



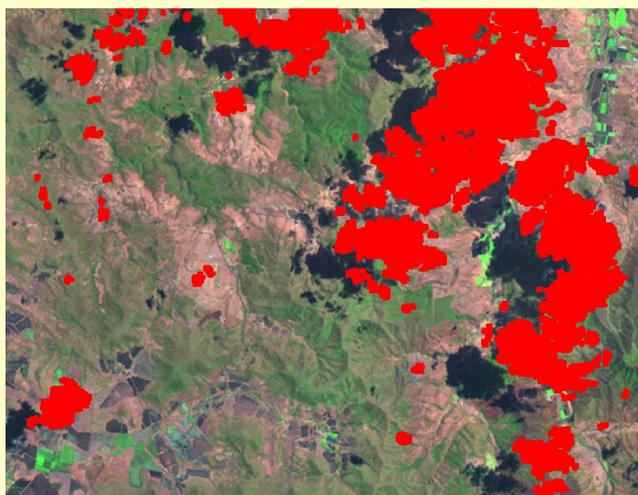
ANALYSIS OF THE SLATS FPC TIME SERIES

*Statewide Landcover And Trees Study
(SLATS)*

PRESENTATION OUTLINE

- Masks used in time series analysis of Landsat imagery and image calibration
- Using the Landsat time series to improve FPC estimates for and individual date
- Using FPC change over time to monitor longer term change in vegetation

