

**Kobe plot I (stock trajectory) +Kobe II (risk assessment matrix diagram) software
(Version 2 for 32- and 64-bit PC)**

Users' manual

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Abstract and Notice (release of the software)

This is the users' manual describing how to use the 2nd version of Kobe I (stock trajectory plots) +Kobe II (risk assessment matrix diagram) software. The software is created by applying our recent technology in "Marine GIS (Geographic Information Systems) (Marine Explorer) software" (<http://ocean-info.ddd.jp/mesupport/en/>). Kobe I (stock trajectory plot) and Kobe II (risk assessment matrix) were recommended by the 5 tuna-RFMO meeting in 2007 (Kobe, Japan) and 2009 (Barcelona, Spain) respectively. As for the Kobe II, the matrix (table) format was recommended, but the table formats have been difficult to understand its meanings, especially for managers as it uses mathematical notations. Thus we improved this situation by converting the matrix to the diagram, so that anyone can easily understand its meanings.

In the 2nd version of Kobe I+II software, we improved the graphic components using TeeChart Pro .NET v2010 (Steema Software). We also developed this software applicable for both 32- and 64-bit version OS PC. In addition we improved various graphic functions based on the requests made by worldwide users. **This software is free of charge. If someone wants to obtain, please contact the corresponding author.** After you use this software and if you need some improvements, please DO let us know. We will revise and make the better software and will release the improved version in the (near) future as we did in this 2nd version for this time.

Please note that this software is suitable for those who have difficulties to make Kobe I plot and Kobe II risk assessments diagrams quickly and efficiently in very short time especially during the working meetings. But it may not be suitable for those who can make these plots/diagrams easily and/or create better ones as this software is designed to make the fixed design outputs (plots and diagrams) with some extended flexibilities such as for colors, fonts, symbols etc. (see the text for details). This software development project was funded by Fisheries Research Agency (FRA) of Japan (2009-2012) for "Tuna and Skipjack Resources Division" in the National Research Institute of Far Seas Fisheries (NRIFSF).

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1. Introduction

This Kobe I+II software consists of Kobe I (stock trajectory plot) and Kobe II (risk assessment matrix diagram). Kobe Plot I can make stock trajectory plots for SSB/SSBmsy (or TB/TBmsy) vs. F/Fmsy. Kobe Plot II can depict results of risk assessment matrix.

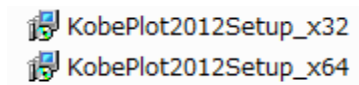
2. Installation

1) Uninstall the 1st version of Kobe I+II software

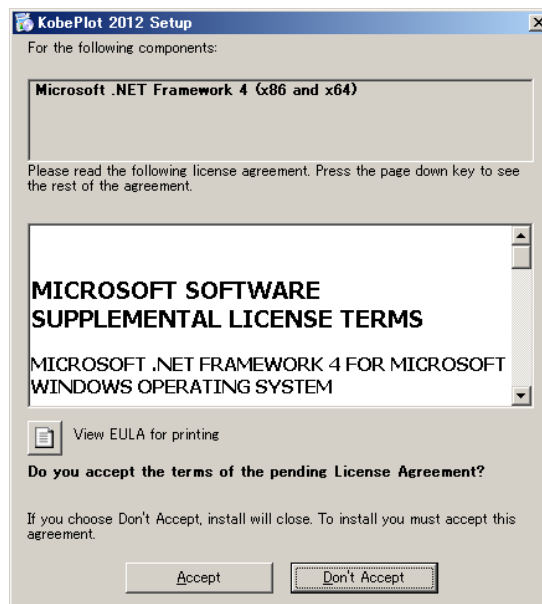
If you installed the 1st version before, uninstall it first.

2) Copy the 2nd version of the software

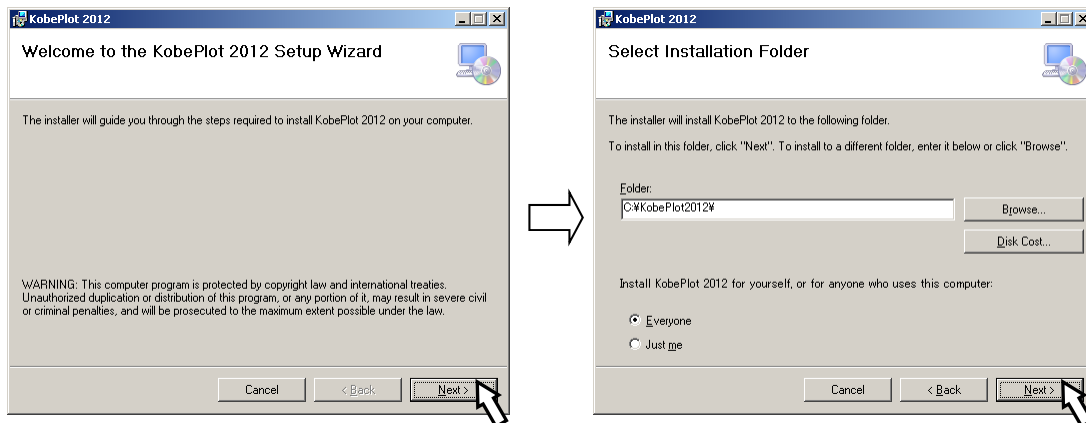
Copy the 2nd version to your PC (32-bit or 64-bit) from the Kobe I+II software package. Then double-click the set-up icon.



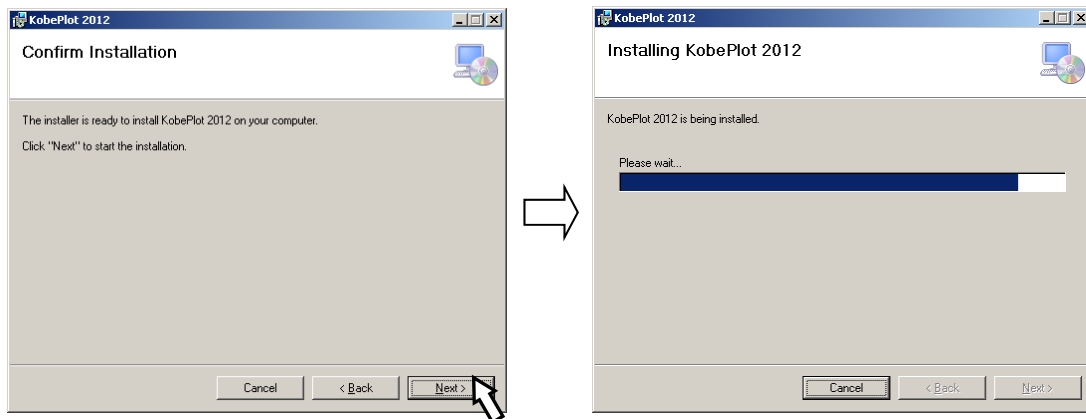
3) Install .NET Framework 4 if you don't have.



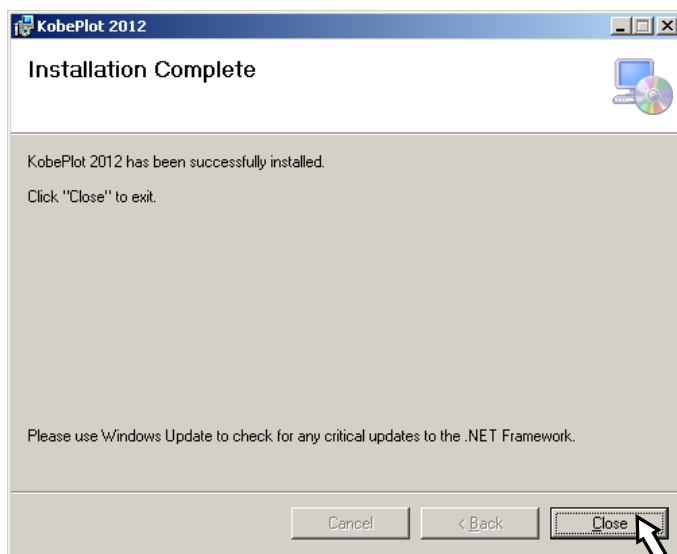
4) Installing Kobe I+II software



*CAUTION: You may not be able to install the **Kobe I+II** software into c:\Program Files if your OS is Windows Vista or Windows 7 due to users account control restriction.*



5) Installation Complete



6) Re-installation

After you install the 2nd version of Kobe I+II software and if need to re-install, go back to the step 2) (double click the set-up icon). Then you will see the window (below) and click “Repair” or “Cancel” then precede the next step.

