Summary and Synthesis of the Available Literature on the Effects of Nutrients on Spring Organisms and Systems

Florida Department of Environmental Protection
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Wendy Graham	UF Water Institute
Kathleen McKee	UF Water Institute

AGENDA

- Presentation (30 min)
  Tasks to support deliverables (Reference Database and Final Report):
  - Task 1. Collection of Available Literature
  - Task 2. Development of a Springs Literature Database
  - Task 3. Synthesis Report
  - Task 4. Seminars, Reports
- Discussion of Database Deliverable capabilities
- Discussion of Report Outline
- Discussion of August Seminar

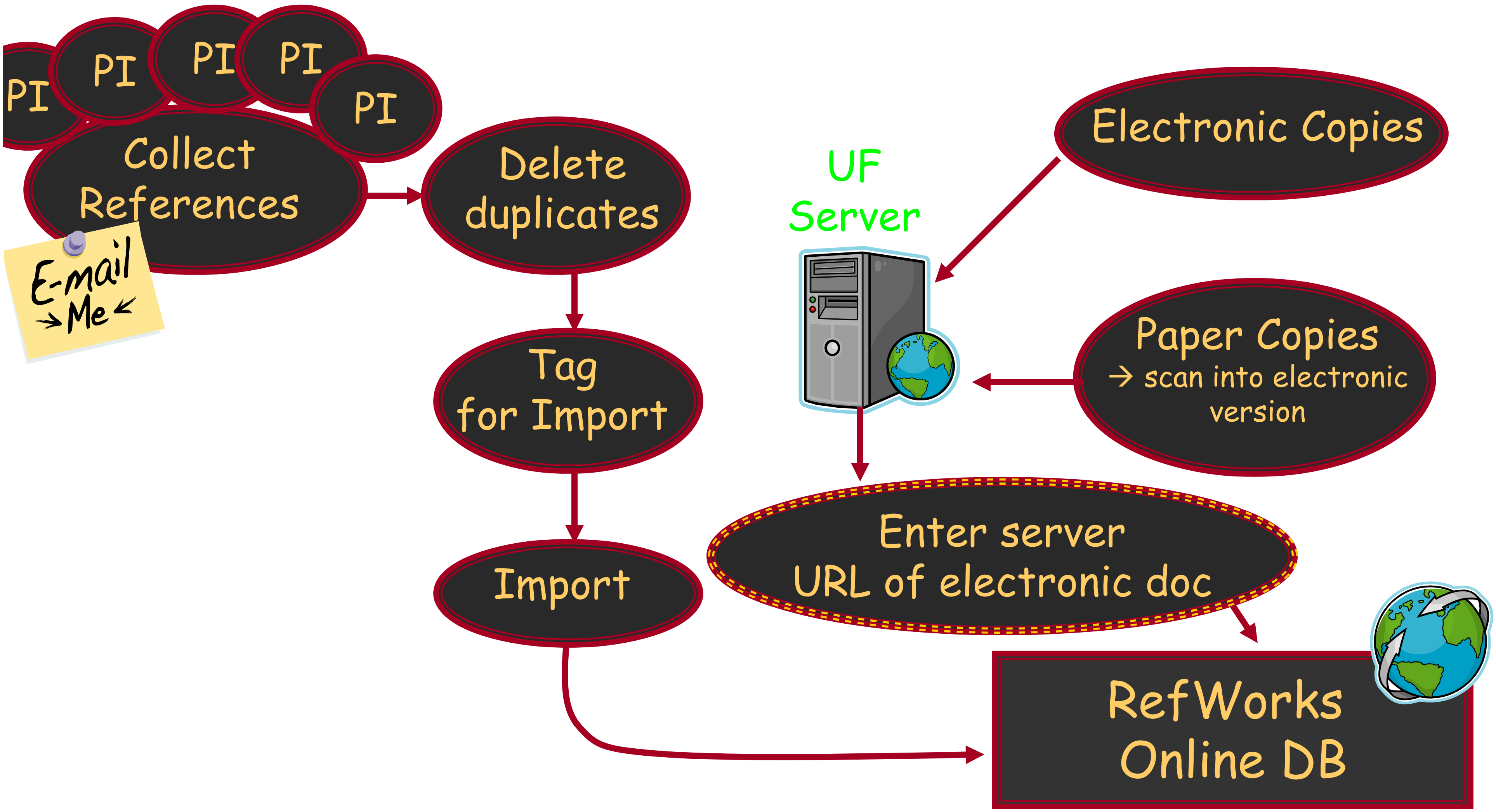
Task 1. Collection of Available Literature

- Books, Journal Articles, Reports, Proceedings
- Stores abstracts, annotations, URLs when available
- Online System for multiple users
- Organizable with Folders
- Searchable by any field including:
  - Author
  - Keyword
  - Major Subject
  - Reference Type
  - Publisher, Agency