CLOUD MASK APPLIED TO LANDSAT TM IMAGE



WATER MASK APPLIED TO LANDSAT TM IMAGERY WITH CONSTANT THRESHOLD

Cairns



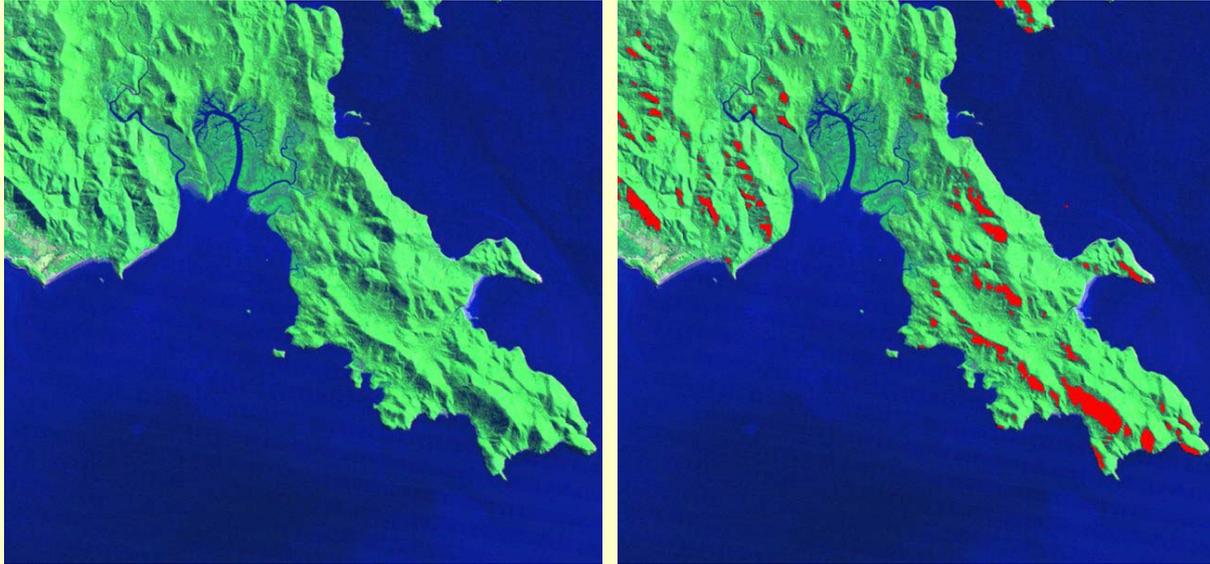
Brisbane



Fremantle

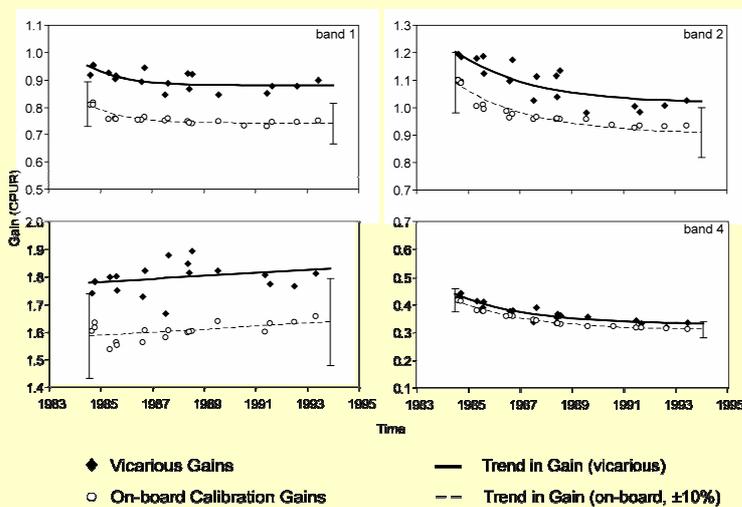


SHADOW AND TOPOGRAPHIC EFFECTS

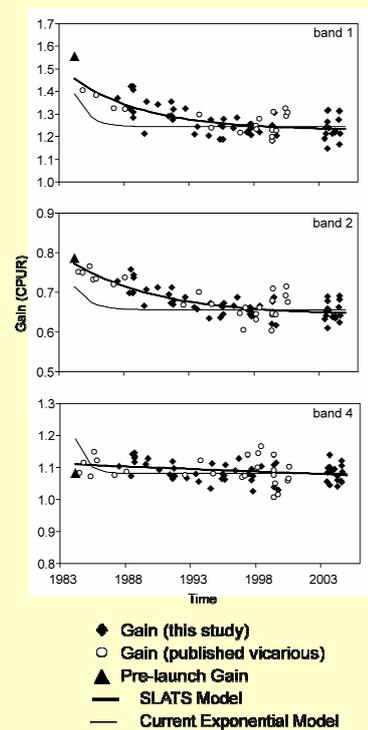


LANDSAT SENSOR CALIBRATION

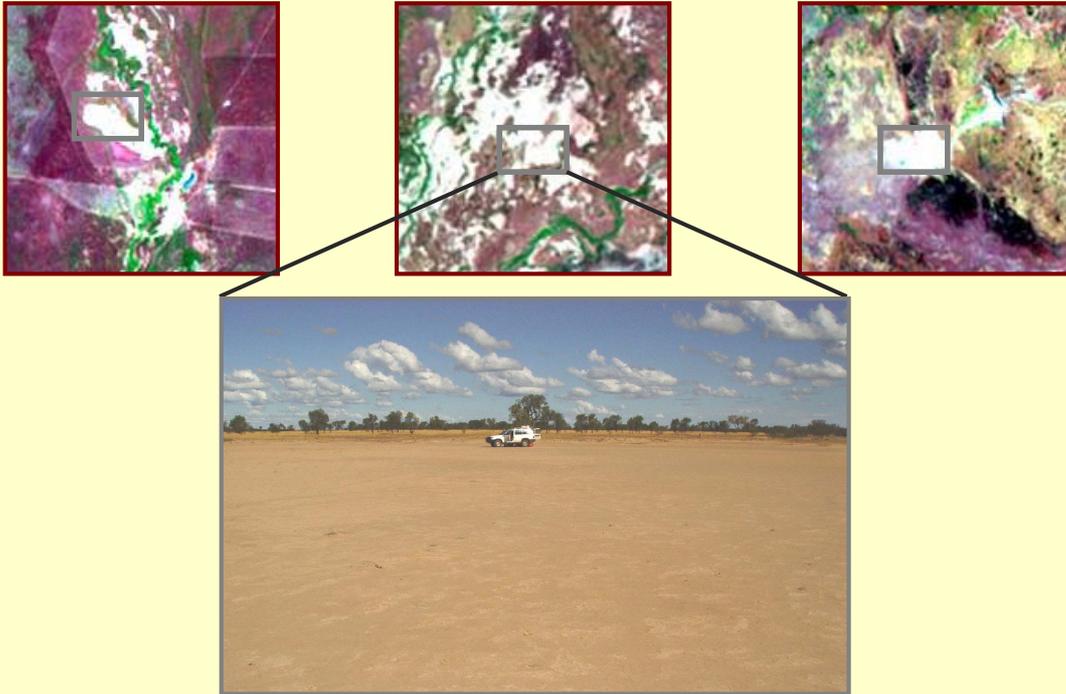
Landsat-2 MSS



Landsat-5 TM

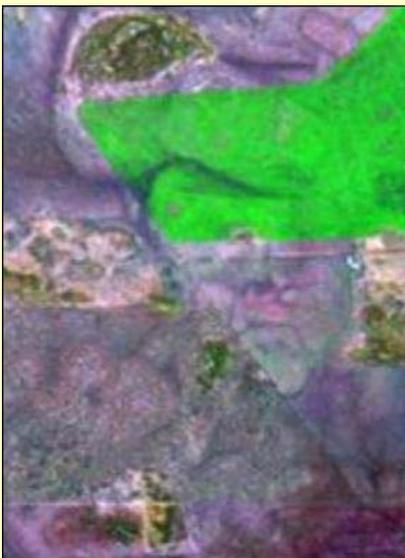


PSEUDO-COLOR INVERTED TARGETS USED FOR CALIBRATION

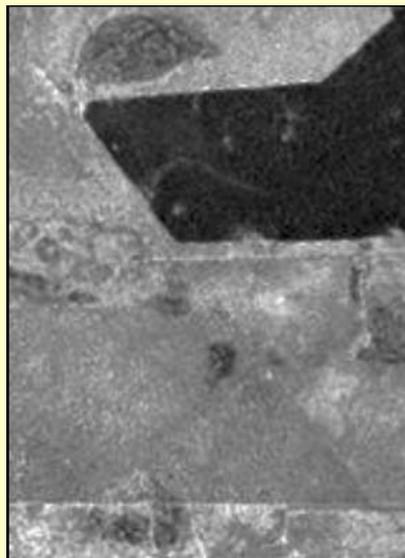


FPC 2003 – USING SINGLE DATE IMAGERY

Landsat-5 TM 2003

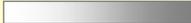


FPC 2003



