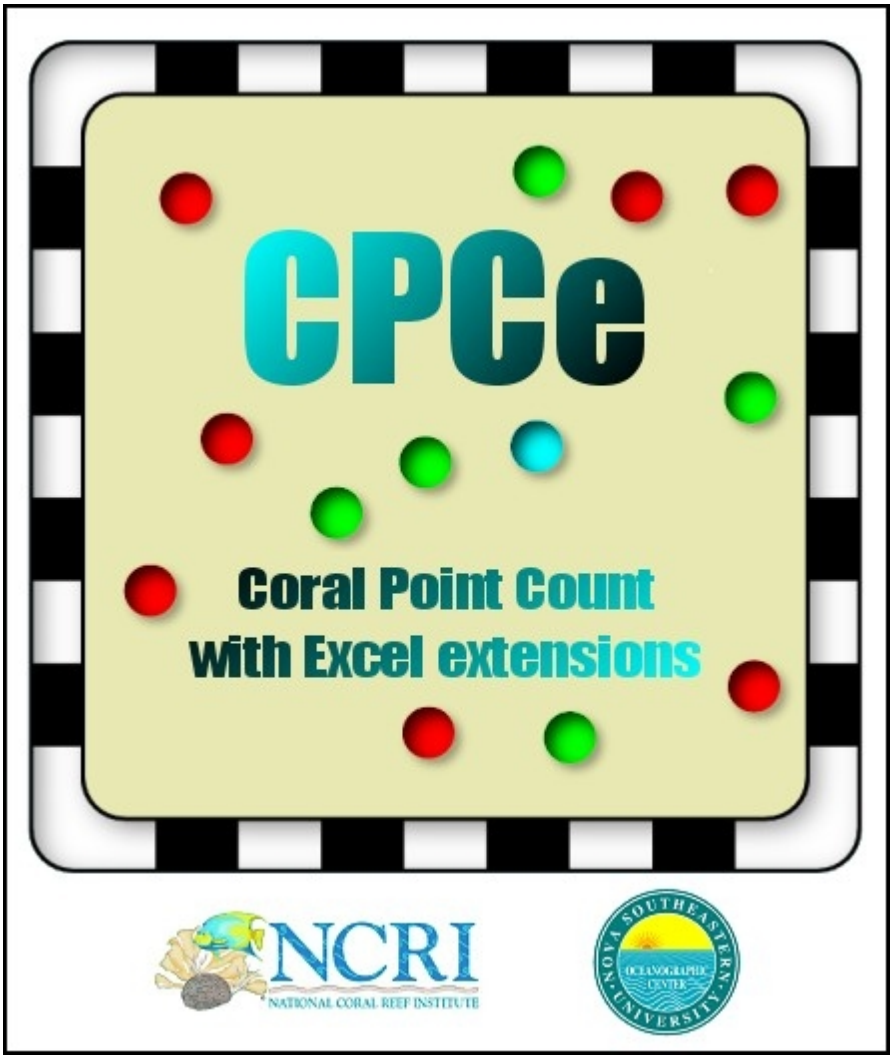
CPCe 4.1 Overview and Quick Start Guide

CPCe overview



OVERVIEW OF CPCe

The CPCe (Coral Point Count with Excel extensions) program is Windows-based software (PC use only) that provides a tool for the determination of coral cover using transect photographs. A specified number of spatially random points are distributed on a transect image and the features underlying the points are user-identified. Coverage statistics are then calculated and the results sent to Excel spreadsheets automatically.

Additionally, CPCe can be used for image calibration and area analysis of benthic features. Excel sheets are automatically generated to summarize the area calculations for each image.

Using CPCe

USING CPCe

Using CPCe is simple and straightforward. The main form is where the transect photograph is displayed, along with the coral codes. The main form has the following menu items:

- **File:**
  - Open:
    - Raw image file: The name of the .JPG file containing the quadrat image.

      Point count image file: The name of a file containing previously analyzed CPCe data.
  - Save:

    Save data to .cpc file

    Save .cpc file(s) to Excel spreadsheet.
  - Multiple image/file processing:

    Process multiple images

    View/edit multiple .cpc data files
  - Exit: Exits the CPCe program.

Mark border:
Allows the specification of the rectangular area of interest on the frame image. This area can be marked manually, the entire frame image can be used, x and y offsets from the image edge can be specified, or an area of specific dimensions can be marked.

