

Doing the RAP in South East Queensland.

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The Riparian Assessment Program (RAP) is a new method used to quantify the “naturalness” of estuaries, using an innovative software tool developed by the Queensland Environmental Protection Agency, Freshwater and Marine Sciences Division. The Riparian tool links data (referring to riparian attributes entered onto a touch screen computer) with GPS points, producing a map of vegetation types and dimensions, land use types, soil, structures and bank modification, in the intertidal and supra tidal zones of estuaries. Interpretation is clear and concise, making it a useful tool in habitat restoration and protection. The tool is adaptable, allowing multiple operators with limited knowledge of riparian characteristics, to use the program. The speed and accuracy of this program is efficient, significantly reducing field time and concomitant costs.

Riparian vegetation provides the interface between a landmass and a water body. Riparian vegetation perform many functions by providing habitat for a wide range of organisms, preventing erosion of riverbanks and blocking nutrients and sediments from entering the water column. Removal of riparian habitat in estuaries reduces the biodiversity and productivity of the system and may lead to a reduction in water quality and ecosystem health as a result. Mangroves are a common species in the estuarine riparian zone, providing crucial nursery habitats to many aquatic organisms, including commercially important fish and prawn species. Riparian habitats throughout the estuaries in SEQ are under considerable threat from modification through urbanisation, industry and agriculture.

The extent of unmodified riparian habitat (both inter and supra tidal) is important to an ecosystem as it acts as a buffer between terrestrial activities and the estuary. Diversity of biota is a function of the resilience of a system to absorb or resist natural and other changes. In the intertidal zone (termed Foreground) the presence of man made structures such as jetties and /or wharves disturb the natural vegetation and substrates and usually support dominant species on their introduced substrate. The quality and quantity of background habitat that occurs above the high tide zone is important, directly influencing and impacting the immediate area. Changes in land use from unmodified to modified riparian habitat (e.g. land clearing, mining, industrial) can have deleterious effects on estuarine water quality such as high chlorophyll, turbidity and nutrients.

The Riparian Assessment Program uses interactive software (National Instruments LabVIEW Full Development System Version 8.2) on a touch screen laptop. The laptop, (Panasonic Toughbook Model CF-29) features a touch screen which allows the observer to activate characteristics of riparian features as described in Figure 1. The RAP data is geographically integrated with a Garmin 76 GPS (Geographic Positioning System). Geographic Information System software is used to quantify riparian modification with respect to vegetation loss, habitat change and existence or absence of structures. The system has been designed to operate continuously from a vessel travelling slowly along the estuary.

The data recorded is split into two zones; the intertidal zone, the area between the high tide and low tide (Foreground); and the “Background” zone, the area from the high tide mark to 100 metres beyond the high tide mark. As the intertidal zone is more easily seen from the water, more detailed observations are recorded including; a) vegetation type, density and height; b)

any continuous structures present e.g. man made retaining walls, wharfs or boardwalks; c) any point features e.g. storm water pipes, drains, jetties and boat ramps; and d) the substrate type. The background observations are less detailed and are limited to one of thirteen land use types.

Where unmodified (natural) habitat exist, the tool enables the observer to map the extent of the habitat, identify the existence of one or more species occurring simultaneously, quantify the height and three dimensional density of the vegetation, and quantify the density of seedlings (e.g., mangrove seedlings) present. Unmodified habitat has natural substrate such as mud, natural rock and does not have any structures (e.g. Jetties) or modified bank type such as tyre walls, boat ramps etc.

Riparian surveys are vessel based and require 1 day per estuary (at 6 knots a survey can easily cover 80 kilometres of estuary). A survey usually begins before the high tide, on the left side looking downstream at the mouth. Each survey is saved as a single continuous file. The RAP tool automatically saves a data point with up to 60 parameters every 1 to 3 seconds. A 80 kilometre survey would contain approximately 12,500 data points. RAP data is saved as a text file which is then analysed using ArcGIS software, which geographically plots the data points and associated attributes.

