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health e waterways
Integrating knowledge

The Health-e-Waterways

Data Integration for Smarter, Collaborative Whole-of-Water Cycle Management

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Health-e-Waterways Project

- Collaboration between:
 - Microsoft Research
 - University of Queensland
 - Healthy Waterways Partnership
 - DNRW, EPA, Local Councils, Universities
- 3 years funding – MSR, ARC Linkage, SmartState
- Integrated Water Information Management for SEQ-HWP



Where are we?

- Fast growing population
- Severe water shortages
- Sensitive ecosystems
- Big investment in Water

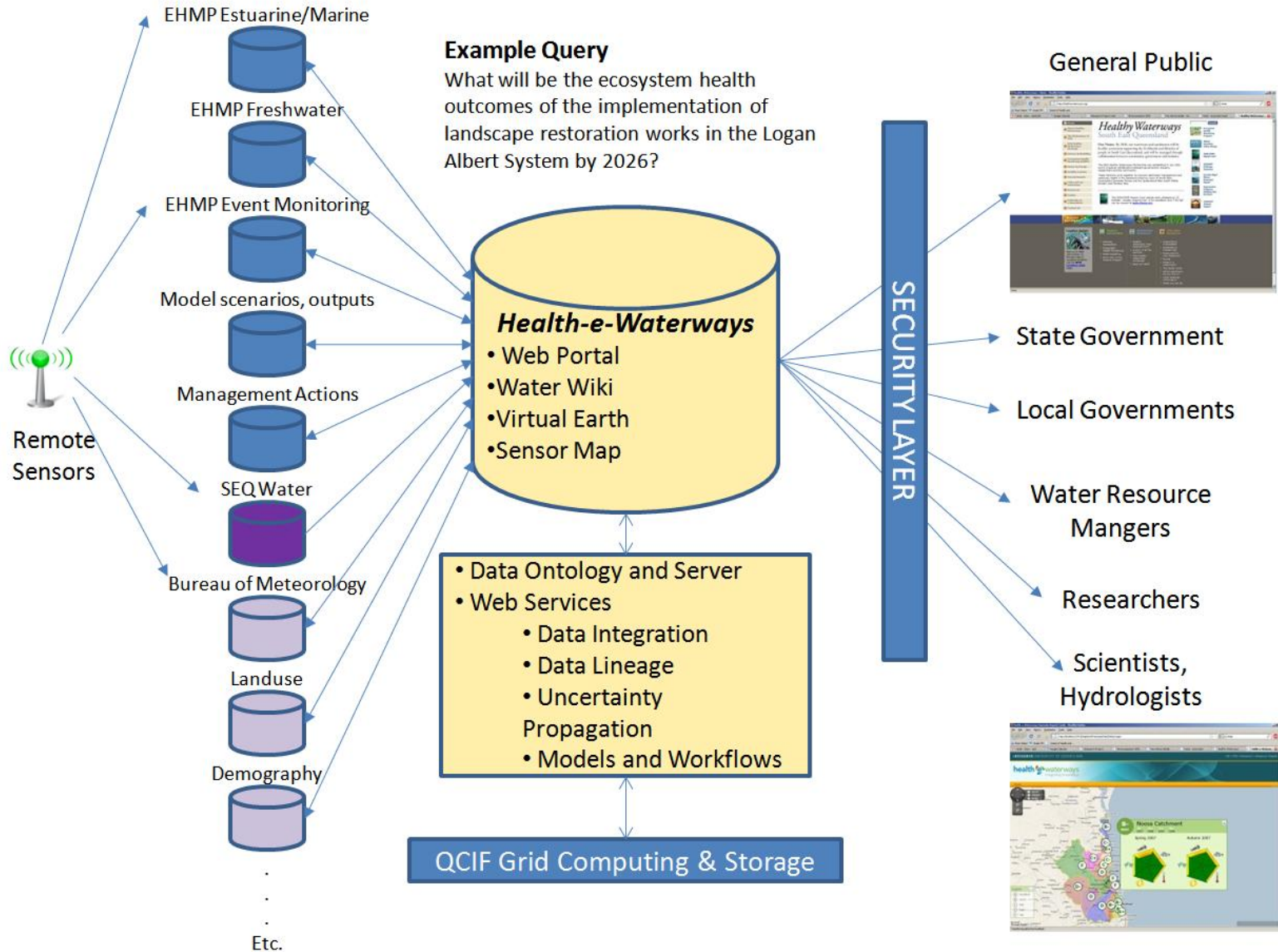


Moreton Island

March 12, 2009



Objectives

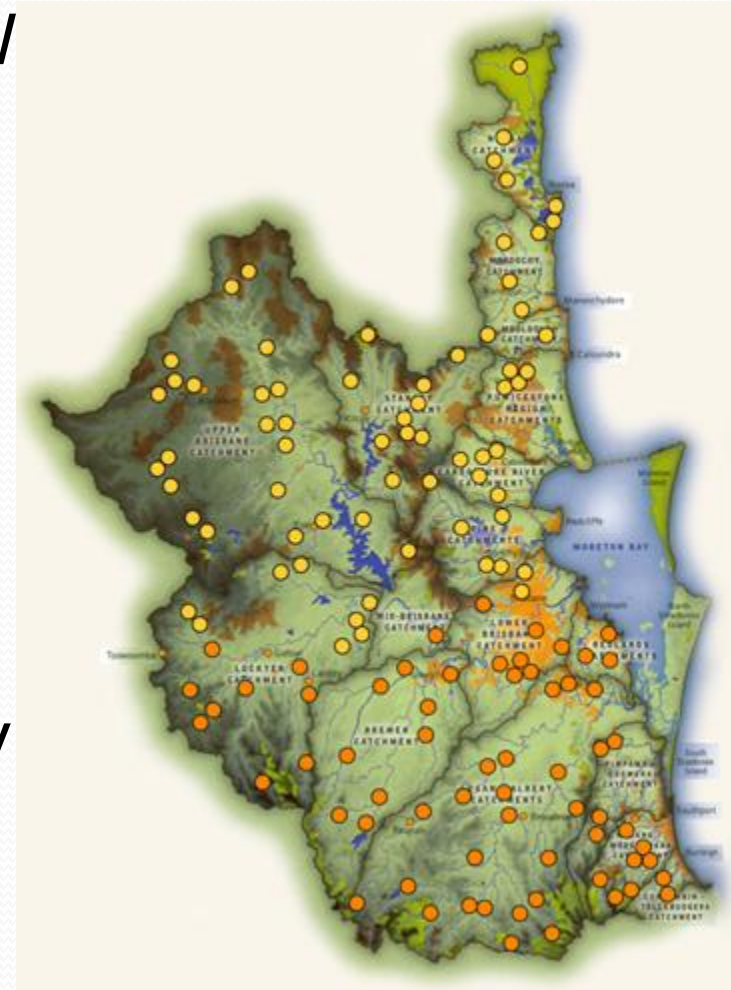


Health-e-Waterways Databases

- Freshwater EHMP - Dept. Natural Resources and Water (DNRW)
- Estuarine/Marine EHMP - EPA
- Event Monitoring – DNRW
- Management Action Database – SEQ-HWP
- Models – many different sources/locations
 - Receiving Water Quality (RWQ)
 - Environmental Management Support System (EMSS)
 - E2 Water Catchment Model

