manual(values= rev(cal\_palette("bigsur2", n=5, type = "continuous")))+  
 labs(y="",  
 x="",  
 fill = "")+  
 guides(fill = "none")+  
 coord\_sf()+  
 annotation\_scale()+  
 annotation\_north\_arrow(location = "tr", height = unit(.8, "cm"), width = unit(.5, "cm"), style = north\_arrow\_orienteering(text\_size = 6))+  
 theme(legend.position = "none",  
 plot.title = element\_text(color = "#5b4f41", size = 16, hjust = 0.45),  
 plot.background = element\_rect("white"),  
 panel.background = element\_rect("#f8f8f8"),  
 panel.grid = element\_line(linetype= "longdash", color = "#f0ece1"),  
 axis.text = element\_text(color = "#5b4f41", size = 7),  
 axis.title = element\_text(color = "#5b4f41"),  
 strip.background = element\_rect("white"),  
 axis.line = element\_line(color = "#5b4f41"),  
 plot.caption = element\_text(size = 9, hjust = -0.1))



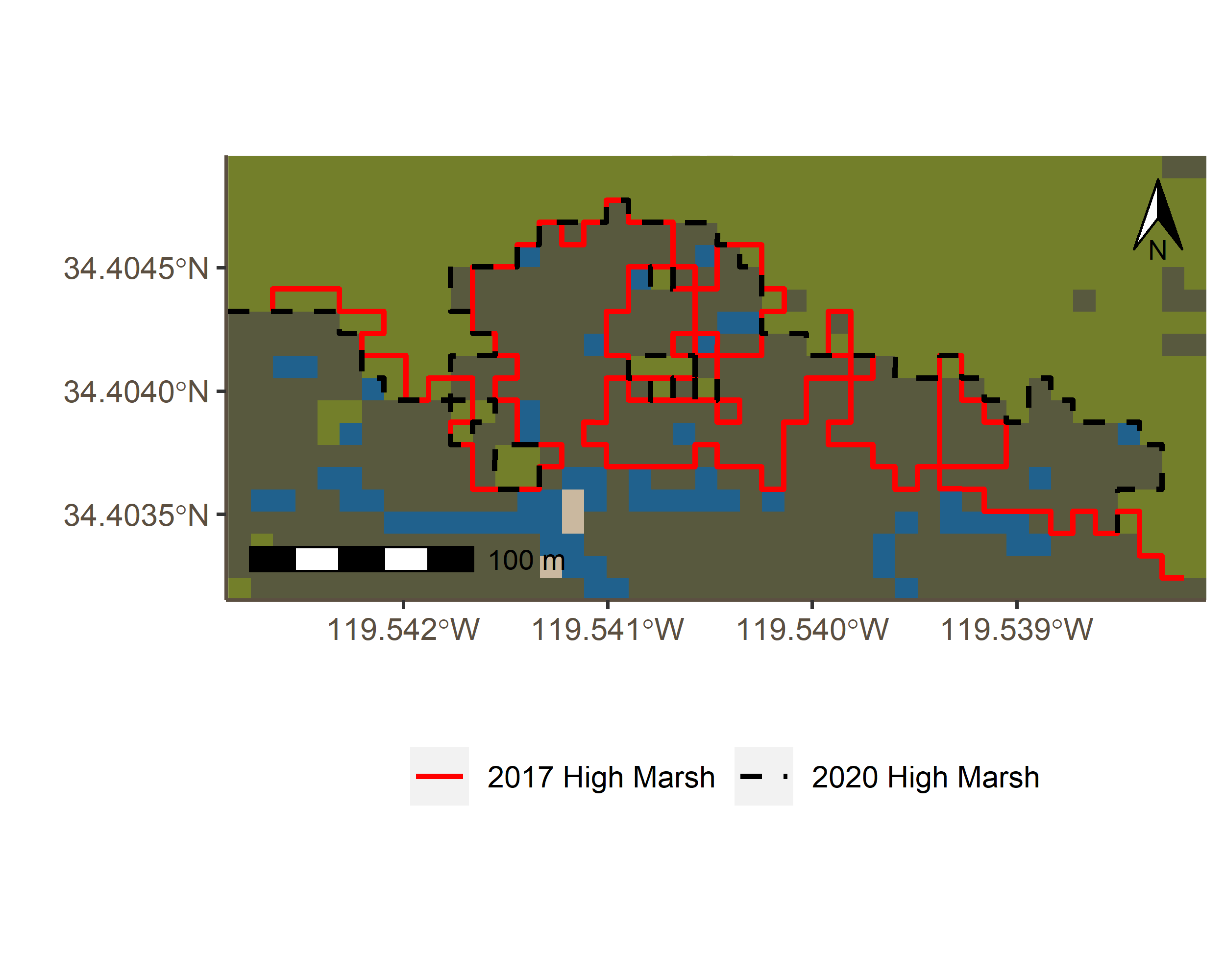
ggplot()+  
 geom\_raster(data= nov20, aes(x=x, y=y, fill= value))+  
 scale\_fill\_manual(values= rev(cal\_palette("bigsur2", n=5, type = "continuous")))+  
 geom\_sf\_pattern(data = mudflat, aes(color = Year\_Type, pattern = Year\_Type), fill = NA, pattern\_fill = c("red", "black"), pattern\_color = c("red", "black"), lwd= .75) +  
 scale\_color\_manual(values = c("red", "black"))+  
 labs(y="",  
 x="",  
 pattern= "",  
 color = "")+  
 guides(fill = "none")+  
 xlim(c(266100,266700))+  
 ylim(c(3809700, 3809925))+  
 coord\_sf(expand = FALSE)+  
 annotation\_scale()+  
 annotation\_north\_arrow(location = "tr", height = unit(.8, "cm"), width = unit(.5, "cm"), style = north\_arrow\_orienteering(text\_size = 6))+  
 theme(legend.position = "bottom",  
 plot.title = element\_text(color = "#5b4f41", size = 16, hjust = 0.45),  
 plot.background = element\_rect("white"),  
 panel.background = element\_rect("#f8f8f8"),  
 panel.grid = element\_line(linetype= "longdash", color = "#f0ece1"),  
 axis.text = element\_text(color = "#5b4f41", size = 9),  
 axis.title = element\_text(color = "#5b4f41"),  
 strip.background = element\_rect("white"),  
 axis.line = element\_line(color = "#5b4f41"),  
 plot.caption = element\_text(size = 9, hjust = -0.1))