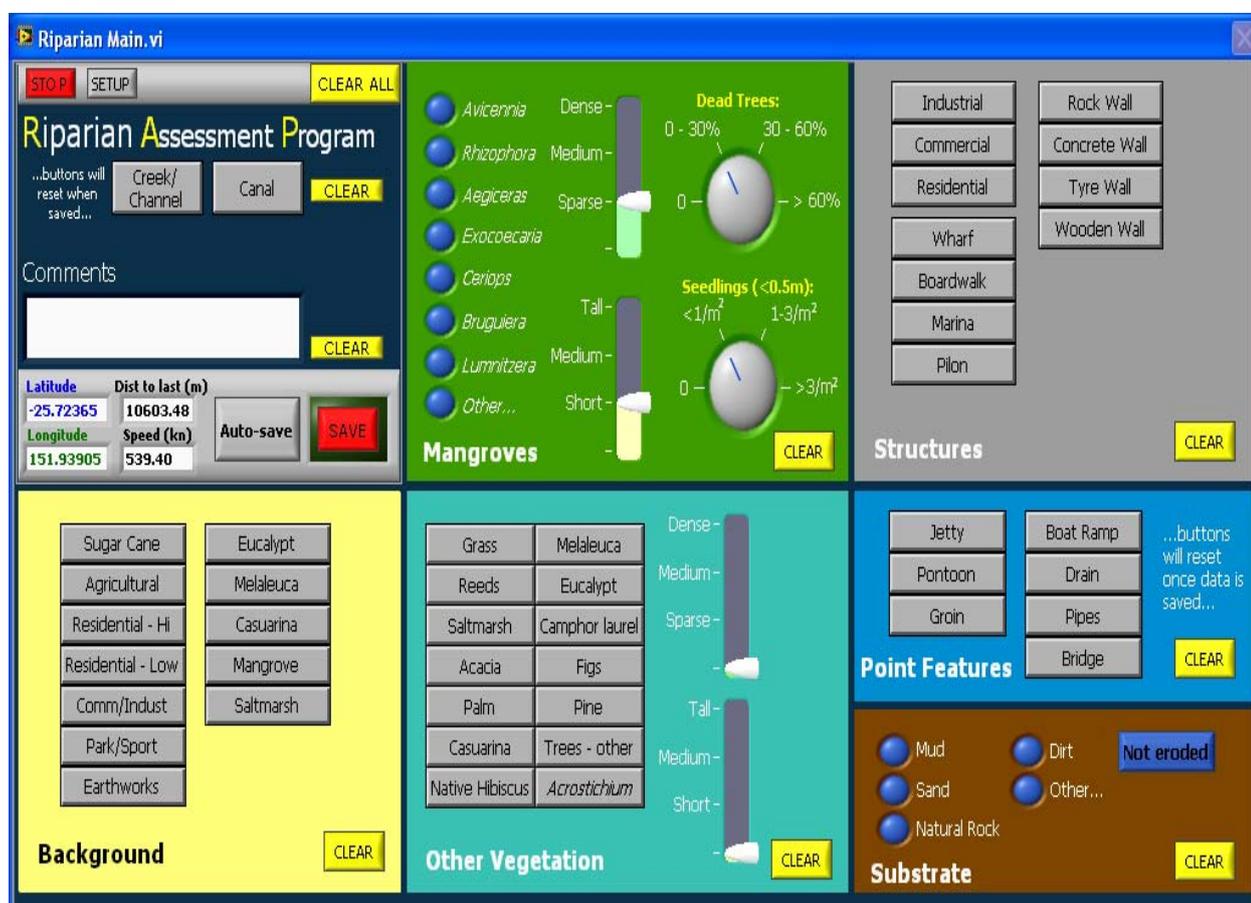


Figure 1 Riparian Assessment program (RAP) appears on a laptop computer screen.

Description of program interface

The top left hand panel initiates the program and auto saves the data every 1 to 3 seconds depending on the settings. The latitude and longitude corresponding to the GPS readings, and the speed and distance between points are also displayed in this panel. The best operating speed is 6 knots. A comments field is also in this panel. Comments entered are attributed to points every 1 to 3 seconds.

The centre top (green) panel contains activation buttons for seven of the most common species of mangrove found in south east Queensland and one for “other” species. An

important feature of this tool is that the species can be changed in the program to reflect the species present. Heights (Tall = > 3m, Medium = >1.5m<3m, Short = >0.5<1.5m) and densities (Dense = where the canopies or branches are intermingled, Medium = where the canopies or branches are touching, Sparse = where > 2m space between canopies or branches) are recorded using the central slide bar. Using a stylus on the touch screen prompts descriptors for height and densities to appear. Seedling density and dead trees/vegetation is recorded here. All the buttons can be activated simultaneously.

The panel on the top right (grey) contains buttons for structures observed in the Foreground. These buttons can be activated simultaneously and defined as large fixed constructions such as chimneys, ports, wharves, commercial, marinas, concrete walls etc.

The next panel below on the right hand side (blue panel) refers to Point Features which are small structures such as jetties, pontoons, drains, boat ramps, groynes, pipes, bridges and pylons. Once activated the buttons deactivate automatically after 1 to 3 seconds. These structures are only recorded as Foreground.

The panel on the bottom left (brown) refers to the substrate type, mud, sand, dirt, other (clay, silt, gravel) and natural rock. There is also an attribute for erosion.

Other Vegetation refers to foreground exotic and natural vegetation and also has densities and height parameters as described for Mangroves.

The bottom left panel (yellow) contains attributes for Background land use and vegetation types - sugar cane, agriculture, high and low density residential, commercial/industrial, park/sport, earthworks, *Eucalypt*, *Melaleuca*, *Casuarina*, mangrove and saltmarsh.

The information gathered using the RAP tool highlights areas of concern such as erosion areas, vegetation loss, land use changes and also areas of high ecological value that warrant protection. As a management tool, the data quantifies areas requiring restoration, protection and monitoring.

The tool has potential to be modified for other ecosystem types. Recently, the tool was used to map dams and catchments, identifying areas of aquatic weeds, bank modifications, drains and intake pipes.

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