GIS - Enabling better land administration

Nick Land, ESRI Europe

FIG Com.7 Meeting, Verona, 11-14 September 2008
We Live in a Rapidly Changing World

Increasingly Driven by Population Growth & Human Action

Impacting the Natural World

- Climate
- Biodiversity
- Natural Resources
- Energy
- Economy
- Security

Challenges Sustainability . . .

. . . For All of Us
Global Network of Survey & GIS Professionals

ESRI User Conference 2008
- 14,000 GIS Professionals
- 121 Countries
- Many Disciplines & Interests

... GIS in action
Impacts of Global Climate Change

- Sea Level Rise Modeling: Florida
- Coastal Zone Planning: Louisiana
- Sea Level Change: Global
- Vegetation Trends: Arctic
- Continental Shelf: Portugal
- Oceanographic Studies: American Samoa
Earth Science & Water Resources

- Soil Moisture, Michigan
- Seismic Hazards, Indonesia
- Landslide Susceptibility, El Salvador
- Geologic Mapping, Canada
- Geologic Analysis, Madagascar
- Groundwater, Texas
- Online Soil Information, Australia
- Flood Risk, Portugal
Environmental Assessment

Nitrate Modeling
*Florida*

Chemical Release
*Washington*

Highway Impacts on Habitat
*California*

Viewshed
*Norway*

Human Footprint
*Oregon*

Oil Spill Risk
*Norway*

Ship Traffic
*Norway*
Conservation

Nearshore Environmental Management
*Oregon*

Sea Grass Management
*Florida*

Benthic Habitats
*NOAA*

Fish Passage Barriers
*US Fish & Wildlife*

Healthy Parks & Healthy Communities
*The Trust for Public Lands*

Priority Conservation Lands
*Quinault Indian Nation*

Land Cover
*Guam*
Managing Natural Disasters

- Cyclone, Myanmar (Burma)
- Floods Simulation, Houston, Texas
- Wildfire, Idaho
- Earthquake, Wenchuan, China
- Earthquake Damage, Japan
- Aftershocks
- Floods, Bihar, India
- Flood Mapping, Iowa
- Floods Simulation, Houston
- Tornado, Alabama
- Hurricane Risk, Texas
- Fire History, Greece
- Wenchuan Earthquake, China
Planning

Land Use Suitability
Montana

Web Based Suitability
North Carolina

Urban Planning
California

Urban Design
San Jose, California

Urban Redevelopment
Bakersfield, California

Virtual City
Bangkok

3D Zoning
Portland, Oregon

Online Community Planning
U.K.

Regional Planning
Puerto Rico

Arizona

Planning
Land Administration

- Native Land Selection (Alaska)
- Property Valuation (Germany)
- Integrated Land Management (BLM)
- Analyzing Transactions (Philadelphia)
- Tax Mapping (Connecticut)
- Adapx Pen-Based Sketching (USAID-Timor Leste)
- Encinitas
Land Administration – a number of challenges

- Meeting rising user expectations
- Financial
- Building synergies & partnerships
  - People & organisations
  - Data & services
  - NSDIs
- Standards (& data models)
- Data quality, reducing data redundancy
- Each country, each implementation, has its specific challenges

... Leverage GIS & our professional knowledge to address these challenges ......

14
1. ROI, Workflow, Requirements

- Understand the costs (investment) & benefits (value)
- Analyse & improve the workflow
2. From cadastral survey to public access

A Complete Integrated System

- ArcReader
- ArcView
- ArcEditor
- ArcInfo
- Engine

- Work Group
- Enterprise

- ArcGIS Mobile
- ArcPad

- Content
- Resource Centers

EXPLORER

MOBILE

WEB

ONLINE

SERVER

DESKTOP
3. Specialised capabilities

- Workflow management
- Spatial Analysis
- 3D Analysis & Visualization
- Publishing
- Interoperability
- Survey
4. Quality improvement – Creating Accurate Parcel Data

Simple Workflow

- Enter Subdivision Plan
- Build Parcels
- Apply Least Squares Adjustment

Geodatabase

Cadastral Fabric

Continuous Parcel Data Model

Improves Accuracy Over Time (Parcels & GIS)

. . . Building On Your Existing Parcel Management
5. Data management

Organising, Managing, Securing land & geographic information

ArcGIS

Geodatabase

• Any DBMS
• Files

Scalable Storage Environments

Comprehensive Information Model
(Any Type of Data)

3D Objects
Networks
Attributes
Vectors
Topologies
Cartography
Schematics
Annotations
Addresses
Surveys
Dimensions
Images
Cadastral
Terrain
6. Performance & Scalability

- Improved Web Map & ADF
  - Printing
  - Map Navigation
  - Map Tips
- Mobile App
  - Better Caching
- Dynamic Processing
- Image Integration
- Metadata Services
- Security & Logging
- More DBMS’s
  - SQL Server 2008
  - PostgreSQL
  - DB2 ZOS
- Mobile App
  - More DBMS’s

- Standards Support
  - SOAP
  - WMS
  - SQL
  - WCS
  - GML
  - REST
  - KML
  - CSW
  - CAD

Open & Interoperable

- Easier Web Development
  - Flex
  - SilverLight
  - JavaScript
  - REST

- Backwards Compatibility
  - 9.3 Client
  - 9.2 Client
  - 9.1
  - 9.0

- Improved Web Map & ADF
  - Printing
  - Map Navigation
  - Map Tips
- Mobile App
- More DBMS’s
  - SQL Server 2008
  - PostgreSQL
  - DB2 ZOS
7. GIS On The Web Is Just Beginning

Harnessing the Web . . .
. . . And the Power of GIS

Going Far Beyond Mapping & Visualization . . .
. . . Ultimately Becoming Essential Infrastructure
7. ArcGIS Server Patterns

- Mobile
- Mapping
- Enterprise Integration
- IT System
- Fusion Center
- Mashups
- Distributed (SDI)
- Departments
- Replication
- Enterprise
- Web GIS
- Applications
8. Cadastre as a key part of the Spatial Data Infrastructure

1. Coordinate reference systems
2. Geographical grid systems
3. Geographical names
4. Administrative units
5. Addresses
6. **Cadastral parcels**
7. Transport networks
8. Hydrography
9. Protected sites

1. Elevation
2. Land cover
3. Orthoimagery
4. Geology
Thank you for your attention!

nland@esri.com