Spawning habitat index

The spawning habitat H_s is used for constraining tuna larval production and larvae mortality and involves four mechanisms assumed to control larvae survival and recruitment:

- Changes in the spatial range of spawning habitat due to temperature.
- Spawning and larvae food overlapping
- Spawning and predators overlapping
- Larvae redistribution by ocean circulation, increasing or decreasing mortality depending on the arrival to favorable or unfavorable areas.

The spawning habitat is defined as follows:

$$H_S = \phi(\Lambda) H_{T_0}$$

Where H_t is the temperature habitat index (refer to Thermal Habitat Index) and lambda Λ is the ratio of primary production *PP* and the tuna forage *F0* times the energy transfer coefficient (E), and $\phi(\Lambda)$ is given by:

$$\phi(\Lambda) = \frac{\Lambda}{\alpha + \Lambda}$$

where α is a statistically estimated parameter.