Aerial Photo 2003



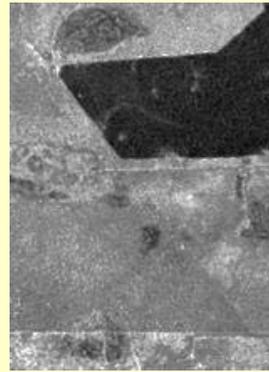
Low  High

FPC 2003 - USING THE 1988-2003 TIME SERIES

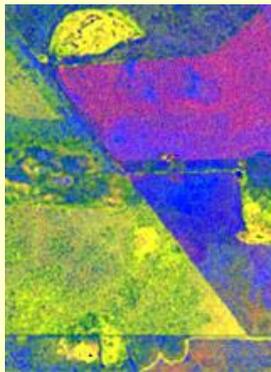
Landsat TM 2003



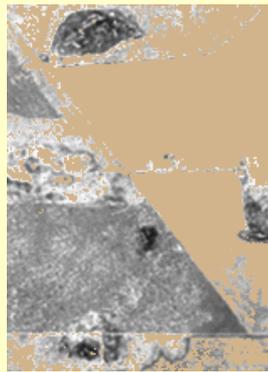
FPC 2003



FPC composite 1988-2003 showing FPC and variation in FPC



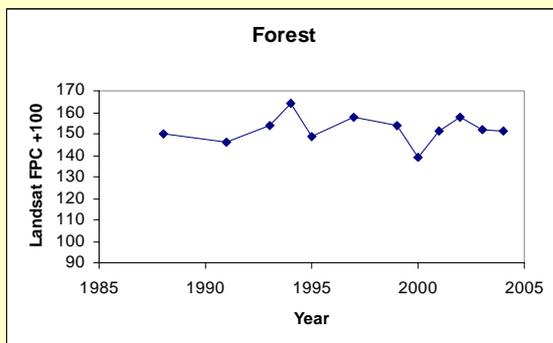
FPC based on time series



Aerial photo 2003

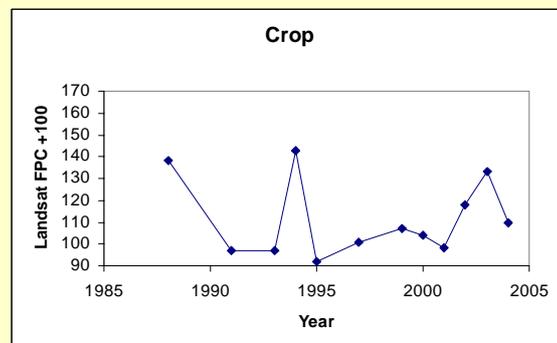


WOODY / NON-WOODY CLASSIFICATION USING S.E. AND MINIMUM



Min FPC (FPC+100) = 139

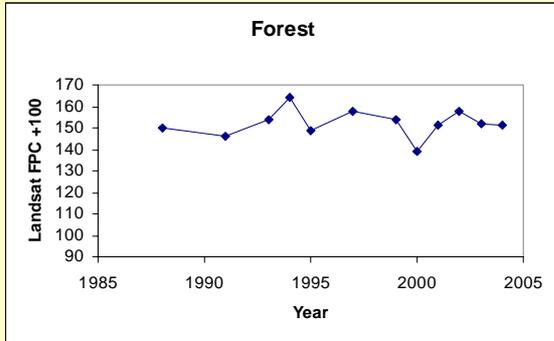
S.E. ratio = 0.11



Min FPC (FPC+100) = 92

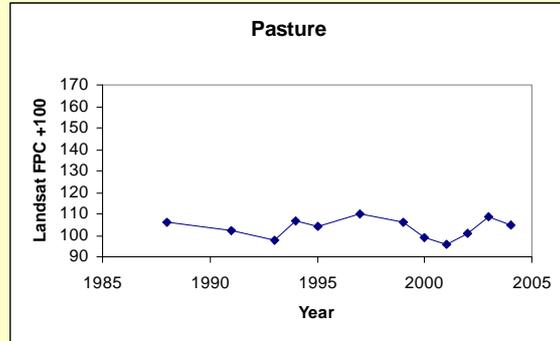
S.E. ratio = 1.07

