

**Young River Catchment Management Plan 2006 – 2008.**  
**Nicole Reichelt, April 2007.**

**Introduction**

A management plan is being prepared for Stokes Inlet to ensure that its high environmental, social and economic values are managed sustainably into the future.

In December 2006 a questionnaire was developed by the Department of Water and sent to the residents within the Shires of Ravensthorpe and Esperance to gain an overview of community perceptions of the Stokes Inlet.

From the survey, catchment impacts were a major concern, and respondents understood that there is a relationship between the Inlet and its catchment. "Upstream agricultural pressure, sedimentation, erosion of creeklines, salinity, nutrient input," and "the present and possible threat of contamination to rivers and Inlet from agriculture and pesticides washed into Inlet from catchment areas" were typical responses.

**Description / Background**

In parallel to the survey, Esperance Regional Forum, (ERF), was working with the South Coast Regional Initiative Planning Team, (SCRIPT), to develop a Strategic Catchment, to implement and monitor on ground work within the Young River Catchment. This project is funded through SCRIPT'S Regional Strategy for Natural Resource Management, (Southern Prospects 2004 – 09), with funds secured from the Australian Governments' National Action Plan for Salinity and Water Quality, (NAP).

The Young River catchment was identified as a target catchment for the land component of the South Coast Regional Initiative Planning Team's (SCRIPT) regional strategy 'Southern Prospects 2004 - 2009', SCRIPT 2004. Community capacity was a substantial contributing factor within this catchment and resulted in it being chosen. Areas for investment were then prioritised to those which had the highest threat and best chance of protecting the assets of high public value.

The major asset identified within the catchment was the Stokes Inlet and the major threat is an increase in sediment load due to land clearing.

Salinity is not the focus of the Young River Catchment Plan concern as the Young River is naturally saline. Extensive clearing is thought to have increased salinity levels over time. This has also caused an increased amount of sediment to be washed from the highly erosive sandy soils, filling river pools and clogging the inlet.

Some of the other degradation issues include waterlogging, nutrient loss, soil erosion, sub soil acidity, water repellence and loss of biodiversity.

**Issues**

**Q) Where is the Young River Catchment Management Plan at?**

**A)** In February 2007, The Young River Management Plan 2006 – 2008 was approved by SCRIPT's Implementing Working Group. Approximately \$600 000 has been allocated for the implementation of on-ground work. These works include; Implementing land management risk containment strategies, establishing profitable perennials, implementing integrated engineering works for water management, soil health initiatives and protection and restoration of native vegetation including revegetation and fencing.

A full time project officer will be employed to carry out all aspects of the project implementation and promotion. The Project Officer will also assist in the collection of water samples to monitor water quality in the catchment in conjunction with the Soil & Water Quality Monitoring Project managed by the Department of Agriculture and Food, (DAFWA).

The catchment is "divided" in to three catchment zones and these will guide prioritisation and implementation of works. In this first year of implementation, the works will be targeted in the high rainfall area, close to the Coast and in the Yerritup Creek closest to Stokes Inlet.

In the upper reaches of the catchment protection and restoration of important existing native vegetation will be targeted.

Late last year, a survey of over half the landholders in the catchment was completed to gain an understanding of the works required in this catchment. From the survey, funds were allocated to individual landholders for each of SCRIPTS sub program activities.

Landholders are now in the process of preparing their property for this year's on-ground works. A review of activities will be undertaken later in 2007.

- 1. What are its priority recommendations?**
- 2. What are the type and location of targeted works in the Young River catchment?**
- 3. How is/will the Young River Catchment Plan be funded?**

To gain a full understanding of the above three questions, (including maps) please see [Appendix 1 – Implementation Plan for the Young River 2006-08](#).

**Q) Where is the greatest catchment erosion occurring?**

**A)** The main river channel flows through a relatively healthy strip of vegetation linking macro corridors from the coast to the mallee in the north. This is predominately on Crown reserve, however many of the tributaries are on private land and have been extensively cleared. Areas of concern are on steep slopes susceptible to gully and sheet erosion.

**Q) How is the catchment plan addressing nutrient, salinity and sediment input from the catchment to the Inlet?**

**A)** To address sedimentation, the main focus of the Implementation Plan for the Young River 2006-08 is to fence off and re-vegetate, (with local native species in appropriate areas) the entire length of the Yerritup Creek. The significance of the Yerritup Creek is its vicinity to the Stokes Inlet, hence 70 % of on ground works will be targeted to this area. The soil health program will integrate with engineering and perennial actions to implement soil conservation strategies, thereby reducing potential off-site impact.