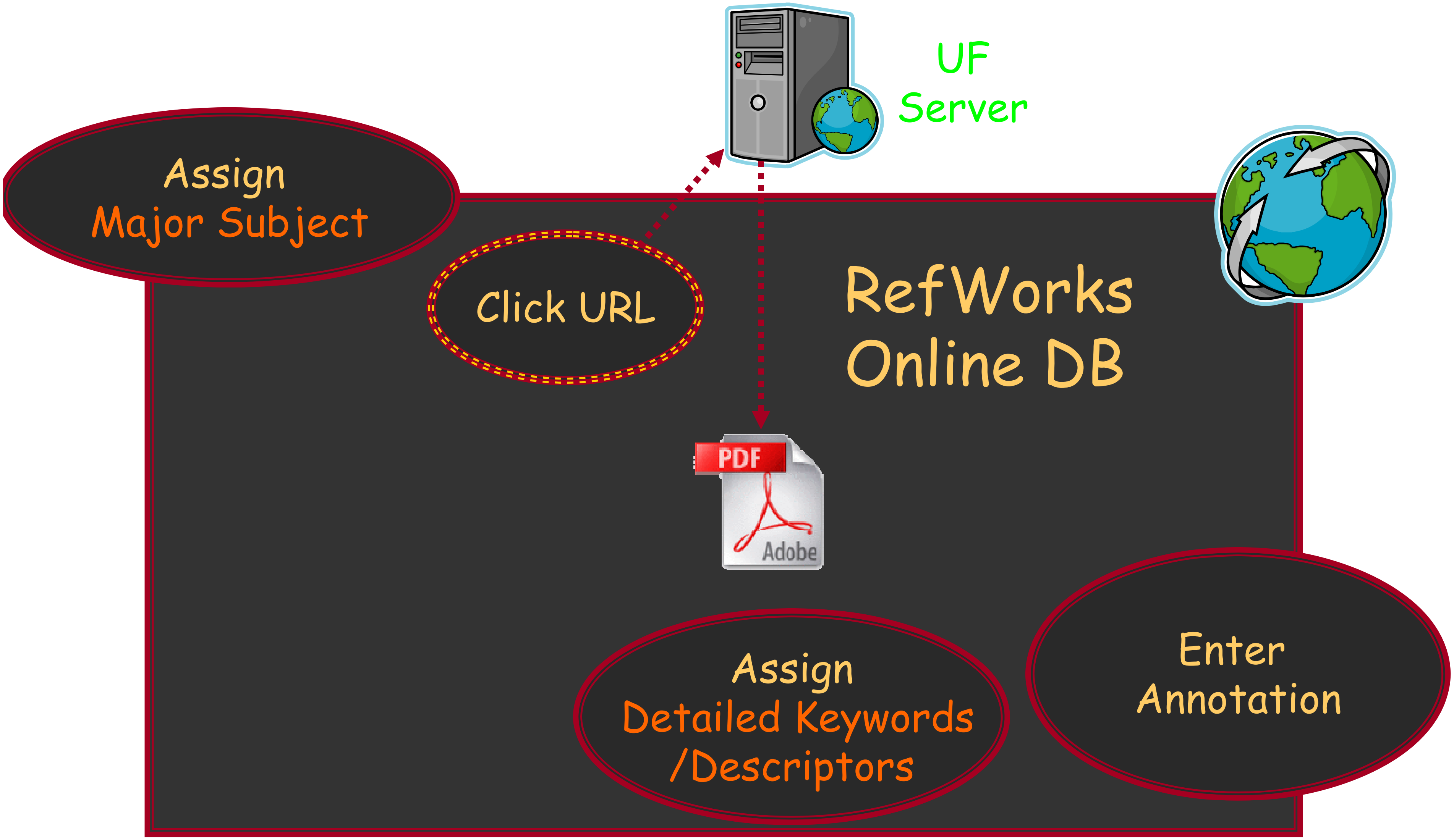
Task 1. Collection of Available Literature

- SWFWMD
- SJRWMD
- SRWMD
- NWFWMD
- USGS
- FDEP / FGS
- Rob Mattson bibliography
- Aquatic, Wetland and Invasive Plant Information Retrieval System (APIRS)
- Journal Article Searches

Task 2. Development of a Springs Literature Database



Task 2. Development of a Springs Literature Database



Web-based references manager

- Allows open access (to UF subscribers) for sharing annotated bibliography
- Has URL links for on-line materials

Refworks Web Based Bibliographic Management Software - Microsoft Internet Explorer

File Edit View Favorites To » Address http://www.refworks.com/Refworks/mainframe.asp?tsmp=1180718563680 Go Links

Google G Go Bookmarks 83 blocked Check AutoLink AutoFill Send to Setting

Back Search Favorites

RefWorks

Welcome, Kelly Chinners Reiss. Log ou

University of Florid

References Search View Folders Bibliography Tools Help Search RefWorks Go

Search Results for Advanced Search

Switch to: Standard View

Use: Selected Page All in List

Add to My List | Put in Folder... | Global Edit | Delete | Print

Sort by Created

Go to Page: 1 2 3 4 Next Last

Ref ID: 284 Journal Reference 1 of 92 Springs View Edit S·F·X

Title:	The transition of a freshwater karst aquifer to an anoxic marine system SO ESTUARIES AB
Authors:	Garman, K.M.; Garey, J.R.
Source:	2005, 28, 5, 686-693

