THE ICAN COASTAL ATLAS MEDIATOR PROTOTYPE AND CONNECTING THE WASHINGTON COASTAL ATLAS

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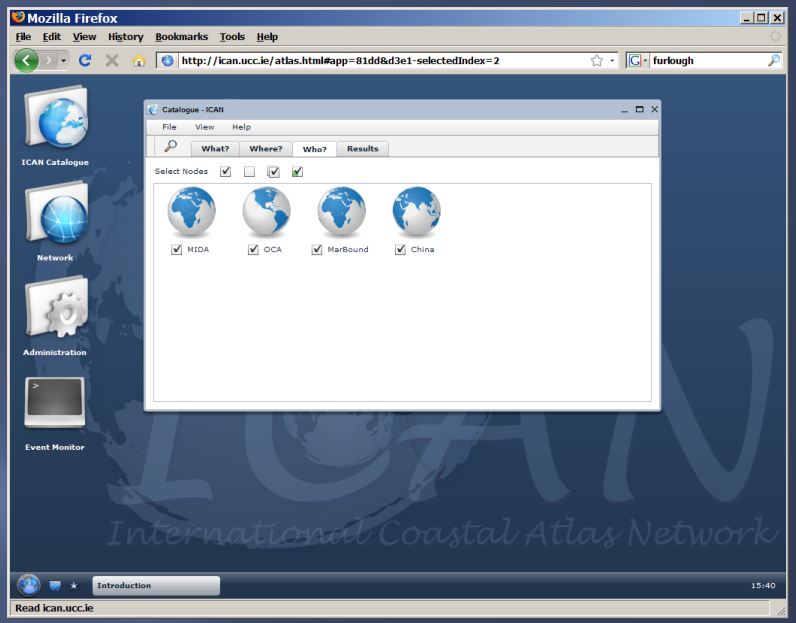
Outline

1. ICAN Atlas Mediator Prototype
2. Connecting the WA Coastal Atlas to the ICAN Prototype
3. Conclusions



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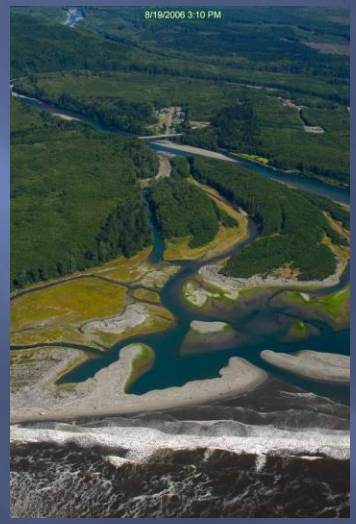
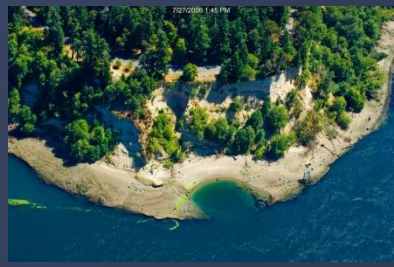
Special Features: Oblique Aerial Photos of Shoreline





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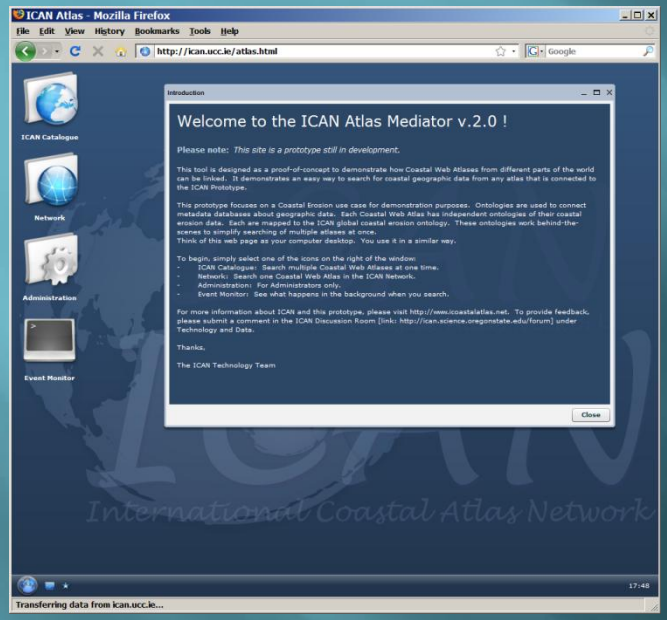
What is the ICAN Atlas Mediator Prototype?



- A web portal where people can search for spatial data from multiple coastal atlases.
- A single test case:

  coastal erosion
- A demonstration of how independent atlases can be connected.

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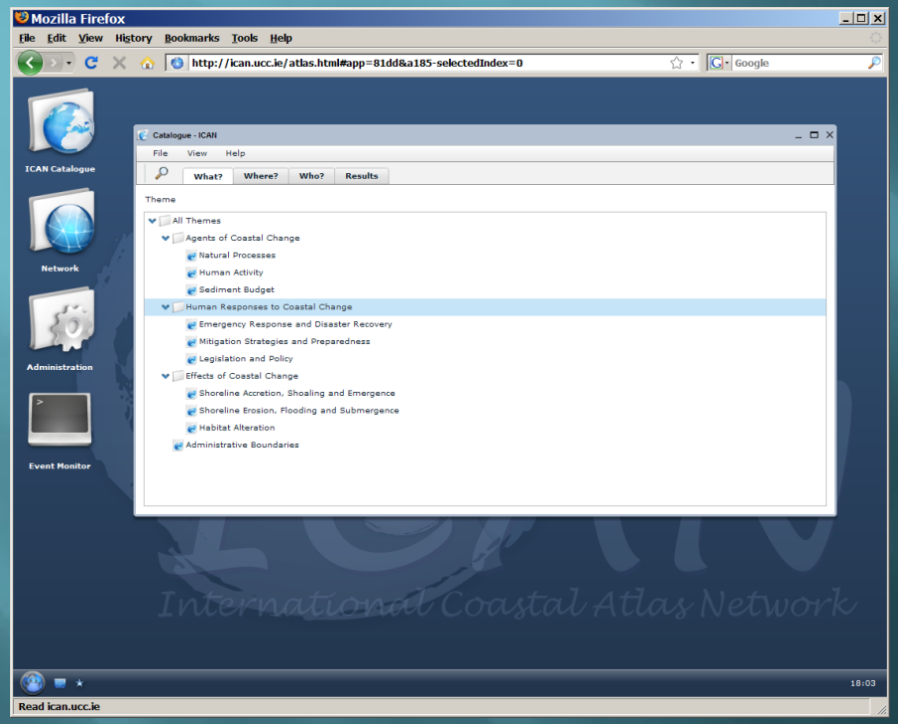
ICAN Atlas Mediator Prototype: Aims



- Long-term:
  - Develop an internationally-enabled Coastal Web Atlas (CWA) ontology
    - Users will be able to conduct sophisticated and meaningful queries across a range of atlases from one site.
- Short-term:
  - A proof-of-concept exercise
  - Focus on one theme
  - Demonstrate the technology and use of standards
- Make connections within regional partnerships
  - Build and strengthen atlas networks (West Coast, US, Europe, etc.)