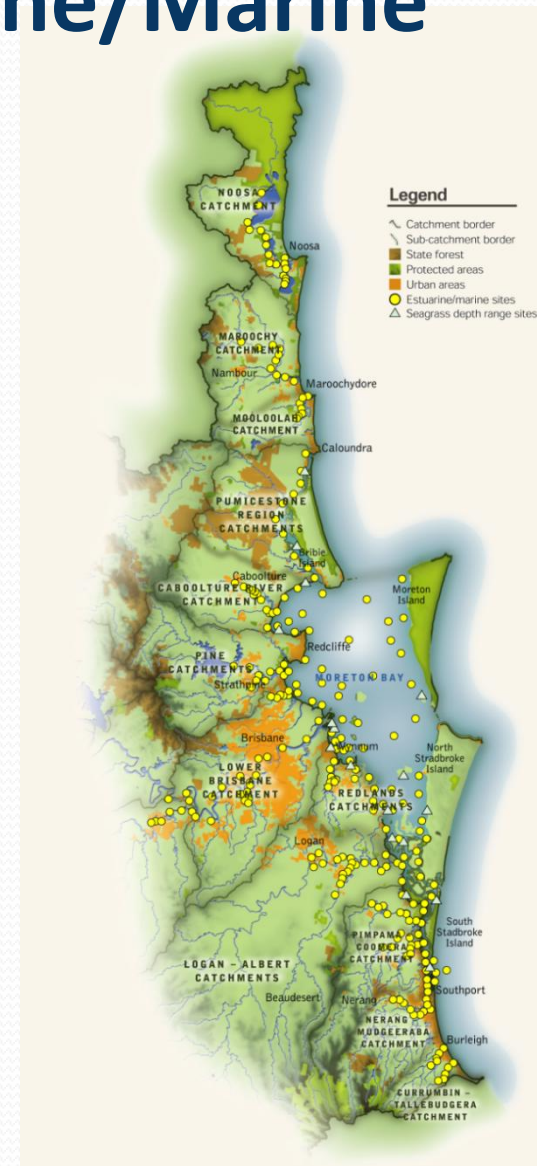
Freshwater Data

- Captured and managed by DNRW
- 135 freshwater sites
- 16 Indices from 5 Indicators:
 - Physical/Chemical
 - Nutrients
 - Ecosystem Processes
 - Aquatic Macroinvertebrates
 - Fish
- Surveys are conducted biannually
- MS Access database.



Estuarine/Marine

- Captured and managed by the EPA
- 254 Sites
 - 168 sites from 19 estuaries
 - 86 from Moreton Bay
- 15 Indicators :
 - Turbidity , Salinity, Temperature, Dissolved Oxygen, pH, Secchi depth, Nitrogen, Phosphorus and Chlorophyll.
 - Lyngbya Majuscula (seaweed) cover.
 - Sewage plume mapping
 - Coral Cover
- Conducted monthly, biannually and annually.
- Oracle 8i relational database.



Event Monitoring

- Captured and managed by the DNRW
- 60 to 100 gauging stations
- Using HYDSTRA (Kister Group)
- Compressed files store time-series data for each site
 - River height, Daily Min/Mean/Max flow
 - Pollutants
 - Events - floods
- Supporting information is also stored:
 - E.g. water parameters, survey technicians
- Raw data is less useful than interpreted data



Management Action Database (MAD)



- Managed by SEQ-HWP
- Tracks Action Plans, Targets and Status of Action plans
- Approximately 550 actions are stored in the database
- MS Access database:
 - Access relational tables back-end
 - Access forms front-end



Models



- Many different models used for catchment hydrology
- Used for simulations forecast and to emulate climate scenarios
- Written in many different languages for a variety of purposes and users
- Focus on 3 Models:
 - EMSS (Environmental Management Support System) Catchment Model
 - Receiving Water Model
 - E2

