



NewDEPOMOD v1.0

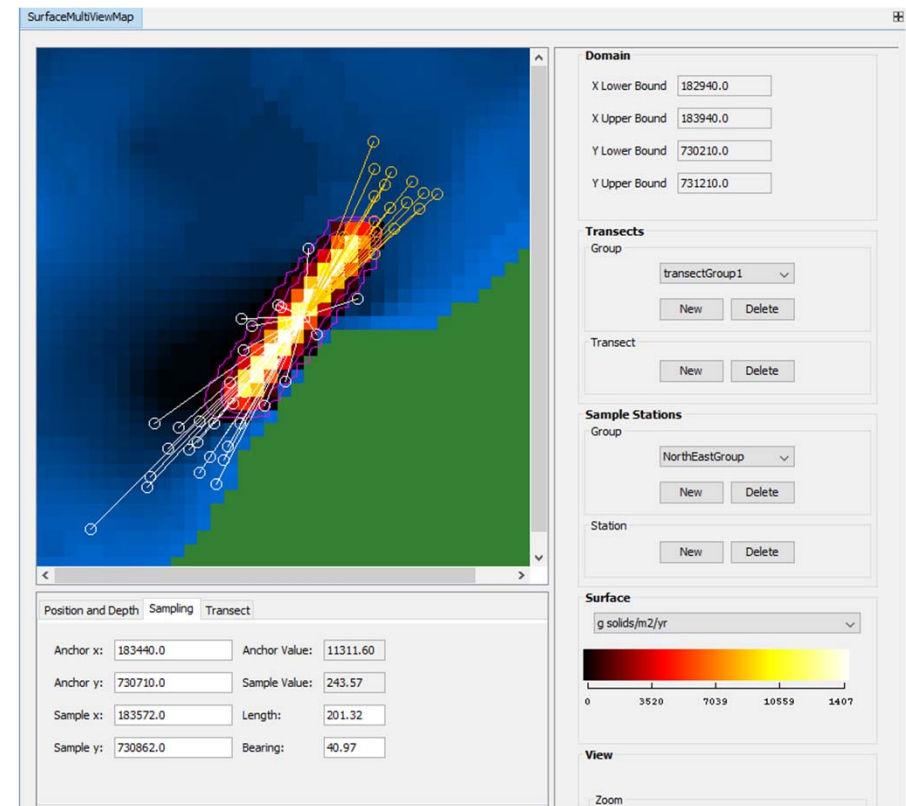
Quick Start User Guide

Rev	Issue Date	Description of Change	Prepared By	Authorised by
01	19/01/2018	Original issue	K. Dobkowski, T. Carpenter, P. Jowitt	J. Hausrath

NewDEPOMOD – Particle Dispersal Modelling Software

NewDEPOMOD can be used to model the extent of impacts to the seabed from uneaten food and fish faeces from marine fish farms. It allows various fish farm options and layouts to be modelled in order to help design optimised layouts. This improved version offers:

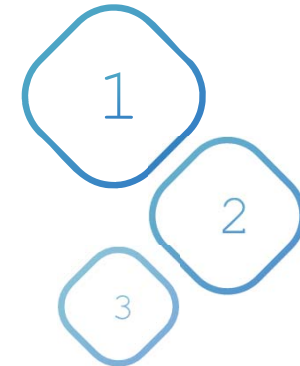
- An updated resuspension process,
- Redesigned user interface to aid simple generation of models of farm sites quickly,
- Additional file formats supported for bathymetry, flow and farm discharges,
- Ability to utilise spatially varying current data,
- Improved predictive abilities for more exposed sites,
- Ability to use data collected at an established site to aid planning for future expansion.



Step-by-Step

The purpose of this presentation is to provide a walkthrough of the NewDEPOMOD software for fish farm deployment, configuration and simulation:

1. Creating a new project,
2. Adding bathymetry data,
3. Adding flow data,
4. Assigning the cage layouts,
5. Running the model,
6. Viewing the model outputs.



Three Important Data

There are three prerequisites in order to start a model and produce meaningful output.

BATHYMETRY DATA

A file containing depth information collected from a site. Values should be represented in one of the formats specified in the user manual.



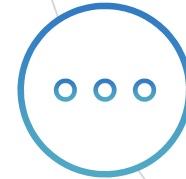
FLOWMETRY DATA

A file that describes the flow measured at the given site.



CAGE LAYOUT

One or more cage layouts, containing information about cages, such as depth, shape, size, number of cages on X and Y coordinates, stocking density, etc.

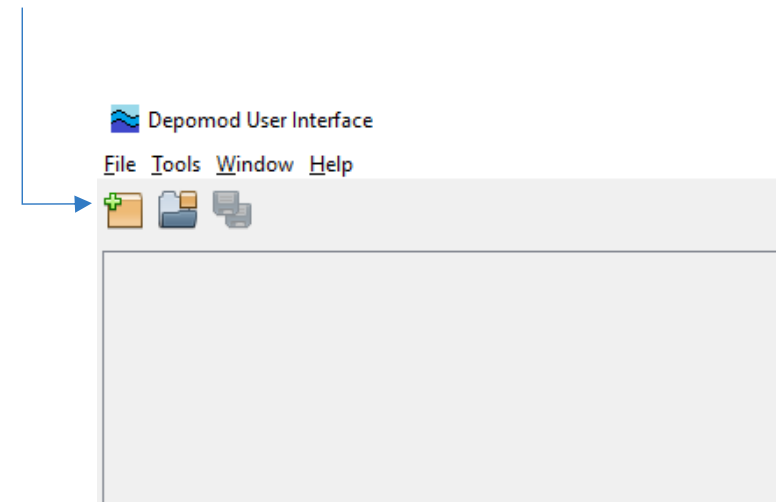


1

Create a Project

Once you have opened the application, navigate to the top left section of the window where you can locate the "New Project" button (see figure to the right).

