$$
\begin{aligned}
Logit(p_f(z,\theta)) = \beta_{0,p_f,i} + \beta_{z,p_f} * z + \\
f_s(\theta_{t,mean,i}) + f_s(\theta_{p,total,i}) + \\
\beta_{p_f,\theta_t,seas} * \theta_{t,seas,i} + \\
\beta_{p_f,\theta_p,seaS} * \theta_{p,seas,i} + \\
\beta_{p_f,\theta_{s2},mean} * \theta_{s2,mean,i} + \beta_{p_f,\theta_{s2},seas} * \theta_{s2,seas,i} + \\
\beta_{p_f,\theta_t \times z,seas} * \theta_{t,seas,i} * z + \beta_{p_f,\theta_p \times z,seas} * \theta_{p,seas,i} * z + \\
\beta_{p_f,\theta_{s2} \times z,mean} * \theta_{s2,mean,i} * z + \beta_{p_f,\theta_{s2} \times z,seas} * \theta_{s2,seas,i} * Z.
\end{aligned}
\tag{4.1.8}
$$