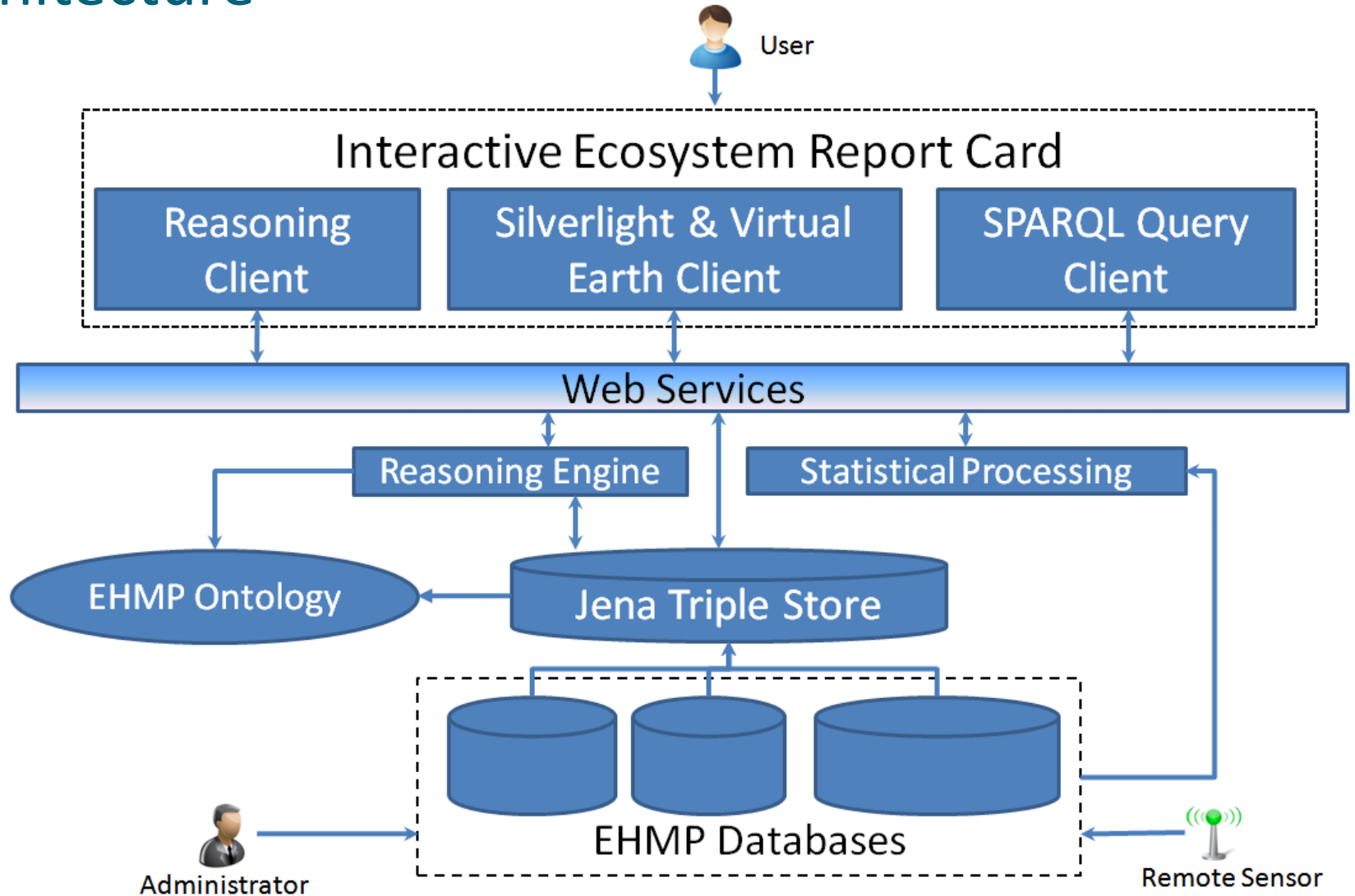


Approach

- Streamline Annual EHMP Report Card Generation
- Search, analysis, reporting interface to integrated databases
- Identify common conceptual model
- Map datasets to common model
- Identify optimum data harvesting and storage
 - Store in SQLServer DB
 - Web services interface to in-situ data
 - Metadata harvesting -> central catalogue
- Develop VirtualEarth+ontology-based query interface