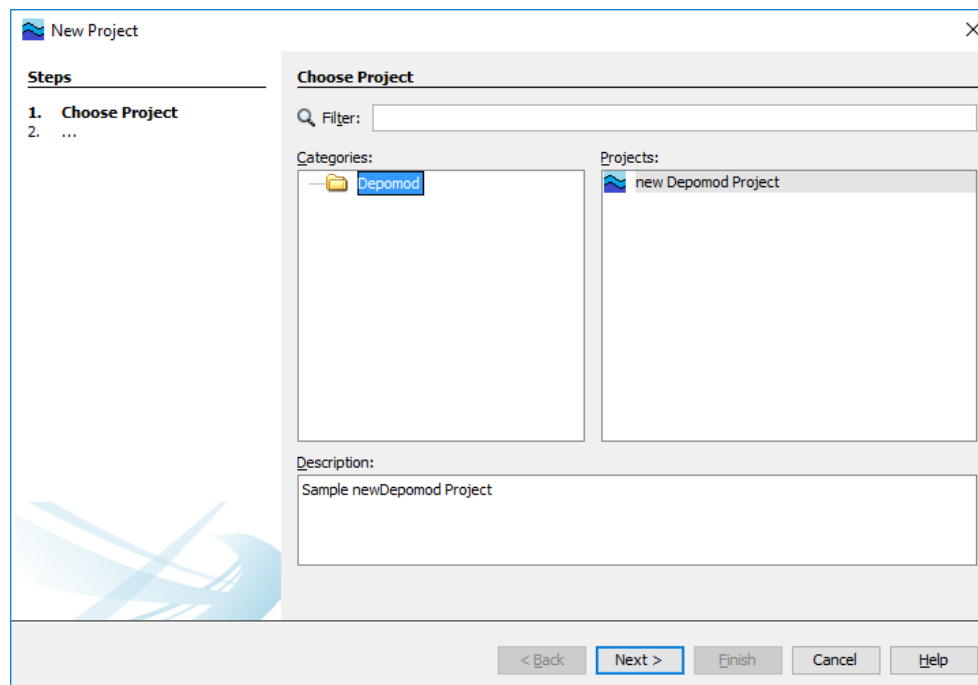
Clicking this button will open a "New Project" wizard



✓ CHOOSE PROJECT TYPE

Choose the project you wish to open. In this example there is only one project available ("new Depomod Project").

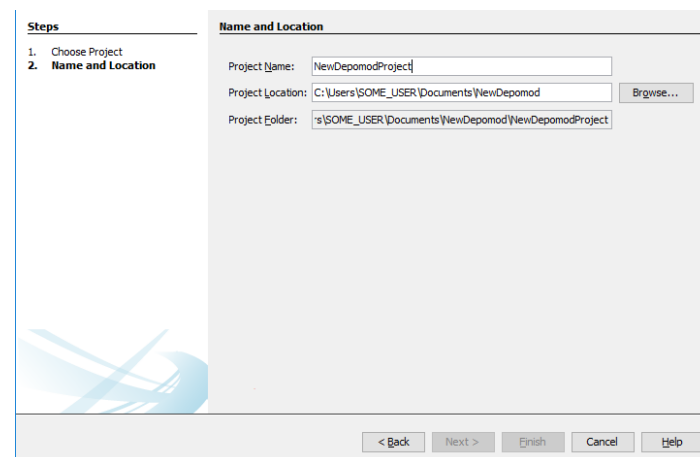
As the only project, it is selected by default. Press the "Next" button to proceed.



📁 NAME AND LOCATION

Here you can specify the project name and location where you wish the project files to be stored.

Once you are happy with your settings, press the "Finish" button to finalize the process.



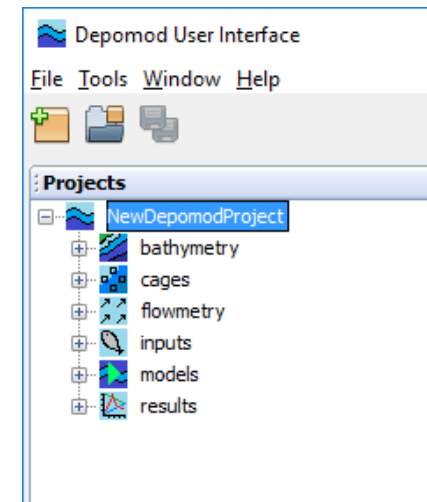


The Structure

Once the project has been created, you will see a structured view of it, where information is divided into categories.

Each section contains data indicated by its title.

E.g. "bathymetry" section will contain bathymetry data. "cages" will store all cage layouts that have been created.



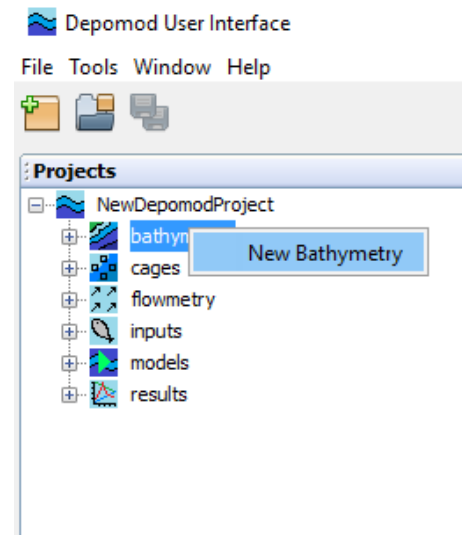
2

Load the Bathymetry

The first step of setting up the model is to load a bathymetry file.

To do so, right-click on the bathymetry section in your project section and select "New Bathymetry".

This will take you to a wizard window, that guides you through the process.





LOCATE BATHYMETRY FILE

Click the "Browse" button and using the file browser locate the bathymetry data file.

Steps
1. Step #1

Step #1 (1. from 1)

Location and Type

File Location: **Browse...**

File Type: **Advanced...**

Projection and Domain

Projection:

Domain: X min X max
Y min Y max

< Back Next > Finish Cancel Help



CHOOSE PROJECTION TYPE

Using the "Projection and Domain" section you can choose the projection type as well as preview the domain min and max values of the X and Y coordinates.

