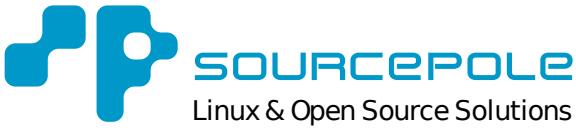

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NIWA SCP QGIS Plugin

Version: 1.0.0
Author: Sandro Mani
Date: February 9, 2015

Version history

Version	Date	Author	Description
0.1	March 13, 2014	Sandro Mani	Initial release
0.1.1	March 14, 2014	Horst Düster	Ensure `json` extension in filename, backwards compatibility fixes
0.2	March 26, 2014	Sandro Mani	Add land layer clipping feature, show areas and quantifying attribute totals in analysis results
0.2.1	April 07, 2014	Sandro Mani	Fix backwards compatibility issue
0.3	April 15, 2014	Sandro Mani	Allow selecting polygon layers with multiple features, display area in map units if CRS are disabled, add button to reset the layer symbology
0.3.1	April 16, 2014	Sandro Mani	Fix reset symbology feature, warn user if no ellipsoid is selected
0.3.2	May 27, 2014	Sandro Mani	Fix referencing symbologies of deleted C++ objects
0.3.3	June 25, 2014	Sandro Mani	Fix case of plugin folder name to avoid confusing the plugin manager
0.3.4	June 25, 2014	Horst Düster	Fix about python error
0.3.5	June 26, 2014	Sandro Mani	Fix manual not displaying in Adobe Acrobat
1.0	February 9, 2015	Sandro Mani	Set version to 1.0

Contents

1 Introduction

This document describes the usage of the System Conservation Planning (SCP) QGIS plugin, developed for the National Institute of Water and Atmospheric Research (NIWA) of New Zealand.

The objective of the plugin is to add an SCP analysis functionality to QGIS, which assesses whether a proposed Marine Protection Area (MPA) achieves the area and value targets of given polygons and points of interest.

1.1 Acknowlegement

The NIWA SCP plugin was inspired by original work undertaken by Kim Ollivier (Ollivier & Co.) and Ben Sharp (New Zealand Ministry for Primary Industries) to assist in the management of the the Ross Sea fishery for Antarctic toothfish.

1.2 Terminology

MPA: The MPA (Marine Protection Area) defines an an area which should fulfill the specified requirements on points and polygons of interest.

Polygons of interest: These areas, which may represent things like whale breeding areas, are defined as polygon layers. For each such layer, the user specifies the required area overlap between the proposed MPA polygon and the polygon of interest, as a percentage of the total area of the polygon of interest.

Points of interest: These points, which may represent things like fishing locations, are defined as a point layer with a quantifying attribute, such as fishing catch. For each such layer, the user specifies the required quantified amount of points outside the proposed MPA polygon, as a percentage of the total quantified amount of the point layer.

2 Usage

The plugin can be launched via the icon NIWA SCP from the toolbar or the `Plugins`→`SCP-Plugin` menu.

2.1 Input

In the input tab of the dialog, point and polygon layers to include in the analysis are added, and the MPA layer specified.

The desired percentage for a layer can be adjusted by editing the value of the spin box on the corresponding table cell. By default, percentage values indicate, for polygon layers, the percentage *inside* the MPA, and for point layers, the percentage *outside* the MPA. The checkbox in the *Inv(ert)* column of the tables allows to invert polarity of the test for the respective layers.

Layers can be removed by clicking on the minus icon in the corresponding table row.

To handle cases where the MPA layer overlaps with a land layer, one can have the tool subtract the overlapping portion from the MPA layer by specifying the land layer.

A possible input configuration is shown in figure 2.1.

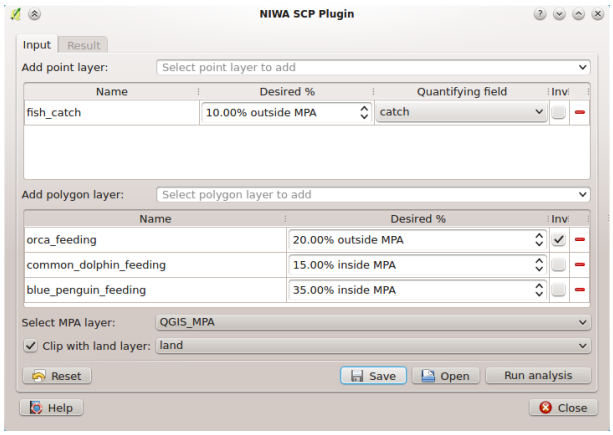

Figure 2.1: Sample input configuration.

2.2 Save and open

The plugin can save the input configuration to a `JSON` file, and load corresponding files to restore a saved configuration.

When the plugin dialog is closed, the input configuration is kept in memory, allowing the user to modify layers and attributes without having to save and re-load the configuration.

When loading input configurations, or re-opening the plugin dialog, the configuration is validated. If layers were removed in the meantime, the corresponding layer name entires in the table will appear red. To update the layer name, one can double-click on the layer name cell, and pick the new layer name from the combo box that appears. An example is shown in figure 2.2.