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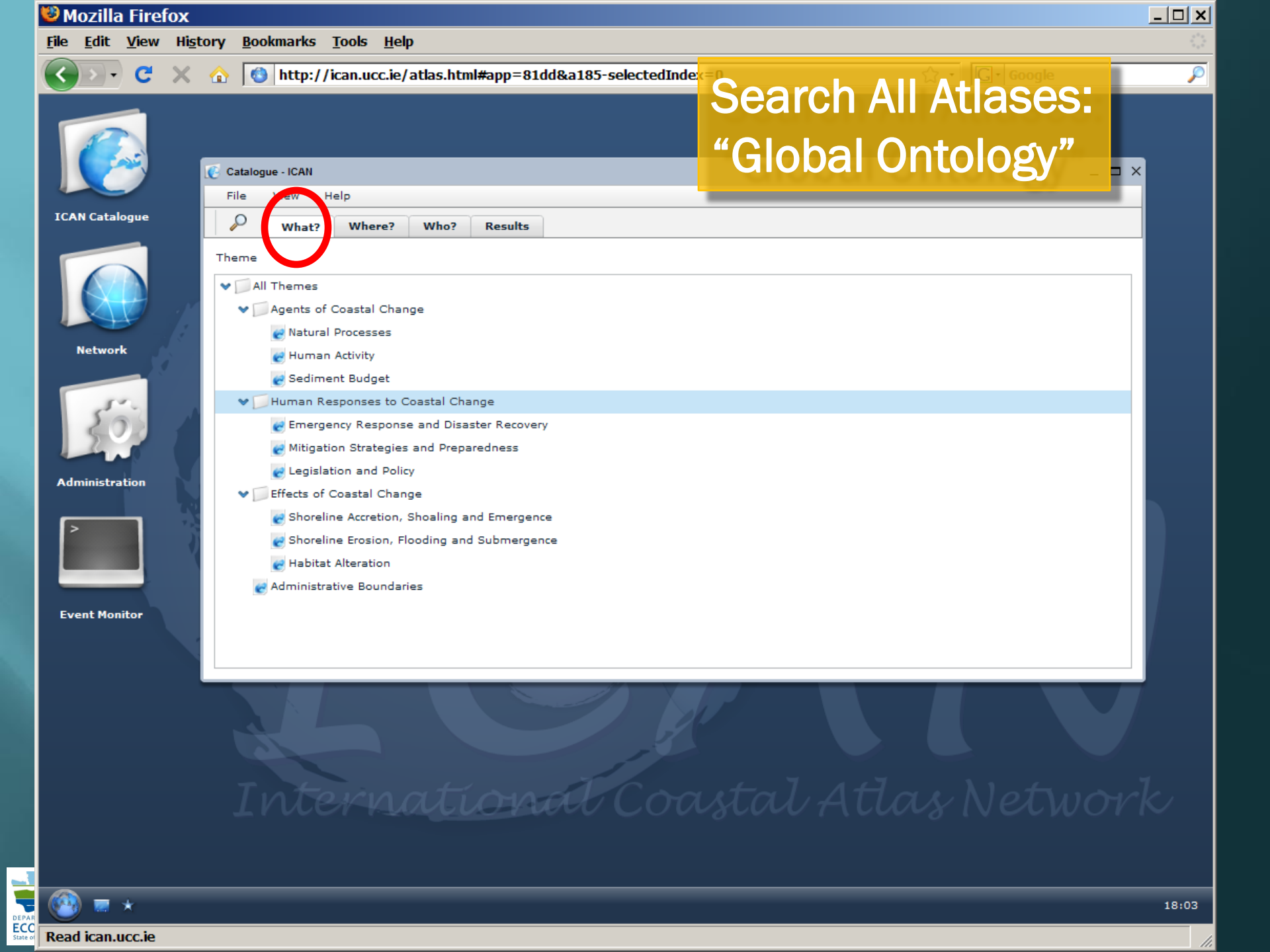
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ICAN Catalogue
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What?
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Agents of Coastal Change
Natural Processes
Human Activity
Sediment Budget
Human Responses to Coastal Change
Emergency Response and Disaster Recovery
Mitigation Strategies and Preparedness
Legislation and Policy
Effects of Coastal Change
Shoreline Accretion, Shoaling and Emergence
Shoreline Erosion, Flooding and Submergence
Habitat Alteration
Administrative Boundaries
International Coastal Atlas Network
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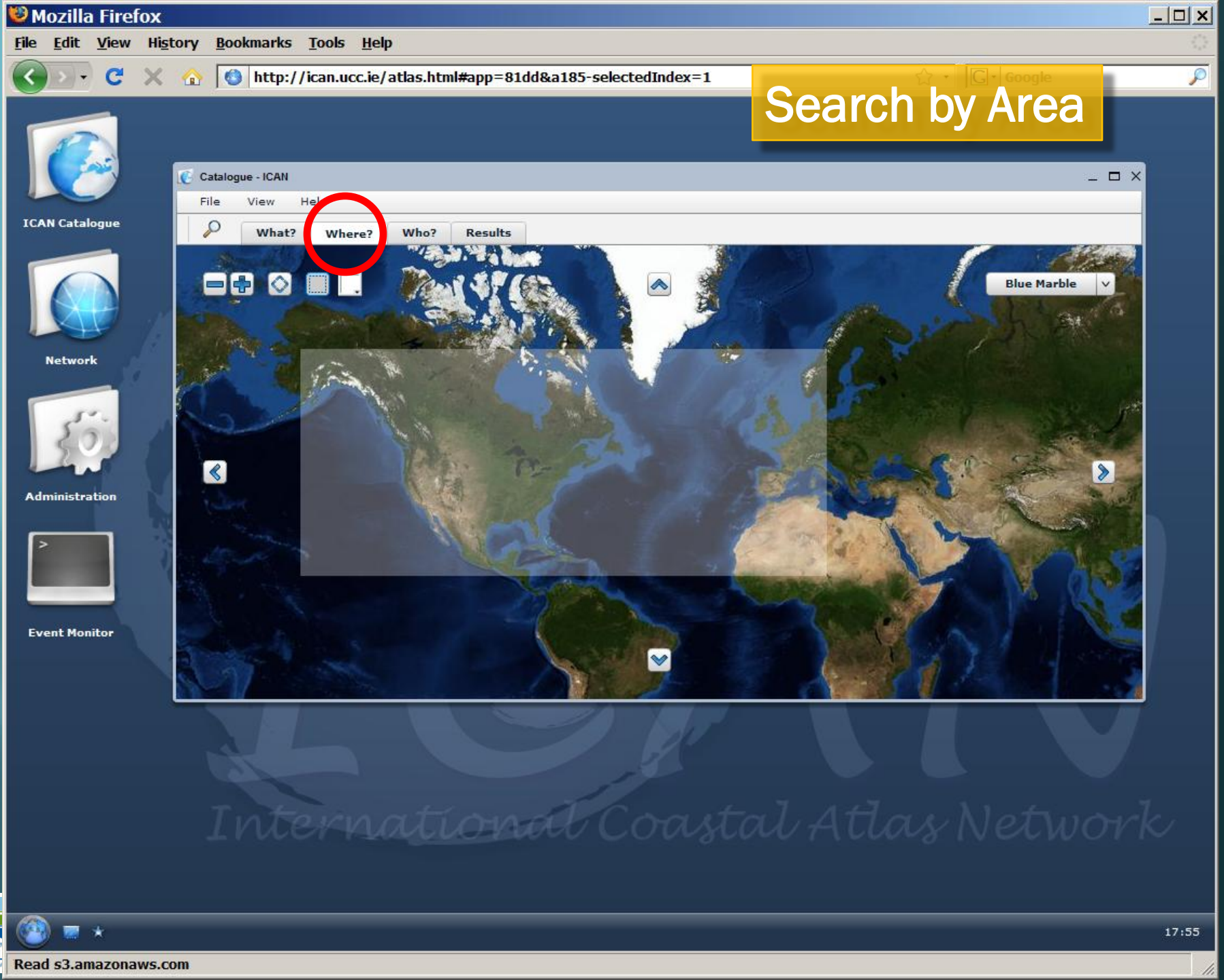
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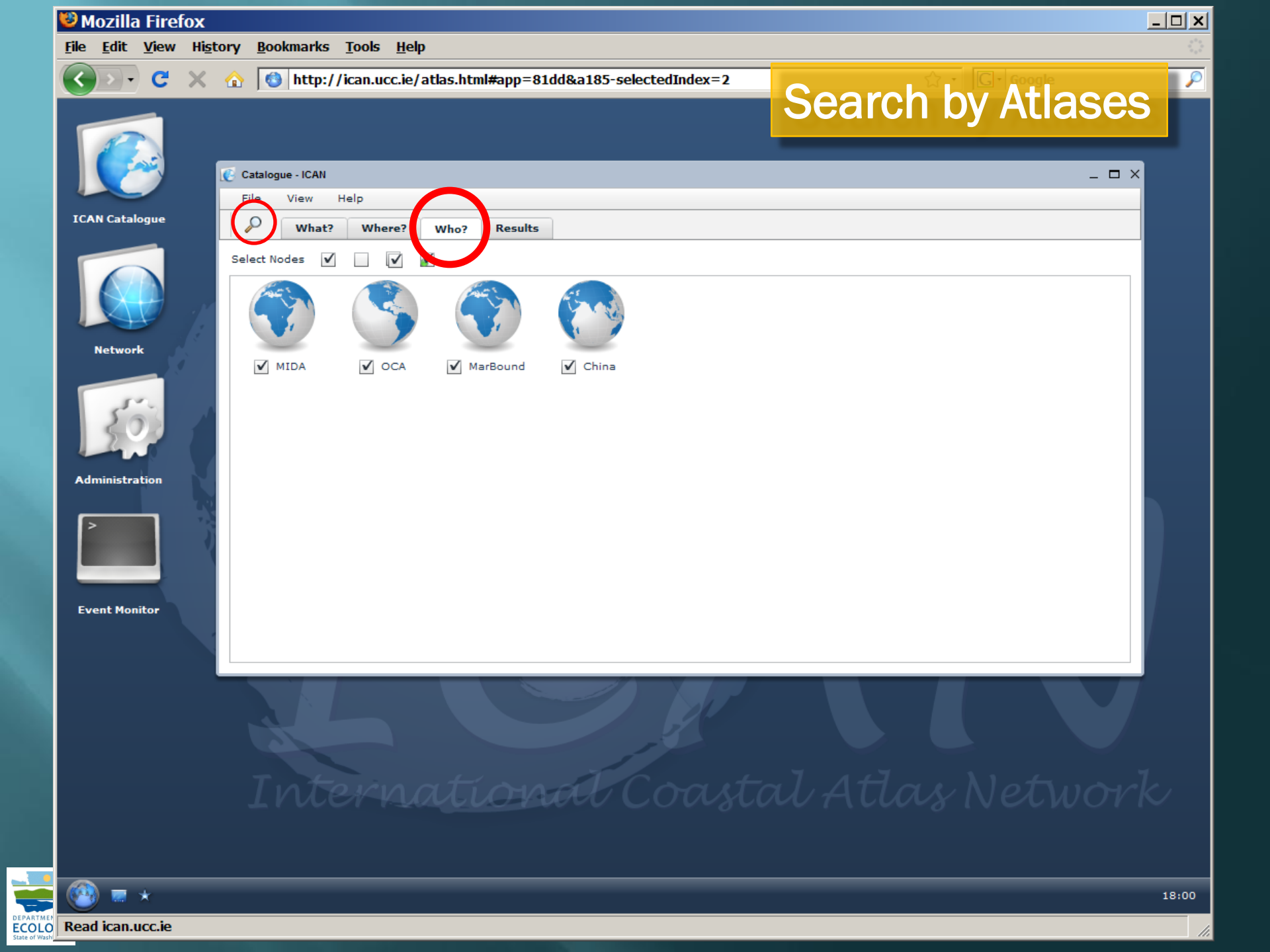
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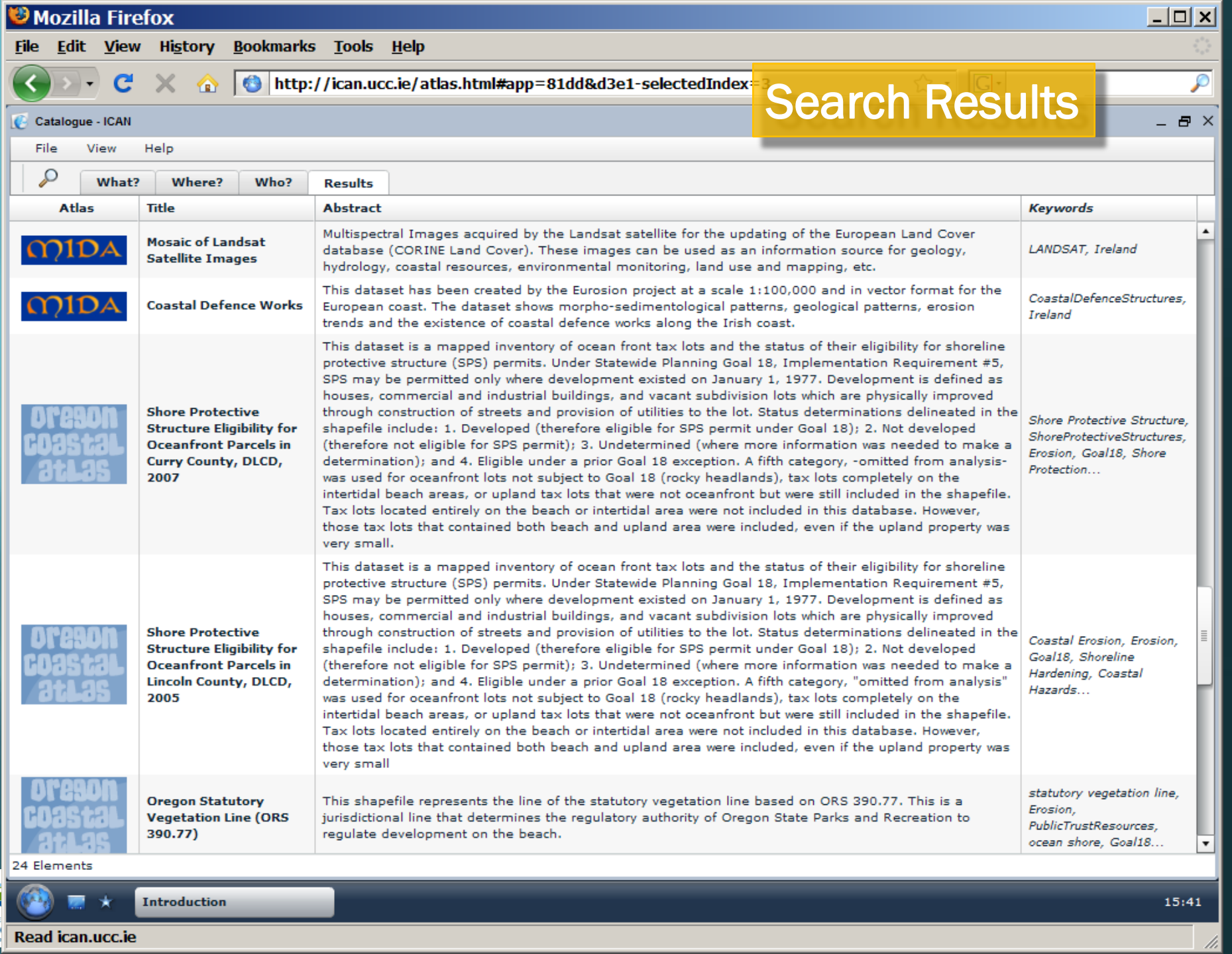
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Search Results
Catalogue - ICAN
File View Help
What? Where? Who? Results
Atlas
Title
Abstract
Keywords
MIDA
Mosaic of Landsat Satellite Images
Multispectral Images acquired by the Landsat satellite for the updating of the European Land Cover database (CORINE Land Cover). These images can be used as an information source for geology, hydrology, coastal resources, environmental monitoring, land use and mapping, etc.
LANDSAT, Ireland
MIDA
Coastal Defence Works
This dataset has been created by the Eurosion project at a scale 1:100,000 and in vector format for the European coast. The dataset shows morpho-sedimentological patterns, geological patterns, erosion trends and the existence of coastal defence works along the Irish coast.
CoastalDefenceStructures, Ireland
Oregon Coastal Atlas
Shore Protective Structure Eligibility for Oceanfront Parcels in Curry County, DLCD, 2007