Point overlay:

- Specify number of random points: Allows the specification of the number of random points drawn on the image for analysis. The points can be distributed as full random, stratified random, uniform grid, or uniform spacing.
- Calculate points: Calculates the positions of the random points drawn on the image.

Measurement:

- Image scaling/calibration: Allows the user to get the scaling for an image, e.g. pixels/cm.
- Area analysis: Calculates the area of a traced region on the analysis image.
- Feature counter: Counts features in a rectangular area of specified dimensions

Image Enhancement:

- Allows the selection of a specified area of the analysis image, and the modification of brightness, sharpness, and contrast of the selected area image.

Utilities:

- Change code file / image file directory location: Allows user to move code and/or image files to new directory locations and to easily change the output file to reflect this movement.
- Code file checker: Finds obvious errors such as syntax and missing required categories in the code file.

- Data check and species search: Checks output files for unassigned data points and occurence of specified species.
- Fix area calibration: Batch alters calibration specification of .ara files and recalculates new areas using the new calibration value.
- Format conversion: Converts .ara file format from pre V3.4 to V3.4 format
- Batch change .ara header data: Changes .ara file header data on a set of specified .ara files

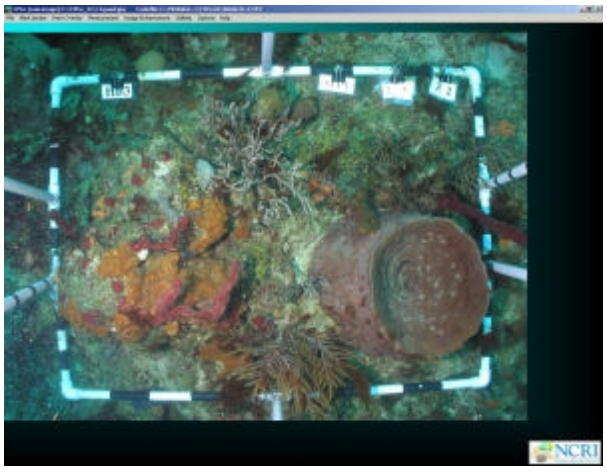
Options:

- Data point graphical parameters: Allows the specification of the shape, size, and colors of the object used to indicate the locations of the random points.
- Color code category codename boxes: Allows the color coding of the coral code category boxes according to species, etc..
- Specify coral code file: Allows the specification of the file containing the coral codes and species names.
- Letter/number symbols: Allows the use of either letters of numbers to label data points.
- Auto-advance point: When checked, advances to the next data point in sequence when a data point is assigned a value. This can speed up analysis time.
- Auto-follow: When checked, maintains zoom level and centers the current data point in focus in the image.
- Maintain zoom: When checked, maintains zoom level between data points.

Help:

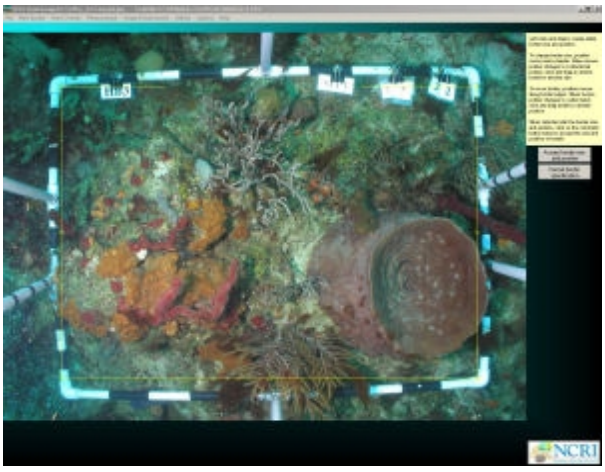
- Help: Information about using the CPCe program
- About CPCe: Information about the CPCe program

OPERATION OF THE CPCe PROGRAM



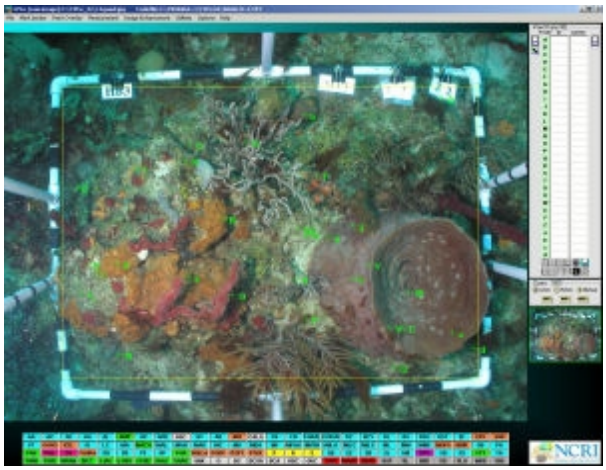
The first step in using CPCe is to specify the quadrat image. This image should be in the form of a .jpg, .gif, or .bmp image file. Files can be retrieved individually or as part of a fileset. To open a file individually, choose File/Open/Raw image file, and specify the image filename. If retrieving a previously analyzed image and dataset, choose File/Open/Point count image file.

