

# OSM NATIONAL LIBRARY

October 10, 2012

## Current Journal Contents

U.S. Office of Surface Mining/DOI  
1999 Broadway, Suite 3320  
Denver, CO 80202-3050

This is the current compilation of the table-of-contents pages for journals received during the month of September in the Library. Individuals may have copies of specific articles by notifying the librarian either by phone, e-mail, or regular mail service. **(If you have more than one or two articles you want, please send a written or e-mail request.)**

Deborah K. McGinnis, Librarian  
[dmcginnis@osmre.gov](mailto:dmcginnis@osmre.gov)

Tel: (303) 293-5073  
FAX (303) 293-5017

[Search the OSM Library Catalog HERE](#)

### **NOTICE OF WARNING CONCERNING COPYRIGHT RESTRICTIONS**

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted material.

Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specific conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

This institution reserves the right to refuse to accept a copying order if, in its judgment, fulfillment of the order would involve violation of copyright law.

## Table of Contents

**Agronomy, Soils & Environmental Quality**

- Fate and Transport of Thirteen Pharmaceutical and Personal Care Products in a Controlled Irrigated Turfgrass System  
Lena Wright, Dale A. Devitt, Michael H. Young, Jay Gan, Brett J. Vanderford, Shane A. Snyder, Michael McCullough, and Laurel Dodgen . . . . . 1244

- Crop Productivity and Nutrient Dynamics in a Shrub (*Guiera senegalensis*)-Based Farming System of the Sahel  
E. L. Dossa, I. Diedhiou, M. Khouma, M. Sene, A. Lufafa, F. Kizito, S. A. N. Samba, A. N. Badlane, S. Diedhiou, and R. P. Dick . . . . . 1255

- Ecosystem Biomass, Carbon, and Nitrogen Five Years after Restoration with Municipal Solid Waste  
D. B. Watts, E. J. Arriaga, H. A. Torbert, D. L. Gebhart, and R. R. Busby . . . . . 1305

- Waste Streams from Methane Digesters: Exporting Nutrients through Turfgrass and Forage Production Systems  
Ronnie W. Schnell, Donald M. Victor, Tony L. Proffitt, and Clyde L. Munster . . . . . 1348

- Temporal and Spatial Influence of Perennial Upland Buffers on Corn and Soybean Yields  
G. M. M. Anomaa Senaviratne, Ranjith P. Udawatta, Kelly A. Nelson, Kent Shannon, and Shibu Jose . . . . . 1356

**Biofuels**

- Yield, Pests, and Water Use of Durum and Selected Crucifer Oilseeds in Two-Year Rotations  
A. W. Lenssen, W. M. Iversen, U. M. Sainju, T. C. Caesar-Ion-Thar, S. L. Blodgett, B. L. Allen, and R. G. Evans . . . . . 1295

**Biometry, Modeling & Statistics**

- Assessing the Uncertainty when Using a Model to Compare Irrigation Strategies  
Daniel Wallach, Nathalie Keussayan, François Brun, Bernard Lauroix, and Jacques-Eric Bergez . . . . . 1274

- Green Leaf Area Index Estimation in Maize and Soybean: Combining Vegetation Indices to Achieve Maximal Sensitivity  
Anthony Nguy-Robertson, Anatoly Gitelson, Yi Peng, Andrés Viña, Timothy Arkebauer, and Donald Rundquist . . . . . 1336

- Uncertainty Analysis and Parameter Estimation for the CSM-CROPGRO-Cotton Model  
Tapan B. Pathak, James W. Jones, Clyde W. Fraisse, David Wright, and Gerit Hoogenboom . . . . . 1363

- Can Integration of Legume Trees Increase Yield Stability in Rainfed Maize Cropping Systems in Southern Africa?  
Gudeta W. Sileshi, Legesse Kassa Debusho, and Festus K. Akinnifesi . . . . . 1392

**Crop Ecology & Physiology**

- Sowing Method Effects on Clover Establishment into Permanent Pasture  
David Schlueter and Benjamin Tracy . . . . . 1217

- Carbon Balance of No-Till Soybean with Winter Wheat Cover Crop in the Southeastern United States  
Mahereme T. Gebremedhin, Henry W. Loescher, and Teferi D. Tsegaye . . . . . 1321

- Soybean Yield and Chemical Composition in Response to Phosphorus–Potassium Nutrition in Kashmir  
M. Kaleem Abbasi, Majid Mahmood Tahir, Waleed Azam, Zaheer Abbas, and Nasir Rahim . . . . . 1476

**Crop Economics, Production & Management**

- Net Return Risk for Malting Barley Production in Western Canada as Influenced by Production Strategies  
E. G. Smith, J. T. O'Donovan, W. J. Henderson, T. K. Turkington, R. H. McKenzie, K. N. Harker, G. W. Clayton, P. E. Juskiw, G. P. Lafond, C. A. Grant, S. Brandt, M. J. Edney, E. N. Johnson, and W. E. May . . . . . 1379

- Tradeoffs in Performance of Native Warm-Season Grass Cultivars and Locally Harvested Seed Managed for Wildlife Habitat or Livestock Production  
S. K. Chamberlain, L. K. Paine, J. L. Harrison, and R. D. Jackson . . . . . 1383

- Rooting in a Creeping Bentgrass Putting Green in Response to Spring and Summer Coring  
Jinmin Fu and Peter H. Dermoeden . . . . . 1408

- Farmers' Opinion on Seed Potato Management Attributes in Ethiopia: A Conjoint Analysis  
Adane Hirpa, Miranda P.M. Meuwissen, Ivo A. Van der Lans, Willemien J.M. Lommen, Alfons G.J.M. Oude Lansink, Admasu Tsegaye, and Paul C. Struik . . . . . 1411

**Climatology & Water Management**

- Water Use Efficiency, Transpiration Efficiency, and Uptake Efficiency of Wheat during Drought  
Mohammad Reza Siahpoosh and Ebrahim Dehghanian . . . . . 1238

**Organic Agriculture & Agroecology**

- Optimizing Cover Crop Benefits with Diverse Mixtures and an Alternative Termination Method  
Sam E. Wortman, Charles A. Francis, Mark L. Bernardis, Rhae A. Drijber, and John L. Lindquist . . . . . 1435

- Performance of Dry Bean Genotypes Grown under Organic and Conventional Production Systems in Michigan  
James A. Heilig and James D. Kelly . . . . . 1485