Ref ID: 285 Journal Reference 2 of 92 Springs View Edit S·F·X

Title:	Nutrient inputs to the coastal ocean through submarine groundwater discharge: controls and potential impact
Authors:	Slomp, C.P.; Van Cappellen, P.
Source:	SO JOURNAL OF HYDROLOGY AB, 2004, 295, 1-4, 64-86

Ref ID: 287 Journal Reference 3 of 92 Springs; Outside Scope View Edit S·F·X

Title:	The behavior of U- and Th-series nuclides in groundwater
Authors:	Porcelli, D.; Swarzenski, P.W.; Porcelli, D.; Andersson, P.S.; Smoak, J.M.; Gramling, C.M.; McCorkle, D.C.; Mulligan, A.E.; Woods, T.L.
Source:	Limnol.Oceanogr., 2003, 48, 3, 957-970

Ref ID: 288 Journal Reference 4 of 92 Springs; Outside Scope View Edit S·F·X

Title:	Source of trace element variability in Great Barrier Reef corals affected by the Burdekin flood plumes
Authors:	Alibert, C.; Kinsley, L.; Fallon, S.J.; McCulloch, M.T.; Berkelmans, R.; McAllister, F.
Source:	SO GEOCHIMICA ET COSMOCHIMICA ACTA AB, 2003, 67, 2, 231-246

Ref ID: 280 Journal Reference 5 of 92 Springs; Outside Scope View Edit S·F·X

Title:	Groundwater vulnerability and risk mapping in a geologically complex area by using stable isotopes, remote sensing and GIS techniques
Authors:	Dimitriou, E.; Zacharias, I.
Source:	SO ENVIRONMENTAL GEOLOGY AB, 2006, 51, 2, 309-323

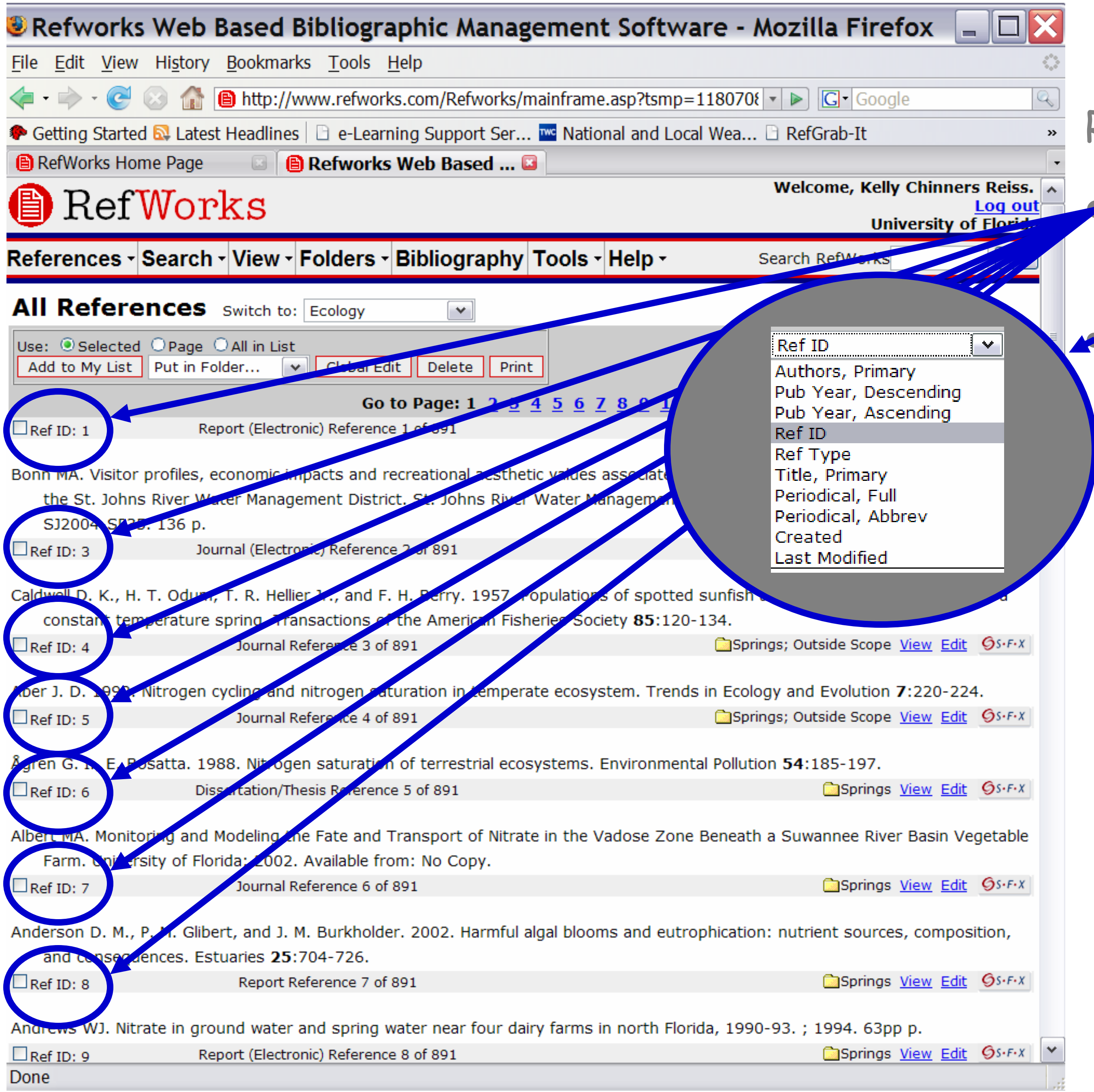
Ref ID: 281 Journal Reference 6 of 92 Springs View Edit S·F·X