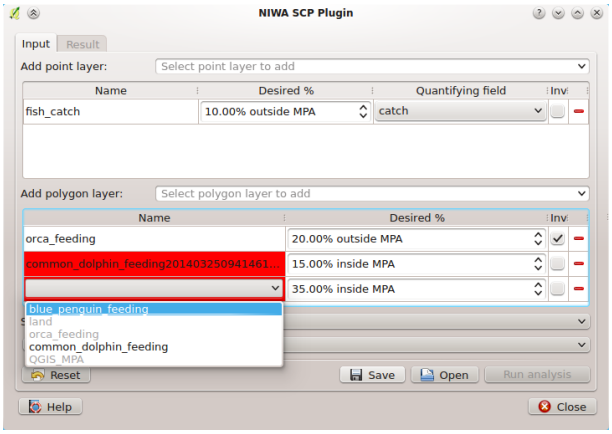

Figure 2.2: Input configuration with invalid layers.

2.3 Analysis result

An analysis is performed when the `Run analysis` button is clicked in the input tab, following which the result tab is shown with the analysis results.

The results table displays, for each layer, total area resp. sum of values of the quantifying attribute (for polygon and point layers respectively), the desired percentage (as specified in the input tab), the actual percentage (as computed by the analysis), and the difference between the two. Rows of the layers satisfying the desired percentage for the proposed MPA appear green, while those not satisfying the desired percentage appear red. Also, a border of the corresponding color is added to the layers in the canvas. The area of the MPA layer is also displayed.

An possible analysis result is shown in figure 2.3.

As shown in figure 2.3, the user is notified if a land layer was specified and clipping was performed to remove overlaps. The original MPA layer geometry is not changed as a result of the clipping performed during the analysis. The apply the clipping to the original MPA layer geometry, one can use the Difference tool, available from the `Vector`→`Geoprocessing Tools`→`Difference` menu.

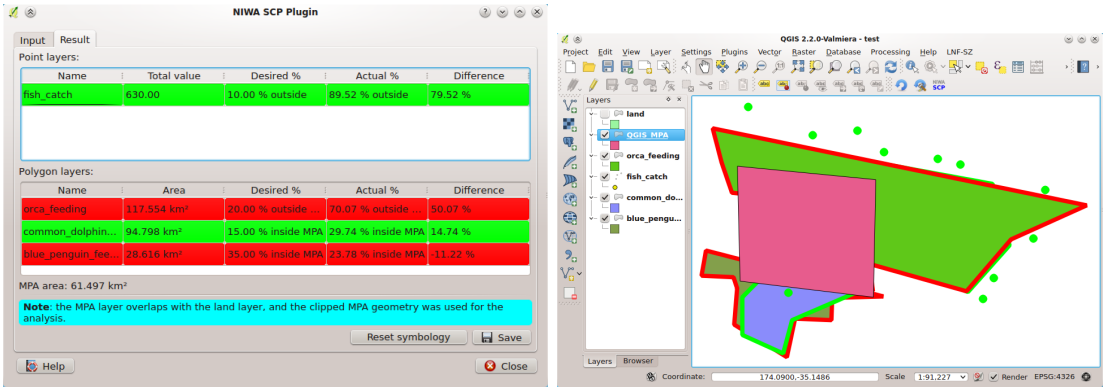

Figure 2.3: Analysis result.

For the analysis results to be correct and accurate, the CRS of all layers used in the analysis must be the same, or otherwise "on the fly" CRS transformations must be enabled for the project. If this is not the case, the user is warned, as shown in figure 2.4. Also, for the areas to be displayed in square kilometers, "on the fly" CRS transformations need to be enabled as well as an appropriate ellipsoid selected in `Settings→Project Properties→General`.

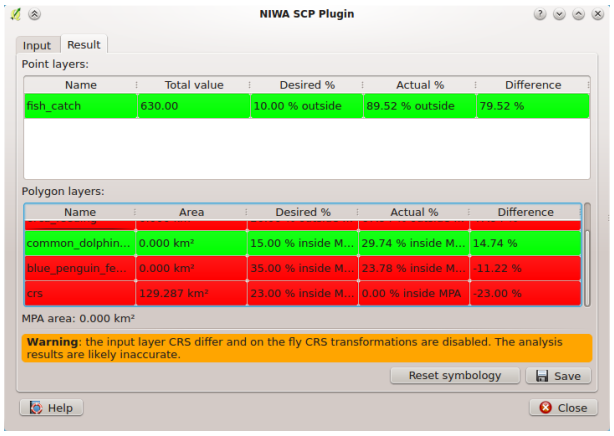

Figure 2.4: Warning of inaccurate results due to differing CRS of layers.

The `Reset Symbology` button allows the restore the previous symbology of the layers. The `Save` button allows the user to save the results to a `CSV` file, where each line is of the form

```
layer name,target percentage,actual percentage
```