## Soil Fertility & Crop Nutrition

- In Vitro Evaluation of Coatings to Control Ammonia Volatilization from Surface-Applied Urea**  
W. Hunter Frame, M. M. Alley, G. B. Whitehurst, B. M. Whitehurst, and R. Campbell . . . . . 1201
- Quantifying Nitrogen Requirement for Creeping Bentgrass Putting-Green Cultivars**  
C. M. Baldwin and A. D. Brede . . . . . 1208
- Soil Nitrogen and Phosphorus Behavior in a Long-Term Fertilization Experiment**  
Peter Anthony, Gary Malzer, Mingchu Zhang, and Stephen Sparrow . . . . . 1223
- On-Farm Evaluations to Calibrate Tools for Estimating Late-Season Nitrogen Status of Corn**  
P. M. Kyveryga and T. M. Blackmer . . . . . 1284
- Effect of Cultivar, Irrigation, and Soil Calcium on Runner Peanut Response to Gypsum**  
J. A. Howe, R. J. Florence, G. Harris, E. van Santen, J. P. Beasley, J. P. Bostick, and K. B. Balkcom . . . . . 1312
- Ground Cover Rice Production System Increases Yield and Nitrogen Recovery Efficiency**  
Hang Qu, Hongbin Tao, Yueyue Tao, Meiju Liu, Kangrong Shen, and Shan Lin . . . . . 1399

- On-Farm Estimation of Nutrient Requirements for Spring Corn in North China**  
Yi Zhang, Pen Hou, Qiang Gao, Xinping Chen, Fusuo Zhang, and Zhenling Cui . . . . . 1436
- Soybean Yield and Quality in Relation to Soil Properties**  
P. Anthony, G. Malzer, S. Sparrow, and M. Zhang . . . . . 1443
- Decreasing Nitrogen Leaching and Increasing Canola Forage Yield in a Sandy Soil by Application of Natural Zeolite**  
Majid Gholamhosseini, Majid AghaAlikhani, Aria Dolatabadian, Aydin Khodaei-Joghan, and Hamed Zakikhani . . . . . 1467

## Soil Tillage, Conservation & Management

- Crop Rotation Effect on Soil Carbon and Nitrogen Stocks under Limited Irrigation**  
Ardell D. Halvorson and Alan J. Schlegel . . . . . 1265
- Tillage Effects on Yield and Nitrogen Fixation of Legumes in Mediterranean Conditions**  
Paolo Ruisi, Dario Giambalvo, Giuseppe Di Miceli, Alfonso Salvatore Frenda, Sergio Saia, and Gaetano Amato . . . 1459

## Other Items

- ASA Statement of Ethics . . . . . iv

**AGRONOMY JOURNAL**  
**Vol. 104, no. 5 (September/October 2012)**  
**Page 2 of 2**



**Darwinian Agriculture**  
How Understanding Evolution Can Improve Agriculture  
R. Ford Denison

"*Darwinian Agriculture* is a very important contribution to our understanding of the links between nature and agriculture, and to the future of our human race. Denison underpins his arguments with an incredible wealth of insight and knowledge about plants, animals, physics, chemistry, biology, and ecology. The depth and breadth of scholarship embodied in this book is stunning. I know of nothing else like it."

—Kenneth G. Cassman, University of Nebraska

Cloth \$39.50 978-0-691-13950-0

 PRINCETON  
UNIVERSITY  
PRESS

See our E-Books at  
[press.princeton.edu](http://press.princeton.edu)

# Coal Age

## FEATURE ARTICLES

- 20 China Iron Ore Shipping Affects Coal Shipping Rates
- 22 Modern Longwall Mining  
*With Absolute Zero as its primary objective, CONSOL Energy's Bailey Complex embarks on an ambitious continuous improvement plan*
- 31 Coal Age: 100 Year Anniversary
- 1911: In the Beginning
  - 1920s: The Age of Mechanization
  - 1930s: Government Controls Follows the Failure of Normalcy
  - 1940s: Coal Provides the Fuel for World War II & the Cold War
  - 1950s: Labor Peace, Continued Mechanization and a Changing Focus on the Environment
  - 1960s: Coal Fuels America's Critical Electrical Backbone
  - 1970s: Coal Offers America Energy Security
  - 1980s: The Massive Build Out Begins
  - 1990s: Market Shifts Bring About Massive Consolidation
  - The Present: Safety Becomes a Priority
- 182 Navigating the World's Largest Mining Exposition  
*MINExpo 2012 will offer educational sessions that cover a wide range of mining topics*
- 186 Hydraulic Traction Drive Prevails at Steep Inclines  
*Tough deposits need tough cutting machines*
- 190 The Growing Popularity of Sustainable Mine Reclamation

## COAL IN THE NEWS

- 4 Times are tough, but Alliance CEO sees market improving
- 4 NMA scores two major victories for the coal industry
- 5 Cloud Peak Energy, Ambre Energy lock horns
- 6 Rhino restarts CAPP mines
- 8 Pennsylvania coal groups form alliance
- 10 MSHA's 'examinations' rule for underground coal mines goes into effect
- 10 Peabody, Kinder Morgan sign Gulf Coast coal export agreements
- 14 Ohio Valley pleads guilty to CWA violations
- 16 The war on coal now being fought from the air

## WORLD NEWS

- 5 Coal miners take to the streets in Spain  
*Zambian miners kill Chinese manager during pay protest*  
*Six miners perish in Mexican mine accident*
- 6 Colombia's Prodeco declares force majeure  
*EIA submitted for Canada's Donkin project*
- 8 Last Saar coal mine in Germany closes  
*China coal majors struggle amid falling coal prices*

## NEWS/4



COAL AGE: 100 YEAR ANNIVERSARY/31

## CONSOL ENERGY/22



ROOM-AND-PILLAR MINING/186



# THIS ISSUE

*Ken Duncan, shearer operator for CONSOL Energy's Bailey mine, raises the drum on an 1,850-hp Eickhoff 300-SL shearer. Using this shearer, which is the only Eickhoff shearer operating in the U.S., the crew posted its best numbers: 12,400 raw tons per shift.*

## DEPARTMENTS

- 2 Editorial
- 4 Coal in the News
- 5 World News
- 12 People
- 14 Dateline Washington
- 16 Calendar
- 18 Awards
- 190 Operating Ideas
- 192 Suppliers News
- 194 Product News
- 197 Classified
- 200 Legally Speaking

## FEATURE

### THE BAKKEN BOOM AND THE NEW WILD WEST

A Young Geologist's Perspective

Oil is flowing in the Bakken Formation near Williston, and young geologists and oil workers are flocking to this remote corner of northwestern North Dakota. The experience of living and working there harkens back to the boomtowns of the old Wild West.

R. Tyler Powers



## FEATURE

### HELPING STUDENTS GET GIS

And on the side, mapping dam failure in Williston

What began as a simple lesson plan for teaching GIS to community college students became a school-wide project that in the end is helping a town manage risks to a growing population.

Meg Marquardt



## FEATURE

### RISKY BUSINESS: Modeling Catastrophes

The probability that a given natural hazard could become a natural disaster is higher today than at any previous point in history. The insurance and reinsurance industries turn to sophisticated catastrophe models to assess the risks.

Zahra Hirji



## FEATURE

### TRAVELS IN GEOLOGY:

Touring Geologic Time in Colorado Springs

Few visitors to Colorado Springs, Colo., realize that the spectacular scenery spans more than a billion years of geologic processes. A visit to some of the area's premier attractions includes a walk through geologic time.