This dataset is a mapped inventory of ocean front tax lots and the status of their eligibility for shoreline protective structure (SPS) permits. Under Statewide Planning Goal 18, Implementation Requirement #5, SPS may be permitted only where development existed on January 1, 1977. Development is defined as houses, commercial and industrial buildings, and vacant subdivision lots which are physically improved through construction of streets and provision of utilities to the lot. Status determinations delineated in the shapefile include: 1. Developed (therefore eligible for SPS permit under Goal 18); 2. Not developed (therefore not eligible for SPS permit); 3. Undetermined (where more information was needed to make a determination); and 4. Eligible under a prior Goal 18 exception. A fifth category, -omitted from analysis- was used for oceanfront lots not subject to Goal 18 (rocky headlands), tax lots completely on the intertidal beach areas, or upland tax lots that were not oceanfront but were still included in the shapefile. Tax lots located entirely on the beach or intertidal area were not included in this database. However, those tax lots that contained both beach and upland area were included, even if the upland property was very small.
Shore Protective Structure, ShoreProtectiveStructures, Erosion, Goal18, Shore Protection...
Oregon Coastal Atlas
Shore Protective Structure Eligibility for Oceanfront Parcels in Lincoln County, DLCD, 2005
This dataset is a mapped inventory of ocean front tax lots and the status of their eligibility for shoreline protective structure (SPS) permits. Under Statewide Planning Goal 18, Implementation Requirement #5, SPS may be permitted only where development existed on January 1, 1977. Development is defined as houses, commercial and industrial buildings, and vacant subdivision lots which are physically improved through construction of streets and provision of utilities to the lot. Status determinations delineated in the shapefile include: 1. Developed (therefore eligible for SPS permit under Goal 18); 2. Not developed (therefore not eligible for SPS permit); 3. Undetermined (where more information was needed to make a determination); and 4. Eligible under a prior Goal 18 exception. A fifth category, "omitted from analysis" was used for oceanfront lots not subject to Goal 18 (rocky headlands), tax lots completely on the intertidal beach areas, or upland tax lots that were not oceanfront but were still included in the shapefile. Tax lots located entirely on the beach or intertidal area were not included in this database. However, those tax lots that contained both beach and upland area were included, even if the upland property was very small
Coastal Erosion, Erosion, Goal18, Shoreline Hardening, Coastal Hazards...
Oregon Coastal Atlas
Oregon Statutory Vegetation Line (ORS 390.77)
This shapefile represents the line of the statutory vegetation line based on ORS 390.77. This is a jurisdictional line that determines the regulatory authority of Oregon State Parks and Recreation to regulate development on the beach.
statutory vegetation line, Erosion, PublicTrustResources, ocean shore, Goal18...
24 Elements
Introduction
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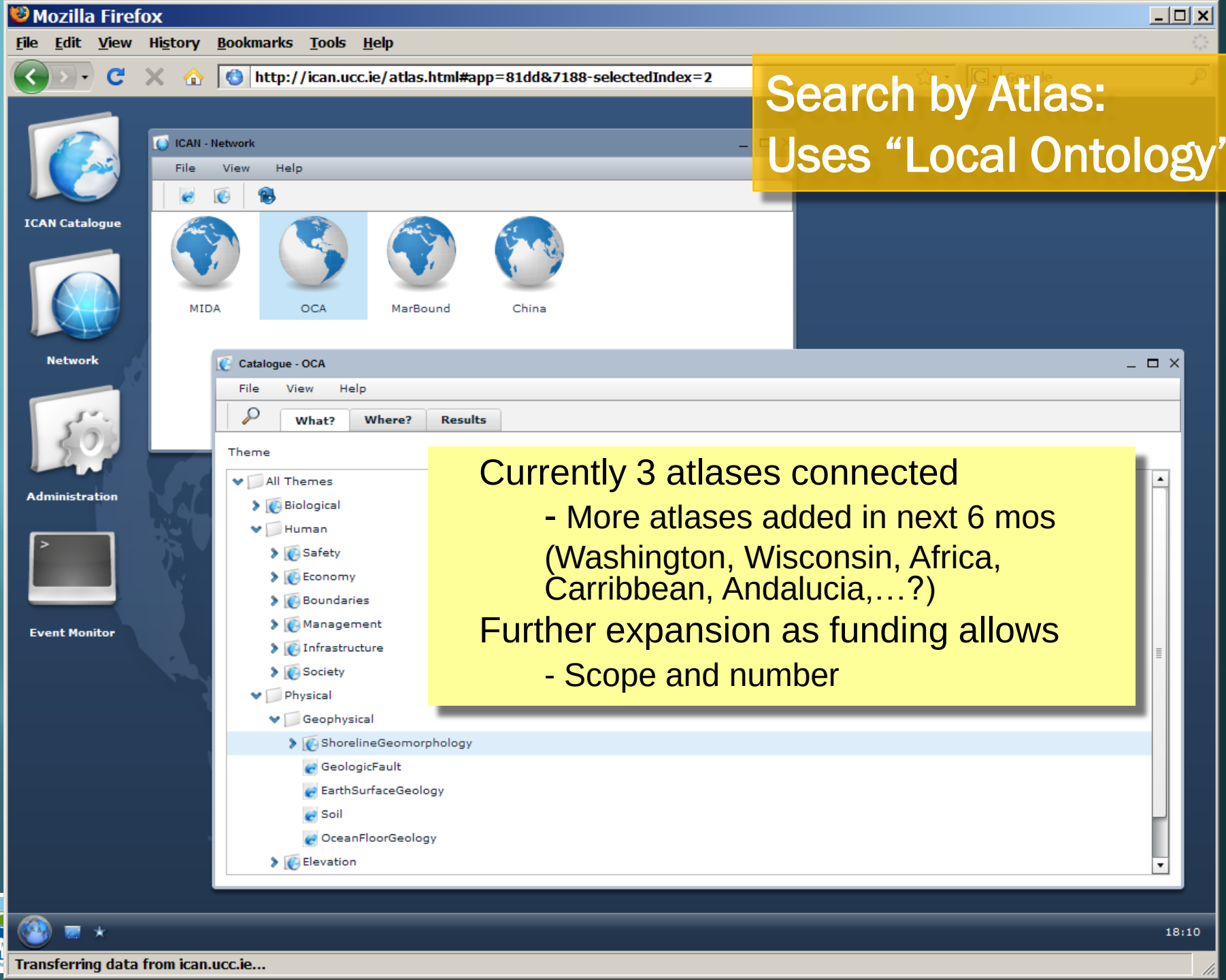
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http://ican.ucc.ie/atlas.html#app=81dd&7188-selectedIndex=2
Search by Atlas:
Uses "Local Ontology"
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File View Help
What?
Where?
Results
Theme
All Themes
Biological
Human
Safety
Economy
Boundaries
Management
Infrastructure
Society
Physical
Geophysical
ShorelineGeomorphology
GeologicFault
EarthSurfaceGeology
Soil
OceanFloorGeology
Elevation
Currently 3 atlases connected
- More atlases added in next 6 mos
(Washington, Wisconsin, Africa, Carribbean, Andalucia,…?)
Further expansion as funding allows
- Scope and number
18:10
Transferring data from ican.ucc.ie...