Title:	Biogeochemical transport in the Loxahatchee River estuary, Florida: The role of submarine groundwater discharge
Authors:	Swarzenski, P.W.; Orem, W.H.; McPherson, B.F.; Baskaran, M.; Wan, Y.
Source:	SO MARINE CHEMISTRY AB, 2006, 101, 3-4, 248-265

Ref ID: 282 Journal Reference 7 of 92 Springs; Outside Scope View Edit S·F·X

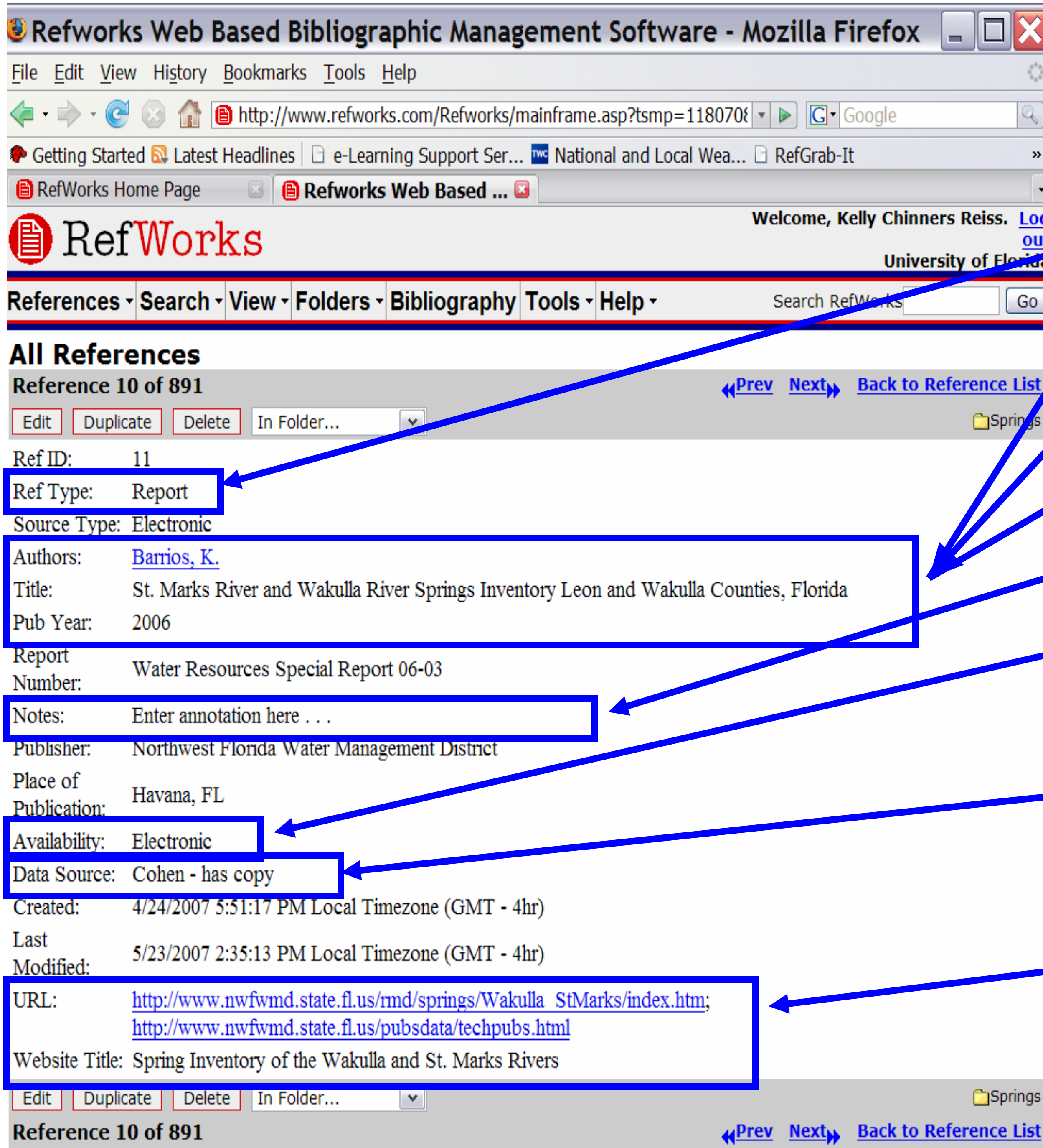
Title:	Statistical clustering of major solutes: Use as a tracer for evaluating interbasin groundwater flow into Indian Wells Valley, California
Authors:	Guler, C.; Thyne, G.D.
Source:	SO ENVIRONMENTAL & ENGINEERING GEOSCIENCE AB, 2006, 12, 1, 53-65

