**Goby:**

*Goby*∼Negative Binomial(*μ*,*ϕ*)

log(*μ*)=*aGoby*​[*Zone*]+*βYear*​⋅*Year*+*βYear*\_2​⋅*Year*2+*βSC*\_*count*​⋅*SC*\_*count*+*βSAV*​⋅*SAV*+*βSB*\_*count*​⋅*SB*\_*count*+*βDO*​⋅*DO*+*βMicro*​⋅*Micro*+*βBreachDays*​⋅*BreachDays*+*βBreachDays*\_2​⋅*BreachDays*2+*βSubstrate*​⋅*Substrate*+*βWind*​⋅*Wind*+*βTemp*​⋅*Temp*+*βTemp*2​⋅*Temp*2+*βGoby*\_*lag*​⋅*Goby*\_*lag*+*Area*

**Zone random effects model:**

*aGoby*​[*Zone*]∼Normal(*μZone*​,*τZone*​)

*μZone*​∼Normal(0,0.5)

*τZone*​∼Exponential(1)

**DO model:**

*DO*∼Normal(*DOν*​,*τ*)

*DOν*​=*aDO*​+*βTemp*​⋅*Temp*+*βWind*​⋅*Wind*

**Temp model:**

*Temp*∼Normal(*Tempν*​,*τ*)

*Tempν*​=*aTemp*​+*βBreachDays*​⋅*BreachDays*+*βWind*​⋅*Wind*

**SB model:**

*SBcount*​∼Binomial(1,*SBμ*​)

logit(*SBμ*​)=*aSB*​+*βDO*​⋅*DO*+*βSAV*​⋅*SAV*

**SC model:**

*SCcount*​∼Binomial(1,*SCμ*​)

logit(*SCμ*​)=*aSC*​+*βSubstrate*​⋅*Substrate*+*βDO*​⋅*DO*+*βSAV*​⋅*SAV*

**BreachDays model:**

*BreachDays*∼Normal(*Breachν*​,*τ*)

*Breachν*​=*aBreachDays*​+*βRain*​⋅*Rain*

**SAV model:**

*SAV*∼Normal(*SAVν*​,*τ*)

*SAVν*​=*aSAV*​+*βDO*​⋅*DO*+*βTemp*​⋅*Temp*

**Fixed effects priors:**

*aGoby*​, *aBreachDays*​, *aDO*​, *aSB*​ , *aSC*​ , *aSAV*​, *aTemp*​, *βSB*\_*count*​, *βYear*​, *βYear*\_2​, *βTemp*​, *βTemp*2​, *βMicro*​, *βWind*​∼Normal(0,0.5)

*βTemp*\_2​∼Normal(−0.10,0.25)

*βMicro*​∼Normal(0.25,0.25)

*βRain*​∼Normal(0.25,0.25)

*βSC*\_*count*​∼Normal(−0.10,0.25)

*βSAV*​∼Normal(0.00,0.25)

*βSAV*\_2​∼Normal(−0.10,0.25)

*βDO*​∼Normal(0.25,0.25)

*βBreachDays*​∼Normal(0.25,0.25)

*βBreachDays*\_2​∼Normal(0.10,0.25)

*βSubstrate*​∼Normal(0.25,0.25)

*βGoby*\_*lag*​∼Normal(0.25,0.25)

**Other priors:**

*τ*∼Exponential(1)

*ϕ*∼Normal(1,5)