- Formation and spacing of pools (Lisle 1986, Andrus et al 1988, Robison & Beschta 1990, Thompson 1995, Montgomery et al 1995).

LWD also serves many ecological functions (Gregory 1992, Gregory & Davis 1992, O'Connor & Lake 1994). Many native tree and shrub species readily coppice when damaged by floods (Nanson et al 1995) and hence can not only survive significant flood damage but can also stabilise eroded sections (Erskine 1986a). The importance of log steps decreases with increasing catchment area as channel size also increases and individual logs are no longer capable of spanning the whole channel (Keller & Swanson 1979, Heede 1981, Marston 1982, Wohl et al 1997).

While the above literature indicates that riparian vegetation and LWD can interactively stabilise channels and floodplains, the mechanisms actually operating in the channels flanked by riparian forests in the Swift Creek catchment need quantification. The forested reaches (table 3) would not be stable except for the trees and LWD. The total LWD loading, the effects of LWD on bed and bank stability and pool formation, recruitment processes of LWD, riparian vegetation and its influence on channel stability should all be determined for the reaches with significant riparian vegetation (forested reaches in table 3). As most of these reaches are upstream of the mine site, they will not be impacted in the immediate future. Therefore, this project can be started after some of the above projects have been completed.

7 Conclusions and recommendations

7.1 Conclusions

The 13 sub-projects outlined above are designed to determine the hydrologic, sedimentologic and geomorphic baseline characteristics of catchments in the Jabiluka Mineral Lease, as well as the physical impacts of uranium mining on Swift Creek. They complement and extend the previous research undertaken by ***eriss*** and other agencies at Ranger uranium mine and in the Alligator Rivers Region (see Erskine & Saynor (2000) for a review of previous research). Additional site-specific work is also required to monitor and measure the environmental impacts of the mine and to derive appropriate data for the calibration of landscape evolution models and for mine management. These models are not only required for environmental impact assessment but also for a meaningful assessment of the long-term stability of rehabilitated landforms at the conclusion of mining.

7.2 Recommendations

The Extreme Events Project recommended by Erskine and Saynor (2000) for the Ranger mine should be undertaken in addition to the above sub-projects because such information is also required for the design of a stable rehabilitated mine site at Jabiluka. Catastrophic floods also profoundly influence suspended sediment dynamics and bed load transport and storage. Pickup et al (1987) recommended that information on extreme events should be compiled and some of their specific projects have not been completed to date. Erskine and Saynor (2000) also found an additional site for such work which was not inspected by Pickup et al (1987).

The above sub-projects represent a comprehensive program of environmental impact assessment of the Jabiluka uranium mine. Results from these sub-projects should be published as Supervising Scientist Reports as well as peer-reviewed papers in international and national journals so that the consolidated database and information are freely available for public scrutiny.