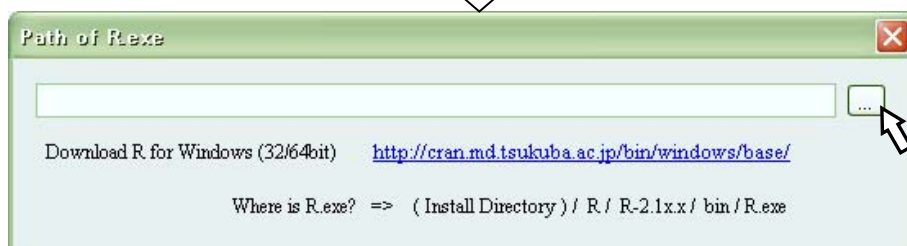
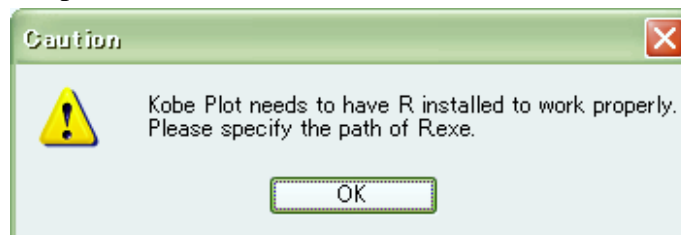


3. Starting the software

1) Click the **KobePlot 2012** icon located on your desktop window.



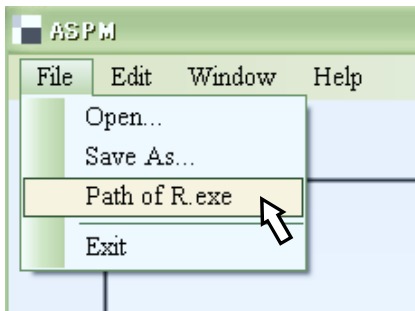
2) You might be asked to specify the path of the **R.exe** when launching **Kobe I+II software** for the first time. If you don't have R software, download and install to you PC. Then specify the path of the **R.exe**.



Generally **R.exe** exists in the following path after installing **R**.
(Install Directory) / R / R-2.1x.x / bin / **R.exe**



3) You can change the path of R.exe later from **File > Path of R.exe**.



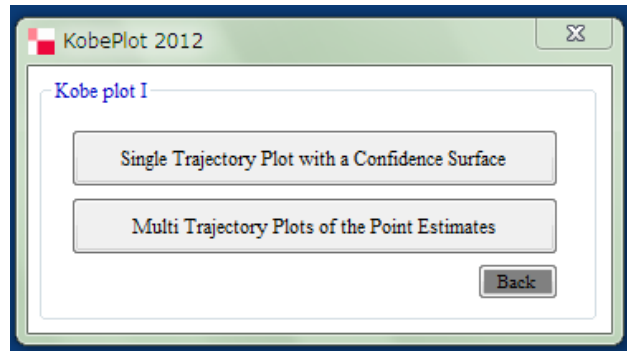
4) Start window will appear as below.



If you want to make stock trajectory plots click **Kobe Plot I**. If you want to make the risk assessment diagrams, click **Kobe Plot II**.

4. Kobe Plot I (stock trajectory)

There are two options on Kobe plot I (stock trajectory), one for one single plot with/without confidence surface and another for multi-plots without confidence surface as below.



4.1 Option 1: A single plot with confidence surface

1) How to create the input data?

To create the input data, make a CSV file (see below), i.e., year (column 1), Spawning Stock Biomass (SSB) or Total Biomass (TB) ratio (SSB/SSBmsy or TB/TBmsy) (column 2) and F ratio (F/Fmsy) (column 3). If you want to create the confidence surface, add 2 columns and put results of re-samplings by MCMC or bootstrap, i.e., SSB ratio (SSB/SSBmsy) or TB ratio (TB/TBmsy) (column 5) and F ratio (F/Fmsy) (column 6).

Col 1	2	3	4	5
Year	X	Y	X	Y
year	B ratio	F ratio	B(ratio)	F(ratio)
1995	1.911086	0.467377	0.850556	0.97836
1996	1.740271	0.576565	0.632261	1.289523
1997	1.60543	0.613848	0.778326	1.065882
1998	1.485294	0.720373	0.749311	1.101676
1999	1.398416	0.716378	0.399919	1.959125
2000	1.352262	0.737683	0.81428	1.021804
2001	1.34276	0.69241	0.684303	1.198776
2002	1.345249	0.70972	0.918728	0.912832
2003	1.285747	0.850866	0.771306	1.072266
2004	1.193665	0.918775	0.606479	1.338571
2005	1.177828	0.792277	0.467253	1.692282
2006	1.235294	0.711052	0.83434	0.997083
2007	1.29276	0.696405	0.649239	1.258571
			0.80995	1.024397
			0.94041	0.889817
			0.989355	0.848734
			0.768794	1.079511

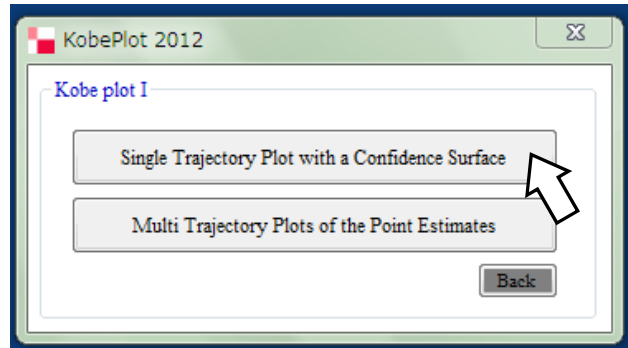
Columns 4-5:
Input data for the confidence surface
from NCMC, bootstrap etc.

The order of columns is important,
follow the example.

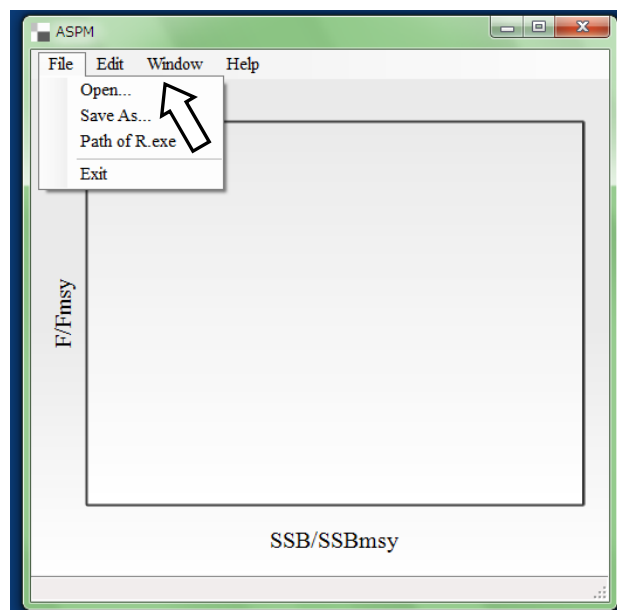
Columns 1-3: Input data for a single plot (trajectory)

2) How to get the input data into the software?

Click the Single trajectory with the confidence surface

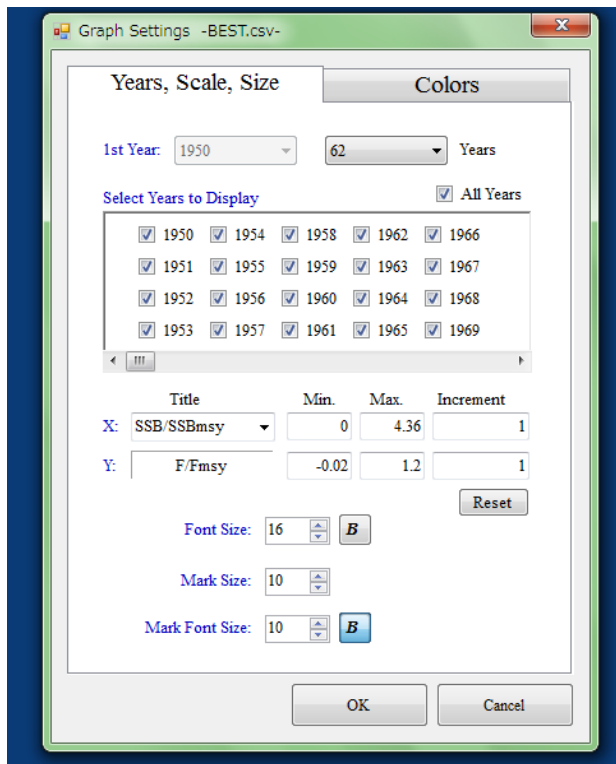


Then you will see the empty window (see right). Then click file, open, then go to the folder where your CVS file is located and import to the software.



Then you will see the graph setting menus as described (next page), which are self-explanatory. You can adjust various parameters to create your desirable output (plot).