How It Works

- Centralised system
  - Resources are accessed through one central system (ICAN global atlas)
- Virtual integration approach
  - Data are not copied into the global Atlas
- Controlled Vocabularies/Ontologies
  - Global Ontology (*ICAN*)
  - Local Ontologies (*Oregon, MIDA, Washington, etc*)
- OGC Services (CSW)
- Balance of Mediation and Harmonisation
- Web site designed using Adobe Flex, Java and SparQL queries

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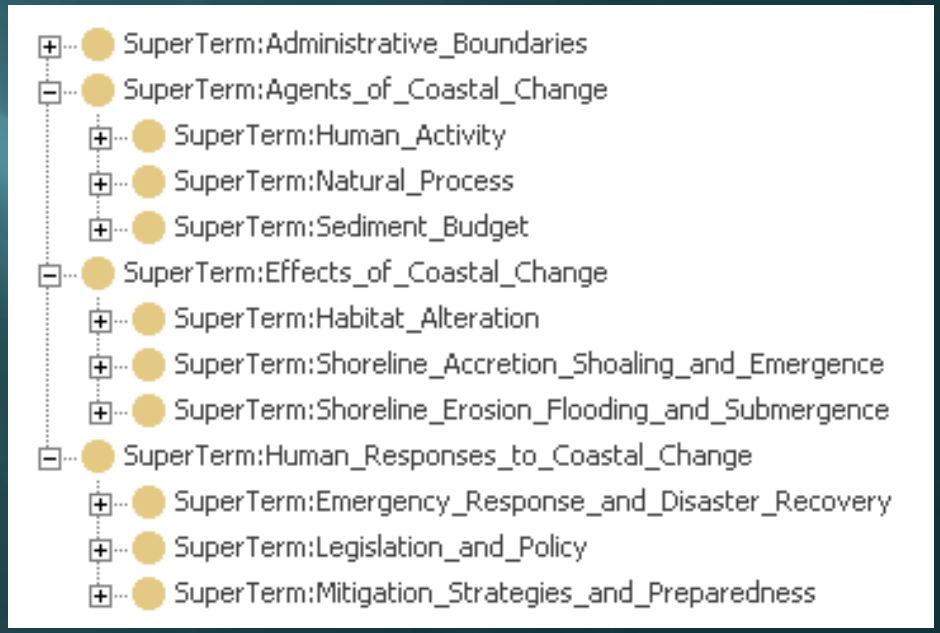
About Ontologies

- Controlled Vocabularies are list of terms
- Ontologies connect these terms to each other – "mapping"
  - Ontology: A Knowledge Organisation System
  - Define concepts (categories and subjects: ex: borders and coastline)
  - Define relationships between those concepts
  - Local Ontology terms connect to the Global Ontology
  - Make it easier to search



NOTE: ICAN COASTAL EROSION ONTOLOGY WAS EXTRACTED FROM THE USGS COASTAL HAZARDS ONTOLOGY.

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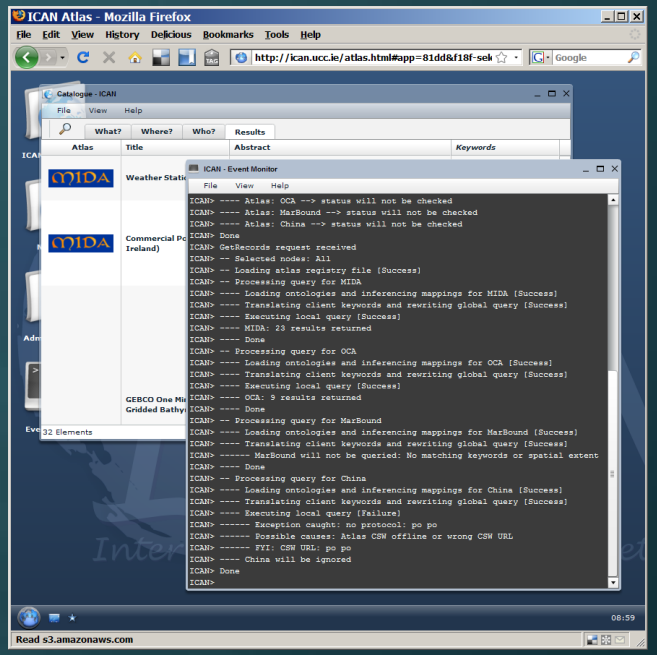
OGC Services

- OGC web services
  - Catalogue Service for the Web (CSW)
  - Web Map Service (WMS)
  - Web Feature Service (WFS)
  - Web Coverage Service (WCS)



- Allows requests for geographic "*resources*" across the Web using platform-independent calls