WOODY / NON-WOODY CLASSIFICATION USING S.E. AND MINIMUM



Min FPC (FPC+100) = 139

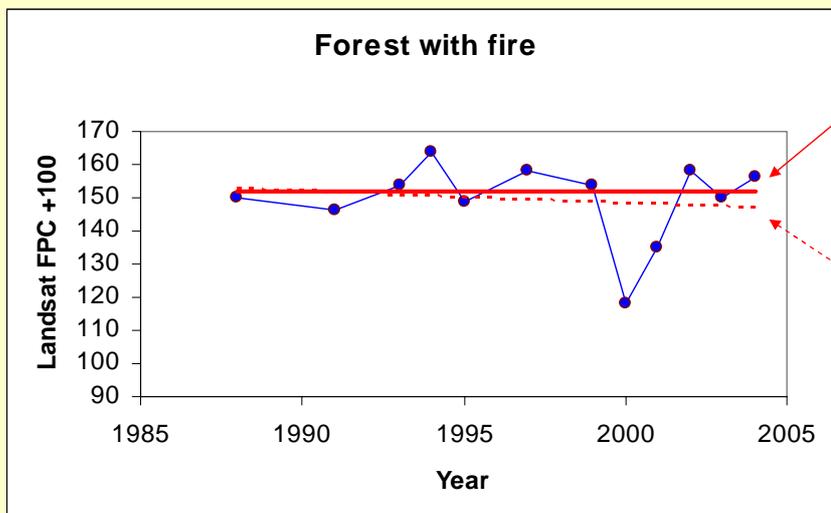
S.E. ratio = 0.11



Min FPC (FPC+100) = 96

S.E. ratio = 0.29

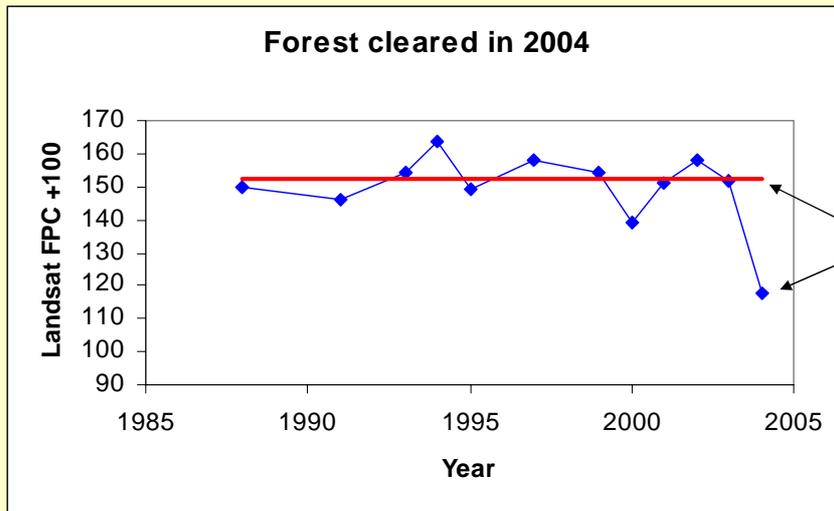
FPC PREDICTION USING ROBUST REGRESSION



Robust regression

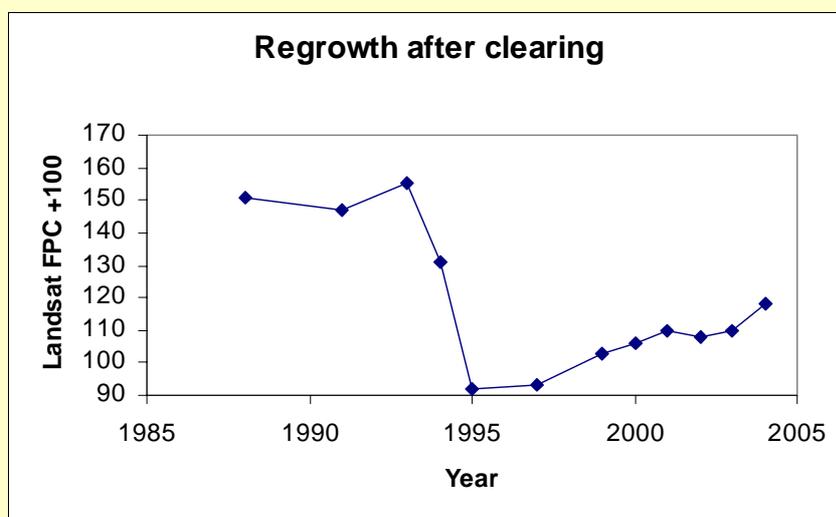
Ordinary least squares regression

SWITCHING BETWEEN SINGLE DATE AND TIME SERIES FPC



Switch threshold based on difference in predicted and actual FPC

SPLIT FPC TIME SERIES



OPTIMISATION OF THRESHOLDS TO SEPARATE WOODY VS. NON-WOODY

- Thresholds for S.E. ratio, Switch and minimum FPC thresholds were determined by optimisation method using field observations
- Kappa 84%
- Omission error 14.4%
- Commission error 2.6%

LANDSAT TM 2004



FPC 2004 'bc6 product'



MONITORING LONG TERM CHANGES IN VEGETATION

Purpose

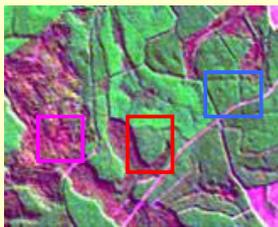
- To provide information on vegetation trends in Queensland for vegetation management, greenhouse gas accounting and potentially woody weed mapping.

Aim

- To examine long term trends in woody vegetation cover such as regrowth, thinning, thickening, natural tree death and encroachment.
- Initially use TM and ETM+ imagery (1986–2005) and eventually incorporating MSS imagery (1979–1988).