3) Graph Settings



Years, Scale, Size

Years

Set the number of years to display.

Select Years to Display

Choose each year individually to display/un-display.

X Axis

Choose SSB/SSBmsy, SB/SBmsy or TB/TBmsy. Set values of the minimum, the maximum and the increment of X axis.

Y Axis (F/Fmsy)

Set values of the minimum, the maximum and the increment of Y axis.

Font Size

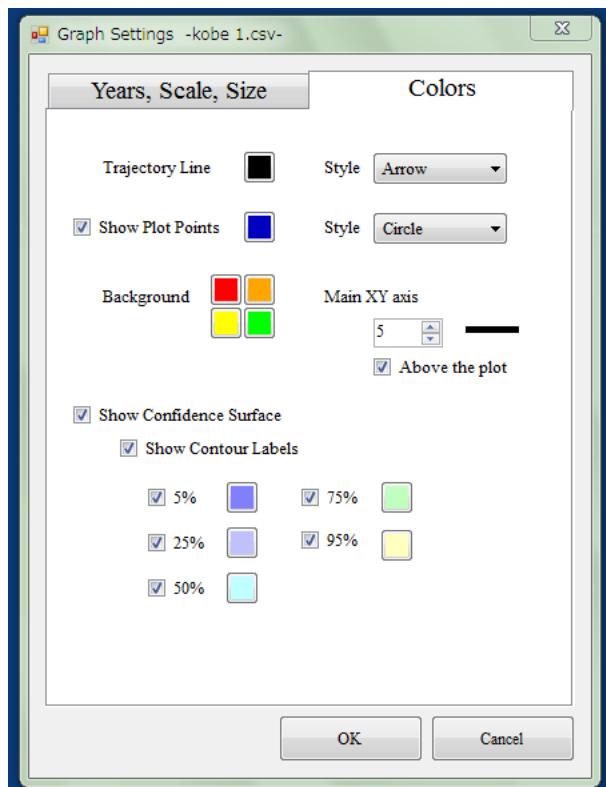
Select the font size. Click **B** to make the font bold.

Mark Size

Select the circle size of year marks (last 2 digits).

Mark Font Size

Select the font size of year (last 2 digits). Click **B** to make the font bold.



Colors

Trajectory line

Select the color of the line and style (Arrow or Line).

Plot Points

Select the color of the Plot and style (Circle or Dot).

Background

Select Background colors.

Main XY axis

Select the width of XY axes and choose XY axes above or behind of plots.

Show Confidence Surface

Check the box to show the Confidence Surface with contour lines.

Show Contour Labels

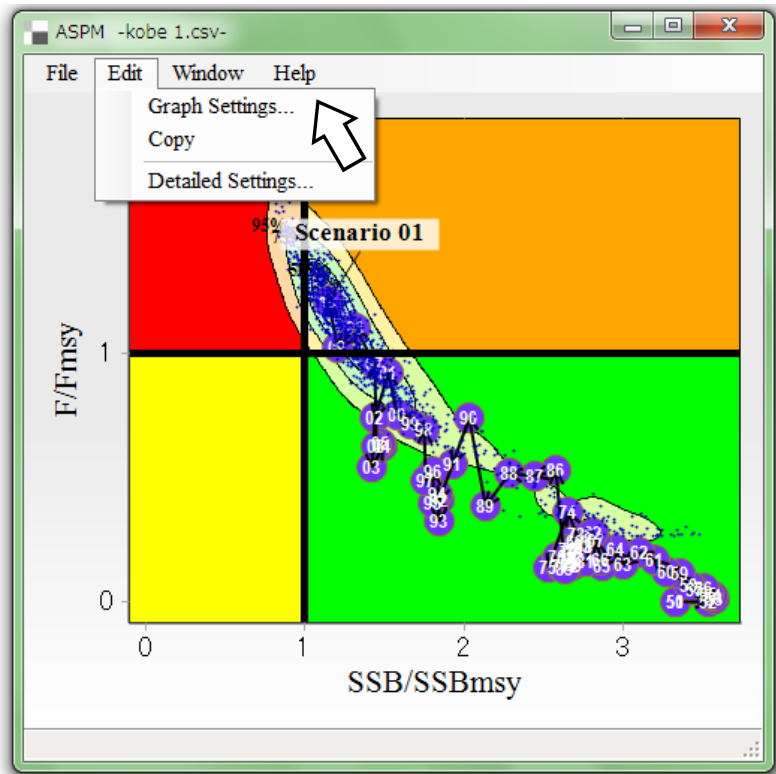
Check the box to show contour labels.

Check the box to show the percentage labels.

4) Displaying and editing Kobe plot I

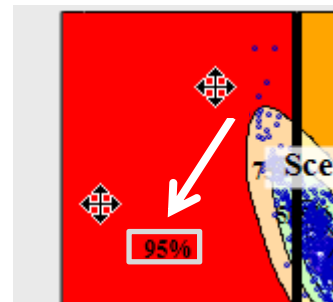
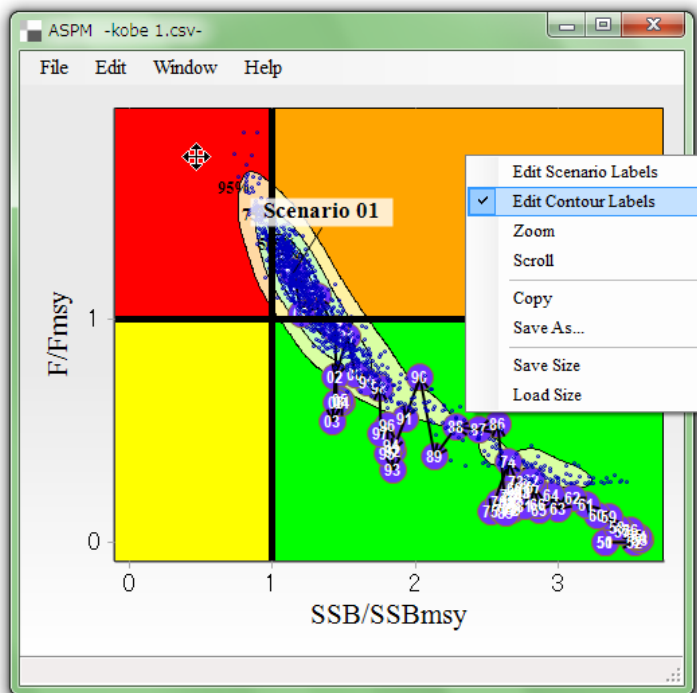
After the graph setting, click OK button (see previous page), then you will get the initial (default) Kobe plot.

If you want to edit the plots, click Graph setting then repeat this exercise until you get the satisfactory plot



5) Moving the location of the contour percentage labels

Move the cursor to the percentage label of the plot and click the right button, then the context menu will appear as below. Select **Edit Contour Labels** then put the cursor on the percentage label (e.g. 95%) then move it to where you desire (see below).



6) Adding the precautionary limit reference point (under construction)

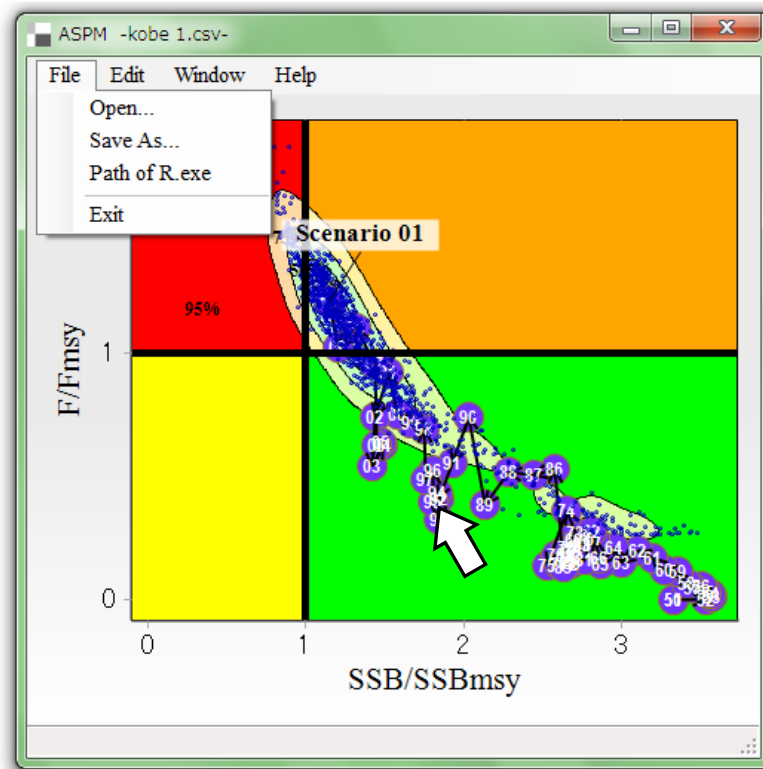
In the next version we will incorporate the limit reference point (see example below in the IOTC) to the Kobe Plot I.

