Wikiprint Book

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The Ecosim module of EwE provides two ways to explore impacts of alternative fishing policies:

i. Fishing rates can be ?sketched? over time and results (catches, economic performance indicators, biomass changes) examined for each sketch. This is using Ecosim in a ?gaming? mode, where the aim is to encourage rapid exploration of options (see below for help with this approach).
i. Formal optimization methods can be used to search for fishing policies that would maximize a particular policy goal or ?objective function? for management (see Using Ecosim for policy exploration for help with this approach).

The first approach has been widely applied for exploring ecosystem effects of changes in fishing effort and is implemented using the Biomass form, the main form for running Ecosim (Time dynamic (Ecosim) > Output > Biomass).

Before running Ecosim, you should be familiar with the introductory material (see links in Introductory material Ecosim?, also found in Chapter 3 of the User Guide).

Running Ecosim

The *Run Ecosim* form (Figure 9.1) consists of a lower panel, where users can sketch or set fishing rates by fleet/gear or Ecopath group and an upper panel where output biomasses are displayed.

Run

Click the *Run* button at the bottom right of the form to generate time series of biomasses. The magnitude of changes for each group will depend on many factors, chiefly the fishing regime and the vulnerability settings.

Note that fishing regimes should generally change gradually from one fishing mortality level to the next, not abruptly. Also, the baseline (Ecopath) fishing mortality should be left unchanged for a year or so.

After running Ecosim, use Ecosim plot and Ecosim results to see detailed results in graphic and tabular form.

Features of the lower (Fishing rate) panel

Target

Use this drop down list to select which fleets or groups you want to change fishing rate for. Note: if an Ecopath group is selected, then relative Fs sketched on the sketch pad will be applied across all fleets.

Set to 0

Set fishing for the fleet/group selected to zero.

Set to value ...

For entry of a fishing intensity value to be applied to the fleet/group selected (or enter a list of comma separated values to set Fs for all fleets).

Reset All

Reset all fishing rates (all groups all fleets) to their Ecopath base values.

Fishing rate sketch pad

The sketch pad is used to display time series of relative fishing rates when the fishing mortality is applied to an individual group. When the fishing mortality is applied to a ?fleet? the *y*-scale of the sketch pad consists of effort multipliers. In either case (individual group or fleet), the default uniform series (representing the Ecopath base values) can be replaced by a time-varying shape, representing temporal changes in the pattern of fishing, by sketching with the mouse (left button held down). The *y*-axis will automatically re-scale as you drag your mouse up or down on the sketchpad. The fishing rates are expressed relative to the fishing rates in the underlying Ecopath model.

To set linear trend for change in fishing rates: if you first click the start point with the left mouse button, and then the end point with shift + the left mouse button, a line will be drawn between the two points. Use this to enter, e.g., a linear increase over time in relative fishing rates.

Features of the upper (Ecosim biomass output) panel

 **Show groups...**

Opens a form for hiding/displaying groups on the biomass graph.

Autoscale

Use the Autoscale button to tell Ecosim to automatically set the scale of the **'y-axis.**

Scale Y axis to

Manually set the *y*-axis upper value using the *Scale Y axis to* box.

Graph options

You can choose whether to display the current annual output in the main screen or whether to overlay results, in which case results are can be viewed under the *Layers* tab.

Sum of squared deviations (SS)

This is an Ecosim output. When an Ecosim model is loaded, you can load time series ?reference? data on relative and absolute biomasses of various groups over a particular historical period, along with estimates of changes in fishing impacts over that period. After time series data have been loaded and applied (see Time series), a statistical measure of goodness of fit to these data is generated each time Ecosim is run. This goodness of fit measure is a weighted sum of squared deviations (SS) of log biomasses from log predicted biomasses, scaled in the case of relative abundance data by the maximum likelihood estimate of the relative abundance scaling factor q in the equation $y = qB$ (y = relative abundance, B = absolute abundance).

See Time series fitting in Ecosim for more details about the sum of squared deviations measure.

Main display panel

Displays Ecosim?s predicted time series of biomass for groups selected using the Show groups form. Biomasses are shown relative to their baseline Ecopath values. If time series have been loaded and applied, they will be displayed as coloured dots on the graph, while Ecosim?s predicted outputs will be displayed as coloured lines (Figure 9.1).

Vertical red lines indicate when to start averaging results for before/after comparisons (displayed using the Ecosim results form). Use a left mouse-click to drag the lines to their desired positions.