Lon Abbott and Terri Cook



**NEWS**

- 14 ARCTIC HUMIDITY ON THE RISE
- 14 CHAIN REACTION KILLS CORALS
- 15 CASE CLOSED ON FUNKY FLUORITE
- 16 DEGLACIATION MAY HAVE OPENED AN EARLIER DOOR TO THE AMERICAS
- 17 HARDY MICROBES MAKE A UNIQUE LIVING IN CHILE'S ATACAMA
- 18 IRON FERTILIZATION SINKS CARBON INTO THE DEEP OCEAN
- 19 GIANT PREHISTORIC INSECTS COULDN'T COMPETE WITH BIRDS
- 19 ANCIENT GROUNDWATER TAPPED IN MARYLAND
- 20 GETTING PUMPED FOR RENEWABLE ENERGY
- 21 HEAVY MORTALITY IN EUROPE POSSIBLE FROM ICELANDIC ERUPTION
- 22 "TIDAL" FEATURES FOUND IN LAKE SEDIMENTS
- 23 VOLCANOES GET A STRATOSPHERIC BOOST FROM MONSOONS
- 24 CLARIFYING EARTHQUAKE-DRIVEN HYDROLOGIC CHANGES
- 25 DEEPWATER HORIZON OIL SPILL LED TO FASTER EROSION
- 26 PHANEROZOIC SULFUR RECORD RE-EXAMINED
- 26 MAPPING THE WOOLLY MAMMOTHS' DEMISE
- 27 ANCIENT ITALIAN SUPER-ERUPTION IS LOOKING MORE SUPER



- 28 INVESTING IN THE EVERGLADES
- 28 TACKLING THE ISSUES: SCIENCE POLICY IN THE 2012 GENERAL ELECTION
- 29 AT EARTH ONLINE ...
- 29 EVIDENCE FOR LARGE-SCALE STRIKE-SLIP FAULTING ON MARS

**VIEWS**

- 8 **A COMMENT**  
IT'S A QUESTION OF ETHICS: SHOULD WE STUDY GEOENGINEERING?  
The decision — or even to study such schemes in large-scale field tests — is not just a question of science; it's also a question of ethics.  
**Jacob Haqq-Misra**
- 9 **A COMMENT**  
GEOENGINEERING RESEARCH: A NECESSARY PART OF A ROBUST CLIMATE RESPONSE STRATEGY  
The intentional application of geoengineering is complex and fraught with issues, but even if geoengineering is ultimately not deployed, an appropriately scoped and coordinated research program could offer co-benefits such as improved climate projections.  
**Riley Duren**
- 80 **GEOLOGIC COLUMN**  
MAKING THE CASE FOR PAPER MAPS  
Before you declare paper maps officially dead, consider their value. Here's a list of the top 10 advantages paper maps have over digital.  
**Lisa A. Rossbacher**

**DEPARTMENTS**

- 4 FROM THE EDITOR
- 6 LETTERS: PERSPECTIVES FROM READERS
- 12 **EARTH EXPOSURES: SUSITNA GLACIER**  
**Michael Collier**
- 61 **GEOMEDIA**  
On the Web: Stay Informed and Explore Earth with Facebook  
Books: "Rough-Hewn Land" Is Anything But Rough
- 63 **CROSS-SECTION: A PUZZLE**
- 64 **WHERE ON EARTH?**
- 65 **MINERAL RESOURCE OF THE MONTH: DIMENSION STONE**
- 66 **BENCHMARKS**  
October 1, 1960: Camp Century, a Cold War Ice Fortress Is Built
- 69 **DOWN TO EARTH WITH**  
COAST GUARD CAPTAIN, ARCTIC EXPLORER, PROFESSOR LAWSON BRIGHAM
- 72 **EARTH PRODUCT SPOTLIGHT**
- 74 **GEOMARKETPLACE**
- 76 **CLASSIFIEDS: CAREER OPPORTUNITIES**

**FEATURES**

**New Gold's New Afton Reaches Commercial Production**  
*A team of seasoned professionals build the next great block cave operation ...* 52

**Navigating the World's Largest Mining Exposition**  
*MINExpo 2012 will offer education sessions that cover a wide range of mining topics* ..... 66

**Productivity and Cost-efficiency Drive DTH Drilling**  
*Down-the-hole (DTH) is one of the mainstream drilling technologies for mining and quarrying worldwide. Recent improvements have largely been aimed at making systems more fuel-efficient and at optimizing tool life.* ..... 72

**How Nonlinear Modeling Improved Understanding of a Hydrometallurgical Leaching Process**  
*Development of quality mathematical models fit for industrial production processes, particularly leaching, has been considered to be very difficult. However, the results of a recent project illustrate that newer nonlinear modeling techniques have clearly improved the situation.* ..... 84

**Chile's Mining Providers and the Human Resources Puzzle**  
*Pascual Veiga, president of Chile's Association of Large Industrial Providers to Mining, discusses the industry's enormous opportunities as well as its challenges—access to people being the key one for providers* ..... 92

**Reopening of Copper Mountain**  
*Four Atlas Copco Pit Viper rotary drill rigs help keep ore production on target* ..... 96

**Australian Technology: CSIRO Helps Mining Industry Work More Efficiently**  
*After a number of traditional global R&D leaders 'dropped the ball'—due to funding cuts, industry disinterest or complacency—Australia saw an opportunity, seized the initiative and became a world leader in mining-technology innovation* ..... 100

**Australian Technology: Technology Drives Improved Productivity** ..... 102

**Optimization Process at Antamina Boosts Production and Energy Efficiency**  
*Helping a large copper/zinc mine meet the economic challenge of processing harder ore types* ..... 116

**Three-way Fight for Underground Market Share**  
*Market analysis of the world's largest underground mines has confirmed the dominant position of Sandvik, Atlas Copco and Caterpillar in mobile equipment* ..... 122

**Where are the Mega-ships Now?**  
*Although the 'new era' of iron ore shipping—involving 300,000 and 400,000-ton carriers—between Brazil and China started off in rough seas, a strong application of common business sense has been like oil upon the waters* ..... 128

**Conflict Mineral Regulations Cause Corporate Concerns**  
*A recent ruling passed down by the SEC has producers and manufacturers alike wondering if they'll have to file a new report form, what they'll need to include and how much it all will cost* ..... 136



*New Gold has re-opened the Afton copper-gold mine near Kamloops, B.C., Canada. The New Afton mine, which achieved commercial production during August, is Canada's only block cave operation. When it reaches full capacity, it will produce 11,000 metric tons per day. On the cover, miners emerge from the New Afton portal. (Photo courtesy of New Gold)*



News—Leading Developments...6



New Afton...52

## LEADING DEVELOPMENTS

Peace Sought Following Violence at Lonmin's Marikana Mine .....	6
BHP Billiton Profit Drops; Olympic Dam Study Extended .....	7
Anglo American and Codelco Settle Dispute over AAS .....	8
Pueblo Viejo Joint Venture Produces its First Gold .....	8
Feasibility Study for Proposed Labrador Trough Rail Line .....	10