Once you are happy with your settings, press the "Finish" button to finalise the process.

Steps
1. Step #1

Step #1 (1. from 1)

Location and Type

File Location: **Browse...**

File Type: **Advanced...**

Projection and Domain

Projection:

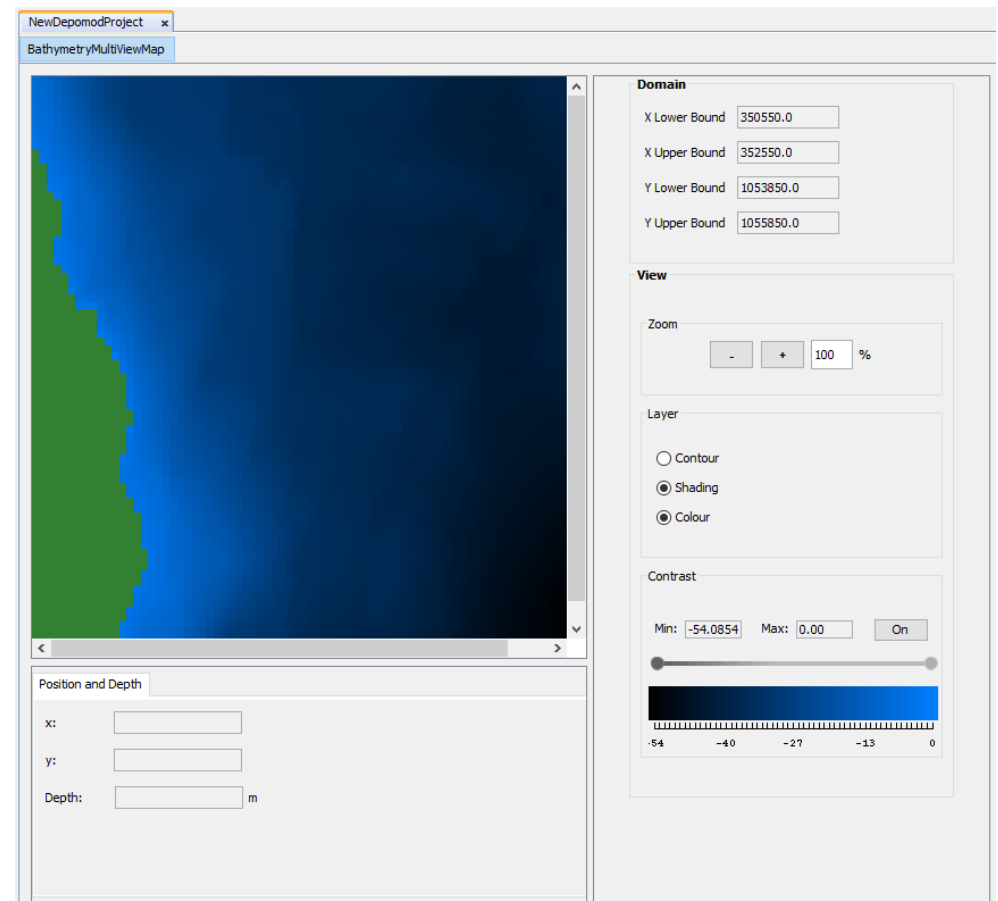
Domain: X min X max
Y min Y max

< Back Next > **Finish** Cancel Help

Viewing the Bathymetry

Once you have completed the previous steps, a bathymetry entry should appear in the "bathymetry" section of your project content.

When double-clicked, a new tab will appear, displaying the graphical representation of the data.

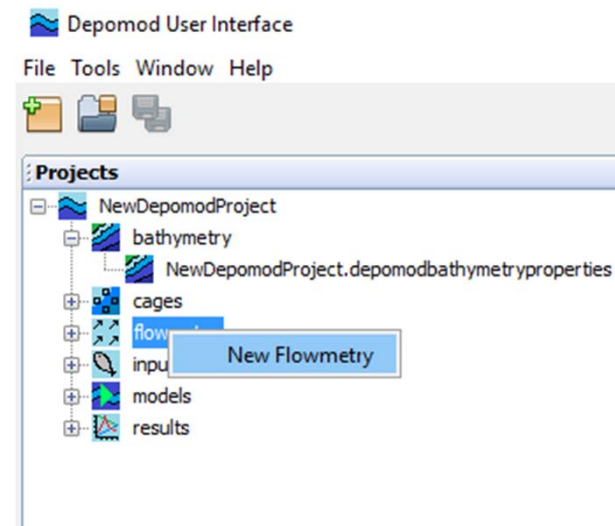


3

Load the Flow Data

The second step in loading the data is to import the flow information for your site.

By right-clicking on the flowmetry section in your project view a wizard will appear, guiding you through the process of importing the data.





LOCATE FLOWMETRY FILE

Click the "Browse" button and using the file browser locate the flowmetry data file.



CHECK IF DATA IS CORRECT

Using the "Site" section and "Current Records" you can preview key information about the data that has just been loaded.

Once you are happy with the content you can press the "Finish" button to finalise the process.

Steps
1. Step #1

Step #1 (1. from 1)

Location and Type

File Location: Browse...

File Type: Unknown Advanced...

Site

Site Depth:

Meter Easting: Meter Northing:

Current Records

Sampling Period: s Number of Samples:

N-S Start Sample: S-N Start Sample:

< Back Next > Finish Cancel Help

Steps
1. Step #1

Step #1 (1. from 1)

Location and Type

File Location: \\flowmetry\\flowData.csv Browse...

File Type: depomodflowmetryproperties Advanced...