Ref ID: 283 Journal Reference 8 of 92 Springs View Edit S·F·X



RefWorks

- Has permanent reference ID
- Multiple sort options
  - Type
  - Author
  - Publication
  - Year, etc.

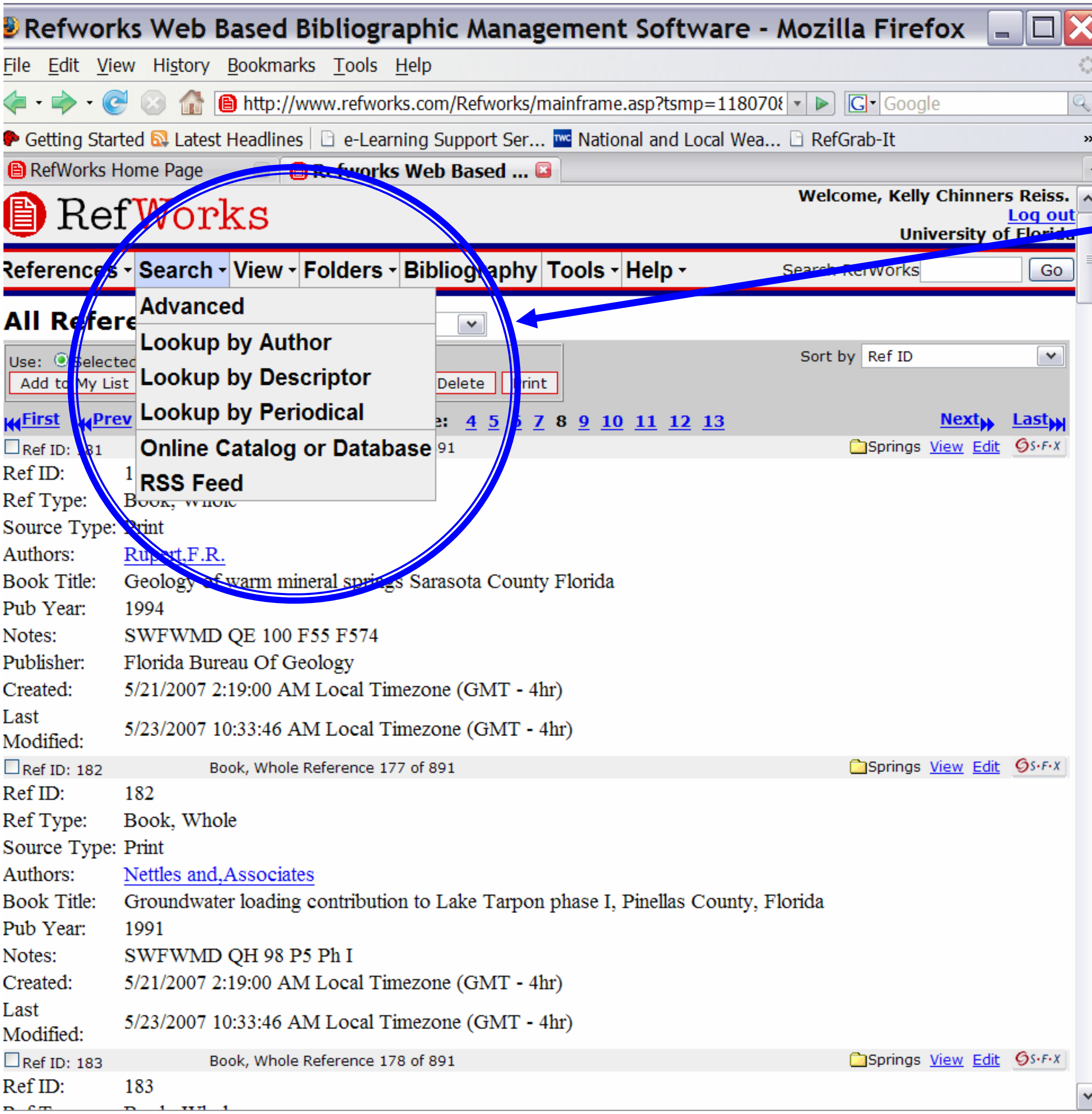


RefWorks

- Reference Type
- Author(s)
- Title
- Year

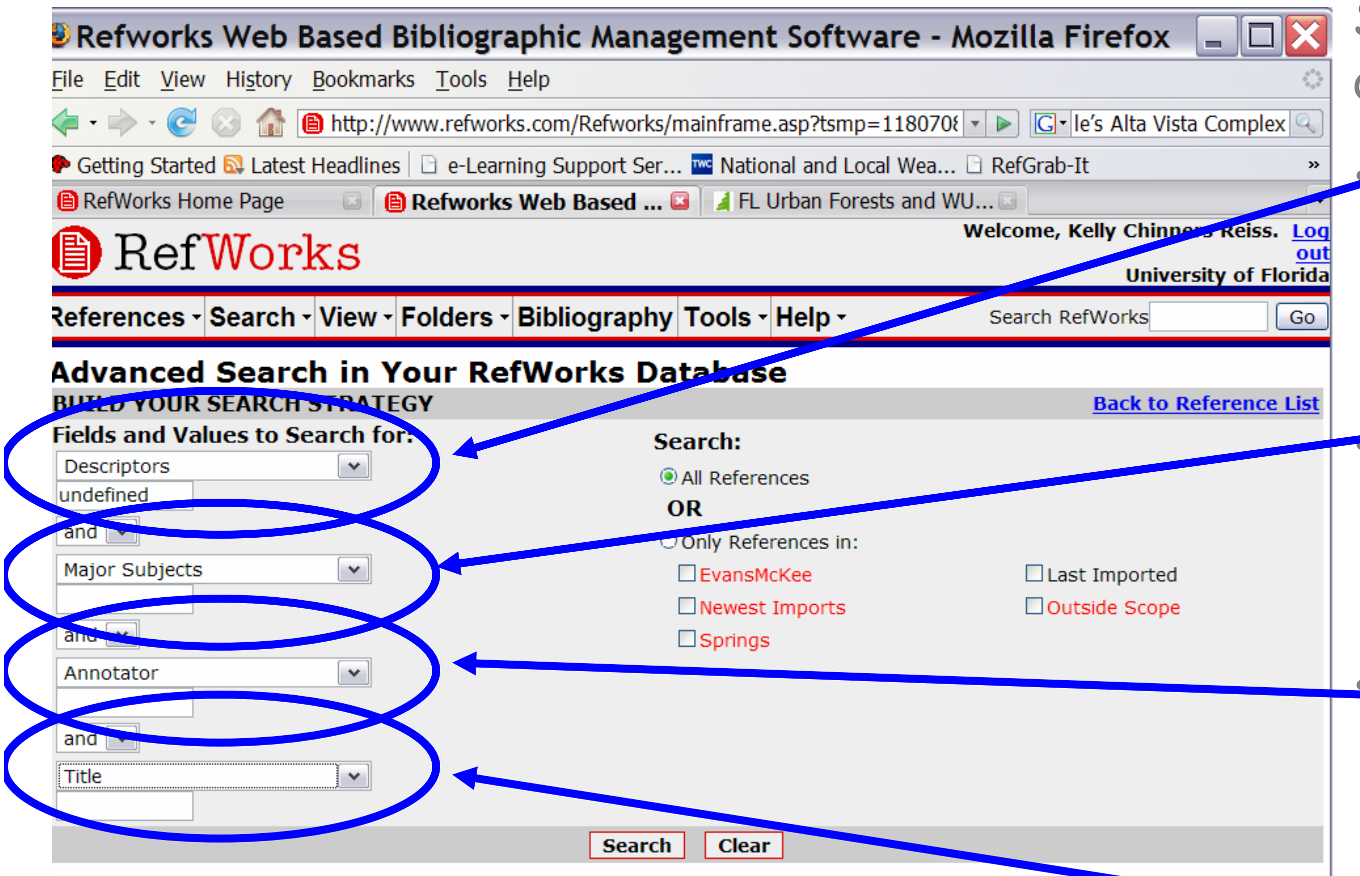
Basic citation info

- Notes
- Availability
  - What CFW has
- Data source
  - Who on project submitted source
- URL for on-line materials
- DOI – digital object identifier if available



RefWorks

- Search options
  - Advanced
  - By author
  - By descriptor (keyword)
  - By periodical