## AROUND THE WORLD

### U.S. & Canada:

<i>Canadian Zinc Reports Prairie Creek PFS, Plans Acquisition of Paragon Minerals</i> .....	14
---	----

### Latin America:

<i>Xstrata Starts Commissioning at Antapaccay</i> .....	26
---	----

### Australia/Oceania:

<i>Xstrata Advances McArthur River and Mount Margaret Projects</i> .....	30
--	----

### Africa:

<i>Endeavour Acquiring Avion in Agreed Transaction</i> .....	34
--	----

### Europe:

<i>Dalradian Reports Positive PEA for Curraghinalt Project</i> .....	38
--	----

### Asia:

<i>Oyu Tolgoi Phase-one Construction Nearing Completion</i> .....	38
---	----

### Exploration Roundup:

<i>Chinalco Subsidiary Signs Farm-in Agreement for Codelco's Sulfatos Property</i> .....	42
--	----

## DEPARTMENTS

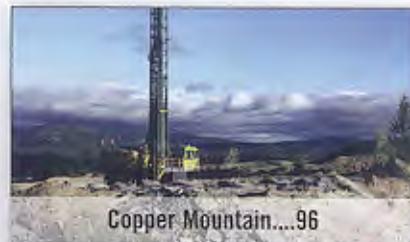
Book Reviews .....	172
Calendar .....	50
Classified Advertisements .....	174
Equipment Gallery.....	166
From the Editor .....	4
Markets .....	176
Operating Strategies .....	142
People .....	22
Processing Solutions.....	158
Suppliers Report .....	150
This Month in Coal .....	46



DTH Drilling...72



Nonlinear Modeling...84



Copper Mountain...96



Australian Technology...100



Energy Efficient Communication...116

## COVER STORY

## Getting Greener

- 32** Data-center owners are trying to control skyrocketing utility costs by reducing electricity and water use in their resource-thirsty facilities.

Cover photo and right courtesy of Skanska



## SPECIAL NEWS REPORT

## After Isaac, Questions Surfacing

- 10** Neighbors ask if their floods are the price for New Orleans' defense

## NEWS

## Government

- 12** **Policy:** Romney as president likely to be 'deregulator in chief'

## Transportation

- 14** **Light Rail:** Chicago team quickly places big truss without falsework
- 19** **Bridges:** Ohio River spans, worth \$2.6 billion, are set for award at year-end.
- 22** **Bridges:** Historic Vermont span slides sideways into a new future

## Environment

- 17** **Nuclear Waste:** DOE Hanford manager wants Bechtel off waste plant design

## UPCOMING ISSUES

Sept. 17 Top 400 Sourcebook

Sept. 24 Q3 Cost Report

Oct. 1 Web News and Updates

Oct. 8 Water Report



Checked House Bridge made wider. Page 22

## Business Management

- 18** **Workplace:** Construction men find refuge in sexual harassment laws
- 20** **Obituary:** 'Father of wind engineering,' Jack E. Cermak, is dead at 89
- 31** **Obituaries:** Cancer claims chiefs of Arkansas engineer, Massachusetts contractor and Reno architect, all under 65

## DEPARTMENTS

- 4** Calendar
- 6** Washington Observer
- 9** Construction Week
- 31** People
- 54** Construction Economics
- 56** Products
- 57** Pulse
- 60** Viewpoint



## For subscriber services call:

(877) 876-8208 or (515) 237-3681

GO TO MY.ENR.COM FOR PASSWORD-PROTECTED ONLINE ACCESS.

**Not getting ENR Insider and News Alerts?** Please call (877) 876-8208

**enr.com**

ADDITIONAL CONTENT ONLINE

## Engineering News-Record

The McGraw-Hill Companies

SERVING THE INDUSTRY SINCE 1874

**advertising offices:** Two Penn Plaza, New York, N.Y. 10121-2298. Phone (212) 512-2000. **Postmaster:** Please send address changes to ENR/Engineering News-Record, Attention: Fulfillment Manager, P.O. Box 5730, Hightstown, NJ 08520. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Canada Post Publication Mail Agreement No. 40012501. Registered for GST as The McGraw-Hill Companies. GST #R123075673. RETURN UNDELIVERABLE CANADIAN ADDRESSES TO: DHL Global Mail, 355 Admiral Blvd-Unit 4, Mississauga, ON L5T 2N1. Email: enr.custserv@cdfulfillment.com. **Copyright, printing and reprinting:** Titles Engineering News-Record (ENR) and CONSTRUCTION WEEK reg. ® in U.S. Patent Office. Copyright © 2012 by The McGraw-Hill Companies. All rights reserved. **Officers of The McGraw-Hill Companies, Inc.:** Harold W. McGraw III, Chairman, President, and Chief Executive Officer; Jack F. Callahan Jr., Executive Vice President and Chief Financial Officer; Kenneth M. Vittor, Executive Vice President and

**ENR (Engineering News-Record),** (ISSN 0891-9526). Published weekly 3 issues a month; 36 weeks a year by The McGraw-Hill Companies, 1221 Ave. of the Americas, New York, N.Y. 10020. **Founder:** James H. McGraw (1860-1948). **Executive, editorial, circulation,**

**General Counsel:** McGraw-Hill Construction: Keith Fox, President; John Murphy, Director, Finance. Where necessary, permission is granted by copyright owner for those registered with Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, Mass. 01923, www.copyright.com, to photocopy any article herein for personal or internal reference use only for the flat fee of \$1.20 per copy for each article. Send payment to CCC, ISSN 0891-9526/02. Copying for other than personal or internal reference use without express permission of The McGraw-Hill Companies is prohibited. Write the editor to request such permission. **Printed in the USA.** **Subscription rates for individuals in the field of the publication:** U.S. and possessions, \$62 per year (single copies \$9.95 in U.S.); Canada and Mexico, \$89 per year; outside North America, \$195 per year. Please allow four to six weeks for shipment. **Subscriber service and single copies:** (877) 876-8208 or (515) 237-3681. Send all correspondence, notices and subscription orders to Fulfillment Manager, ENR, P.O. Box 5730, Hightstown, NJ 08520. If possible, attach address label from a recent issue. **Please contact customer service to change your name or address.** If the postal authorities alert us that your magazine is undeliverable, we have no further obligation unless we receive a corrected address within two years. Please allow a month for change of address to take effect. **Classified advertising:** Send ads to ENR, Classified Advertising, Two Penn Plaza, 9th Floor, New York, NY 10121. Phone (212) 904-2815.