Site

Site Depth: -40.4

Meter Easting: 204387.5 Meter Northing: 629187.5

Current Records

Sampling Period: 3600.0 s Number of Samples: 360

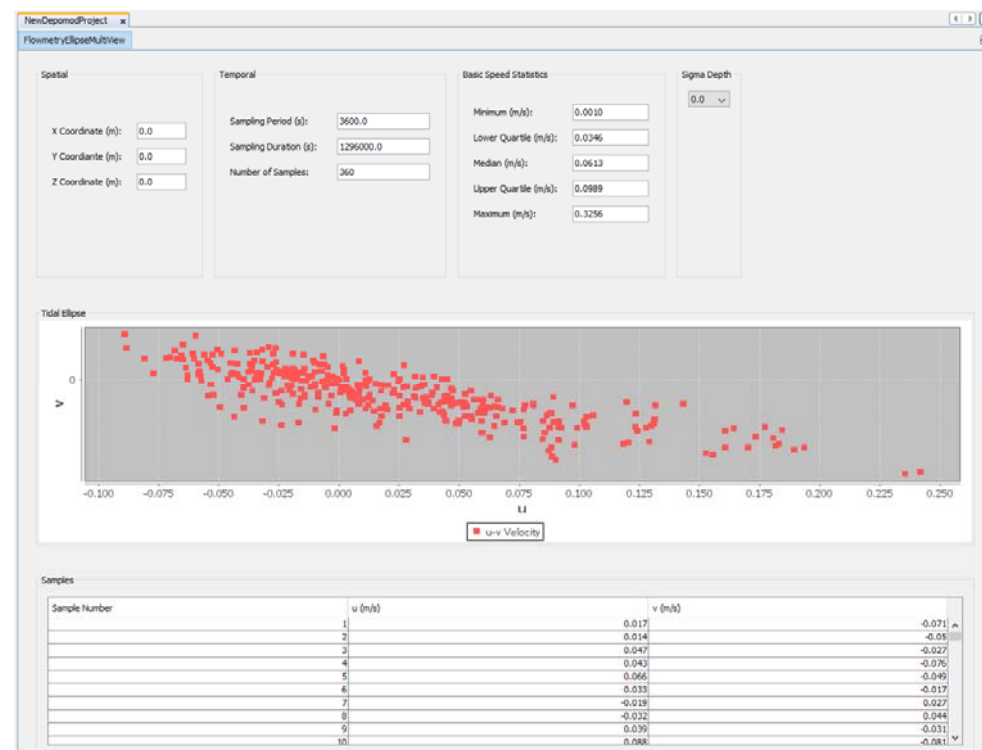
N-S Start Sample: 1.0 S-N Start Sample: 114.0

< Back Next > Finish Cancel Help

Viewing Flowmetry Data

Once you have completed the previous steps, a flow entry should appear in the “flowmetry” section of your project content.

When double-clicked, a new tab will appear, displaying the graphical representation of the data.

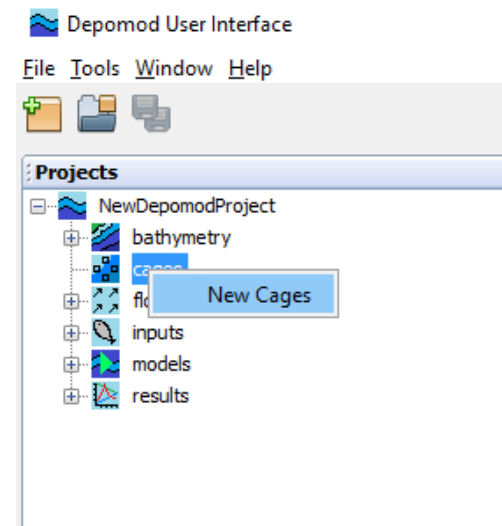


4

Creating a Cage Layout

The final step before we can start a model is to create a cage layout.

To do so, right-click on the "cages" section in the project layout, which will open a "New Cages" wizard window.





NAME THE CAGES

Provide the name (tag) of the new cage layout.



CONFIRM NAME

Once you are happy with the name press the "Enter" key for the "Finish" button to appear.

Once the button appears, click on it to finalise the procedure.

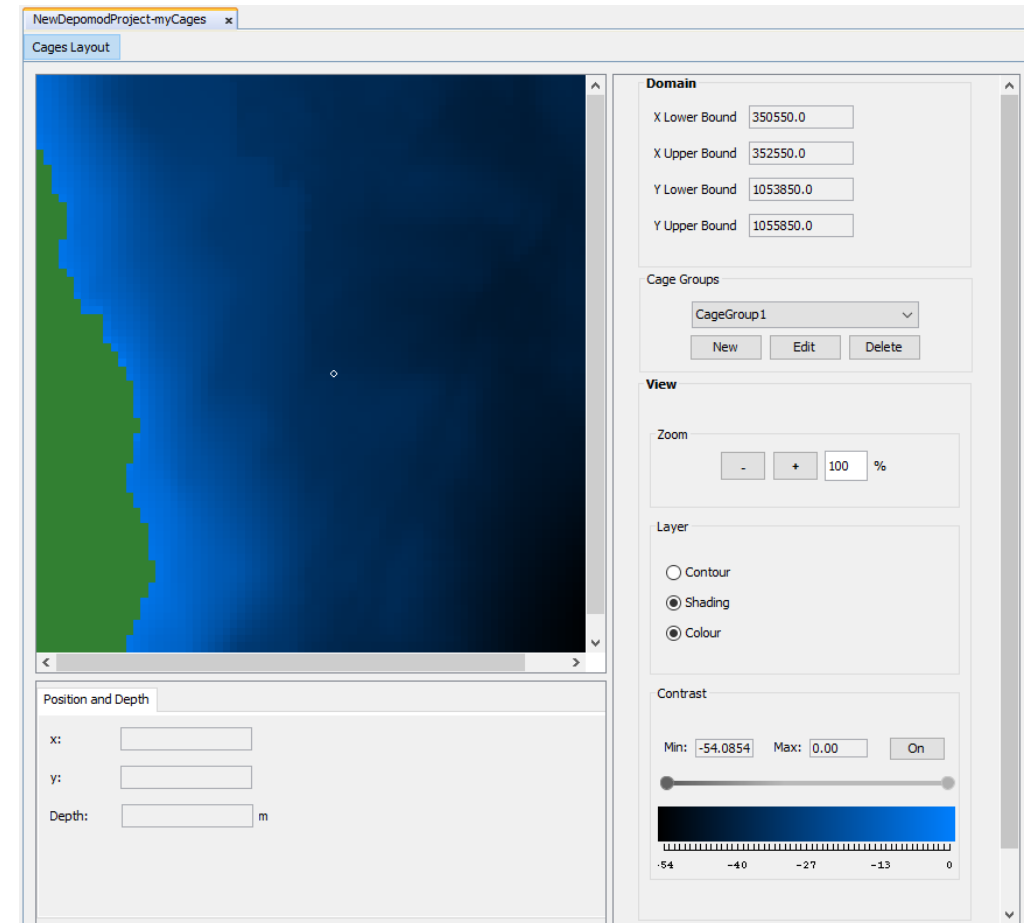
The screenshot shows a dialog box titled 'Step #1 (1. from 1)'. On the left, a 'Steps' pane lists '1. Step #1'. The main area has a 'Tag' label and a text input field containing 'myCages'. At the bottom, there are five buttons: '< Back', 'Next >', 'Finish', 'Cancel', and 'Help'. The 'Finish' button is currently disabled (greyed out).

