The On-Line Atlas of Oregon Lakes

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Why produce a lakes atlas?

- Water quality issues
  - Scientists, planners, policy makers
- Public interest in lakes
  - Boaters, fishermen
  - Destination for recreational visits
- Perhaps 5,500 named water bodies that would be recognized as lakes
- The 1985 print Atlas of Oregon Lakes
1986 Atlas of Oregon Lakes

- Published 1986, Oregon State University Press
- Sold well (7,000 copies)
- Now out of date, out of print
- CD version
- Funded by EPA Clean Lakes Program
- Emphasis on trophic status
- Center for Lakes and Reservoirs
Highly varied lake environs

- Mountain lakes
- Desert irrigation reservoirs
- Coastal dunes lakes
- Flood control reservoirs
Web based lakes atlases

• 2006 Survey of lakes data by states and provinces
• “DNR” websites provide access to a wide range of data including lakes.
• Legacy bathymetric maps: Wisconsin, Minnesota, British Columbia
• Websites specific to lakes: Utah, Alberta
• The EPA National Survey of lakes
2009 Contract with Oregon Department of Environmental Quality

- **EPA funding**
- **Provide tool to access lake water quality data**
  - Pacific Northwest Water Quality Exchange Database
  - Access data
  - Edit and add new data
  - Operate on copy of PNWWQX
- **Provide a graphical user interface**
  - Select water quality data from map
  - Provide lakes mapping and data to public
Main features of the atlas

- The PNWWQX water quality data
- Legacy lake data
- Lake basin delineations and basin characteristics
- Lake bathymetry
- Custom base maps using NHD hydrography
- Lake photo library
- Downloadable PDF lake maps
Keeping count of lakes

- Lake inventories for Oregon
  - The PNW River Reach File, 100K
  - The National Hydro Database, 24K

- The LLID & NHD reach codes
  - State continues to use LLID
  - Lack of cross-walk table

- The Geographic Names Information System
  - Many missing and mislabeled lakes
The PNWWQX

- Convert legacy data
- Provide access to data for scientists, policy makers, planners
- Provide a method for updating database by authorized persons
• Select lake from list

• View data, plots, download

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Atlas of Oregon Lakes

Lake Inventory

- Agate Reservoir
- Agency Lake
- Amber Lake
- Antelope Flat Reservoir
- Antelope Reservoir
- Anthony Lake
- Applegate Lake
- Baca Lake
- Badger Lake
- Balm Creek Reservoir
- Beale Lake
- Bully Creek Reservoir
- Bumphead Reservoir
- Bybee Lake
- Cape Meares Lake
- Cast Lake
- Charriton Lake
- Chickahominy Reservoir
- Clear Creek Reservoir
- Clear Lake
- Clear Lake (1130)
- Clear Lake (167)

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Secchi Transparency Chart

Devils Lake vs All Oregon Lakes
Lake basin delineations

• Reason?
  - The characteristics of the lake’s water in part a result of conditions in the lake basin
  - Wanted to tabulate lake basin characteristics

• A variety of methods used for delineations
  - Some large reservoirs aggregate of 6th field basins
  - For some small lakes needed to delineate from DEMs
Example of Lake Basin Delineation

1. Basin outline from AOL and 1/100k streams
2. Add 24K streams
3. Create vector polygon from AOL TIF image
4. Compare with 6th field basins
5. Add layer for NHD Plus catchment areas
6. Dissolve catchment areas to Lake Selmac Basin
7. Save results
Lake basin bathymetry

• Most were from legacy printed maps
• For about 20 maps digital depth grids were available
• Bathymetry to be published on Oregon GEO website
Example of geo-referencing of bathymetry

Scanned and geo-referenced legacy map.

Resultant depth contours and grid depth shadings
Custom base map cartography

- Use Google maps or ESRI?

- Compile own base map
  - Statewide view down to 1/9K at 9 scales
  - NHD hydrography
  - Best local roads, public lands
  - All text as annotation
  - Need to build the collar (WA, ID, NV, CA)

- Issues with tiling with ArcGIS Server
Tiling created for 9 scales from 1/9,000 to statewide. Public lands option.
Viewers provided choice of “public lands” or “naturalistic” background, using NLCD theme.
Downloadable PDF maps

- Both professional and public audience interested in being able to download and print maps.
- Options for printing
  - Frame area on screen and print
  - Produce custom maps for selected lakes
Sample PDF Map

Paulina Lake
Deschutes County

GNIS Name - Paulina Lake
GNIS ID - 1147502
NHD Reach - 17070302000352
Lat/Lon - 43° 42' 48" / -121° 16' 29"
Elevation - 6,336 ft, 1,936m
Lake Area - 1,531.0 acres, 619.6 hectare
Basin Area - 17.1 sq mi, 44.3 sq km
Type - Natural lake
Trophic Status - Mesotrophic, 21/08/82
Bath Map - AOL (ODFW), 30/12/64

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Conclusions

- Just recently on line. To soon to judge.
- Problems with tile creation and map navigation tools in ArcGIS Server 10. Dropped back to Server 9.3.
- Interest by other state agencies such as Oregon Marine Board.
- Like concept of using best Oregon data and NLCD for base map, but await feedback.
- A work in progress. Data to be added for more lakes. Additional types of data to be added.