## COVER STORY

## Tearing Down To Build Up

**48** Restoration of a river in the Pacific Northwest to its natural state begins with the largest-ever dam removal.

Cover photo and right courtesy of Barnard Construction



## FEATURE

## The Top Green Contractors

- 55** Green building spreads slowly while perception and measurement shift
- 63** Top 100 Green Contractors List

## NEWS

## Government

- 10** **Politics:** Obama agenda and GOP road-block unlikely to change in a second term

## Buildings

- 11** **Development:** Pact opens door to complete stalled Sept. 11 museum
- 16** **Work Methods:** Turner pauses all staff and subs for tutorials on lean and safety
- 17** **Project Finance:** 'Village' eyed to aid Nevada

## Environment

- 14** **Sustainability:** Team goes high-tech to boost water and air quality in Africa

## Technology

- 18** **Technology:** New use of 2D material may be transistor breakthrough

## Business &amp; Management

- 26** **Obituary:** Torcon founder Benedict Torcivia Sr. dies at 82

## SOURCEBOOK

## General Building

- 66** Builders see positive signs the market is improving

## Petroleum

- 68** Sizable backlogs make contractors upbeat

## Power

- 70** Cheap gas creates a sea change in projects

## Transportation

- 73** Alternative delivery carries tepid market

## Manufacturing/Telecom

- 76** Producers beginning to bring it all back home

## Environment

- 79** Projects drying up as funding falls short

## Overview

- 83** Private industry work is up, but public spending sags
- 85** The Top 400 Contractors

## UPCOMING ISSUES

Sept. 24 Q3 Cost Report

Oct. 1 Web News and Updates

Oct. 8 Water Report

Oct. 15 Top 600 Specialty Contractors

## DEPARTMENTS

- 4** Update
- 6** Washington Observer
- 9** Construction Week
- 22** Information Technology
- 20** Products
- 26** People
- 117** Construction Economics
- 121** Pulse
- 128** Viewpoint



**For subscriber services call:**  
(877) 876-8208 or (515) 237-3681

GO TO MY.ENR.COM FOR PASSWORD-PROTECTED ONLINE ACCESS.

**Not getting ENR Insider and News Alerts?** Please call (877) 876-8208

**enr.com**

ADDITIONAL CONTENT ONLINE

## Engineering News-Record

The McGraw-Hill Companies

SHOWING THE INDUSTRY SINCE 1874

advertising offices: Two Penn Plaza, New York, N.Y. 10121-2298, Phone (212) 512-2298. Published weekly 3 issues a month, 36 weeks a year by The McGraw-Hill Companies, 1221 Ave. of the Americas, New York, N.Y. 10020. Founder: James H. McGraw (1860-1948). Executive, editorial, circulation, Postmaster: Please send address changes to ENR/Engineering News-Record, Attention: Fulfillment Manager, P.O. Box 5730, Harlan, IA 51593. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Canada Post Publication Mail Agreement No. 40012501. Registered for GST as The McGraw-Hill Companies. GST #R123075673. RETURN UNDELIVERABLE CANADIAN ADDRESSES TO: DHL Global Mail, 355 Admiral Blvd-Unit 4, Mississauga, ON L5T 2N1, Email: enrsubs@serv@cdsfulfillment.com. Copyright, printing and reprinting: Titles Engineering News-Record (ENR) and CONSTRUCTION WEEK reg. © in U.S. Patent Office. Copyright © 2012 by The McGraw-Hill Companies. All rights reserved. Officers of The McGraw-Hill Companies, Inc.: Harold W. McGraw III, Chairman, President, and Chief Executive Officer; Jack F. Callahan Jr., Executive Vice President and Chief Financial Officer; Kenneth M. Vittor, Executive Vice President and

General Counsel. McGraw-Hill Construction: Keith Fox, President; John Murphy, Director, Finance. Where necessary, permission is granted by copyright owner for those registered with Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, Mass. 01923, www.copyright.com, to photocopy any article herein for personal or internal reference use only for the flat fee of \$1.20 per copy for each article. Send payment to CCC. ISSN 0891-9526/92. Copying for other than personal or internal reference use without express permission of The McGraw-Hill Companies is prohibited. Write the editor to request such permission. Printed in the USA. Subscription rates for individuals in the field of the publication: U.S. and possessions, \$82 per year (single copies \$9.95 in U.S.); Canada and Mexico, \$89 per year; outside North America, \$195 per year. Please allow four to six weeks for shipment. Subscriber service and single copies: (877) 876-8208 or (515) 237-3681. Send all correspondence, notices and subscription orders to Fulfillment Manager, ENR, P.O. Box 5730, Harlan, IA 51593. If possible, attach address label from a recent issue. Please contact customer service to change your name or address. If the postal authorities alert us that your magazine is undeliverable, we have no further obligation unless we receive a corrected address within two years. Please allow a month for change of address to take effect. Classified advertising: Send ads to ENR, Classified Advertising, Two Penn Plaza, 9th Floor, New York, NY 10121, Phone (212) 904-2815.

## COVER STORY

## Raising the Bar on Bridges

- 28** Five years after the I-35W bridge collapse, industry strives to improve management, repairs and replacements of critical links.
- 34** UDOT, which pioneered design-build, continues to provide a case study for successful construction innovation.

Cover photo courtesy of HNTB.  
Photo right courtesy of MODOT.



## COST REPORT

## Third-Quarter Overview

- 37 Economics:** Materials prices tied to housing market bounce back while other prices remain flat
- 39 Confidence Index:** Industry believes market will remain flat through 2013
- 41 Equipment:** Going green makes costs for truck maintenance shoot up
- 42 Insurance:** New formula for calculating workers' compensation could hike costs
- 44 Labor:** Labor costs inch upward despite high unemployment

## NEWS

## Power &amp; Industrial

- 10 Renewable Energy:** Solar firms rush to become cost-competitive by 2016

## UPCOMING ISSUES

Oct. 1	Web News and Updates
Oct. 8	Water Report
Oct. 15	Top 600 Specialty Contractors
Oct. 22	Education Report

- 14 Alternative Fuels:** Butanol backers push retrofit effort as ethanol boom fades

- 15 Alternative Energy:** Concrete for wind towers

## Business Management

- 13 Companies:** PSI president's improbable journey puts firm on road to recovery
- 16 Workplace:** U.S. anti-bias agency expands guidance on ex-offender hires
- 16 Next Generation:** For CM grad, internship is key to landing a job in a tough market
- 17 Management:** Owners and contractors connect risk-taking and value creation
- 49 Obituary:** John Lamberson, surety executive, is dead

## Transportation

- 17 Infrastructure:** Funding gap seen for ports and waterways

## Infrastructure

- 11 People:** New commander Bostick taking stock and setting Corps of Engineers priorities
- 12 Professional Practice:** FIDIC: Remove the obstacles to true sustainable design

## DEPARTMENTS

- 4** Update
- 6** Construction Week
- 9** Washington Observer
- 18** Information Technology
- 49** People
- 51** Construction Economics
- 85** Equipment Tracks & Trends
- 86** Products
- 87** Pulse
- 96** Viewpoint



For subscriber services call:  
(877) 876-8208 or (515) 237-3681

GO TO MY.ENR.COM FOR PASSWORD-PROTECTED ONLINE ACCESS.

