

## **How do major perturbations (tectonic, climatic, volcanic, anthropogenic) affect the generation, translation and preservation of sediment in the Waipaoa Sedimentary System?**

### **Charge to Working Groups:**

- Outline existing information base
- Identify major gaps
- Determine what new observations/information are needed

### **UPLANDS (Page, Dunne)**

- *Existing Information Base:*
  - Qmap (1:250000) – lithology, structure etc. – available in digital format as well as map and bulletin
  - Basic geol coverage
  - Little soils coverage – not a lot
  - Terrace map and heights (GPS) – tephra cover database for key sites
  - DEM's (25 m for whole country, 20 m for whole Waipaoa catchment & more detailed for Mangatu Forest)
  - Map of all GDC gauging sites (5 gauges in catchment, 20 in district)
  - Some farm rain gauges
  - Magnitude frequency relationships for landslides (Reid & Page)
  - Vegetation info:
    - Current vegetation cover – dates of forest plantings
    - Run plans – for some areas
    - Oral tradition from maori
    - Pollen analysis from Lakes Repongaere (Wilmshurst et al.) & Ngamarua
    - Some pollen information (Howarth, McGlone)
    - Potential pollen record from Waihuka oxbow cores – at least 8000 years
  - Titoki/Ngatapa core – 10–30 000 year record (Pere, MSc project)
  - Gully database
  - Aerial photography:
    - Sequential coverage (approximately every decade) – commenced 1938/1945 (1:15 000) – good quality
    - Black & white (1:25 000) 1939-1945
    - Colour (1:25 000) 1997-2001
    - Black & white (1:25 000) Cyclone Bola, 1988
  - Downstream fining information (Rosser)
  - Some clay mineralogy of source rocks, bedload & suspended sediments (Nelson, D'Ath, MSc thesis)
  - Limited seismic profiles from floodplain (Airstrip terrace and Whatatutu) (Seth, honours project)

- Some petrology of pebbles from selected sites (Marseglio student) – aimed at provenance
  - Carbon map (0-10, 10-30, 30-100 cm) based on soil type, rainfall, slope
  - LRI
  - Land systems map, derived from LRI
  - Report written to identify existing databases in 1994
  - Carbon-14 database (GNS Radiocarbon laboratory & some dates from Landcare cores etc.)
  - All knickpoints: map of locations from photos, DEM & field (elevation, drainage area, slope above & below, distance from mouth & headwaters) monitoring stations at 2 sites, hand survey of 10 channels. All available in GIS format
  - Permanent GPS base station in Gisborne
  - Floodplain soil map (Pullar)
  - Landslide database (1: 50 000) (GNS) – polygons with head scarps. Being redesigned to include an attribute database.
  - Shallow landslide mapping using satellite photography
- *Gaps:*
    - Reliable tephra identification in each tributary
    - Physical & petrological rock properties
    - Terrace ages
    - Depositional history of Holocene fans on lower floodplain
    - Detailed geotechnical data – rocks and soils
    - Subsurface geometry, ages & depositional sequence of tributaries
    - Timing of valley floor incision
    - Periodicity of major landslide events
    - Weathering rates, residence times of soils
    - Identification of sediment traps – models etc.
    - Tectonic processes affecting the catchment

*Framework – issues that need addressing:*

- Basin-wide sediment budget
- Landscape models
- What initiated the incision & adjustment between levels
- Slope response to incision
- Study of ancient analogue of modern system (Mangatuna formation)
- Effects of volcanic events on vegetation cover, run-off & erosion
- Effects of earthquakes (deep-seated landsliding, sediment delivery & storage)