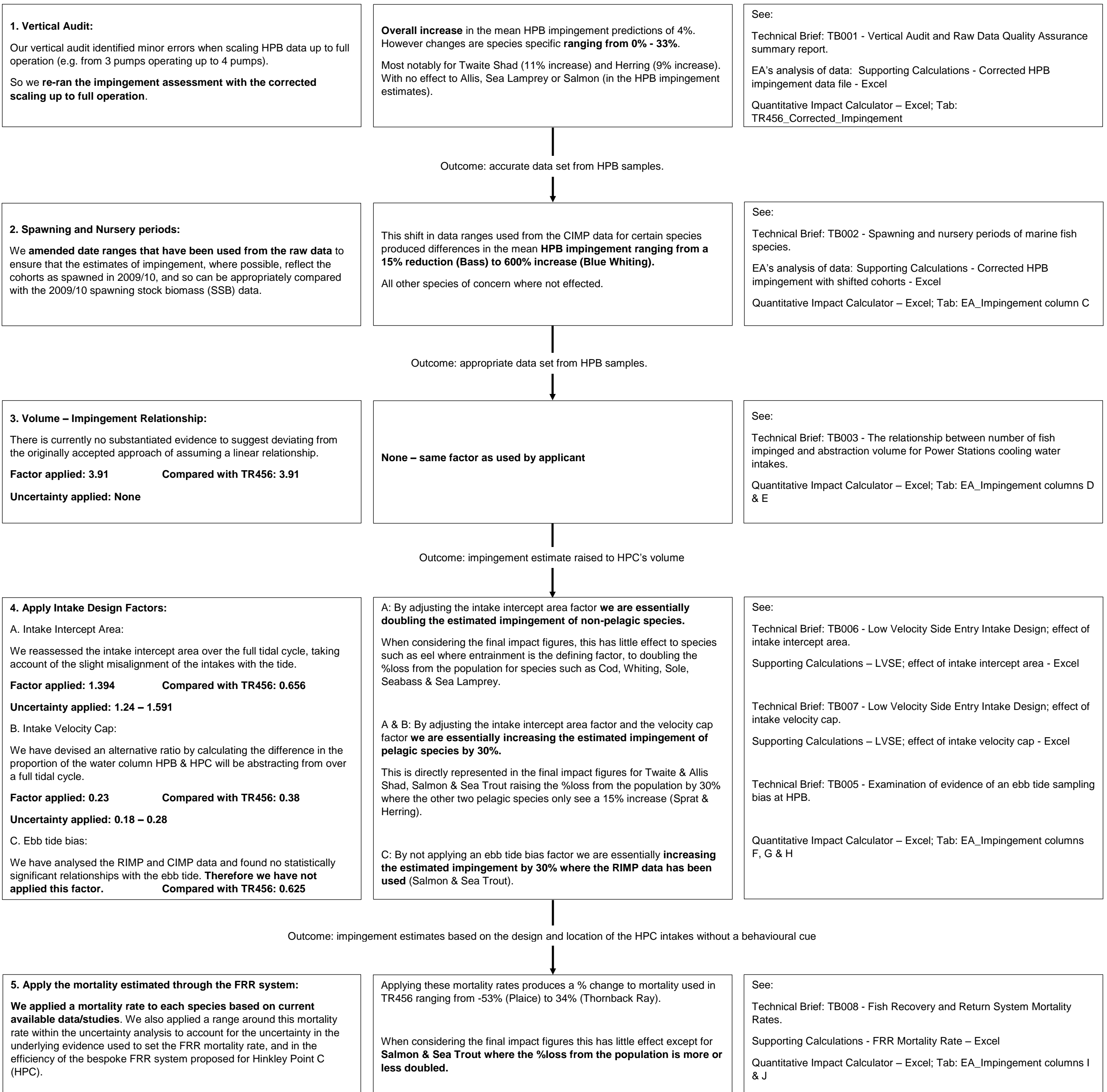


Process of Quantitative Impact Assessment Model

Approach

Effect (of EA's approach compared with applicant's)

Documentation



Outcome: impingement mortality estimates through the HPC CW system



6. Apply Equivalent Adult Value (EAV) factor:

The **Spawning Production Foregone** method was considered to be the **most appropriate**, as it takes into account the value of repeat spawning fish.