Not getting ENR Insider and News Alerts? Please call (877) 876-8208

**enr.com**  
ADDITIONAL CONTENT ONLINE

Engineering News-Record

The McGraw-Hill Companies  
SERVING THE INDUSTRY SINCE 1874

advertising offices: Two Penn Plaza, New York, N.Y. 10121-2298. Phone (212) 512-2298. Postmaster: Please send address changes to ENR/Engineering News-Record, Attention: Fulfillment Manager, P.O. Box 5730, Harlan, IA 51593. Periodicals postage paid at New York, N.Y., and at additional mailing offices. Canada Post Publication Mail Agreement No. 40012501. Registered for GST as The McGraw-Hill Companies. GST #R123075673. RETURN UNDELIVERABLE CANADIAN ADDRESSES TO: DHL Global Mail, 355 Admiral Blvd-Unit 4, Mississauga, ON L5T 2W1. Email: enrsubs@mcgraw-hill.com. Copyright, printing and reprinting: Titles Engineering News-Record (ENR) and CONSTRUCTION WEEK reg. ® in U.S. Patent Office. Copyright © 2012 by The McGraw-Hill Companies. All rights reserved. Officers of The McGraw-Hill Companies, Inc.: Harold W. McGraw III, Chairman, President, and Chief Executive Officer; Jack F. Callahan Jr., Executive Vice President and Chief Financial Officer; Kenneth M. Vittor, Executive Vice President and

ENR (Engineering News-Record), (ISSN 0891-9526). Published weekly 3 issues a month, 36 weeks a year by The McGraw-Hill Companies, 1221 Ave. of the Americas, New York, N.Y. 10020. Founder: James H. McGraw (1860-1948). Executive, editorial, circulation, Postmaster: Please send

General Counsel. McGraw-Hill Construction: Keith Fox, President; John Murphy, Director, Finance. Where necessary, permission is granted by copyright owner for those registered with Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, Mass. 01923, www.copyright.com, to photocopy any article herein for personal or internal reference use only for the flat fee of \$1.20 per copy for each article. Send payment to CCC. ISSN 0891-9526/92. Copying for other than personal or internal reference use without express permission of The McGraw-Hill Companies is prohibited. Write the editor to request such permission. Printed in the USA. Subscription rates for individuals in the field of the publication: U.S. and possessions, \$82 per year (single copies \$9.95 in U.S.); Canada and Mexico, \$89 per year; outside North America, \$195 per year. Please allow four to six weeks for shipment. Subscriber service and single copies: (877) 876-8208 or (515) 237-3681. Send all correspondence, notices and subscription orders to Fulfillment Manager, ENR, P.O. Box 5730, Harlan, IA 51593, if possible, attach address label from a recent issue. Please contact customer service to change your name or address. If the postal authorities alert us that your magazine is undeliverable, we have no further obligation unless we receive a corrected address within two years. Please allow a month for change of address to take effect. Classified advertising: Send ads to ENR, Classified Advertising, Two Penn Plaza, 9th Floor, New York, NY 10121. Phone (212) 904-2815.

**SPECIAL ISSUE: Trends in Biogenic-Carbon Accounting**

Guest-editor: Eric Johnson

Biogenic carbon accounting: A special issue <i>Eric Johnson</i>	1
Climate impacts of bioenergy: Inclusion of carbon cycle and albedo dynamics in life cycle impact assessment <i>Ryan M. Bright, Francesco Cherubini and Anders H. Strømman</i>	2
Baseline effects on carbon footprints of biofuels: The case of wood <i>Eric Johnson and Daniel Tschudi</i>	12
Carbon sequestration, optimum forest rotation and their environmental impact <i>Erhun Kula and Yavuz Gunalay</i>	18
Accounting for forest carbon pool dynamics in product carbon footprints: Challenges and opportunities <i>Joshua P. Newell and Robert O. Vos</i>	23
A methodology to estimate greenhouse gases emissions in Life Cycle Inventories of wastewater treatment plants <i>G. Rodriguez-Garcia, A. Hospido, D.M. Bagley, M.T. Moreira and G. Feijoo</i>	37
Attributing land-use change carbon emissions to exported biomass <i>Laura Saikku, Sampo Soimakallio and Kim Pingoud</i>	47



0195-9255(201211)37;1-G

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

**SciVerse ScienceDirect**

VOL. 25, NO. 12

# GOVERNING

09.2012

Uzeir Ispahi,  
an Ahiska Turk  
whose family  
immigrated to  
Dayton, Ohio

## FEATURES

### SPECIAL SERIES

**25** AMERICA IS GETTING OLDER. FAST.

**26** TALKIN' 'BOUT MY GENERATION

What makes the boomers the boomers?

*By Neil Howe*

**34** BOOM(ER)TOWN

How will an aging population reshape America's cities?

*By Ryan Holeywell*

**40** ROCK THE VOTE

They hold tremendous influence, but baby boomers and their role at the polls are a bit hard to pin down.

*By Rob Gurwitt*

**44** WITH OPEN ARMS

Forget Arizona. Dayton, Ohio, and other cities are actively working to attract immigrants.

*By Dylan Scott*

**52** LOOKING AT THE BOOKS

Are the financial reports cities and counties issue once a year useless?

*By Jonathan Walters*

PHOTO: JIM WITMER  
COVER PHOTO: CORBIS

## DEPARTMENTS

4 Publisher's Desk

6 Letters

### OBSERVER

9 Recall Fever  
Recall attempts have been rising, but recent efforts have stumbled.

10 Taxing the Cloud  
States wrestle with how to tax something you never possess.

12 Forget the Plan  
Atlanta voters turn back a major transportation funding measure.

### POLITICS + POLICY

14 Dispatch  
It's time to rethink the parking lot and how to measure its value.

16 Potomac Chronicle  
Today, the nation's capital is more about what you own than what you do.

17 FedWatch  
Sewage overflows cause a stir between the feds and localities.

18 Health  
Michigan's "4x4" is not a truck, but a plan to fight obesity.

20 Green Government  
San Francisco wants a street-light that can think for itself.

22 Economic Engines  
Centennial Campus is the poster child for today's business parks.

23 Urban Notebook  
Despite their high value, urban trees are on the decline.



MARIC HALLING STATE UNIVERSITY

### PROBLEM SOLVER

58 Raising Drug-Free Families  
Drug abuse is a common problem in child neglect cases. An Arizona program treats parents in an effort to reunite families.

60 Smart Management  
Poorly managed sick pay is a growing fiscal headache.

61 Idea Center  
Georgia wants to use robots to fix highways.

62 Tech Talk  
Failure of the federal Cyber Security Act leaves critical infrastructure vulnerable to attack.

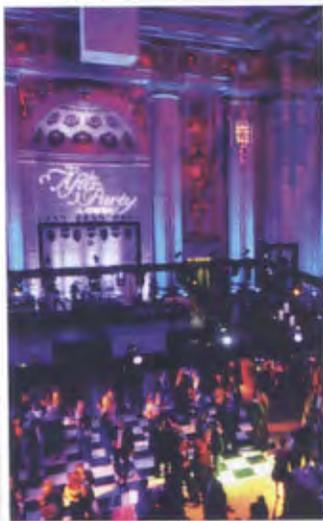
64 Public Money  
It is more crucial than ever to know whether government programs are effective.