CSW Request	Response
`Get Capabilities`	*Metadata about the types / operations the CSW supports*
`Get Records`	*Metadata records available, with possibility of filtering (bounding box, spatial, temporal, keywords search, etc.)*
`Get Record By ID`	*Record with the specified ID*

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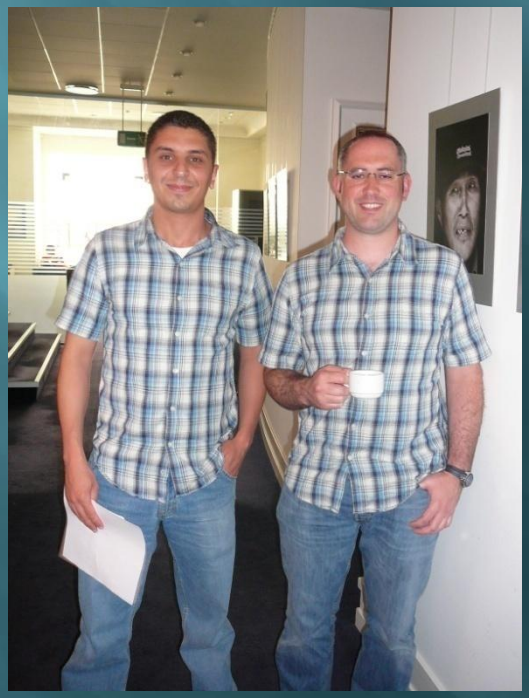
A Balance

- Atlases have autonomy
  - Hold, distribute and organize their own data
  - Use software of their choice

Harmonization and Mediation



Achieving Interoperability

1. Harmonisation:
   - Harmonize access interfaces to atlases
     - *Implement OGC Web Services*
   - Harmonize resource formats
     - *Use ISO metadata standards*
       - ISO-19115 & ISO-19139, FGDC
   - Harmonise Web querying and delivery formats
     - *OGC queries for geographic resources*
     - *Delivery of XML for metadata, GML for data, etc.*

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Achieving Interoperability

2. Mediation:

- Allow local atlases to use their own data structures, semantics, vocabularies (ontologies)
- Allow local atlases to choose OGC-compliant software
  - Open Source (*GeoNetwork*)
  - COTS (*GIS Portal Toolkit*)
- Use a common data structure and a common ontology for the global atlas
- Provide mappings between terms in local ontologies and the global ontology

Mapping Example:

ICAN global ontology:Coastline

is similar to

WCA ontology:Shoreline

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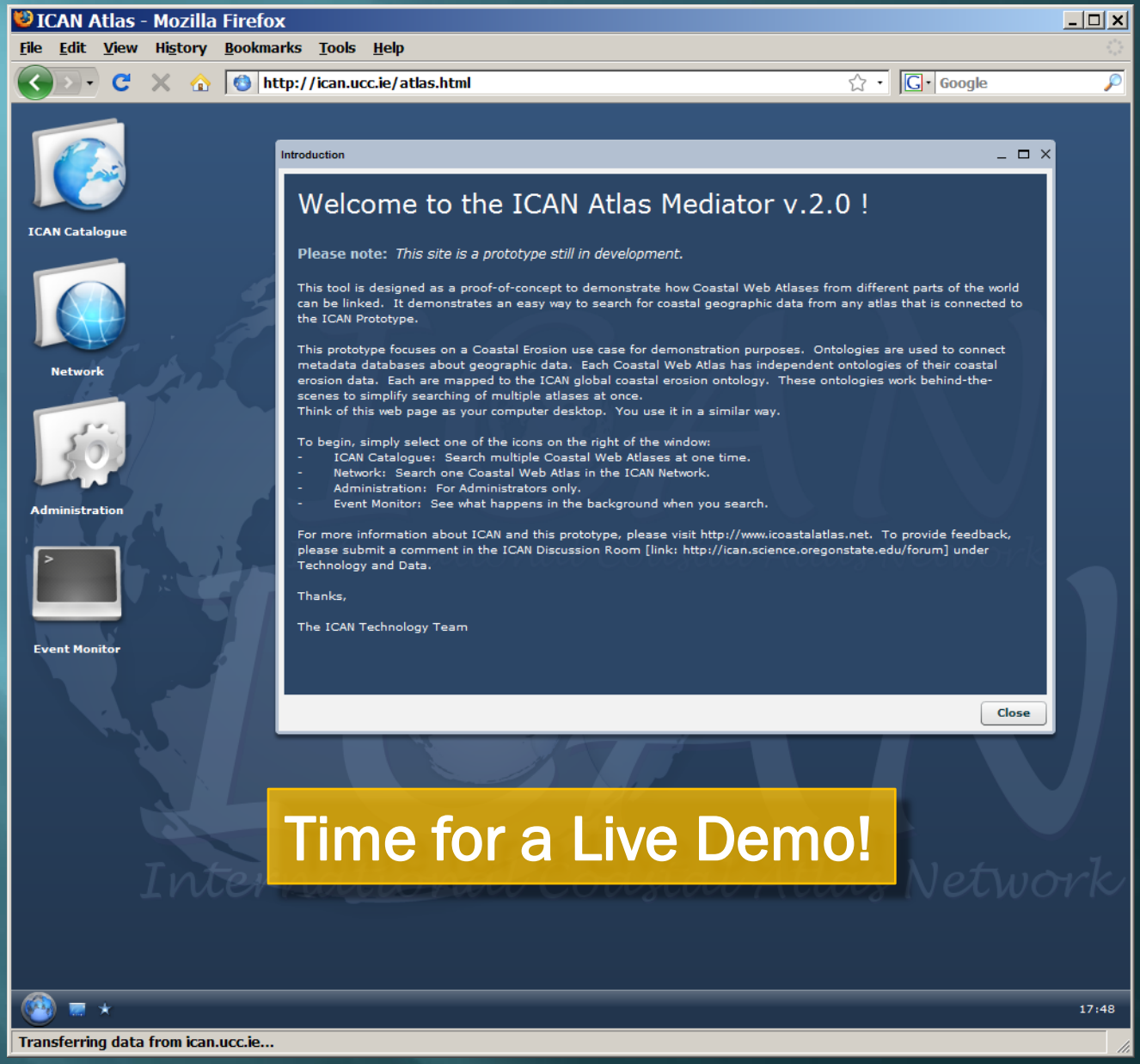

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Future of the Prototype

- Will include WMS in time for the next ICAN Workshop in November 2009 in Trieste, Italy
  - Possibly include WFS before then
- Future depends on funding opportunities
  - Current development done with donated time
- Looking for grants in US and Europe to fund expanding:
  - The scope – Broaden the topics included
  - The scale – The number of atlases involved

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Steps for Connecting the WCA to the ICAN Atlas Mediator Prototype

1. Pick OGC compliant software (CSW, WMS, WFS)
   - Install and set up as CSW
2. Develop Coastal Erosion Controlled Vocabulary
3. Map Local Ontology
   - Map how terms relate to each other (Protégé software)
   - Get input from coastal hazards expert
4. Coordinate with ICAN Ontology master
   - Submit WCA ontology
     - He maps WCA ontology to super ontology
     - Adds WCA as a node in the Atlas Mediator Prototype
5. Test that ICAN prototype can search WCA CSW
   - Refine as needed
   - May occasionally be tweaks to ontology
6. Implement WCA WMS and test with ICAN prototype

Outcome: WCA Metadata will be searchable, just as current connected atlases are.

