

Operating model

Start of year t

Assessment

Productivity
changes
4 scenarios

a_{t-k}

Population

$$R_t = S_{t-k} e^{a_{t-k} - \beta S_{t-k} + \varepsilon_{t-k}}$$

$$\varepsilon_t \sim N(0, \tau_R^2)$$

$\{S_i\}_{i=1}^{t-1}$

Data collection

$$\sigma_S^2, \sigma_C^2$$

$$S_t^{obs} = S_t e^{v_{s,t}}$$

$$C_t^{obs} = C_t e^{v_{c,t}}$$

Fishery

$$S_t = R_t - C_t$$

S_t

R_t

$\{C_i\}_{i=k+1}^{t-1}$

Assessment
model
(XSR, KF, TSR)

Failed to estimate
optimal escapement \hat{S}^*

a_t, β, τ_R

$\hat{a}_t, \hat{\beta}, \hat{\tau}_r$

R_t

S^*

C_t

$$OU = f(R_t, \hat{R}_t)$$

$$\hat{S}^* = f(\hat{a}_t, \hat{\beta}, \hat{\tau}_r)$$

$$R_t(1 - h_{min})$$

Set escapement goal
 E^* using a harvest rate
 $h_{min} = 0.2$

E^*

$$E^* = (1 + M)E^*$$

Apply a safety
margin (M) to E^*

$$E^* = OU \times E^*$$

Adjust E^* by outcome
uncertainty (OU)

Yes

$$R_t > E^*$$

No

Harvest
rule

$$C_t = R_t - E^*$$

$$C_t = 0$$

C_t

End of year t

Management