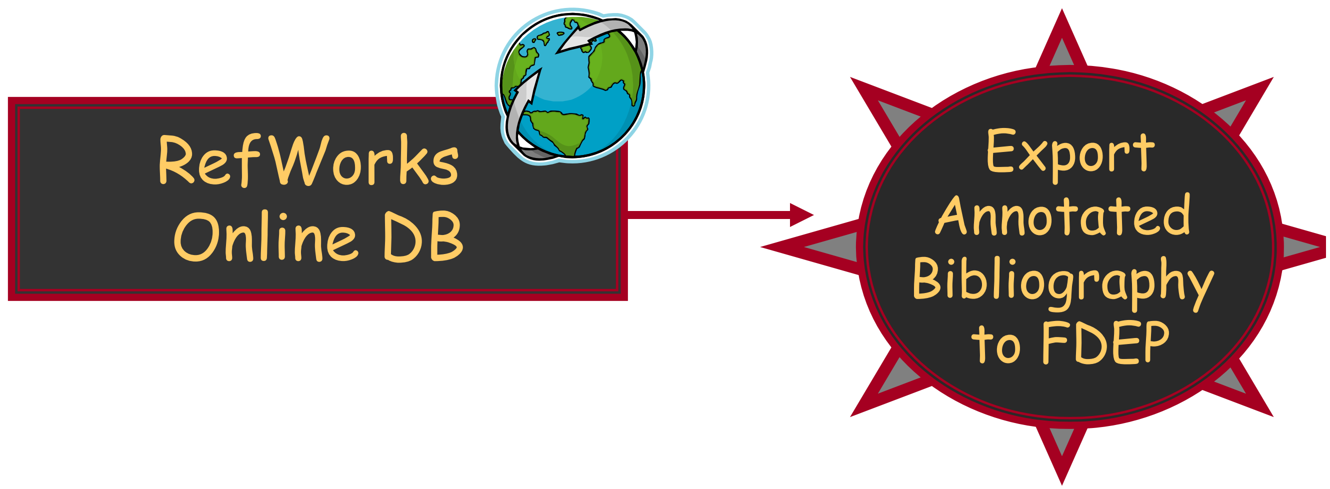


RefWorks

Searches can be done using

- Descriptors
  - Basic subjects
  - Keywords
- Major Subjects
  - Assigned for bibliography
- Annotator
  - Who wrote the annotation
- Title
- Etc.

Task 2. Development of a Springs Literature Database



Format?

→ RefWorks

→ EndNote

→ MS Access

Task 3. Synthesis Report

- Introduction
- Ch 1 Springs as Ecosystems (B. Knight)
- Ch 2 Sources, Transformations and Sinks of Nutrients in Karst Systems (M. Cohen)
- Ch 3 Biogeochemical Processes (P. Inglett)
- Ch 4 Macrophytes and Algae (T. Frazer)
- Ch 5 Macroinvertebrates and Fish (C. Jacoby)
- Ch 6 Invasive Species and Management (J. Evans)
- Ch 7 Ecosystem Level Processes (B. Knight)
- Ch 8 Synthesis (M. Brown)

Ch. 1 Springs as Ecosystems (B. Knight)

- Introduction
  - Historic Context
  - Major Literature Sources
- Springs as Ecosystems
  - Springs Ecosystem Model
  - Environmental Forcing Functions
    - Solar Inputs
    - Atmospheric Inputs
    - Groundwater Inputs
    - Anthropogenic Inputs
  - Energy Storages/Structure
    - Spring/Spring Run Basin
    - Water and Dissolved Constituents
    - Primary Producers
    - Primary Consumers
    - Higher-Level Consumers
- Literature Cited

Ch. 2 Sources, Transformations and Sinks of Nutrients in Karst Systems (M. Cohen)

- Introduction
  - Nitrogen Pollution Globally
  - Nitrogen Pollution in Florida
  - Nitrogen Biogeochemistry
- Sources of N
  - Overview of Env Loading of N
  - Sources of Nitrate-N in GW
  - Loads / Yields Watershed Scale
  - Inferring Sources of Nitrates
  - Temporal / Spatial Var of NO3 Loading
  - Annual / Seas Patterns N loading
  - Spatial Patterns of NO3 Loading
- Assessing Vulnerability to NO3 Loading
  - Geologically Induced Vuln
  - Land Use Induced Vuln
  - Time Lag Issues
- NO3 Transformations and Transport
  - Transport of NO3
  - Transformations of N
- Sinks for Nitrogen
  - Ecosystem Reactivity
  - Reactivity -Sub-Surface
  - Zones of Enhanced Reactivity: Riparian Wetlands
  - Zones of Enhanced Reactivity: Lakes
  - Zones of Enhanced Reactivity: Headwater Streams
  - Ecosystem Saturation
  - Anthropogenic Enhancement of N Removal
- Regional Load Case Studies
  - Santa Fe Basin
  - Upper Floridan Aquifer
  - Suwannee River Springs
  - Silver Springs
  - Rainbow Springs
  - Wekiwa Springs
  - Wakulla Springs
  - Ichetucknee Springs

Ch. 3 Biogeochemical Processes
(P. Inglett)

- Introduction
  - Importance
  - Major Literature Sources
  - Characteristic Environments/Organism Groups
    - Submerged surfaces
      - Epiphytic/Epilithic/Epibenthic
    - Sediments
      - Oxic/Anoxic Interface
  - Biogeochemical Processes
    - Carbon
      - Autochthonous/Allochthonous
      - Organic Matter Decomposition
    - Phosphorus
      - Inorganic/Organic
      - Ca/Fe Interactions
    - Nitrogen
      - Nitrogen Mineralization
      - Nitrogen Fixation
      - Denitrification
    - Sulfur
      - Sulfate Reduction
      - Sulfide Oxidation
    - Micronutrients
  - Effects of Nutrients
    - Nitrogen Impacts
    - Phosphorus Impacts
    - Carbon/Organic Matter Impacts
    - Sulfur Impacts
  - Research Needs
- Literature Cited