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ESRI GIS Portal Toolkit

- Chosen to fit Dept. of Ecology's Enterprise system
- ArcGIS Server Extension
  - Catalog and Search resources
  - Build portals, SDIs, Metadata catalogs
  - *Ex:* Geospatial One-Stop, NOAA Large Marine Ecosystems
- OGC Compliant
  - Catalog Service for the Web (CSW):
    - Requires editing a line in web.config
- Installation issues:
  - Does not yet support SQL 2008
  - Access to CSW through Firewall
  - No filters for providing limited access to target user groups
    - Must install multiple GPT instances

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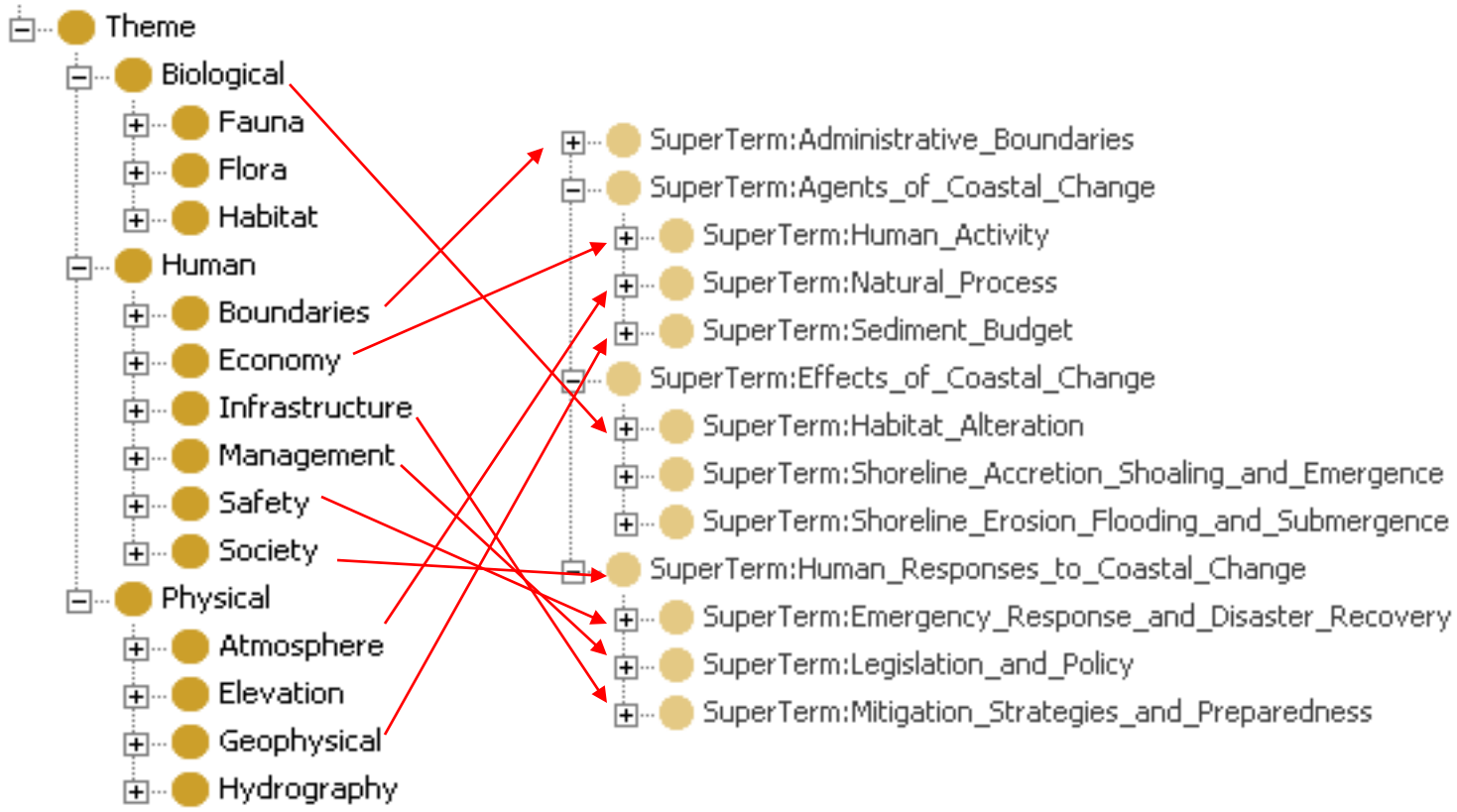
Controlled Vocabulary & Mapping Ontologies



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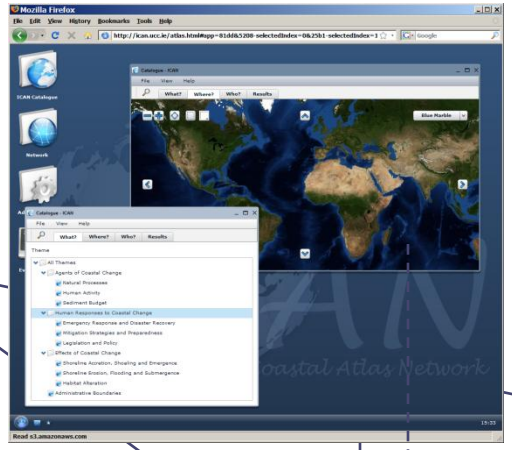
When WCA and others are Added…



ICAN Ontology

Mappings

MIDA Ontology

OCA Ontology

WCA Ontology

CSW WMS WFS

CSW WMS WFS

CSW WMS WFS

MIDA

oregon coastal atlas

…

Washington Coastal Atlas

1. User selects search criteria
2. Refers to local ontologies and mappings
3. If there, sends query to local CSW
4. Resulting metadata returned to ICAN and displayed

