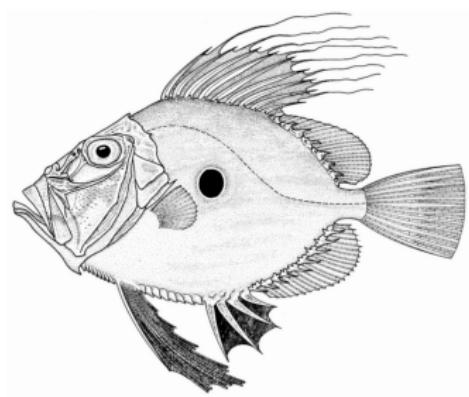


# The FLR platform

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Wageningen Marine Research



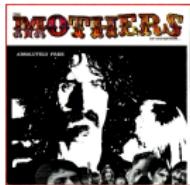
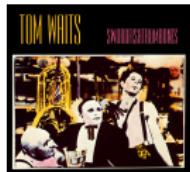
# Why, oh why?

Schnute *et al.* (2007 and 1998) compared the number of software tools and languages currently available for stock assessments with the Babel tower myth and concluded that: “The cosmic plan for **confounding software languages** seems to be working remarkably well among the community of quantitative fishery scientists!”



# A brief history of FLR

- Started by FEMS FP5, COMMIT & EFIMAS FP6
- Beta ICES WG Methods 2004
- FLCore version 1.0 - 2005
- FLCore version 1.4 *The Golden Jackal* - 2007
- FLCore version 2.2 *Swordfish Polka* - 2010
- FLR 2.4 *The Duke of Prawns* - 2011



LE CHEF-D'ŒUVRE DE FRANCIS FORD COPPOLA DANS SA VERSION DÉFINITIVE

**Marlon  
BRANDO**

Robert  
DUVAL

MARTIN  
SHEEN

# SHEEN FIR Now

UN FILM DE  
**FRANCIS FORD COPPOLA**

DALE IN THOMAS BROTHERS BROS. MURKIN CO. — "THREE'S A CROWD" FREDERIC HARRIS BROTHERS BROS. SIB. BROS.  
LAWRENCE FERBER DOROTHY MARSHALL RALPH CLARKSON JAMES L. T. STONE — "THE THREE STOOGES" ROBERT SWANSON 1930-1932 — "PAUL AND GENE" PAUL SWANSON 1932-1933  
WILLIAM DEAN SWANSON 1933-1934 — "THE THREE STOOGES" ROBERT SWANSON 1934-1935  
WILLIAM DEAN SWANSON 1935-1936 — "THE THREE STOOGES" ROBERT SWANSON 1936-1937  
WILLIAM DEAN SWANSON 1937-1938 — "THE THREE STOOGES" ROBERT SWANSON 1938-1939  
WILLIAM DEAN SWANSON 1939-1940 — "THE THREE STOOGES" ROBERT SWANSON 1940-1941  
WILLIAM DEAN SWANSON 1941-1942 — "THE THREE STOOGES" ROBERT SWANSON 1942-1943  
WILLIAM DEAN SWANSON 1943-1944 — "THE THREE STOOGES" ROBERT SWANSON 1944-1945



# Current

FLR 2.6 - *Black Swan*



# FLR development

- Collaborative development
- Informal team
- Indirect funding
- Open Source



GNU project (<http://gnu.org>)

*Free software is a matter of liberty, not price*

{free = free speech}

{free != free beer}



# Mission statement

The FLR project provides a **platform for quantitative fisheries science** based on the R statistical language. The guiding principles of FLR are:

- **openness** - through community involvement and the open source ethos
- **flexibility** - through a design that does not constrain the user to a given paradigm
- **extendibility** - through the provision of tools that are ready to be personalized and adapted.