MONITORING TREND IN FPC

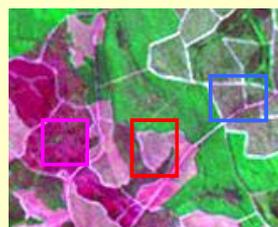
1994



1997



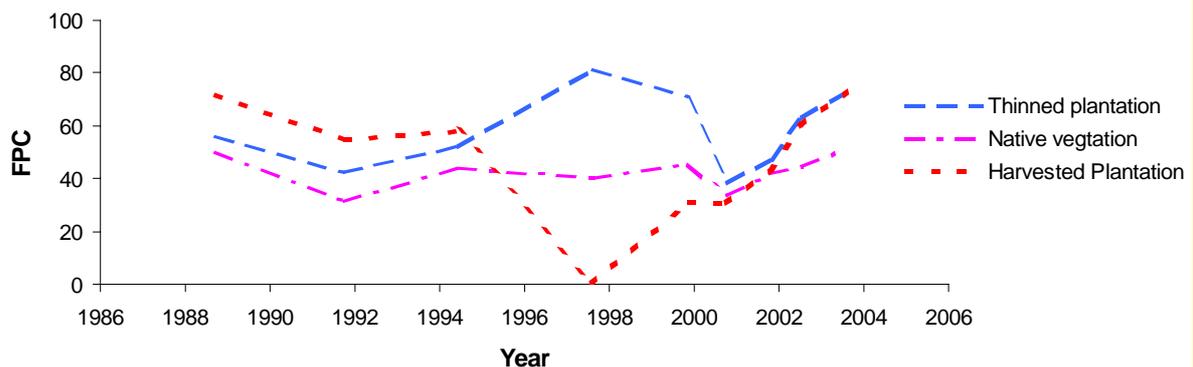
2000



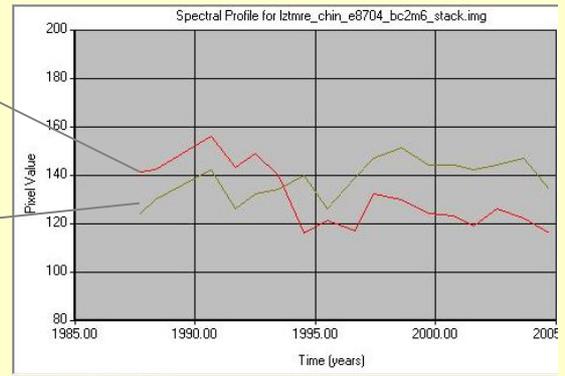
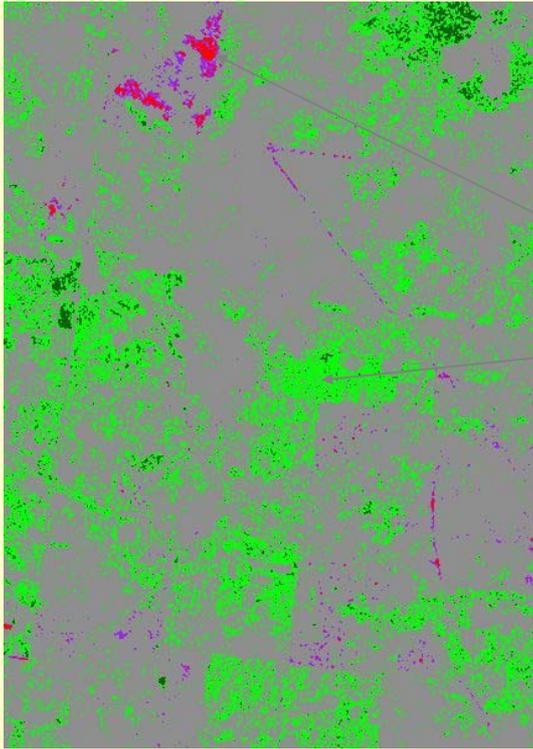
2003