66 Last Look  
Wisconsin is home to the longest-serving state lawmaker in the country.

10



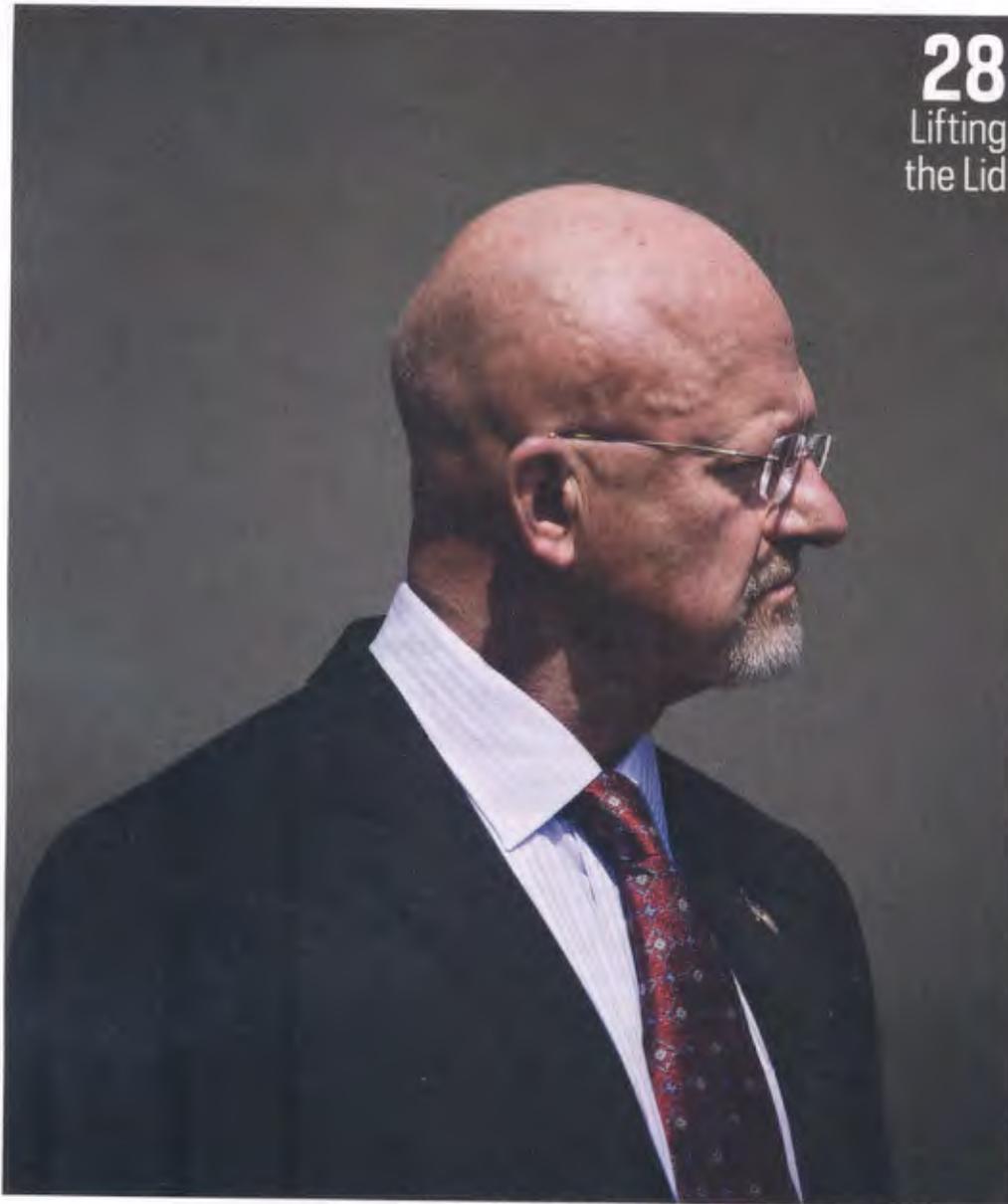
SHUTTERS/STOCK.COM



AP IMAGES.COM

16

28  
Lifting  
the Lid



James Clapper, Office of the Director of National Intelligence

FEATURES

18 All Business

Mitt Romney has been a governor and run the Olympics. But he says **his private sector experience** is what would make him a successful president. By Kellie Lunney

28 Lifting the Lid

National Intelligence Director **James Clapper** must blend 16 agencies into a coherent community. By Charles S. Clark

4 Editor's Notebook  
When it comes to his presidential campaign, Mitt Romney is a company man.

BRIEFING

9 Around Government  
Helium shortage on the horizon, veterans at risk, GSA back at Ground Zero.

12 Defensive Maneuvers  
Backers of domestic unmanned aircraft promote privacy and security protections.

16 Backing BRAC  
Defense still believes in the base realignment and closure process.

NEXTGOV

37 Tech Roundup  
VA looks to consolidate cellphone bills, a very loud cyberattack and fed websites gain fans.

38 Managing Technology  
Consolidating data centers alone won't eliminate costly electric bills.

ADVICE AND COMMENT

43 Management Matters  
Social media opens doors for managers.

44 Analysis  
Choosing the cloud that meets your agency's needs.

45 Perspectives  
Achieving consensus on fair pay for feds.

46 Thinking Ahead  
Snow, rain and revolution don't stop Shane Morris' diplomatic couriers.

JIM LO SCALZO/LANDOV

COVER PHOTOGRAPH BY LAN/CORBIS; ILLUSTRATION BY JESSE LENZ

# Information Security Journal: A Global Perspective

Volume 21 ■ Number 5 ■ 2012

- 231  
Compact Keccak Hardware Architecture for Data Integrity and Authentication on FPGAs  
*Ismail San and Nurey At*
- 243  
Using the Digital Signature of a Fingerprint by an Elliptic Curve Cryptosystem for Enhanced Authentication  
*T. N. Shankar, G. Saboo, and S. Niranjani*
- 256  
A Novel High Quality High Capacity Image Hiding Scheme Based on Image Compression  
and an Optical Pixel Adjustment Process  
*Lo'ail A. Tawalbeh, Omar Banimelhem, and Mohammed Al-Batati*
- 269  
Forecasting Malware Conditions: Worsening Conditions, Some Bright Spots  
*Henk-Jan van der Molen*
- 280  
A Unified User Management System  
*Georgios Mamalakis and Chariton Karamitas*
- 285  
Quadruple Difference Expansion-Based Reversible Data Hiding Method for Digital Images  
*Osama S. Faragallah*



Volume 100

CONTENTS

1 October 2012

(Abstracted/Indexed in: Chemical Abstracts; Current Contents Physical, Chemical and Earth Sciences; Geo Abstracts; PASCAL/CNRS; PROMIS; and the Science Citation Index. Also covered in the abstract and citation database SciVerse Scopus®. Full text available on SciVerse ScienceDirect®)