This screenshot is identical to the one above, but the 'Finish' button at the bottom is now active (highlighted in blue), indicating that the 'Enter' key has been pressed.

Viewing Cage Layout

Once you have completed the previous step, a new cage layout will appear inside the "cages" section of your project view.

When double-clicked, a new tab will appear, displaying the graphical representation of the cages.





How to Edit Cages

Once a cage layout has been opened, on the right hand side of the new tab, navigate to the "Cage Groups" category in the tools panel and click on the "Edit" button.

When clicked, an editing window will appear, which will allow you to edit cage layouts.

Domain

X Lower Bound

X Upper Bound

Y Lower Bound

Y Upper Bound

Cage Groups

▾

View

Zoom

%

Layer

☐ Contour

☒ Shading

☒ Colour

Contrast

Min: Max:

Reguar Grid Cage Layout

Name

CageGroup1

Origin X (m)

351550.0

Origin Y (m)

1054850.0

X spacing (m)

30.00

Y spacing (m)

30.00

Bearing

0.00

Cages X

1

Cages Y

1

Type

CIRCULAR

Width (m)

20.00

Length (m)

20.00

Hieght (m)

10.00

Circumference (m)

62.83

Depth (m)

5.00

Input time series

allCages

Edit

OK

Cancel

Cages Configuration

This window allows you to configure the cages so that they represent the proposed layout on site.

ORIGIN - SPACING - BEARING

These parameters affect positioning and spacing between cages as well as the angle of the cage layout.

CAGES X - CAGES Y

These parameters signify how many cages will be placed on the X and Y coordinates, equally spaced.

TYPE - PHYSICAL CHARACTERISTICS

You can choose between "Circular", "Spherical" and "Rectangular" cage types.

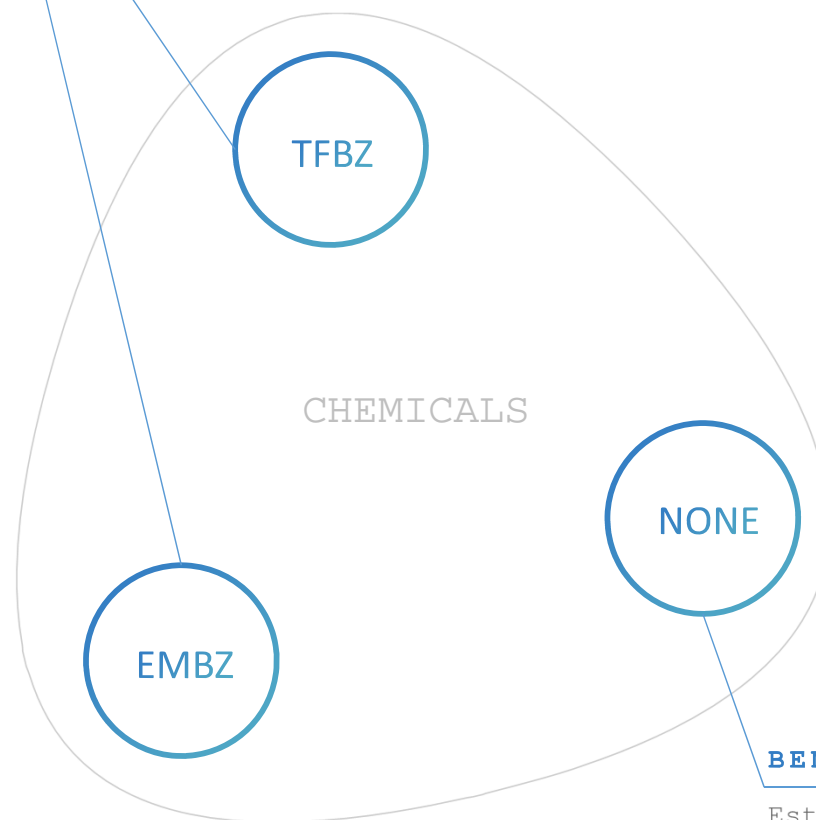
The last section of parameters define the cages physical characteristics such as size and depth at which the cages are submerged.

IN FEED TREATMENT

Estimates concentration of in feed treatment for sea lice in the sediment and the maximum dose which can be given in a single application.

THE MODEL

Chemical Treatment Types



BENTHIC IMPACT

Estimation of the solids flux and ITI, using a validated relationship. This provides a holding capacity for the site.

Single

This mode will iterate only once. Estimating either the benthic impact or treatment sediment concentrations.

SINGLE

MODEL

OPTIMISED

Optimised

This mode will iterate multiple times, adjusting cages biomass or treatment dose to estimate the maximum value that will pass the environmental quality standard (EQS) criteria.