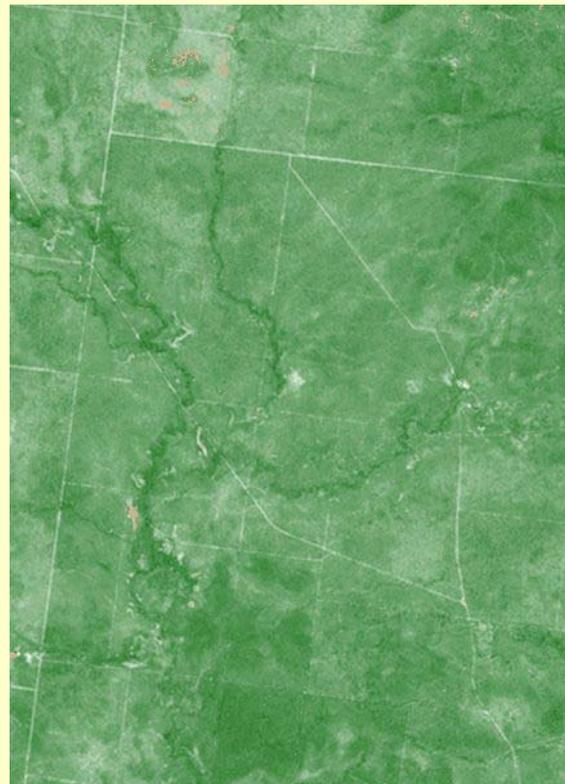
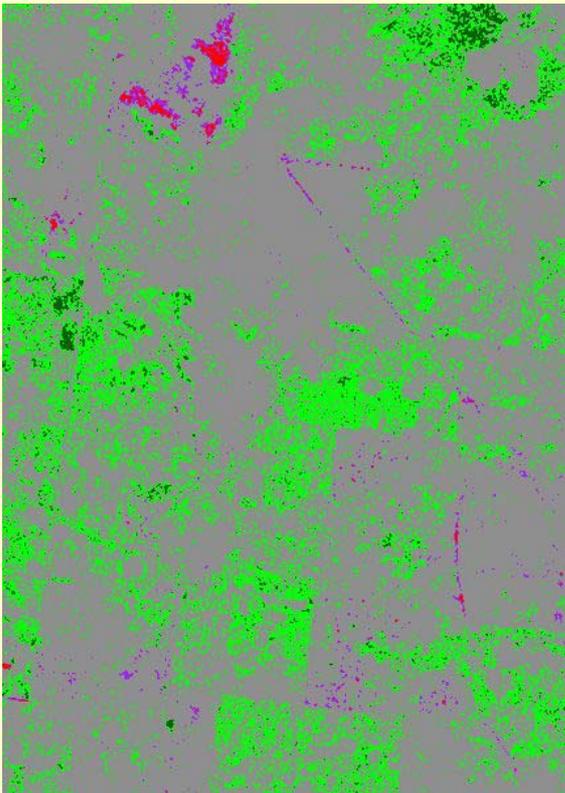
FPC Time Series 1988 - 2003



