

# Example script for stream network example in VAST

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## 1 Overview

This tutorial provides an example for setting up a stream network model in **VAST** using New Zealand longfin eel data.

Please see the single-species or multi-species example documents provided with **VAST** for information on package installation and citation.

## 2 Data

Datasets for stream models in **VAST** require observations by segment, with each segment defined by a parent and child node. Thus, connectivity between stream segments is defined by shared parent nodes rather than simply Euclidean distance.

Many example data sets are archived with the **VAST** and **FishStatsUtils** R packages. We will use the New Zealand longfin eel data to demonstrate the stream network model:

```
Data_Set = c("NZ_longfin_eel", "Chatham_rise_hake", "Iceland_cod", "WGBTS_canary",  
             "GSL_american_plaice", "BC_pacific_cod", "EBS_pollock", "GOA_Pcod", "GOA_pollock",  
             "GB_spring_haddock", "GB_fall_haddock", "SAWC_jacopever", "Aleutian_islands_POP")[1]  
  
data(NZ_longfin_eel, package = "FishStatsUtils")
```

### 2.1 Visualize data

The stream network spatial model in **VAST** requires a dataframe **Network\_sz** in the following format:

```
head(Network_sz)
```

```
##   parent_s child_s   dist_s  
## 1         1     6645  352.2173  
## 2         2     8039  473.3976  
## 3         3     8040  994.3764  
## 4         4         3  243.6675  
## 5         5     8041 1087.4995
```

```
## 6          6      8042  821.5369
```

## 3 Settings

First we make sure we're using the latest version for CPP code:

```
Version = get_latest_version( package="VAST")
```

### 3.1 Spatial settings

The following settings define the spatial resolution for the model. While `n_x` defines the number of knots in a grid, mesh, or spherical mesh, for stream networks we use the number of parent or child nodes.