Stock	Target Reference Point	Limit Reference Point
Albacore	$B_{MSY}; F_{MSY}$	$0.4*B_{MSY}; 1.4*F_{MSY}$
Bigeye tuna	$B_{MSY}; F_{MSY}$	$0.5*B_{MSY}; 1.3*F_{MSY}$
Skipjack tuna	$B_{MSY}; F_{MSY}$	$0.4*B_{MSY}; 1.5*F_{MSY}$
Yellowfin tuna	$B_{MSY}; F_{MSY}$	$0.4*B_{MSY}; 1.4*F_{MSY}$
Swordfish	$B_{MSY}; F_{MSY}$	$0.4*B_{MSY}; 1.4*F_{MSY}$

Under construction. To be released in the 3ed version.

7) Saving the plot

After finalizing the plot, save the plot by click “**Save As**”. There are 4 ways to save by 4 different types of external file, i.e., “.KSP”, “.BMP”, “.PNG” and “.EMF”. If you save with “.KSP” file, then later you can retrieve the last plot that you save then you can do further editions. “.EMF” file is recommended to use for your paper/document as it will provide the best quality of picture, although it is a heavy file. as it will



4.2 Option 2: Multiple plots without confidence surface

This option will produce 2 or more Kobe plot 1 (stock trajectories).

1) How to create the input data?

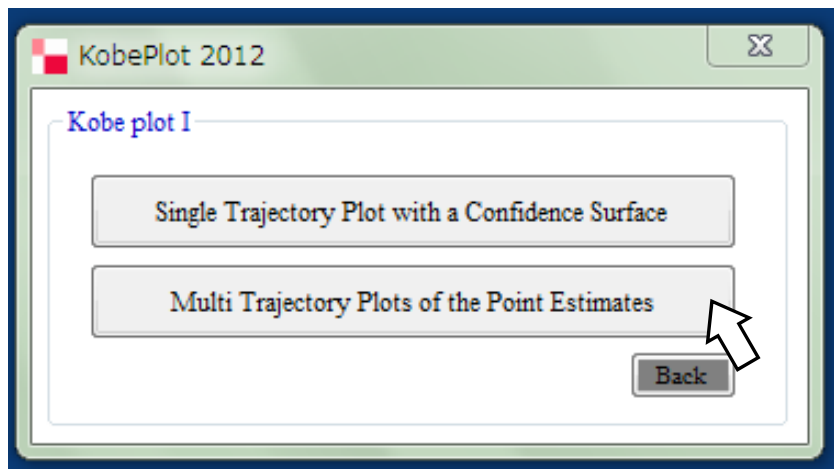
To create the input data, make one CSV file as below, i.e., year (column 1), then the data for the first plot: Biomass: SSB (TB) ratio (column 2) and F ratio (column 3), then for the second plot: Biomass: SSB (TB) ratio (column 4) and F ratio (column 5) and so on.

Year	X	Y	X	Y	X	Y
year	TB(ratio)(1)	Fratio(1)	TB(ratio)(2)	Fratio(2)	TB(ratio)(3)	Fratio(3)
1970	3.74E+00	2.78E-02	3.13E+00	5.21E-03	5.31E+00	6.90E-06
1971	4.72E+00	1.69E-02	3.12E+00	6.12E-03	5.31E+00	2.14E-04
1972	6.12E+00	1.20E-02	2.92E+00	7.15E-03	5.37E+00	1.29E-03
1973	7.51E+00	1.22E-02	2.83E+00	6.67E-03	5.44E+00	1.76E-03
1974	7.81E+00	2.35E-02	2.13E+00	1.09E-02	5.41E+00	4.18E-03
1975	6.71E+00	3.52E-02	1.86E+00	2.20E-02	5.46E+00	3.06E-03
1976	5.29E+00	3.66E-02	1.77E+00	3.00E-02	5.41E+00	4.61E-03
1977	4.39E+00	3.33E-02	1.99E+00	1.67E-02	5.45E+00	5.45E-03
1978	4.09E+00	3.67E-02	2.17E+00	1.22E-02	5.39E+00	5.71E-03
1979	3.95E+00	5.11E-02	2.19E+00	1.23E-02	5.38E+00	6.90E-03
1980	3.85E+00	4.93E-02	1.82E+00	1.91E-02	5.36E+00	8.43E-03
1981	3.72E+00	4.98E-02	1.96E+00	1.77E-02	5.42E+00	8.31E-03

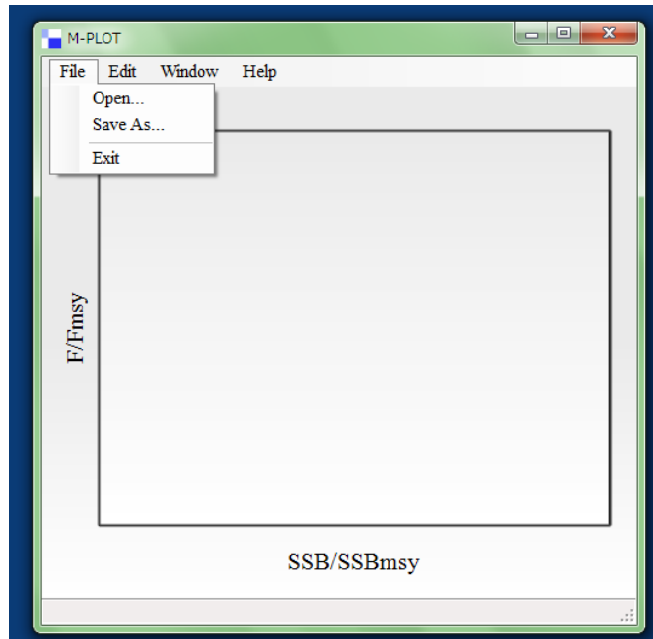
You can use the normal decimal numbers (not necessary to use the data with E shown in this example). The order of columns is important, follow the example. The number of scenarios (plots) is not limited.

2) How to get the input data into the software?

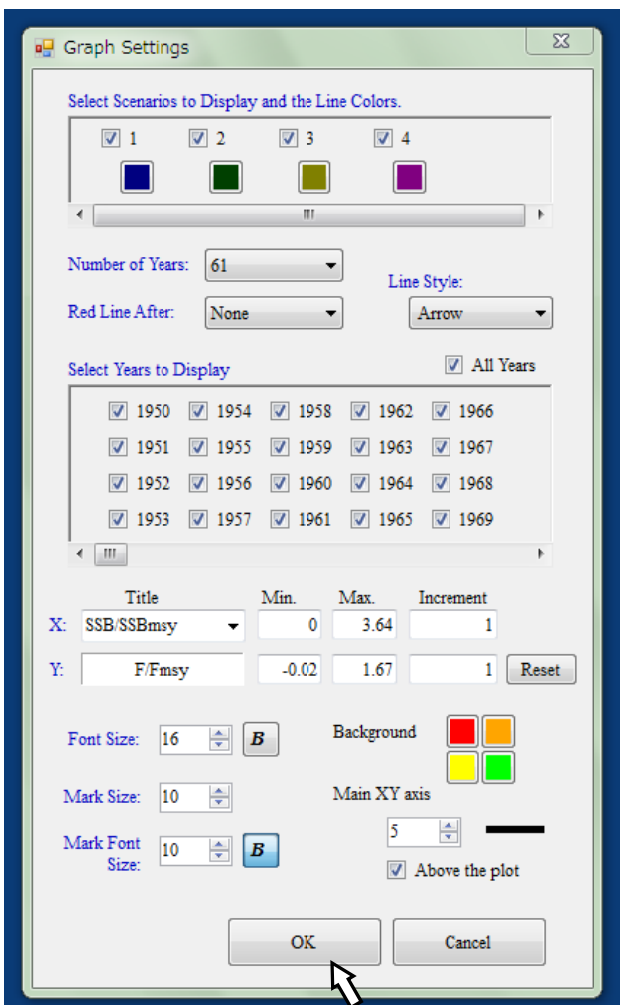
Click the Multi trajectory plot window.



Then you will see the empty window as below. Then click file, open, then go to the folder where your CVS file is located and import to the software. Then you will see the graph setting menus as described in the next page, which are self-explanatory. You can adjust various parameters to create your desirable output (plot).



3) Graph Settings



Number of Years

Choose number of years to display.

Red Line After

If you want to change the color of the trajectory lines to red starting from some year in order to highlight/emphasize, select the year (see example below). Then the line color change to red from 1989 as shown below.