Salinity will be partially targeted by planting perennials in high recharge areas of the catchment and by working with the Forest Products Commission, (FPC) to implement the FPC's NAP funded Strategic Tree Farm Project.

Salinity mitigation works in the upper reaches of the catchment, will include some small scale surface drainage, fencing of remnant vegetation and fill in revegetation with local native species where required.

Nutrient input will be monitored in conjunction with Land & Water Quality Monitoring Project, (LWQM) below.

**NB:** For further details relating to salinity in the catchment, please refer to the [Background paper on groundwater prepared by Mr John Simons, Catchment Hydrogeologist, DAFWA](#).

**Q) What monitoring will take place in the catchment over the next 5 years?**

**A) The following are summaries by Young River Project partners and technical expertise, Ms Rebecca Ovens, (DAFWA), Mr Brendan Nicholas, (DAFWA) and Mr Owen Massenbauer, (SCRIPT).**

Water quality monitoring

Three surface water quality monitoring sites have recently been established across the Young and Lort River catchments. Data to be gathered from the sites includes daily water samples - to be analysed for nitrogen, phosphorus, salts and suspended sediment content, and a continuous record of water depth to provide corresponding stream flow information.

These three sites have been selected in order to provide a comparison of stream water quality in similar catchments with differing levels of riparian vegetation.

The Yerritup sub-catchment (to be monitored at the Ned's Corner Rd crossing), represents a totally degraded system with no remnant riparian vegetation. The second catchment, a tributary of the Lort River monitored near Ashdale Rd, has some riparian vegetation remaining along the main streamline. A third catchment, a tributary of the Young River west of Beltana Rd, has an intact riparian zone extending to cover approximately 50% of the catchment land area. This monitoring will not only provide information of the benefits of remnant riparian vegetation, but also on the expected water quality improvements of a revegetation program.

This initial monitoring and data collection work will help quantify the works that are required to see a desired water quality improvement in the Young River and Stokes Inlet. The water quality benefits of this work are not expected to be seen immediately, but will require time for plants to become established.

In addition, long term water quality improvements resulting from the substantial fencing and revegetation program proposed for the Yerritup sub-catchment will be monitored. This time lapse will effectively allow a 'before and after' water quality comparison in the Yerritup catchment and help to quantify the water quality benefits of these works.

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#### Soil Health and Condition

The LWQM (Land & Water Quality Monitoring Project) sub program aims to measure changes in soil conditions including soil acidity, pH, water repellence and subsurface compaction as a result of implementation. The LWQM project will target managed and unmanaged sites, primarily in the Yerritup Creek, to determine what impacts management actions have had on soil condition. This project will also assist in the establishment of temporal trends and baseline levels of relevant indicators of soil condition.

Much of the baseline soil health data was collected by Ms Andrea Hills, (DAFWA, Esperance Office), in 2005. The Young River Management Plan 2006 – 2008 aims to monitor changes in soil condition over time by taking further soil tests in the catchment. Other activities will assist in determining current soil health and what actions will be required to address potential soil issues in the future, (including nutrients, soil organic carbon, water repellence, acidity, sodicity and salinity).

#### Biodiversity Monitoring

The biodiversity investment in this catchment is aimed at protecting and revegetating the riparian areas along the Young River and its associated tributaries. From this we endeavour to maintain and re-establish the biodiversity values of these areas as well as reduce sediment movement.

Monitoring is essential to enable change to be measured within the catchment.

By measuring this change we aim too:

- identify threats to the condition of the catchment so that they can be addressed;
- understand how the condition of the catchment varies over time and across the region, and to improve the management of natural resources;
- quantify the success of actions in achieving specific goals;

Investment data management will be captured by the Catchment Land Use Change Information Database (CATCHPLAN).

Information collected from all landowners will indicate:

- Revegetation Sites
- Fencing of remnant vegetation and revegetation sites

Monitoring will be targeting point of investment within the catchment. All sites will have an initial photo point established however ongoing monitoring will be more selective, targeting representative sites. These will also link with other ongoing monitoring in the catchment. SCRIPT Biodiversity Monitoring forms will be adopted and each vegetation type in the catchment will be represented. This data will help give an indication of the condition of the area against benchmarks developed for the SCRIPT region. Photopoints will be established to once again show the “before and after” conditions and illustrate effects of on ground works in the Young River catchment.