THE MODEL

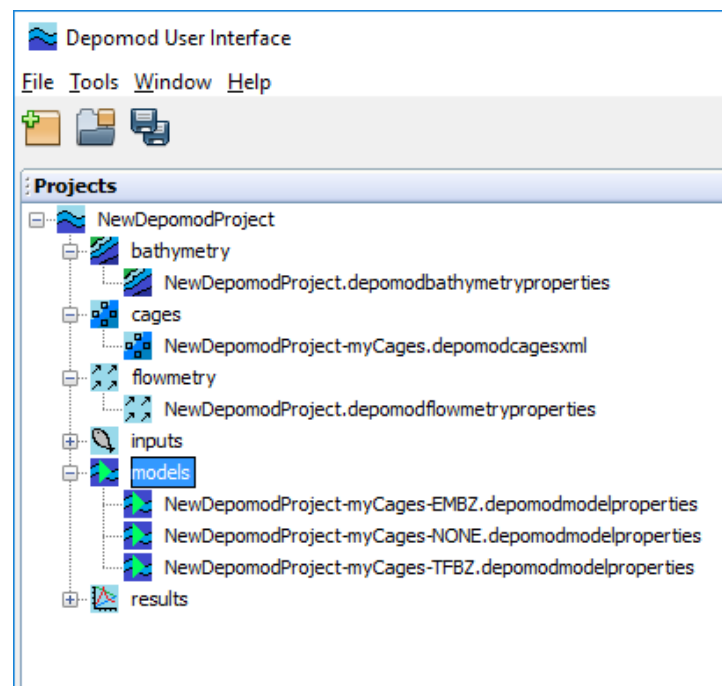
Run Types

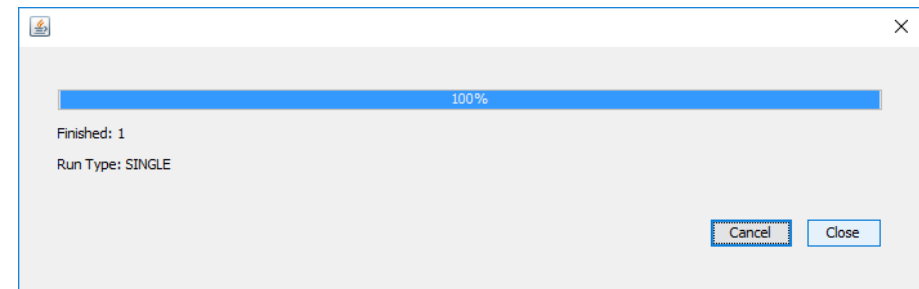
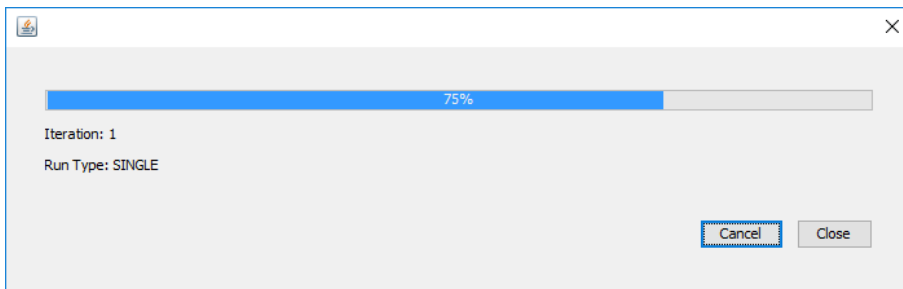
5

Starting the Model

Now that all the data has been successfully loaded and we have created a cage layout, we can start a model run.

In the “models” section of your project view, choose which chemical type you wish to use, right-click on it and select the desired run type.





ITERATION

Depending on the type of run that has been selected, the model may iterate multiple times before finishing.

The iteration number is displayed below the progress bar.



FINISH

Once the progress bar reaches 100%, result files will be created in your project view section.

You can press the "Close" button to exit the progress window.

6

Model Output

When the model starts, an "Output" window will appear.

Once the model has finished iterating, results in a textual form will appear there.