Line Style

Choose the Line style (Arrow or Line)

Select Years to Display

Choose each year individually to display/un-display.

X Axis

Choose SSB/SSBmsy, SB/SBmsy or TB/TBmsy. Set values of the minimum, the maximum and the increment of X axis.

Y Axis (F/Fmsy)

Set values of the minimum, the maximum and the increment.

Font Size

Select the font size. Click **B** to make the font bold.

Mark Size

Select size of marks (circles presenting the plots).

Mark Font Size

Select the font size of “years (last 2 digits)” to be displayed inside of the mark (point). Click **B** to make the font bold.

Background Colors

Select Background colors.

Main X Y axis

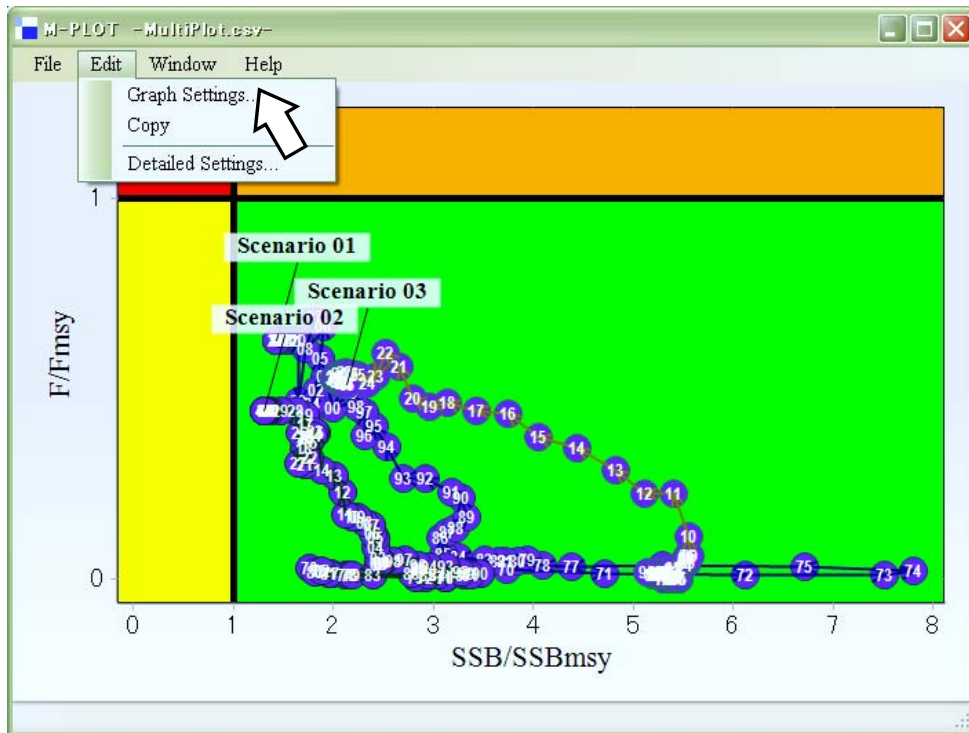
Select the width and choose above or behind of plots.

4) Displaying the Kobe plot I (multiple plots)

After you set up the graph setting, click OK button (see previous page), then you will get the Kobe plot I (multi plot options) (see example, next page).

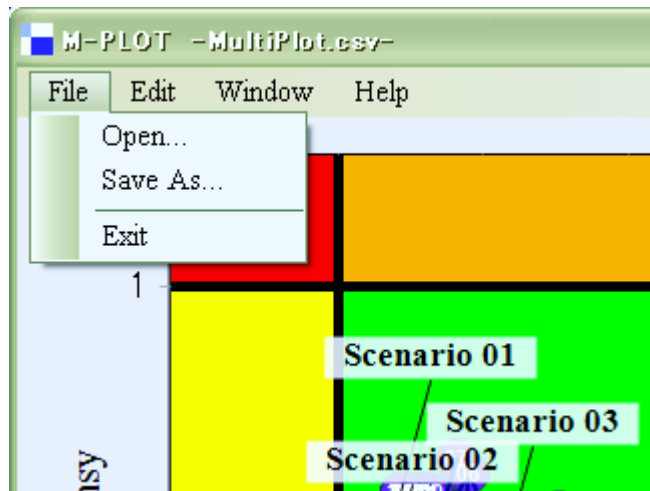
5) Editing the plots

If you want to edit the plots, click Graph setting and go back there then edit. Repeat this exercise until you get the satisfactory plots.



6) Saving the plots

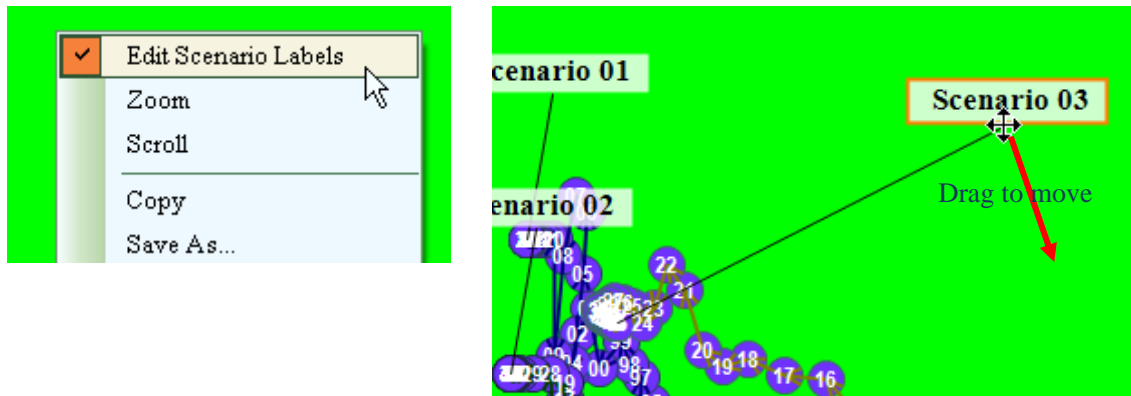
After finalizing the plot, save the plot by click "Save As". There are 4 ways to save by 4 different types of external file, i.e., ".KMP", ".BMP", ".PNG" and ".EMF". If you save with ".KMP" file, then you can retrieve the last plot that you save then you can do further editions.



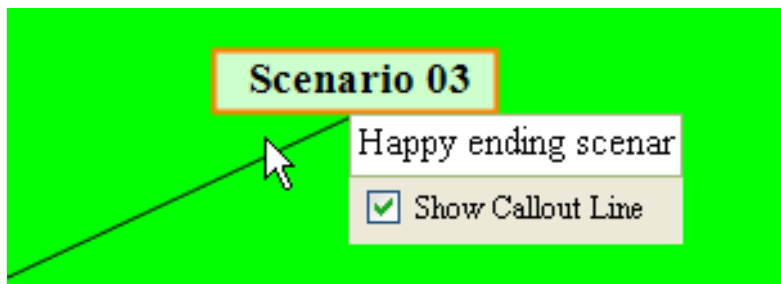
4.3 Common functions (text editor, zoom and scroll)

1) Editing Scenario Labels

Click the right button of the mouse in the plot area then the context menu will appear. Select and tick “**Edit Scenario Labels**”. Then click the label you want to move and drag it to where you desire to place.



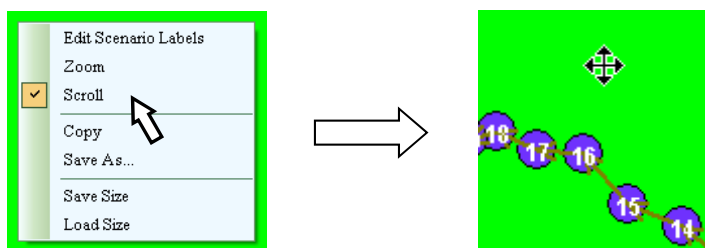
In order to rename the scenario label, click the label then edit the text. To show off the callout line, remove the tick mark.



Press the **Enter** key to finish editing.