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#### **Knowledge Gaps identified in the Young River Management Plan**

Future trends, research findings and community thoughts and values will need to be considered when planning further works and or actions within the whole catchment. A number of gaps were identified and these include; little fauna and flora survey data, limited Indigenous Heritage information, river flows estimated from gauging stations in the Lort River, very little known about the river pools, (including aquatic vertebrates and invertebrates), little information on bio-security issues and no long term monitoring data was available and these gaps will need to be addressed in the future.

#### **Suggested actions for Draft Management Plan**

It is important to note that the Stokes Inlet has a large catchment consisting of two major rivers including the Young and Lort Rivers, with a combined area of approximately 503,000ha. At present, the Young River catchment is only focusing on half the potential risk to the Inlet. For a more holistic approach, future planning should also take into consideration the whole watershed, including the Lort River Catchment to develop a river restoration project to further enhance and protect the Stokes Inlet.

The catchment planning process could be expanded to encompass the Lort River. It is recommended that if this is to be pursued, then the required resources, (financial, human and research data and analysis) be fully and adequately allocated to this task. Extensive community consultation will need to take place in a timely and appropriate manner. This will include fostering and facilitating community spirit, interest and participation across the catchment in a manner appropriate to the targeted stakeholders.

The current recommendation is to continue to adequately support the Young River Management Committee to implement further on-ground works and monitoring activities into the future. Due to limited data within the catchment, further monitoring and studies are recommended to gather more information on the key threats.

Research and development as identified by the catchment group should be considered and farming to land capability should be fostered at every opportunity. As an example, in late 2005, a survey of land holders identified problem land and soil areas. The Young River Management Committee believes that these difficult to manage areas warrant further investigation. It is recommended that landholder needs in this area of research and development, trials and demonstrations or extension activities be supported now and into the future. This will increase landholder understanding of on-site / off-site land degradation issues in relation to the Stokes Inlet.

Other research priorities identified to be included in the catchment area are; sediment cores, nutrient snapshot in the catchment, (partially being addressed – more attention needed), groundwater investigations, significance of upstream pools and a foreshore condition report for other tributaries of the Young River and the River Channel itself.

It is recommended that all monitoring records obtained within the Young Catchment this year be collated and results kept in a central location to direct further activities in the Young Catchment in the future.

It is highly recommended that communication between all stakeholders in the Catchment area and Inlet users / managers needs to be maintained. It is suggested that the Natural Resource Management Officer employed by Esperance Regional Forum could be an ideal conduit for this information flow.

#### **Further reading/references**

- Bowyer, J 2001. Lort and Young Rivers Catchment, Rapid Catchment Appraisal. Dept of Agriculture, Government of Western Australia, Resource Management Technical Report 231. (Attached).
- Janicke, S. & Michael, M. 2005. *The Condition of Yerritup Creek*. Department of Water (unpublished report).
- Janicke, S. & Michael, M. 2004. *State of the Young River*. Department of Water (unpublished report).
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- Mayer, X.M 2005, Ruprecht, J.K. and Bari, M.A. (2005), *Stream salinity status and trends in South West Western Australia*, Dept of the Environment, salinity and land use impact series, report No. SLUI 38.
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- Slee, ST and Simons, JA. 1997. *Catchments of the Esperance Region of Western Australia*. Resource Management Technical Report No 165.
- Southern Prospects, 2004 – 2009. The South Coast Regional Strategy for Natural Resource Management, SCRIPT 2004.

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Implementation Plan for the Young River 2006-08, not attached, but available by contacting the author. (TOTAL 16 pages).

APPENDIX 1 – Young River Implementation Plan 2007-08. (pdf) - attached

**Note: As partner, but not directly involved in** The Young River Management Plan 2006 – 2008, The Department of Water, (DoW) has provided the following information and recommendations via Ms Mieke Bourne to be included with the background paper, (below).

**Information provided by DoW to prepare a background paper for the  
Stokes Inlet steering group.  
Ms Mieke Bourne, Department of Water, March 07.**

**What sampling of waterways occurs in the catchment?**

The Department of Water (DoW) has gauging stations on the Lort and Young Rivers. The Lort River site (immediately upstream of the South Coast highway bridge) was established in 1971 and the three sites on the Young River which are Ned's Corner, Munglinup and Melaleuka were established in 1971, 1974 and 1974 respectively.

These gauging stations continuously record flow and are manually sampled to test water quality parameters every two months (nutrients, temperature, conductivity, pH, turbidity etc). Additionally, for the last two years, the gauging station at Neds Corner has continuously measured temperature and salinity.