## Warning: Removed 8408 rows containing missing values (geom\_raster).



ggplot()+  
 geom\_raster(data= nov20, aes(x=x, y=y, fill= value))+  
 scale\_fill\_manual(values= rev(cal\_palette("bigsur2", n=5, type = "continuous")))+  
 geom\_sf(data = high\_marsh, aes(color = as.factor(Year), linetype = as.factor(Year)), lwd= .75) +  
 scale\_color\_manual(values = c("red", "black"), labels = c("2017 High Marsh", "2020 High Marsh"))+  
 scale\_linetype\_manual(values = c("2017 High Marsh" = "solid", "2020 High Marsh" = "dashed"))+  
 labs(y="",  
 x="",  
 color = "",  
 linetype = "")+  
 guides(fill = "none")+  
 xlim(c(266259,266700))+  
 ylim(c(3809790, 3809990))+  
 coord\_sf(expand = FALSE)+  
 annotation\_scale(pad\_y = unit(0.3, "cm"))+  
 annotation\_north\_arrow(location = "tr", height = unit(.8, "cm"), width = unit(.5, "cm"), style = north\_arrow\_orienteering(text\_size = 6))+  
 theme(legend.position = "bottom",  
 plot.title = element\_text(color = "#5b4f41", size = 16, hjust = 0.45),  
 plot.background = element\_rect("white"),  
 panel.background = element\_rect("#f8f8f8"),  
 panel.grid = element\_line(linetype= "longdash", color = "#f0ece1"),  
 axis.text = element\_text(color = "#5b4f41", size = 9),  
 axis.title = element\_text(color = "#5b4f41"),  
 strip.background = element\_rect("white"),  
 axis.line = element\_line(color = "#5b4f41"),  
 plot.caption = element\_text(size = 9, hjust = -0.1))

## Warning: Removed 8663 rows containing missing values (geom\_raster).



ggplot()+  
 geom\_raster(data= nov20, aes(x=x, y=y, fill= value))+  
 scale\_fill\_manual(values= rev(cal\_palette("bigsur2", n=5, type = "continuous")))+  
 geom\_sf\_pattern(data = pre\_debris, aes(color = Year), fill = NA, pattern\_fill = c("red", "orange"), pattern\_color = c("red", "orange"), lwd= .75) +  
 geom\_sf(data = post\_debris, aes(color = Year), fill = NA, lwd = .75)+  
 scale\_color\_manual(values = c("red", "orange", "gray", "black"))+  
 labs(y="",  
 x="",  
 pattern= "",  
 pattern\_spacing = "",  
 color = "")+  
 guides(fill = "none")+  
 xlim(c(266950,267550))+  
 ylim(c(3809300, 3809700))+  
 coord\_sf(expand = FALSE,)+  
 annotation\_scale()+  
 annotation\_north\_arrow(location = "tr", height = unit(.8, "cm"), width = unit(.5, "cm"), style = north\_arrow\_orienteering(text\_size = 6))+  
 theme(legend.position = "bottom",  
 plot.title = element\_text(color = "#5b4f41", size = 16, hjust = 0.45),  
 plot.background = element\_rect("white"),  
 panel.background = element\_rect("#f8f8f8"),  
 panel.grid = element\_line(linetype= "longdash", color = "#f0ece1"),  
 axis.text = element\_text(color = "#5b4f41", size = 9),  
 axis.title = element\_text(color = "#5b4f41"),  
 strip.background = element\_rect("white"),  
 axis.line = element\_line(color = "#5b4f41"),  
 plot.caption = element\_text(size = 9, hjust = -0.1))

## Warning: Removed 7488 rows containing missing values (geom\_raster).