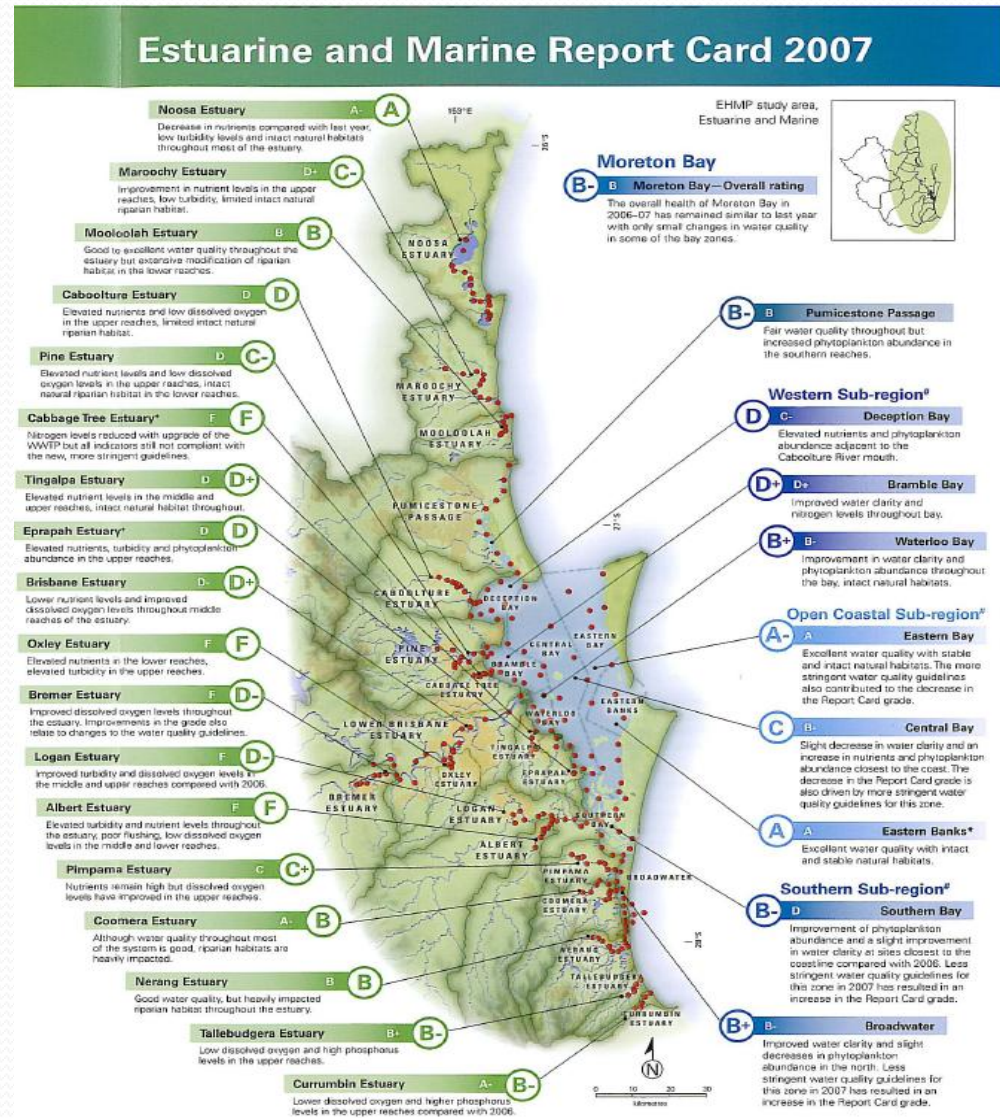


Architecture



Report Cards

- Publicised output of the SEQ Healthy Waterways Partnership
- A to F
- Provides an insight into the effectiveness of investments in waterway and catchment management
- Split into two reporting zones, freshwater and estuarine/marine
- Each has it's own objectives, parameters, methods and analysis



Demo



Future Work

- Complete Estuarine-Marine Dynamic Online Report Cards
- Link monitoring data to management action database
 - > adapt management actions based on impact on ecosystem health
- Integration of:
 - MODIS satellite data, BoM climate data
 - Real-time sensor data
 - Community data – ReefCheck, CoralWatch, Caring for Country
 - Socio-economic data - demographics
- Extend to Great Barrier Reef /Centre for Marine Studies
- Analytical services
 - correlate ground data to derived data from satellite images
- Link predictive models to integrated datasets
- Visualization of model output
- Estimate uncertainty/reliability of results



Acknowledgements

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Questions?



<http://www.health-e-waterways.org>

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