Water samples are taken from the Lort and Young Rivers where they cross the South Coast Highway fortnightly, this sampling is recent and commenced in August 2006. The water samples are tested for the standard parameters including nutrients, conductivity, pH and TSS.

***Recommendation:** continue sampling the Young and Lort Rivers fortnightly and maintain the present gauging stations.*

**What information do we have about water quality and contributions of nutrients, salinity and flow in these waterways?**

A literature review has been completed for Stokes Inlet and its catchment and includes more detailed information on water quality. In general, available information suggests that most of the time, a small amount (less than 2%) of the annual rainfall in the catchment passes down the waterways into the Inlet. Most flow occurs in flood events, when river water levels rise dramatically.

The naturally saline Young and Lort Rivers appear to be increasing in salinity and the volume of water passing down them is also increasing. The nitrogen and phosphorus levels have been measured as being moderate to high.

**What are the catchment contributions to nutrients in the Inlet? How are these contributions determined? Where and what are the main sources?**

The only measurement of catchment nutrient contributions to the Inlet at present is from the samples taken from the Lort and Young Rivers at the gauging stations every two months and at the Highway every fortnight. From this data it is difficult to determine the whole catchment contribution. However, it may be possible to estimate loads through calculating flow and concentrations. This calculation has not been completed as yet and will be looked into further by DoW given that the data is available.

We are not aware of where in the catchment most of the nutrients are coming from. One way of understanding this better is to carry out snap shot catchment waterway sampling.

***Recommendation:** carry out a nutrient snap shot in the catchment.*

**What waterway sampling will be done by DOW in the catchment in the future?**

The four gauging stations on the Lort and Young Rivers will continue to be in operation in the foreseeable future. No further gauging stations are planned for the catchment.

The fortnightly water sampling of the Lort and Young Rivers from the South Coast Highway is funded until mid-2008; it is intended to continue this sampling post 2008 subject to funding.

While the level of sampling in the main waterways in the catchment is quite good there would be advantages in some improvements such as the addition of a conductivity probe and Telemetry to the Lort River gauging station so that salinity can be measured constantly and data can be transmitted automatically. To measure suspended sediment loads it would be useful to add turbidity probes to the Young and Lort River gauging stations.

**Recommendation:** *support the addition of salinity and turbidity probes as well as Telemetry to the gauging station on the Lort River and turbidity probe on one of the Young River gauging stations.*

**How much sediment is being contributed to the Inlet from the catchment? What are the sediment loads in the river pools?**

We know very little about the present sediment loads coming from the catchment.

Hodgkin and Clark (1989) reported that sediment cores taken from the Inlet in 1987 showed that 50-60cm of wet sediment has accumulated in the previous 30 years, following clearing. Additionally, OzEstuaries modelling suggests that a fine suspended sediment yield of 6.9 kilo tonnes /year enters the Inlet now compared to natural yields (pre-European settlement) of 0.3 kilotonnes/year.

Brearley (2006) commented that more erosion and run-off in the catchment has resulted in sediment in the estuary leading to a rapidly shallowing of the basin. Shallowing of the basin could lead to hypersalinity and fish deaths and so should be avoided.

A number of documents and anecdotal evidence suggests that the Young and Lort Rivers as well as the Inlet are shallowing and the Young River Catchment Management Plan has identified sedimentation as a major threat to the Inlet and as such proposed catchment works focus on high priority areas for sediment transferral.

More localised sediment sources such as small tributaries leading into the Stokes National Park and sand dune erosion near the mouth of the Inlet are also likely to be contributing sediment.

This suggests that the Inlet and major tributaries are receiving sediment loads greater to those pre clearing, the rates and movement of this sediment and the likely impacts this will have on the Inlet have not been determined and as such are major information gaps.

Estimates of historical sedimentation could be developed from cores assuming areas of undisturbed sediment accumulation could be found. In the short term, bathymetric coverage of the inlet could be obtained which will support subsequent coring efforts. Sediment loads and movement within the main tributaries of the Inlet are also unknown and longer term monitoring would be valuable.