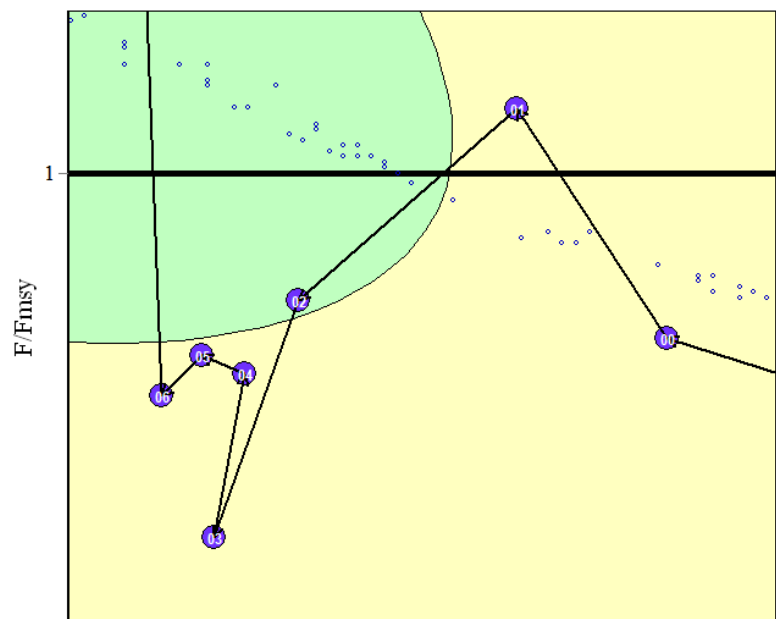
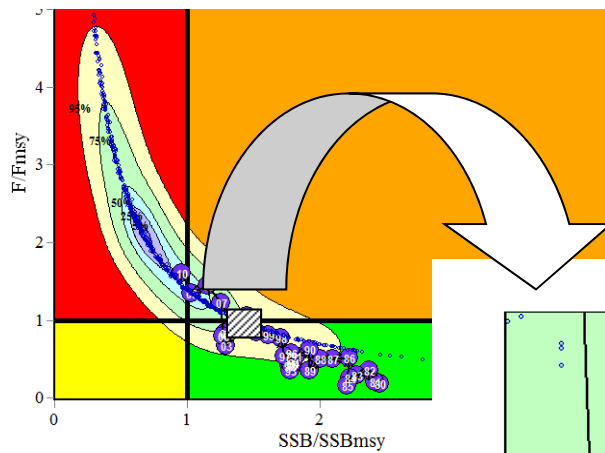
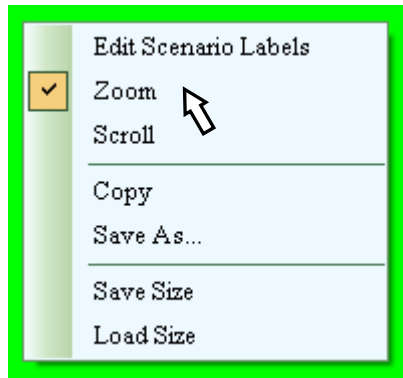
2) Scrolling

Click the right button of the mouse in the plot area then the context menu will appear. Select and tick “**Scroll**” then drag the cursor and scroll the plot area as you like.



3) Zooming the plot area

Click the right button of the mouse in the plot area then the context menu will appear. Select and tick “**Zoom**”. Then drag the cursor to the area you want to zoom then that area will be highlighted with slash lines (shades). To go back to the original plot, click the left button then drag towards the left-upper corner. Then you will get back the original plot.



SSB/SSBmsy

5. Kobe Plot II (Risk assessment matrix diagram)

Kobe II (Risk assessment matrix) was recommended to produce by 5 tuna RFMOs meeting (2010) in San Sebastian, Spain. The risk matrix here means the risk probabilities that SSB/TB ratio and F ratio will exceed their MSY levels in 3 and 10 years. But the matrix (table) has been quite difficult to understand its meanings especially for manager as the matrix is described by the mathematical notations (see below). To improve this situation, we developed the diagram to convert from the matrix (table) format, so that anyone can easily understand the meanings of the matrix. We applied spatial contour estimation techniques used in our marine GIS (Marine Explorer).

Reference point and projection timeframe	Alternative catch projections (relative to 2010) and probability (%) of violating MSY reference points							
	60%	80%	85%	90%	100%	110%	120%	140%
$B_{2013} < B_{MSY}$	45	48	50	53	57	62	67	81
$F_{2013} > F_{MSY}$	11	47	54	58	66	71	76	82
$B_{2020} < B_{MSY}$	18	51	59	66	74	82	87	91
$F_{2020} > F_{MSY}$	<1	49	61	70	82	89	91	96

1) How to create the input data?

To create the input data, make one CSV file based on the risk matrix for 10 years as below, i.e., Column 1: percentage increase or decrease from the current catch (status quo). Columns 2-11 projected years and corresponding risk probabilities by percentage (Y axis). This format is the diagrams for both SSB (or TB) ratio and F ratio. Please note that colors are not needed. Here colors are used only for the illustration purpose to understand the risk probability levels.

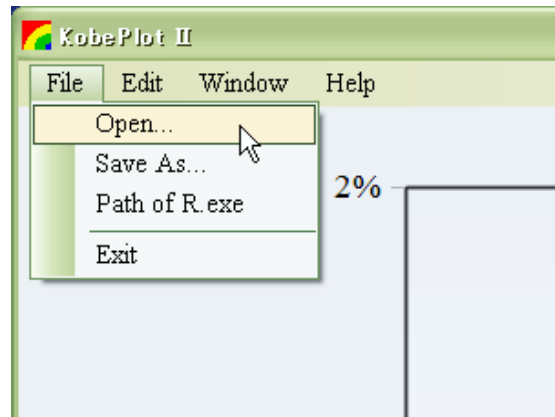
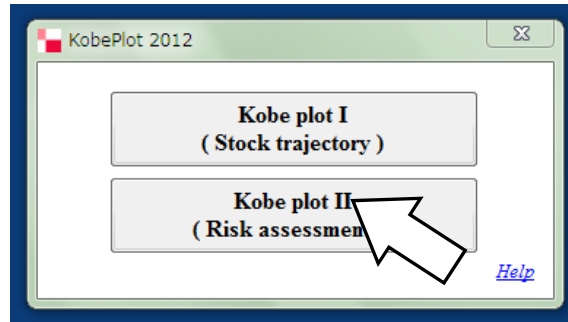
Example from Indian Ocean albacore stock and risk assessment.

	column 1	column 2	column 3	column 4	column 5	column 6	column 7	column 8	column 9	column 10	column 11
row 1		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
row 2	-40%	0.101	0.008	0.002	0.001	0	0	0	0	0	0
row 3	-30%	0.101	0.05	0.042	0.044	0.05	0.048	0.054	0.056	0.058	0.063
row 4	-20%	0.101	0.091	0.081	0.087	0.099	0.096	0.107	0.111	0.115	0.127
row 5	-10%	0.101	0.194	0.239	0.291	0.342	0.37	0.409	0.437	0.459	0.489
row 6	0%	0.101	0.296	0.396	0.495	0.584	0.644	0.71	0.762	0.803	0.821
row 7	10%	0.101	0.434	0.572	0.677	0.757	0.811	0.853	0.881	0.902	0.923
row 8	20%	0.101	0.572	0.748	0.858	0.929	0.978	0.996	1	1	1
row 9	30%	0.101	0.683	0.847	0.925	0.965	0.989	0.998	1	1	1
row 10	40%	0.101	0.794	0.945	0.992	1	1	1	1	1	1

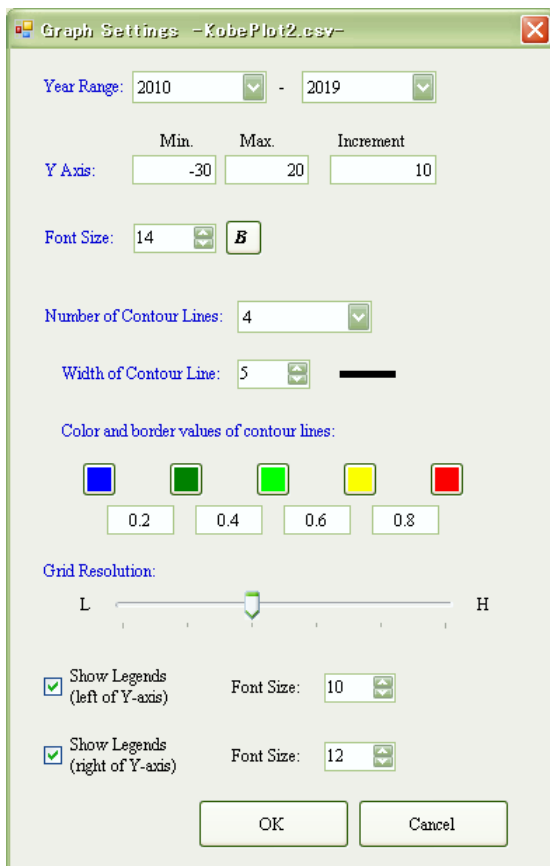
2) How to get the input data into the software?

Click Kobe Plot II.

Then you will see the empty window (see right below). Then click file, open, then go to the folder where your CVS file is located and import to the software. Then you will see the graph setting menus as described below, which are self-explanatory. You can adjust various parameters to create your desirable output (diagram).



3) Graph Settings



Year Range

Set the year range to display.

