

$$\text{logit}(\psi_{t=1,s,j}) = \mathbf{h}_s^{(\psi_1)} \cdot \mathbf{w}_j^{(\psi_1)} \quad \text{Initial occupancy}$$

$$\text{logit}(\phi_{t,s,j}) = \mathbf{h}_{t,s}^{(\phi)} \cdot \mathbf{w}_j^{(\phi)} \quad \text{Persistence}$$

$$\text{logit}(\gamma_{t,s,j}) = \mathbf{h}_{t,s}^{(\gamma)} \cdot \mathbf{w}_j^{(\gamma)} \quad \text{Colonization}$$

$$\text{logit}(p_{t,s,j}) = \mathbf{h}_{t,s}^{(p)} \cdot \mathbf{w}_j^{(p)} + \mathbf{X}_{t,s}\beta \quad \text{Detection}$$

Spatiotemporal factors
(time t, site s)

Loadings
(species j)