# Really, what is FLR?

- Extendable toolbox for implementing bio-economic simulation models of fishery systems
- Tools used by managers (hopefully) as well as scientists
- With many applications including:
  - Fit stock-recruitment relationships,
  - Model fleet dynamics (including economics),
  - Simulate and evaluate management procedures and HCRs,
  - More than just stock assessment (VPA, XSA, ICES uptake)
- A software platform for quantitative fisheries science
- A collection of R packages
- A team of devoted developers
- A community of active users



# Design principles

- OOP - S4
- Classes: elements in system
  - FLStock, fish stock
  - FLBRP inputs for BRP calc
- Methods: link objects
- Mid-steepenes learning curve



# Packages



**FLCore**

Core classes and methods for FLR.



**FLa4a**

The a4a population model for stock assessment and MSE.



**ggplotFL**

Apply ggplot2 to the FLR classes.



**FLBRP**

Reference Points and Fisheries Advice.



**FLFleet**

Modelling of fishing fleet dynamics.



**FLBEIA**

Bio-Economic Impact Assessment of Management strategies.



**FLSAM**

SAM stock assessment model in FLR.



**FLXSA**

Data sets and methods to simulate data.



**FLAssess**

Support for FLR Stock Assessment methods.



**FLash**

Package for fisheries forecasting.



**kobe**

Methods for summarising results from SAs and MSEs in the Kobe format.



**FLasher**

Next generation package for fisheries forecasting using Rcpp and cppAD.



**FLife**

Methods for incorporating life history traits and processes.



**diags**

Diagnostics for stock assessment methods.



**mse**

Tools for implementing and evaluating management procedures using MSE.



**bbm**

Two-stage biomass based model.



**a4adiags**

Perform diagnostics on a4a fit

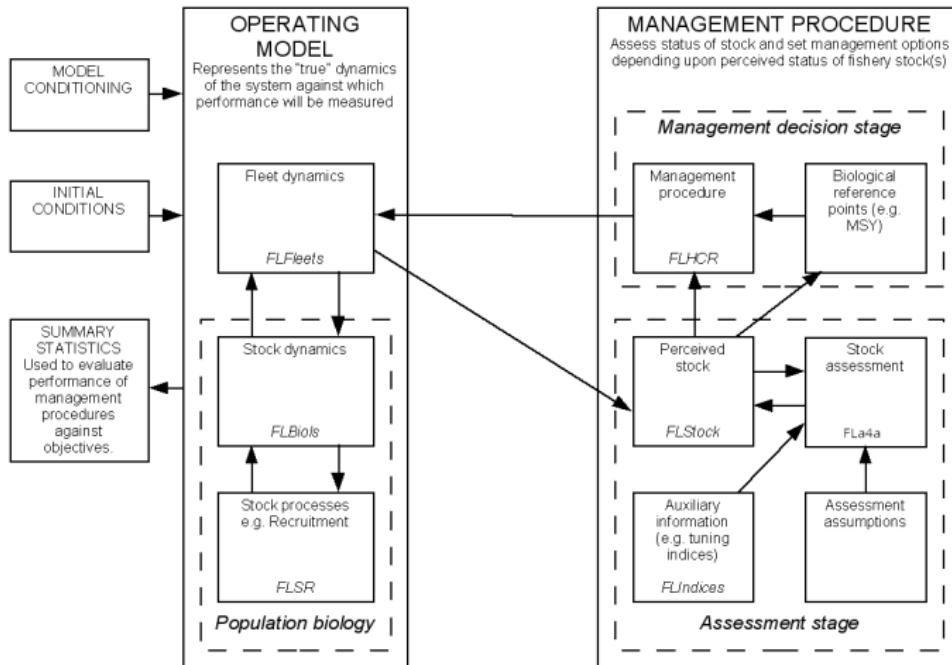


**FLSRTMB**

Fit Stock-Recruitment Relationships in TMB



# MSE - The Lego block approach



## More information

- FLR Project @ <http://flr-project.org>
- Source code @ <http://github.com/flr/>





KEEP  
CALM  
AND  
KEEP  
CODING