Group tab

To the right of the upper panel, under the *Group* tab, a smaller panel displays the groups? names, in the same colours as used for the biomass lines. Clicking on the name of any group in this panel (and releasing the mouse button) results in all other groups being greyed out so that the group of interest can be clearly seen. Click on *All groups* at the top of the list to return all groups to their original colours.

Layer tab

Behind the *Group* tab is the *Layer* tab. If the user has selected *Overlay* under *Graph options*, outputs of different runs will be displayed on different layers.

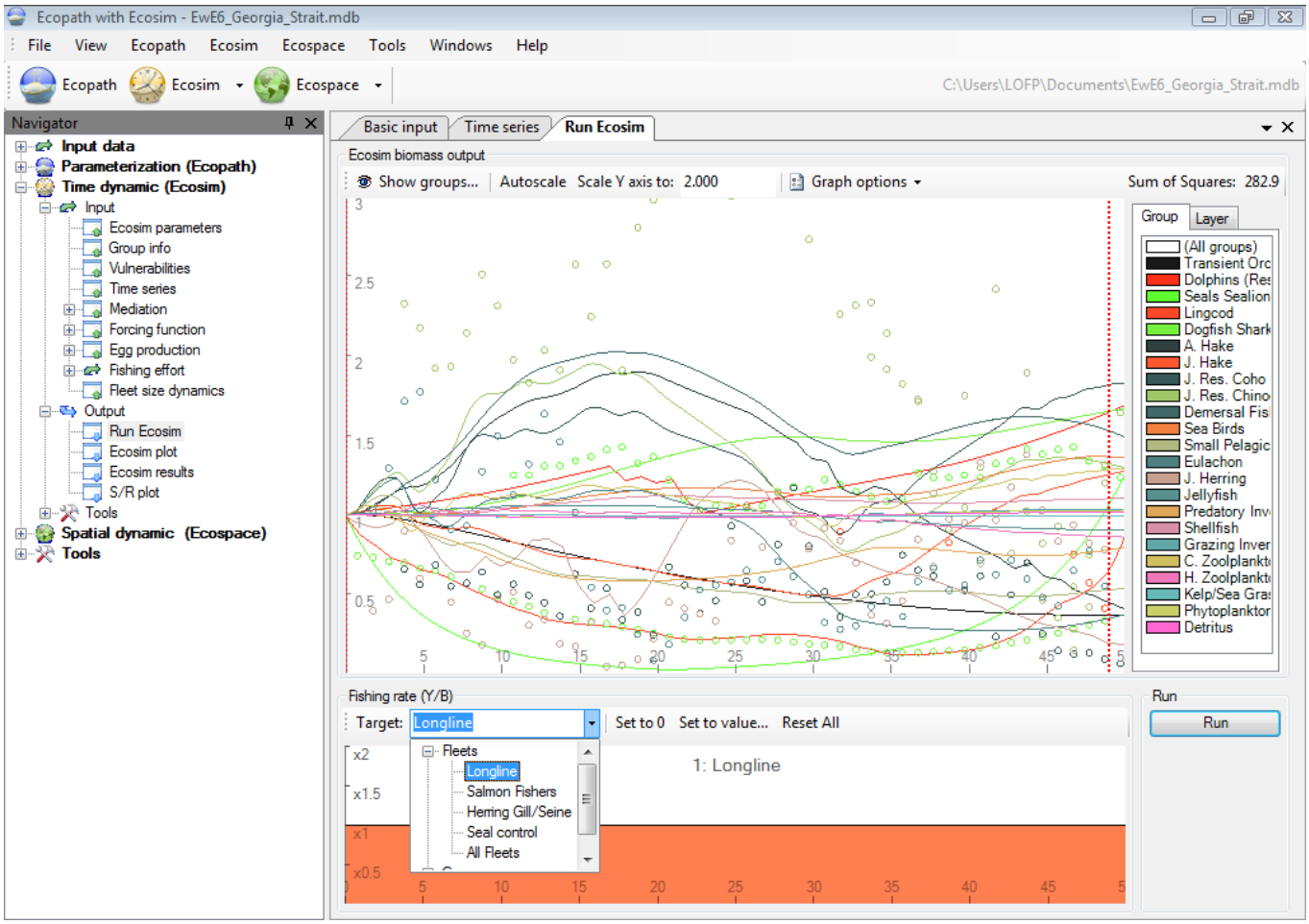


Figure 9.1 The *Run Ecosim* form showing predicted (coloured lines) and observed (coloured dots) biomass trajectories. The red fishing mortality sketch pad can be seen in the bottom panel. The longline fleet has been selected from the drop-down *Target* menu.