**Recommendation:** *carry out coring of sediment in the Inlet to determine historical sedimentation rates (this recommendation is covered by the Inlet Water Quality background paper).*

**Recommendation:** *determine bathymetry of the Inlet so that sedimentation information can be collected (this recommendation is covered by the Inlet Water Quality background paper).*

**Recommendation:** *set up a monitoring project to determine future sedimentation rates. Potentially by looking at an area of interest, presumably the delta, properly survey the area and see if that could be a way of looking at sediment movement around areas of interest (this recommendation is covered by the Inlet Water Quality background paper).*

**Recommendation:** *set up a long term monitoring project to look at the sediment in the main tributaries of Stokes Inlet to determine loads and movement. It has been suggested*

*that photo points or sediment traps would be one way of gaining a better understanding of this (this recommendation is covered by the Inlet Water Quality background paper).*

**Has there been a foreshore condition survey for the Lort and Young Rivers? Where does the reserve need to be widened?**

Steve Janicke and Max Michael from the Department of Water have prepared preliminary assessments of the state of the riparian zones of the Lort and Young Rivers using aerial photographs and site visits.

On the whole the Lort and Young Rivers are in good to excellent condition and have wide foreshore vegetation buffers. For both Rivers, the reaches below the South Coast Highway have the thinnest foreshore buffers and most degraded vegetation.

Janicke and Michael looked at the Yerritup Creek in more detail in 2005 and noted that the condition of the creek is relatively easy to describe in broad terms. The lower one third of stream reaches in the catchment are in good condition, being well vegetated, but the channels in the upper two-thirds of the catchment are highly eroded and bare. The poor condition of these areas has also had adverse effects on farming, extending broadly across the riparian areas and has meant there is little benefit to farm productivity in the base of the valleys. The Young River Catchment Plan and DoW River Restoration funds are being used to fence off and revegetate much of the Yerritup creek over the next few years.

***Recommendation:*** *prepare river management plans for the Young and Lort Rivers.*

***Recommendation:*** *that high erosion risk areas in the floodway of the main channels of the Lort and Young Rivers, primarily below the South Coast Highway (key locations have been identified in the State of the Lort and Young River reports), be assessed on the ground and fenced off and revegetated as required and as soon as possible.*

***Recommendation:*** *that the riparian buffer of the Lort River for the river reaches south of the South Coast Highway is enhanced over its entire length and stock access is controlled.*

**References**

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Janicke, S. & Michael, M. 2005. The Condition of Yerritup Creek. Department of Water (unpublished report).

Literature Review of Stokes Inlet prepared in 2006 by Mieke Bourne, Department of Water.

South Coast Rivercare website: <http://www.rivercare.scric.org/infodata/catch.html>



Water quality data collected quarterly by DoW. From February, May and August 2006. as interpreted in the DRAFT Stokes Inlet Condition Statement (DoW).

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## **Summary of Recommendations discussed by the steering group**

### Current recommendations for 2006 – 08

- *Continue to adequately support the Young River Management Committee to implement on-ground works and monitoring activities into the future.*
- *All monitoring records obtained within the Young River Catchment this year be collated and results kept by ERF to direct further activities.*

### Future recommendations – Catchment

- *Future planning could consider the Lort River as well as the Young River catchment.*
- *A river restoration project could be developed to encompass works in both the catchments of Stokes Inlet.*
- *The required resources, (financial, human and research data and analysis) be fully and adequately allocated to achieve sustainable outcomes across the whole catchment in an integrated manner.*
- *Extensive community consultation should take place in a timely and appropriate manner regarding the inclusion of Lort River Catchment in future planning.*
- *Communication between all stakeholders in the Catchment area and Inlet users / managers to be maintained. The Natural Resource Management Officer employed by Esperance Regional Forum should be the information conduit and link between the different groups along with community members who are involved in preparing the management plan for Stokes Inlet.*
- *Prepare river management plans for the Young and Lort Rivers.*
- *That high erosion risk areas in the floodway of the main channels of the Lort and Young Rivers, primarily below the South Coast Highway (key locations have been identified in the State of the Lort and Young River reports), be assessed on the ground and fenced off and revegetated as required and as soon as possible.*
- *That the riparian buffer of the Lort River for the river reaches south of the South Coast Highway is enhanced over its entire length and stock access is controlled.*

### Research recommendations

- *Landholder needs in this area of research and development, trials and demonstrations or extension activities be supported now and into the future.*
- *Further monitoring and studies, (per technical advice) to gather more information on the key threats, foreshore condition report for other tributaries, a study to identify and qualify the significance of upstream pools and where possible, ground water studies.*
- *Continue sampling the Young and Lort Rivers fortnightly and maintain the present gauging stations.*
- *Support the addition of salinity and turbidity probes as well as Telemetry to the gauging station on the Lort River and turbidity probe on one of the Young River gauging stations.*
- *Carry out a nutrient snap shot in the catchment.*