Y Axis

Set values of the minimum, the maximum percentage and the interval (increment).

Font Size Select the font size. Click on the **B** button to make the font bold.

Number of Contour Lines

Select the number of contour lines from 2 to 4.

Width of Contour Lines

Select the width of contour lines from 0 to 10.

Colors and border values

Set colors and border values of the contour lines

Grid Resolution

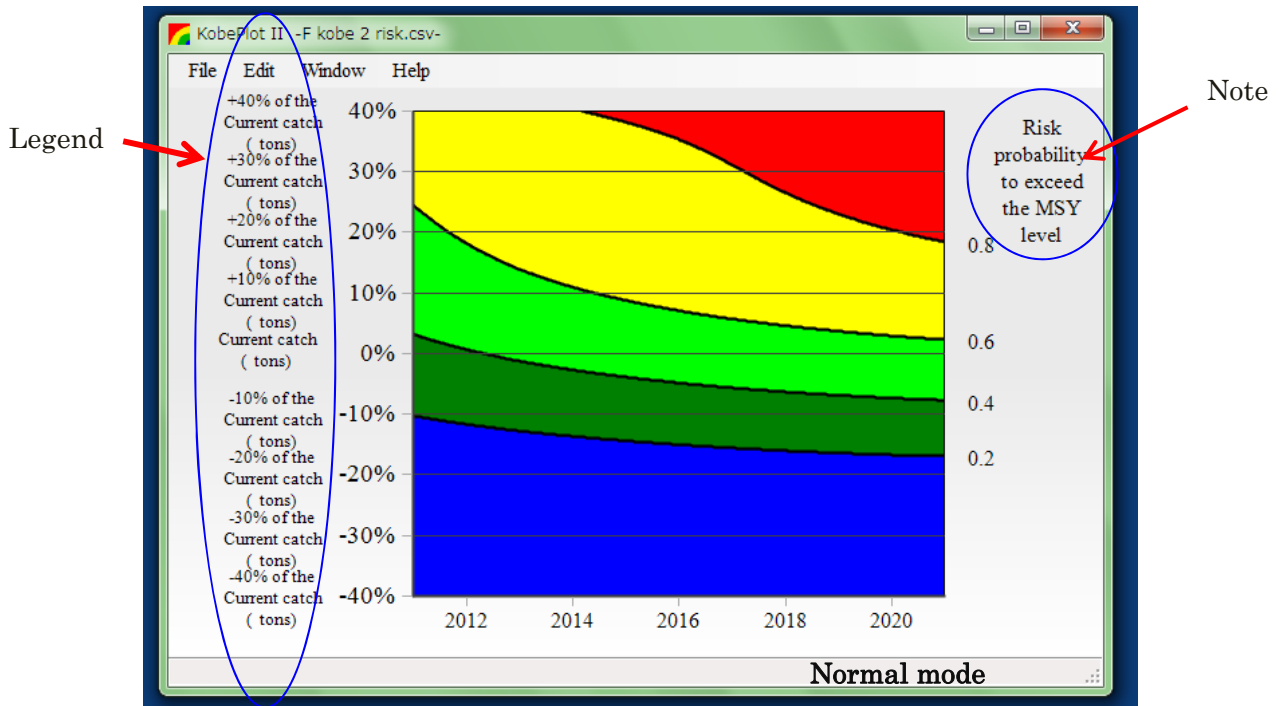
Move the grid resolution bar for the optimum resolution of the diagram (default position is recommended).

Legends/Note and Font size

Tick the box to show Legend (left of Y-axis) or Note (right) (refer to the sample, next page) and select Font size.

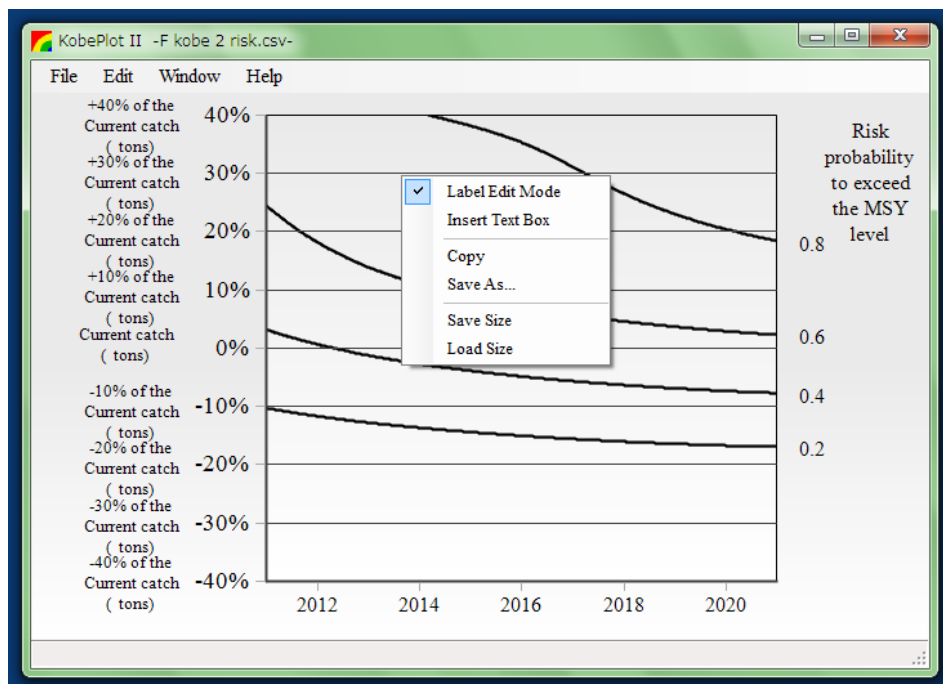
4) Displaying the Kobe plot II diagram (SSB/TB ratio or F ratio)

After you set up the graph setting, click OK button (see previous page), then you will get the Kobe plot II (risk assessment matrix) diagram with “Legend” and “Note” as below. *[Note] You can change ranges, for example, (-40%) – (40%) by 10% interval by graph settings.*



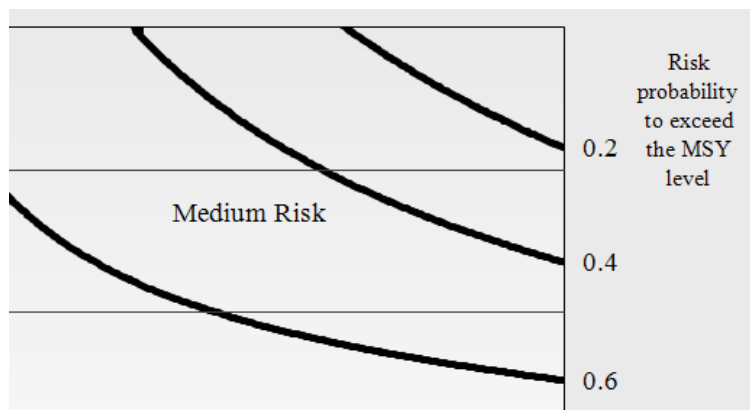
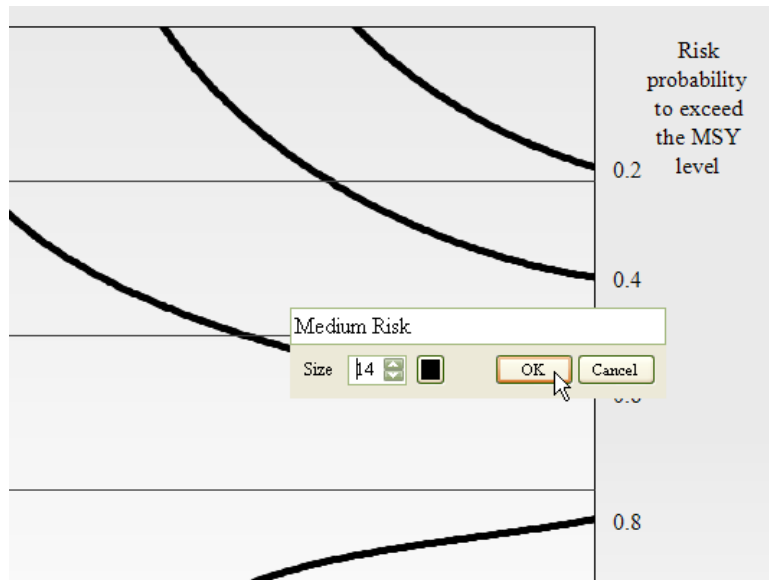
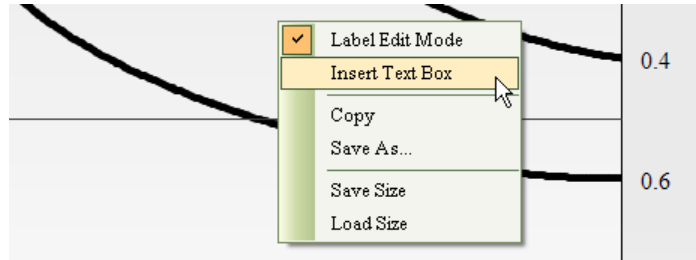
5) Label Edit Mode

To edit the “Legend”, “Note” and “To insert some text”, Change from Normal Mode (above) to Label Edit Mode (below). To get the menu, click the right button of your mouse (or other ways if you don’t use the mouse).