To speed analysis, you can specify a fileset by choosing File/Specify auto-advance fileset. In this case, you specify a directory containing the files to process. All files of the specified type (.BMP, .JPG, etc.) in the specified directory will be processing in alphabetical order. This option eliminates the need to manually select each frame image.

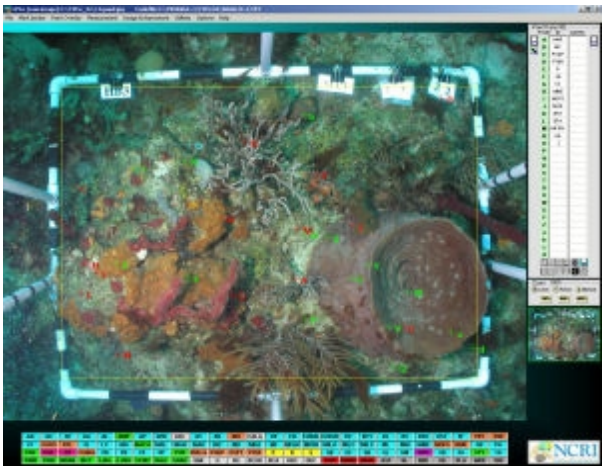


The rectangular region surrounding the area to be analyzed must be marked. All random points will lie within this rectangle. You can choose to either mark the border locations manually, or can choose the entire image as the usable frame area. If manually marking the border, left click and drag the mouse to specify the border outline, and use the border handles to fine tune. You can alternatively specify the dimensions of the border if you have the image scaling.

The image is displayed on the screen.

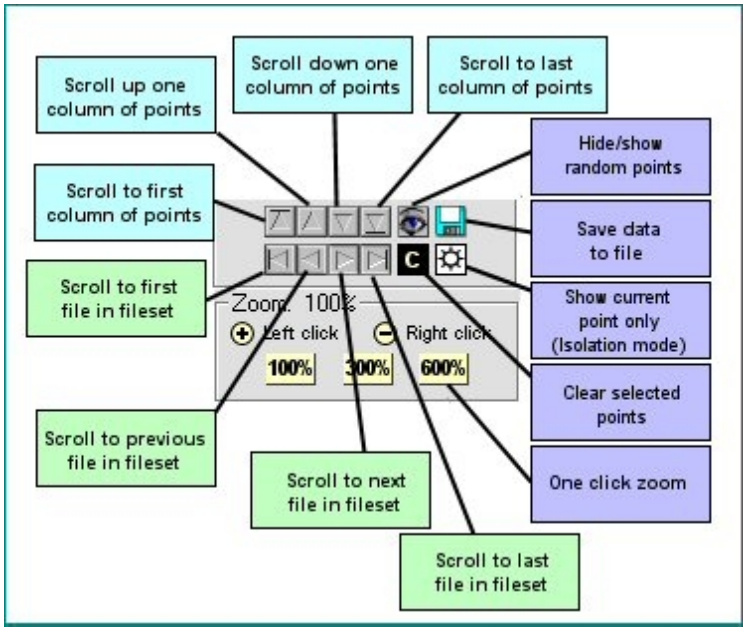


The number of random points to be drawn on the image is now specified. The maximum allowed is 500, and a default number of points can be specified in the configuration file. You can specify either random points, stratified random, or points on a grid. The random points are then superimposed on the image, and a query for the file containing the coral group and class names is displayed. The file shallow_water_corals.txt is supplied with CPCe. However, you can create your own to suit your individual needs. After specifying the coral code file, the coral codes are displayed beneath the image.



The data can now be classified. Each of the random points is assigned an alphabetical label (A, B, etc.). Points with no associated data classification are shown in the unassigned_color (see Colors). To associate a data point with a classification, click on the point label in the point codes box on the right side of the screen in the ID column. The corresponding data point will change to the current_focus color (see Colors). Then click on the appropriate coral code from the list of codes beneath the image. The corresponding coral code will be inserted in the point code table. After the coral code has been entered, the data point changes to the assigned_color (see Colors), indicating that it has been classified. The NOTES column is used to further classify the data points pertaining to disease, bleaching, etc. Data for the NOTES column is entered in the same manner as for the ID column.