Here you can find EQS result values and other details such as the total number of released particles, etc.

```
Output - NewDepomodProject-myCages-TFBZ

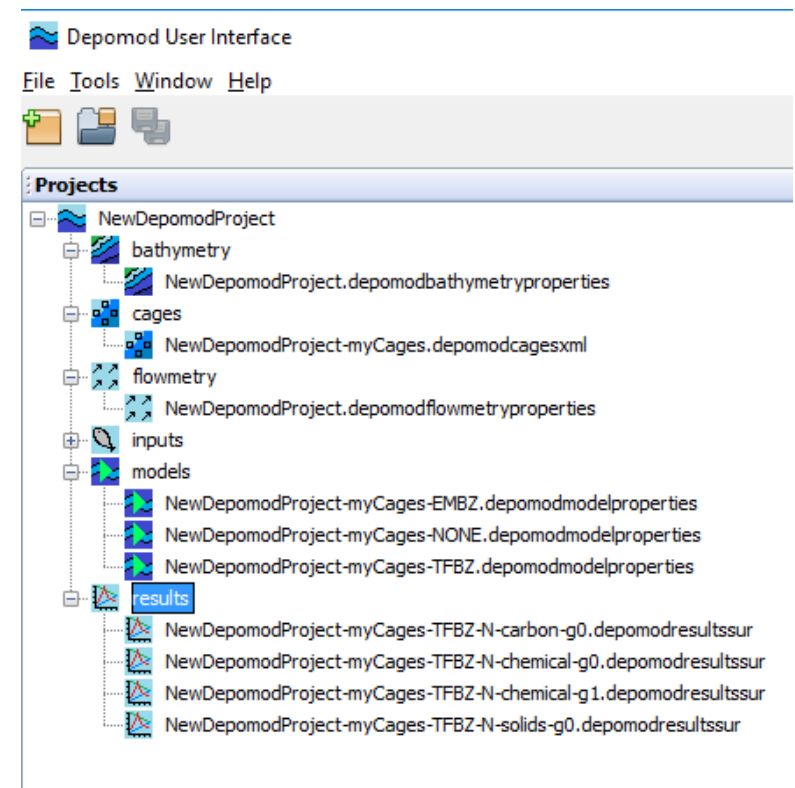
Task: Exercise Method Timer Reset
Finished Task: Exercise Method Start time: 1508229992973 End time: 1508230121805 Duration: 128832
Accumulating Task: Release Accumulated Duration: 1937
Accumulating Task: Suspension Transport Accumulated Duration: 1200
Accumulating Task: Bed Transport Accumulated Duration: 5864
Accumulating Task: Consolidation Accumulated Duration: 96437
Accumulating Task: Resuspension Transport Accumulated Duration: 906
Accumulating Task: Degrade Accumulated Duration: 14724
Accumulating Task: List Management Accumulated Duration: 6027
Total Calculation Time 127095
ratio 0.9865175484351714
releaseParticles 0
suspensionParticles 0
bedParticles 0
consolidatedParticles 0
resuspensionParticles 0
outOfDomainParticles 0
Total released particles 43200
Total released mass 34593.696
Total released carbon mass 11501.6616144
Total released chemical mass 130.78320528
Total released Feed mass 5913.4680072
Total released Feed carbon mass 2897.5896072
Total released Feed chemical mass 3.96577428
Total released Faeces mass 28680.2279928
Total released Faeces carbon mass 8604.0720072
Total released Faeces chemical mass 126.817431
Used 8 threads
SINGLE: 2062.951949
Critical Eqs:
    Over Treatment Factor step EQS: Result: PASS Parameter Step: 0.0000 Target: 0.0100
    Parameter Limit EQS: Result: LOW ( NonIterator default value )
    Chemical Far Field EQS: Result: HIGH Far field Area: 264042.2738 Target: 94180.3037
Warning Eqs:
    Benthic Far Field EQS: Result: HIGH ITI Level: 8.8749 Target: 10.0000
    Benthic Impacted Area EQS: Result: LOW Area: 315020.7265 Target Area: 500000.0000
    Chemical Near Field EQS: Result: HIGH Concentration: 59.0071 Target: 10.0000

Iteration Result: HIGH
executionTime: 143.691
```

Model Results

Once the model has finished iterating, result files will be created in the “results” section of the project view.

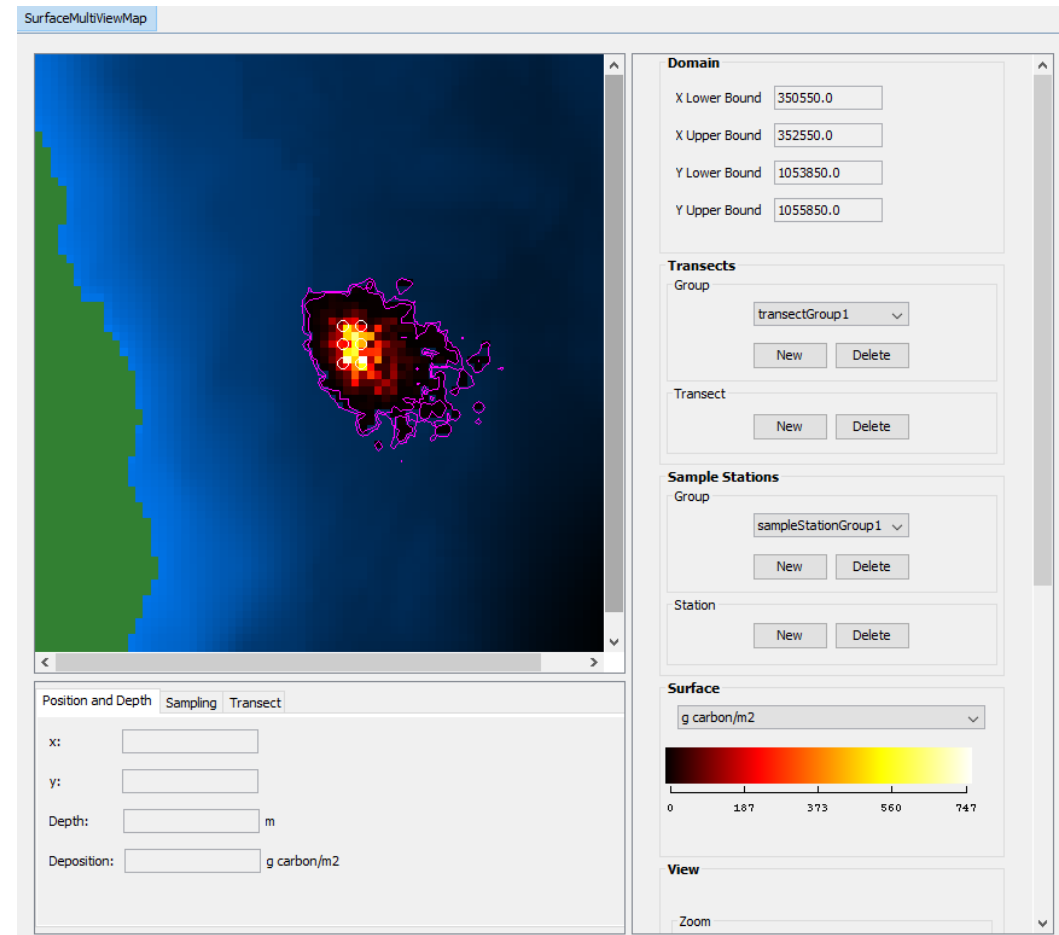
Double-click on the result that you are interested in to open a graphical preview tab.