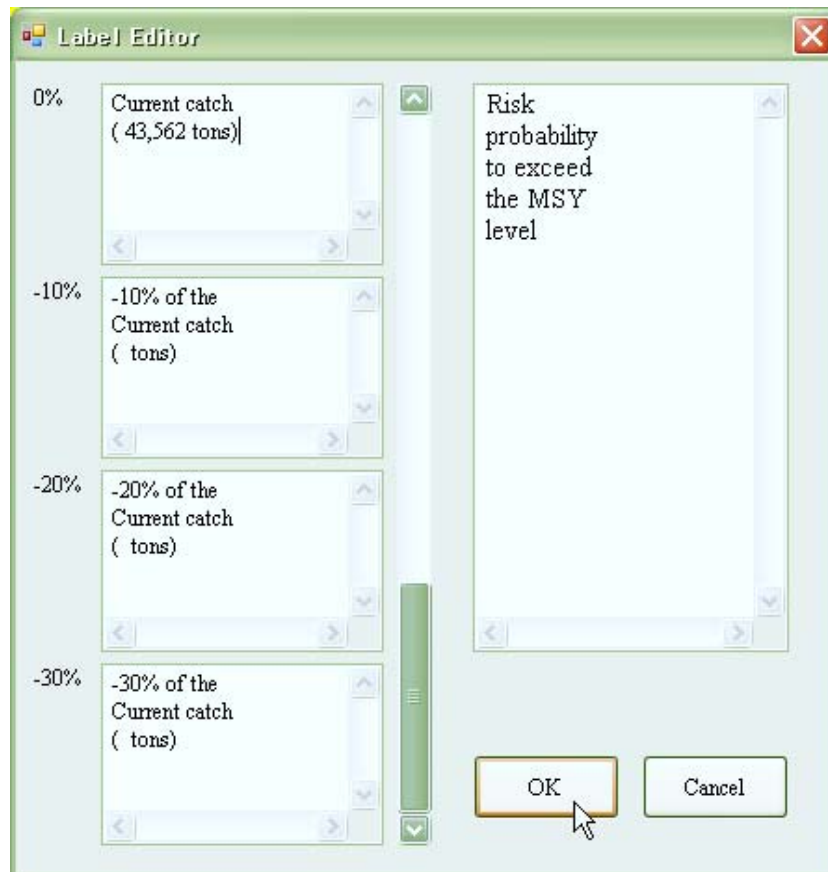
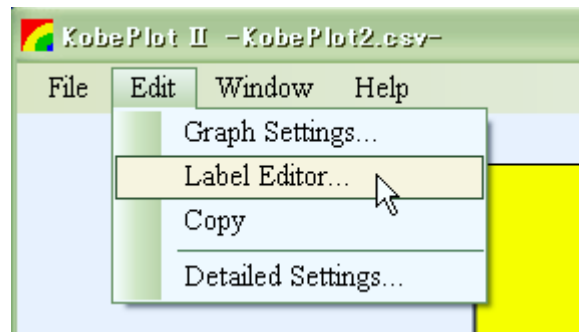
6) Insert and Edit the text in the diagram

You can add the text anywhere in the diagram. First, move the cursor to the location where you want to make text box then click the right button of your mouse. You will see the context menu as below. Click **Insert Text Box** then make the text. You can drag the text box by the cursor to move the location that you want to place.



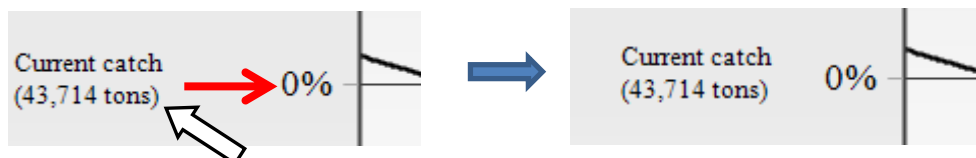
7) Editing Legends (X-axis left) and Note (X axis right)

To edit Legends (X-axis left) and Note (X axis right), get “Label Editor” (below) then edit.



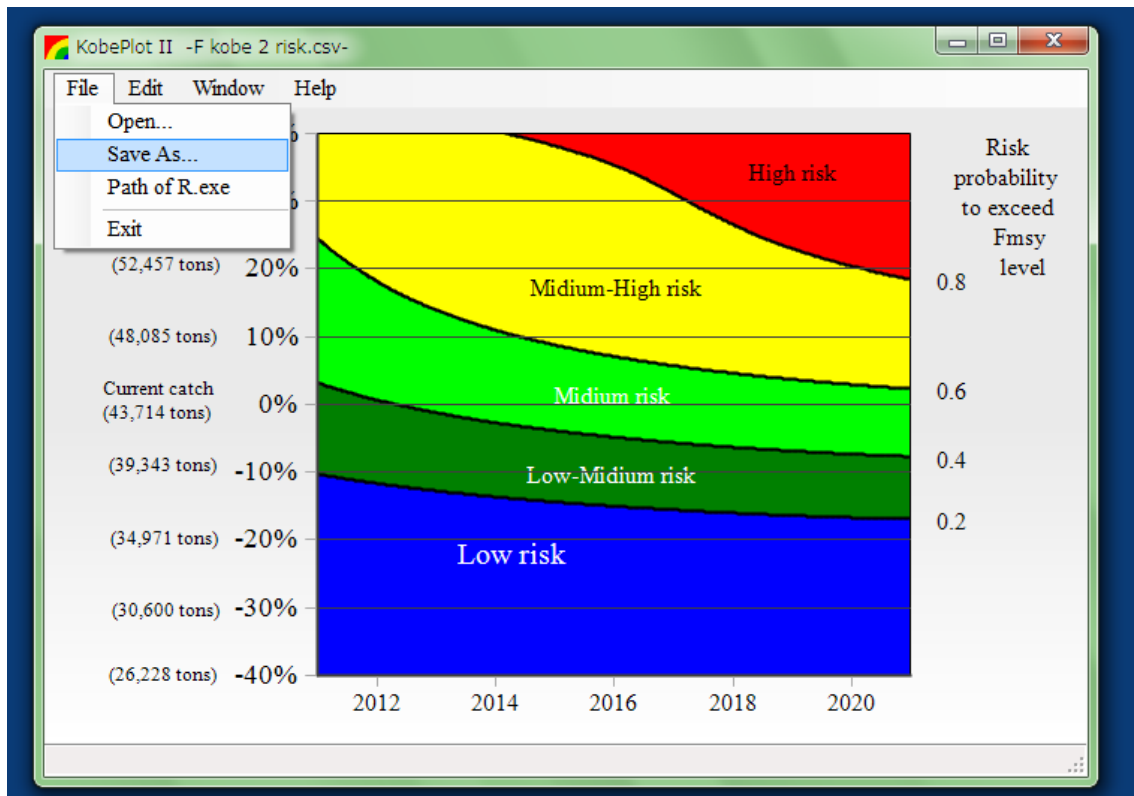
7) Moving Legends (X-axis left) and Note (X axis right)

In the “Label Edit Mode” (see above), you can adjust positions of Legend (X-axis left) and Note (X-axis right) by dragging with mouse.



8) Saving the diagram

After you finalize the plots, save the plots by click “**Save As**”. There are 4 ways to save to the external file, i.e., .KP2, .BMP, .PNG, and .EMF. If you save “.KP2” file, then you can retrieve the last diagram that you save then you can do further editions. “.EMF” file is recommended to use for your paper/document file as it will provide the best quality of picture, although it is a heavy file.



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APPENDIX A: SPECIFICATION OF KOBE I AND II SOFTWARE

This software was made using following application and program engines software.

General

- Microsoft Visual Studio 2010 (general programming)
- TeeChart Pro .NET v2010 (graphical components)

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Confidence surface in Kobe plot I and contour estimations in Kobe plot (diagram) II

'R' is linked to the main application (above) and following functions are applied:

Confidence surface

- 'kde2d' function : Kernel estimation
(Suggested by Professor Kitakado, one of co-authors of this document)

Kobe plots 2 (Contour estimation of the diagram)

- 'surf.gls' function :to assign contour surface by least square means
- 'prmat' function: to assign the contour line by kriging