If the auto-follow option is checked, after a data point is assigned a value, the next point in sequence will be highlighted with the current_focus color. This eliminates the need to click each data point before assigning a value.



There are several controls designed to improve the efficiency of assigning values to the data points. A schematic diagram of the various buttons and controls are shown above.

Zooming:

To assist with the species classification, there is the ability to zoom in on the image. To zoom in, simply left-click anywhere on the image. To zoom out, right-click anywhere on the image. Each additional click zooms by an additional 50%. The center of the zoomed image is as near the cursor position as possible. There are 3 one-touch zoom buttons, which zoom to 100%, 300%, and 600%, respectively.

Scrolling data points:
hen not all data points can be displayed on the screen, you can use the cyan buttons provided to allow you to scroll to the first, last, previous, and next column of data points.

Scrolling image files:
To scroll between various files in a fileset, use the green buttons provided. You can scroll to the first, last, previous, and next file in the fileset. Note that these buttons are enabled only when using a fileset, rather than specifying the image files manually.

Hide/show points:
By clicking on the hide/show button, the data points are removed/restored from/to the image. This can make it easier to see exactly what is lying beneath a data point.

Isolation mode:
While in this mode, only the current point is shown on the image, rather than all of the random points. This can make points easier to discern in cases where points overlap. This button acts as a toggle, that is, clicking it again will make all points re-appear.

Clear selected points:
This button clears the data values for any points selected for group selection assignment. Group selection allows multiple points to be assigned a single data value with one click. To select points, click on a point label, and then use either Shift-Click or Cntrl-Click to select a range of points. After the points have been selected, they can be assigned a single data value by simply clicking the appropriate data label.

When the data points have been classified, they can be saved to file by clicking on the "Save to File" button. The data can be saved in two formats: 1) a CPC data file and 2) a Microsoft Excel spreadsheet.

By saving to a CPC data file, the data can be retrieved at a later time for modification. Both the image filename and the data points are saved to the file. To save to a CPC file, click on the appropriate button, and indicate the name and location of the saved CPC file.

By saving to a MS Excel spreadsheet, the data can be further analyzed, grouped, etc. The data can be saved either to a new Excel spreadsheet, or be added to an existing spreadsheet.

If the data is being saved to a new spreadsheet, a query is displayed as for the name of the transect. This name is analogous to a "worksheet" in an Excel workbook. The appropriate coral categories and classes specified in the coral class code file are inserted automatically.

If the data is being saved to an existing spreadsheet, a query is displayed for the name of the transect, along with the names of the existing transects. The data can saved either to a new transect or an existing transect. If the data is to be saved to an existing transect, it can either be *appended* to frames already in the transect, or it can *replace* a frame already in the transect.

EFFICIENT DATA PROCESSING

There are several features in CPCe which can be used to increase the efficiency of categorization and analysis.