By applying this extension to the EAV methodology the **majority of EAVs have been increased, some by an order of magnitude** such as for Cod & Herring.

This has a varying degree of effect on the final impact figures. With the **most notable being Cod with an order of magnitude increase**, Sole, Seabass & Twaite shad having a 4 fold increase.

See:

Technical Brief: TB010 - Converting impingement and entrainment numbers to Equivalent Adult Values and Spawning Production Foregone.

Quantitative Impact Calculator – Excel; Tab: EA_Impingement columns K, L & M

Outcome: impingement mortality estimates of equivalent adults through the HPC CW system given the lifetime of the site



7. Include an additional EAV number to take account of the impingement on a 5mm screen:

We defined **which individuals would become impinged rather than entrained at HPC due to the 5mm screens** and apportion fish between entrainment and impingement.

The approach produces **additional impingement for certain species ranging from 0.73 to 21 (Sprat) tonnes of equivalent adults**.

This has little effect on the final impact figures **except for Plaice with an order of magnitude increase**.

See:

Technical Brief: TB004 - Accounting for entrainment losses and difference in drum screen size.

Quantitative Impact Calculator – Excel; Tab: EA_Entrainment columns P & EA_Impingement column N

Outcome: impingement mortality estimates taking in to account the 5mm screens at HPC



8. Include entrainment losses to produce entrapment losses:

We defined **which individuals would become impinged rather than entrained at HPC due to the 5mm screens** and apportion fish between entrainment and impingement.

This approach produces an **additional loss for certain species due to the entrainment losses**.

This was dependant on which species relevant information and data was available for this to be carried out.

Most notably for Eels producing an additional 10 tonnes of equivalent adults, resulting in an increase of two orders of magnitude %loss from the population.

See:

Technical Brief: TB004 - Accounting for entrainment losses and difference in drum screen size.

Quantitative Impact Calculator – Excel; Tab: EA_Entrapment columns C, D & E

Outcome: entrapment mortality estimate through the HPC CW system for certain species



9. Estimate the population unit best associated with designated features:

We reviewed the currently available literature and data on more localised populations and **define an appropriate estuarine community unit/area**, species by species.

These approaches have **reduced the majority of population estimates and developed additional population estimates** for more species than presented in the application.

Most notably for Whiting, Seabass & Allis Shad resulting in **an increase of an order of magnitude in %loss from the population**.

See:

Technical Brief: TB011 - Scale of assessment areas for marine fishes and assessment method comparing Sprat losses with Spawning Stock Biomass.

Technical Brief: TB012 - Predicting adult sea trout populations in the Severn Estuary.

Technical Brief: TB015 - Review of adult run size estimates for river lamprey and sea lamprey in the Severn Estuary, River Wye and River Usk.

Technical Brief: TB016 - Review of adult run size estimates for Twaite Shad and Allis Shad in the Severn Estuary, River Wye and River Usk.

Technical Brief: TB017 - Review of adult run size estimates for Atlantic Salmon in the Severn Estuary, River Wye and River Usk

Technical Brief: TB018 - Review of European (silver) Eel biomass escapement biomass for the Severn Estuary.

Quantitative Impact Calculator – Excel; Tab: EA_Entrapment columns F, G & H and Tab: Comparison_workbook

Outcome: population estimates to consider the impacts at the scale of the SAC



10. Compare the Entrapment losses with the population units to establish a % loss from population:

We compared the total losses predicted against the % of SSB, % of Fishery or % of number of fish within the relevant population.

The significance of these percentage losses will be considered alongside the uncertainty analysis within the Feature Impact Assessment Templates.

See:

Quantitative Impact Calculator – Excel; Tab: EA_Entrapment columns I, J & K

Also see the Quantitative Impact Calculator – Excel; Tab: Comparison_workbook