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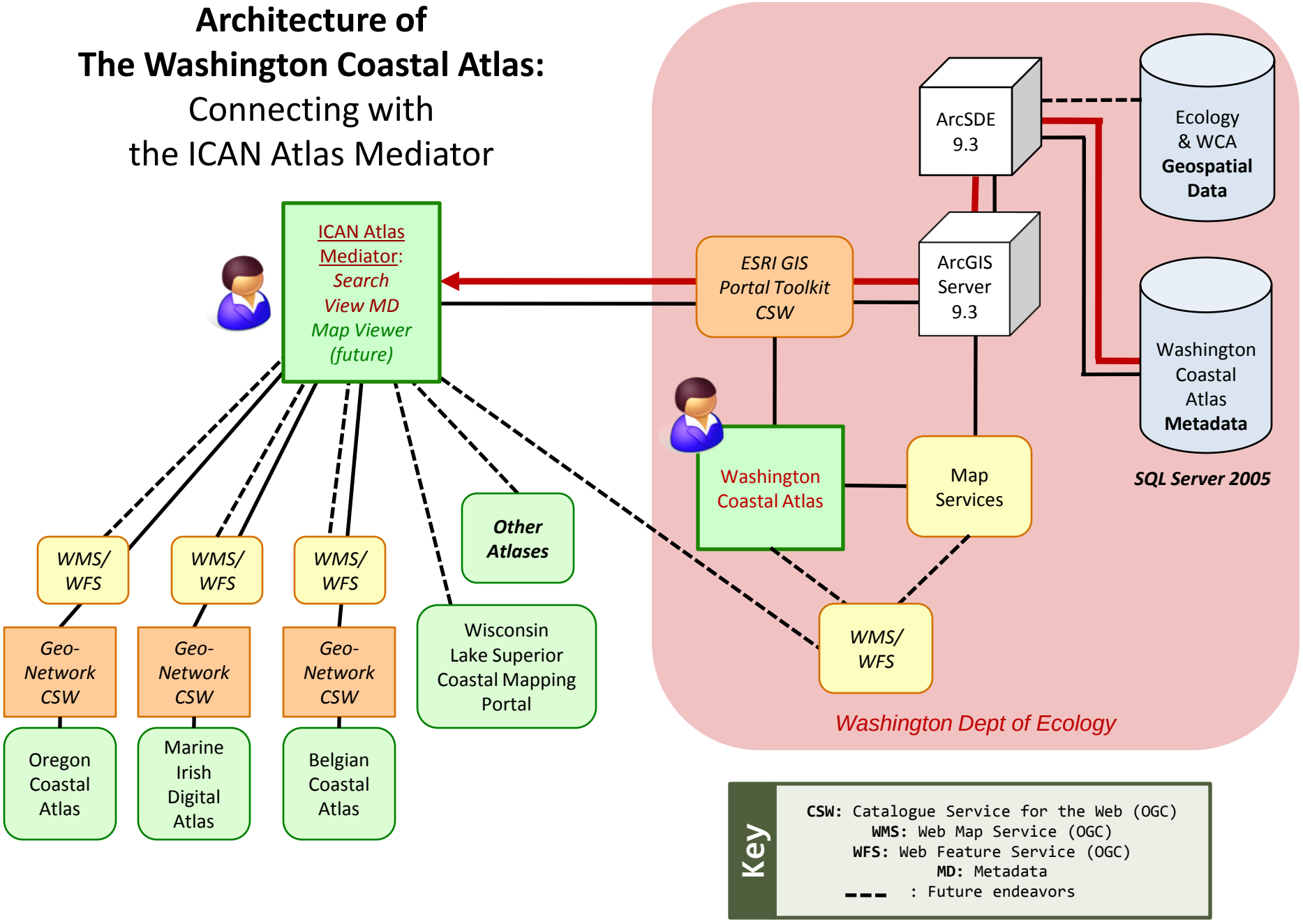
Architecture of The Washington Coastal Atlas: Connecting with the ICAN Atlas Mediator



Conclusions

- Coastal Atlases provide an array of geographically based information which can inform coastal scientific, policy and planning work.
- Sharing data across borders can:
  - Improve ecosystem management
  - Help communicate priorities and needs
  - Make cross-border management of natural resources easier and likely more effective
  - Enhance communication among scientists regarding existing conditions
- It is feasible to implement collaborative tools to improve access to coastal data
  - Dedication, support and openness to sharing

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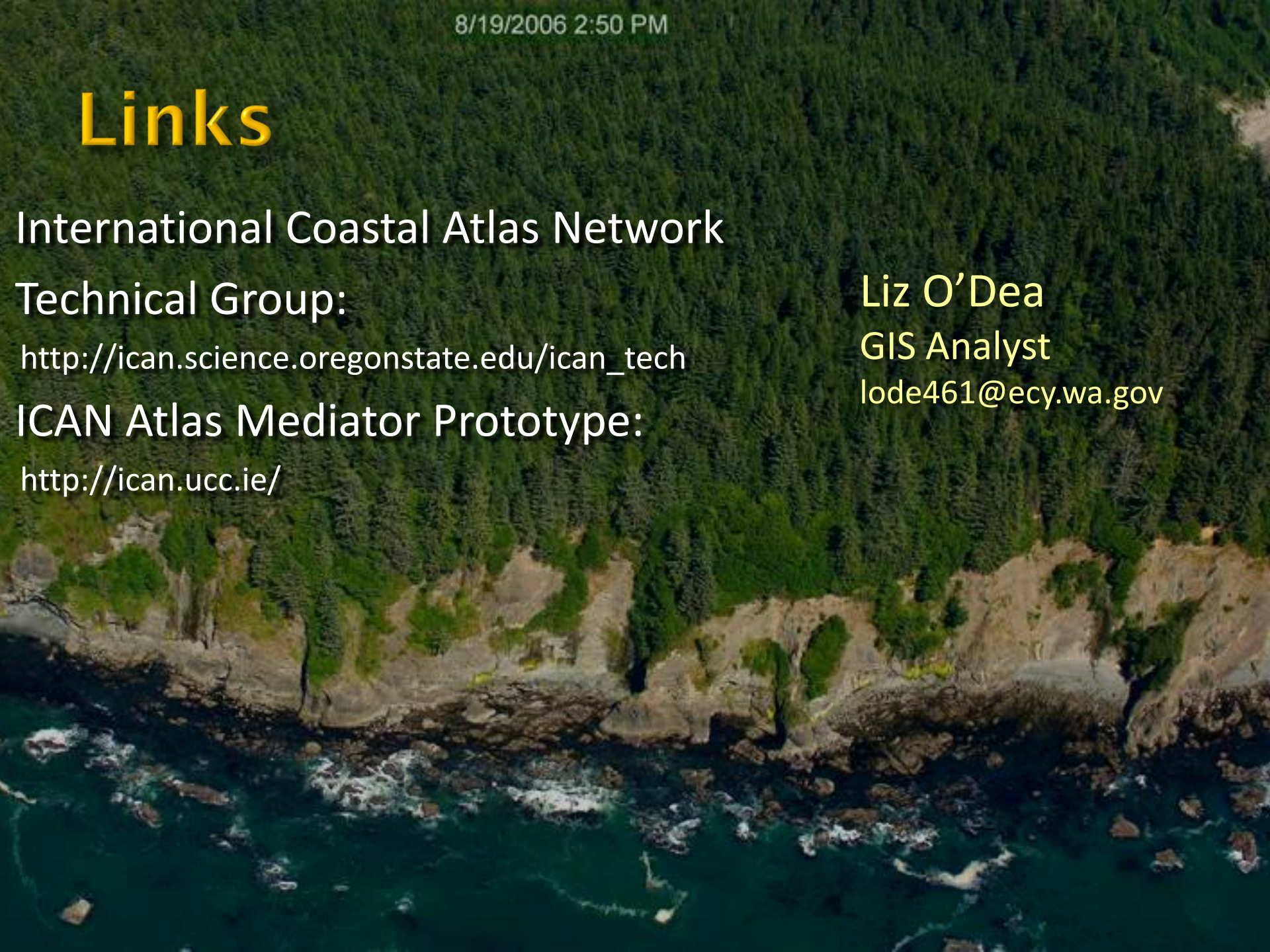

Links

International Coastal Atlas Network

Technical Group:

http://ican.science.oregonstate.edu/ican_tech

ICAN Atlas Mediator Prototype:

http://ican.ucc.ie/

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lode461@ecy.wa.gov