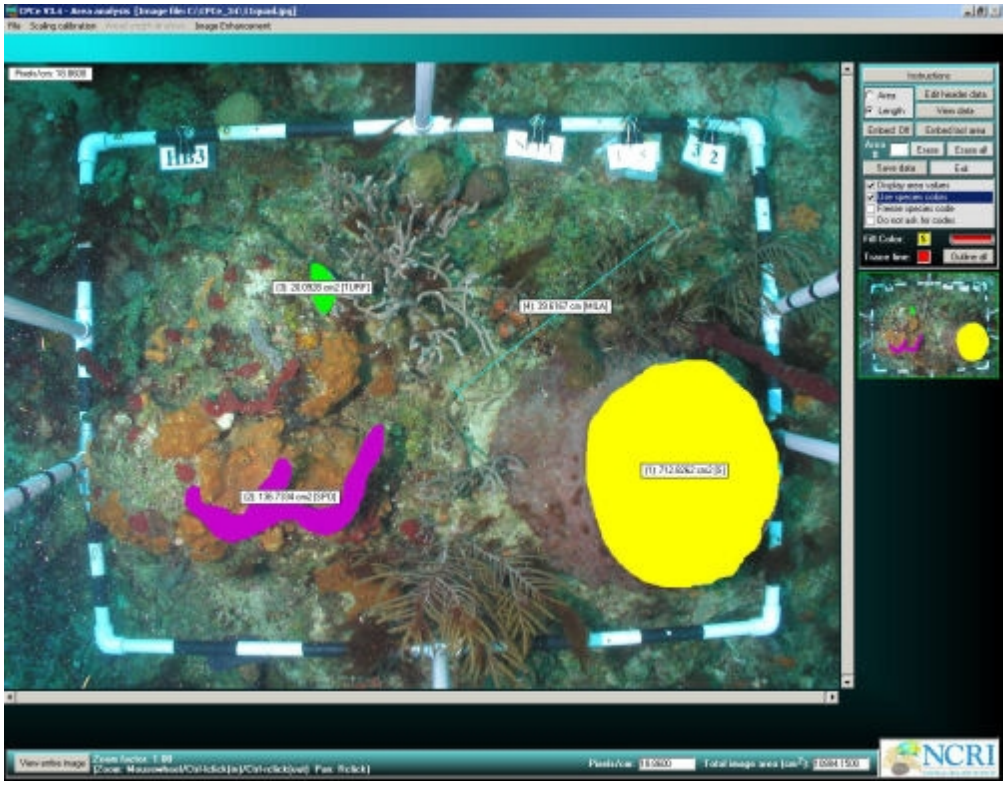
To assist in data entry, users can color code the category boxes, making data assignments more efficient by coloring similar data groups the same. Also, users can group select points by clicking on a point label and then using Shift-Click or Cntrl-Click to select a range or group of points. All points selected can be assigned a single data value at once. To cancel group select, click anywhere on the point frame or an individual text box.

To further speed processing, there is the ability to specify multiple image files for processing. By specifying the directory containing several image files, it is unnecessary to manually specify each image for analysis. All images of a given file extension (.bmp, .gif, .jpg) are processed in order. An additional benefit of processing multiple image files is that the analysis data is saved to a .cpc file having the same name as the image. This avoids having to manually specify names of saved datasets.

Last, there is the ability to add multiple .cpc files to an Excel spreadsheet. This allows the user to concentrate on the categorization of images and the creation of .cpc datasets. After assembling all of the .cpc files for a specific transect, the data from the separate images can be added at once.

Area analysis

Additionally, CPCe can measure the area of traced regions on the transect image. The image must be calibrated by specifying two points on the image a known distance apart. After calibration, lengths and areas on the image can be calculated. The area data can then be imported into Excel for archiving and further analysis.


Instructions
Edit header data
View data
Embed DB
Embed bar area
Erase
Erase all
Save data
Exit
Display area values
Use species codes
Freeze species code
Do not edit fix codes
Fill Color:
Trace line:
Outline all
NCRI

Citing CPCe

Please use the following citation in published literature using CPCe:

Kohler, K.E. and S.M. Gill, 2006. Coral Point Count with Excel extensions (CPCe): A Visual Basic program for the determination of coral and substrate coverage using random point count methodology. Computers and Geosciences, Vol. 32, No. 9, pp. 1259-1269, DOI:10.1016/j.cageo.2005.11.009.

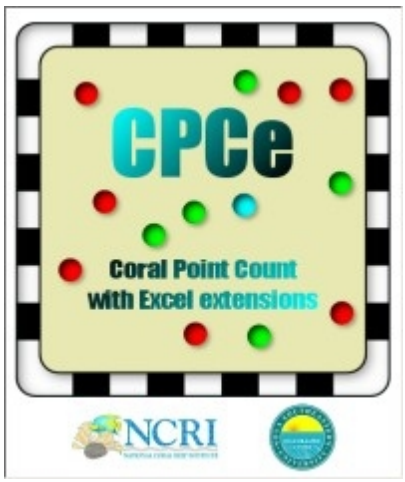
Donations

CPCe is released as copyrighted freeware. It is NCRI's aim to provide a useful tool for researchers, coral reef managers, and individuals involved in coral reef monitoring, assessment, and restoration.

Due to its popularity, updating CPCe and providing support via email and telephone requires a significant amount of time and effort. If you have found CPCe to be useful for your research, we encourage you to make a donation that will be used for the further development and support of CPCe.

You can make a donation by directly sending a check or by credit card. Please email cpce_donation_1@mail.ocean.nova.edu or johnmatt@nova.edu for details.

Contact Information



CPCe V4.1
Coral Point Count w/ Excel extensions
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Questions and suggestions regarding CPCe can be addressed to:

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