BENTHIC MODEL OUTPUTS:

Solids Flux Carbon Deposition

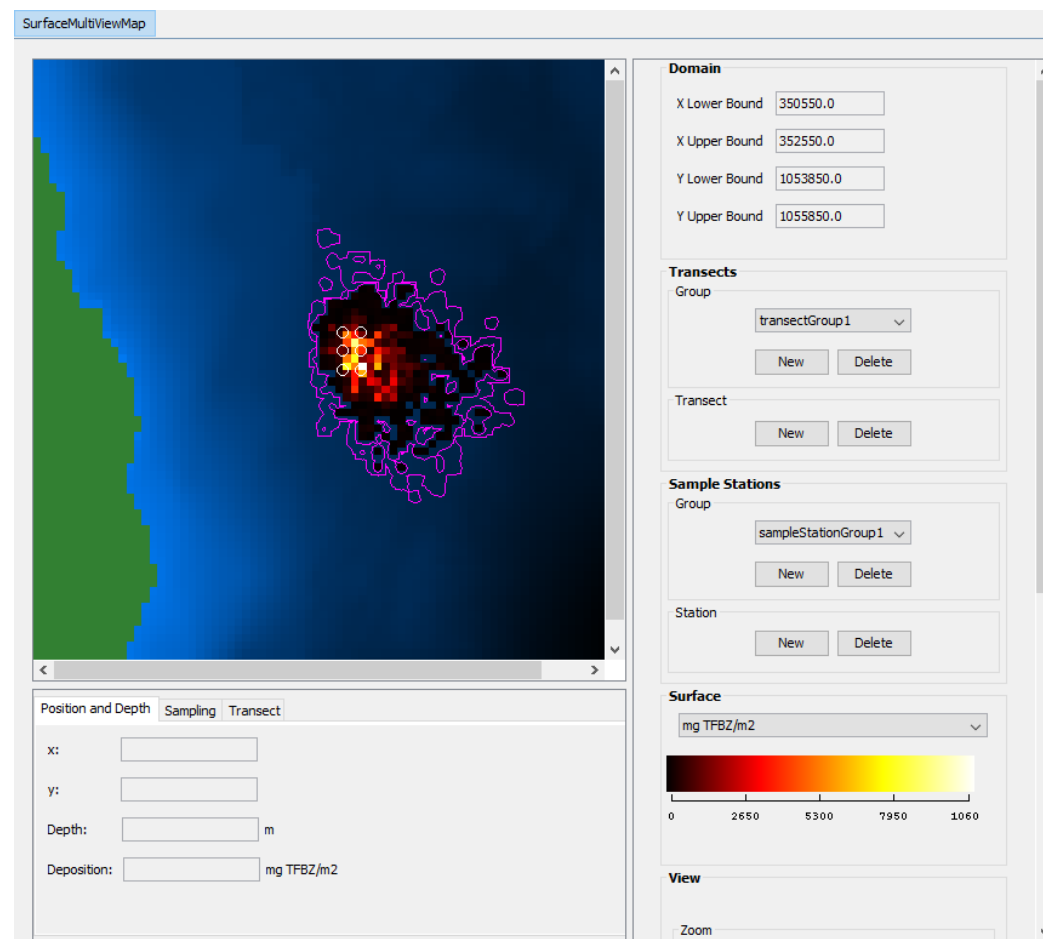
For benthic models the solids flux allows users to identify the 10 and 30 ITI contours that are used to estimate the biomass holding capacity for the proposed fish farm site.



IN TREATMENT MODEL OUTPUTS:

Degraded and Undegraded Chemical Concentrations

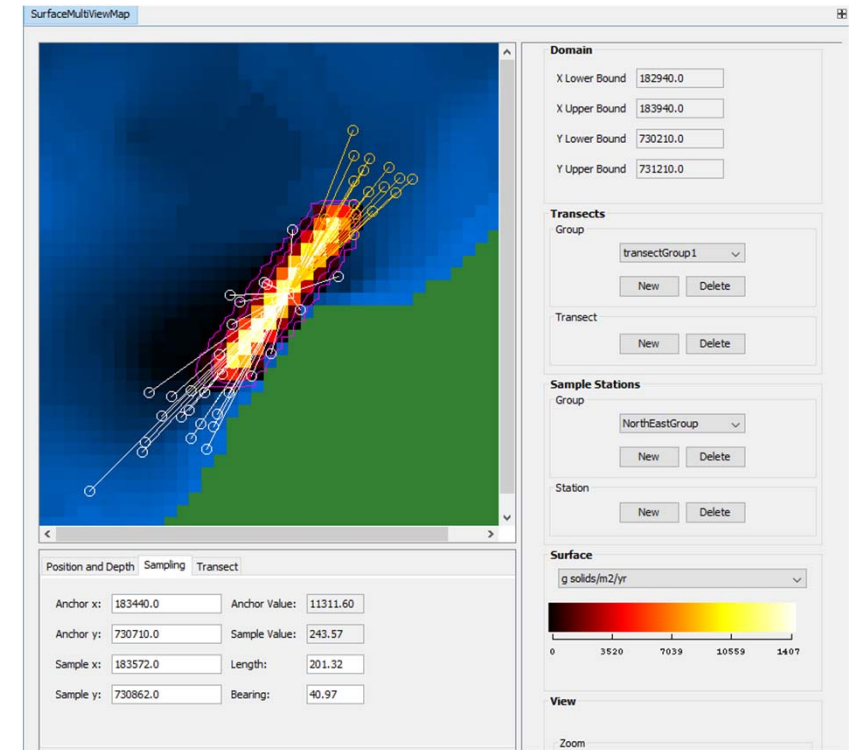
Chemical models produce outputs showing the spatial distribution of chemical concentration within the sediment along with the near and far field environmental quality standard (EQS) contours.



Summary

NewDEPOMOD software facilitates fish farm optimisation by modelling potential impacts on the seabed. Benefits include:

- Iterative capability to assess different farm layouts,
- Visual presentation of outputs, which can be used for reporting,
- Intuitive interface for model setup,
- Complete access to model parameters for fine tuning predictions,
- Create multiple cage and parameter configurations within a single project,
- Improved portability allowing projects to be shared between users,
- Additional functionality to meet customers requirements can be created using plug-ins.





QUESTIONS?

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