RIVER PLUME EFFECTS ON THE COASTAL SEA ENVIRONMENT

Paul Gillespie
Cawthron Institute
Nelson New Zealand
Primary goal: to develop a “river plume ecosystem” (RPE) concept for management of coastal environments.
Land-Sea Connections

**Catchment influences that define the RPE**

- Fresh water (dominant source for Tasman Bay)
- Organic & inorganic nutrients (C, N, P, Si)
- Inorganic sediments (SPM)
- Contaminants (microbes, organic & inorganic chemicals)

**Ecosystem features affected**

- Water column structure (density stratification)
- Plant production
- Microbial processes (O2/nutrient flux, denitrification)
- Seabed habitat structure & composition (animal production, food web interactions, biodiversity, introduced species)
Tasman Bay LT in situ Data Collection Facility

Trial Deployment
Sept – Oct 2005
Management Tool Development

Tasman Bay Data Buoy (LT *in situ* collection of environmental data)

- **Midwater**
  - Conductivity
  - Temperature
  - Salinity
  - Depth
  - Current velocity & direction
  - Chlorophyll a
  - Turbidity

- **Near bottom (50 mm above seabed)**
  - Temperature
  - Chlorophyll a
  - Turbidity

- **Surface (planned addition)**
  - Conductivity
  - Temperature
  - Salinity
Data Buoy Station Location

- 6 km offshore from the Motueka River mouth
- 1 km outside AMAs
- 20 m depth
Coordinated Information

- Satellite imagery (surface chl a, turbidity, temperature)- spatial component
- Water sampling & analyses- sensor calibration and investigating events
- Nelson Bays Hydrodynamic and Ecosystem Models- spatial component
- Existing historical data bases- Are things changing?
- State-of-the-environment monitoring- (TDC)
- Better management of shellfish resources- (CSECo, mussel industry)
- Aquaculture impacts- (control site for assessing WC effects)
- Catchment implications- ICM links
- Seasonal & longer-term cycles- context
- Environmental events (major floods, droughts, phytoplankton blooms)- finger on the pulse
- Verification/improvement of coastal circulation and ecosystem models- improved simulation abilities, scenario testing
- Forecasting/risk assessment- the ultimate goal