Ch. 4 Macrophytes and Algae (T. Frazer)

- Introduction
  - Factors affecting the abundance and distribution of aquatic plants and algae
  - Effects of nutrient enrichment on plant and algae (general)
- Spring Flora (patterns of abundance and distribution)
  - Historical
  - Present
- Effects of Nutrients on Spring Flora
  - Direct
  - Indirect
- Nuisance and Invasive species
- Additional Research Needs and Questions
- Literature Cited

Ch. 5 Macroinvertebrates and Fish (C. Jacoby)

- Background
  - Factors affecting the distribution and abundance of macroinvertebrates and fish
  - Overview of responses to nutrients for macroinvertebrates and fish
- Distribution and abundance of macroinvertebrates and fish in Florida springs
  - Historical
  - Present
- Impacts of nutrients on macroinvertebrates and fish
  - Direct (from known to uncertain)
  - Indirect (from known to uncertain)
- Gaps and research needs
- Literature cited

Ch. 6 Invasive Species and Management (J. Evans)

- Major Invasive Plants
  - *Eichhornia, Pistia, Hydrilla, Hygrophila*
- Commonly Cited Problems
  - Competition with native plants
  - Community structure changes
  - Overgrowth affecting navigation, dissolved oxygen, organic sedimentation rates
- Invasive Plant Management in Florida
  - Maintenance control – maintain at "lowest feasible levels"
  - Herbicides used, amounts, etc.
- Nutrients and Invasive Plants
  - nutrient/growth response relationships
  - Differences in nutrient relationships among the species
- Functions Provided by Invasive Plants
  - Contaminant uptake, Wildlife habitat, Buffering
- Case Studies
- Research Needs/Gaps
- Literature Cited

Ch. 7 Ecosystem Level Processes
(B. Knight)

- Ecosystem Level Processes
  - Basin Erosion and Sediment Transport
  - Primary Productivity
  - Community Respiration
  - Secondary Productivity
  - Photosynthetic/Respiration Ratio
  - Ecological Efficiency
  - Community Export
  - Pollutant Assimilation
  - Human and Aesthetic
- Effects of Nutrients on Spring Ecosystems
  - Primary Producers
  - Community Metabolism
  - Community Structure
  - System Export
  - Human and Aesthetic
- Additional Research Needs and Questions

Ch. 8 Synthesis
(M. Brown)

- Overview of nutrient effects – current knowledge
  - Organisms
  - Trophic dynamics
  - Ecological processes
- Hypotheses – organization, impacts, and effects
- Nutrient and spring ecosystem model
  - Mechanistic vs. empirical models
  - Energy and material flows
  - Trophic organization
  - Sensitivity analysis
  - Simulation results – test of hypotheses
- Knowledge gaps
- Future research directions
- Literature Cited

Task 4. Seminars, Reports

Project Timeline

June 1	Citations in RefWorks
June 4	Update Meeting with FDEP
June 4	Final report outline
August 15	Annotation of large # of references
August 21	Intermediate seminar
November 1	Draft chapters
January 31	Final seminar
February 1	First draft of final report
March 15	Draft final report

Task 4. Seminars

- August 21

  Intermediate seminar in Gainesville

  "...to encourage participation from experts on springs ecology ... allowing the opportunity for comment on project progress."

- Prior to January 31

  Final Seminar to FDEP in Tallahassee

August 21 Seminar
List of Invitees (p. 1 of 2)

- FDEP
  - Joe Hand, Russ Frydenborg + others!
- FGS
  - Gary Maddox, Harley Means
- USGS
  - Brian Katz, Stephen Walsh
- SRWMD
  - Louis Mantini, Kirk Webster
- SWFWMD
  - Mark Hammond, Marty Kelly, Veronica Craw, Gregg Jones
- NWFWMD
  - Kristopher Barrios
- SJRWMD
  - Rob Mattson, Dave Fisk, David Hornsby

August 21 Seminar
List of Invitees (p. 2 of 2)

- FWCC
  - Joe Prenger, Kent Smith
- UF
  - Jack Ewel, Jon Martin, Thea Edwards, Mark Clark, Andrea Albertin, Marty Anderson
- Faculty Outside UF
  - Wm Burnett (FSU), Jeffrey Chanton (FSU), Philip Darby (UWF), Jim Sickman (UCRiv), Jan Stevenson (Michigan)
- TNC
  - Doug Shaw
- Springs Working Groups
  - Faye Baird, Jim Stevenson
- Consulting
  - Bob Burleson, Carol Lippincott, Aga Pinowska, Scott Emery, Sam Upchurch,

Discussions

- Database Deliverable Capabilities
- Final Report Content
- August Seminar

Thank you!