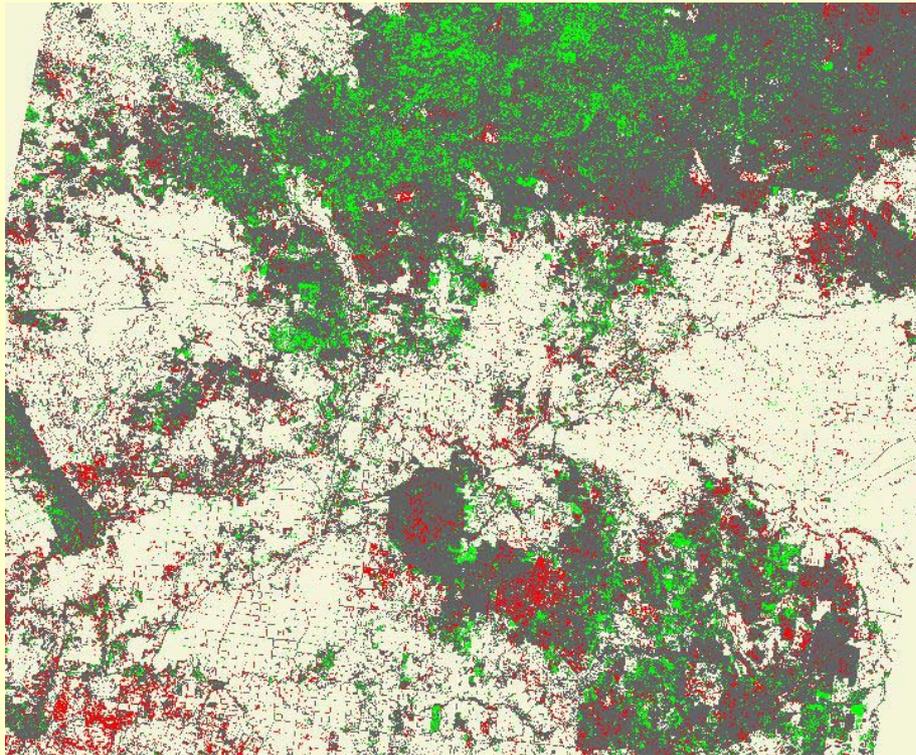
MONITORING TREND IN FPC



MONITORING TREND IN FPC



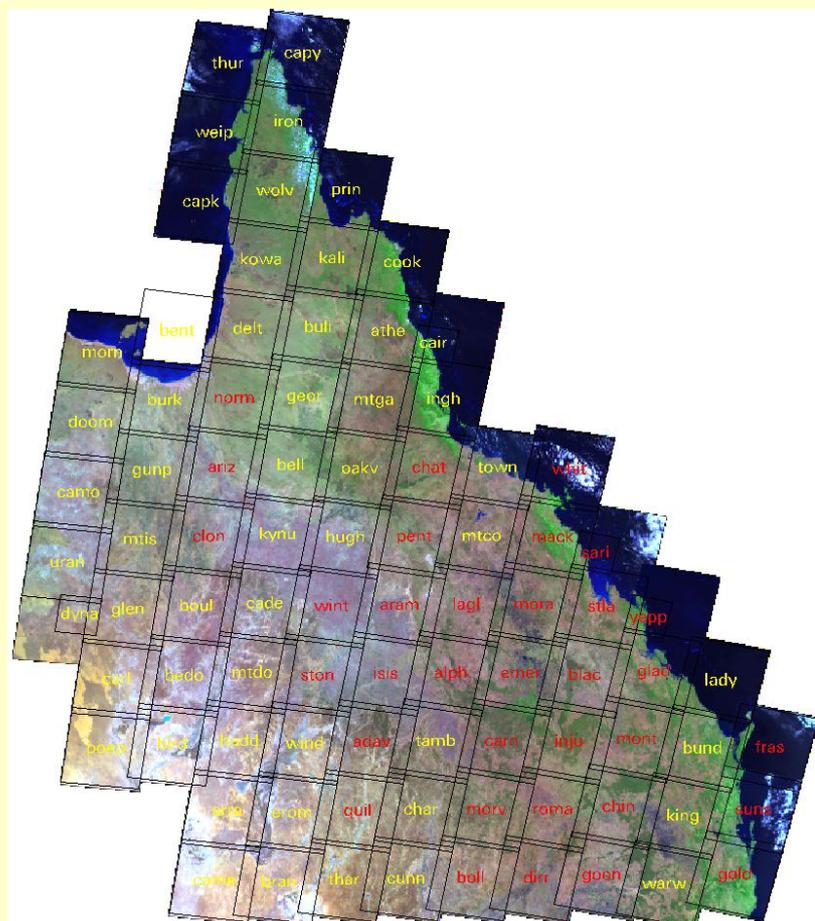
CHINCHILLA SCENE FPC TREND



SLATS LANDSAT SCENES

Red = annual imagery

Yellow = biennial imagery 1988-1998 and annual imagery 1999-2005



FPC TIME SERIES PROJECT STATUS

- Experimental products produced
- Image improvements – masks, calibration
- Additional image acquisition
- Validation of time series
- Development of time series products
- Ongoing improvements
 - image pre-processing
 - improved techniques

For further information on SLATS

<http://www.nrm.qld.gov.au/slats>