Review Article

Sulfur in coals: A review of geochemistry and origins
C.-L. Chou 1

Research Papers

A Tier 3 method to estimate fugitive gas emissions from surface coal mining
A. Saghafi 14
Geochemical characterization of solid bitumen (migrabitumen) in the Jurassic sandstone reservoir of the Tut Field, Shushan Basin, northern Western Desert of Egypt
M.R. Shalaby, M.H. Hakimi and W.H. Abdullah 26
Functional groups and common pyrolysate products of Odontopteris cantabrica (index fossil for the Cantabrian Substage, Carboniferous)
E.L. Zodrow, J.A. D'Angelo, R. Helleur and Z. Šimůnek 40
Pore size distribution and accessible pore size distribution in bituminous coals
R. Sakurovs, L. He, Y.B. Melnichenko, A.P. Radlinski, T. Blach, H. Lemmel and D.F.R. Mildner 51
Vitrinite reflectance gradients of deep wells with thick chalk sections and high pressure: Implications for source rock maturation, Danish-Norwegian Central Graben, North Sea
H.I. Petersen, C. Andersen, A.C. Holme, A.D. Carr and E. Thomsen 65
Observations from an enhanced gas recovery field trial for coal mine gas management
R. Packham, L. Connell, Y. Cinar and R. Moreby 82
Maceral types in some Permian southern African coals
J.C. Hower, N.J. Wagner, J.M.K. O'Keefe, J.W. Drew, J.D. Stucker and A.R. Richardson 93

Erratum

Erratum to "A provenance study of mineral matter in coal from Appalachian Basin coal mining regions and implications regarding the respirable health of underground coal workers: A geochemical and Nd isotope investigation" [Int. J. Coal Geol. 94 (2012) 123-136]
S.J. Schatzel and B.W. Stewart 108



(Abstracted/Indexed in: Chemical Abstracts; Current Contents Physical, Chemical and Earth Sciences; Geo Abstracts; PASCAL/CNRS; PROMIS; and the Science Citation Index. Also covered in the abstract and citation database SciVerse Scopus®. Full text available on SciVerse ScienceDirect®)

*Review Articles*

Coalbed methane: A review

T.A. Moore ..... 36

*Research Papers*

Enrichment of arsenic, lead, and antimony in Balingian coal from Sarawak, Malaysia: Modes of occurrence, origin, and partitioning behaviour during coal combustion

S.-G. Sia and W.H. Abdullah ..... 1

Geological interpretation of gas content trends, Walloon Subgroup, eastern Surat Basin, Queensland, Australia

S.K. Hamilton, J.S. Esterle and S.D. Golding ..... 21

*Short Communication*

The further adventures of Tin Man: Vertical temperature gradients at the Lotts Creek coal mine fire, Perry County, Kentucky

J.C. Hower, G.C. Copley, J.M.K. O'Keefe and J.M. Hower ..... 16



The Journal of Explosives Engineering  
Published by International Society  
of Explosives Engineers  
30325 Bainbridge Road  
Cleveland, Ohio 44139  
www.isee.org

**Publisher**  
International Society of Explosives Engineers

**Editor**  
Dede Manross  
explo@comcast.net

**Contributing Writers**  
R.B. Hopler  
Bill Reisz

**Board of Directors**  
*President*  
John E. Capers  
*Vice President Administration*  
Michael J. Koehler

*Vice President, Technical*  
Jack W. Eloranta  
*Treasurer*  
James P. Daley

*Secretary*  
Alastair C. Torrance

*Past President*  
Ron J. Elliott

*Directors*  
Nancy C. Allen  
Josef (Boet) E. Coetzee  
Fred L. Grabner  
Kevin J. Hachmeister  
Algernon R. Hackett  
David Harrison  
Keith M. Henderson  
Richard M. Hosley, Jr.  
Thomas S. Jenkins  
Hans E. Wallin  
Dean A. Wiegand  
John E. Wiegand

*Executive Director*  
J. Winston Forde

*Director of Communication*  
Dede Manross

*Meetings & Conference Manager*  
Lynn Mangol, CMP

*Office Manager*  
Mary Spena-Bosch

*Membership Coordinator*  
Ruth Schaefer

*Publications Coordinator*  
Lauren Creneti

*SEE Education Foundation Program Director*  
Arlene Chafe

All correspondence should be directed to:  
International Society of Explosives Engineers,  
30325 Bainbridge Road, Cleveland, Ohio 44139  
Telephone: (440) 349-4400. Fax: (440) 349-3788.  
Email: isee@isee.org WebSite: www.isee.org

The Journal of www.isee.org

# EXPLOSIVES ENGINEERING

Volume 29 Number 5 September/October 2012

## FEATURES

- 6 High Profile Project in Historic Affluent Nashville Neighborhood Poses Challenges**  
The Montgomery Bell Academy project in Nashville, TN included building a parking garage structure topped by a soccer field. The project included expanding the parking area and moving the existing tennis courts. Unique challenges were encountered including public relations challenges with owners of an affluent historic neighborhood, proximity of structures, local geology, and planning work around continuous school activities.
- 14 Member Focus**  
Dr. David E. Siskind
- 34 Urban Blasting — Gaps in Regulatory Control in British Columbia**  
This article proposes that good regulations or guidelines, specifically tailored to urban blasting, can improve urban blasting practices in B.C. and across Canada.
- 42 Recent Projects**  
Paseo Bridge Pier Demolition.

## DEPARTMENTS

- 4 From the Executive Director**
- 18 Industry News**
- 22 Chapter News**
- 24 Calendar of Events**
- 26 Explosives, 100 Years Ago, More or Less**  
The breakup of Dupont into Dupont, Atlas, and Hercules.
- 30 19th Annual Photo & Art Contest**  
Pre-Split Walls.



*On the Cover: Sometimes it's good to be a driller. On this day on the Missouri River, David Hersey takes a moment to ponder and size things up. The new I-35 bridge looms in the background as David waits for the barge to move so he can resume drilling on the old Paseo Bridge Pier. See story, page 42.*

Copyright ©2012 Society of Explosives Engineers, Inc., dba International Society of Explosives Engineers  
The Journal of Explosives Engineering, published six times per year, is the official publication of the International Society of Explosives Engineers. The Society is not responsible for opinions expressed and statements made by authors in articles or advertisements published in the Journal. ISEE assumes no responsibility for the completeness, accuracy, or conclusions reached in any of the articles or items published in this Journal.

Since the information is unique and because each job site is different, information presented in this Journal may not apply to your specific field situation. Readers are cautioned to carefully consider ideas presented and decide for themselves if the procedures described are safe and appropriate for the intended use. The International Society of Explosives Engineers cannot be responsible for the specific application of the information presented. Also, remember to always consult the manufacturer of the product(s) you are using for recommended practices.

Mention in this publication of a commercial or proprietary product does not constitute an endorsement or recommendation for its use. Registered names, trademarks, logos, artwork, photographs, etc., used in this publication, even without specific indication thereof, are to be considered protected by law.

Yearly subscription rates: \$95 U.S.A., \$115 all others (International Air Mail). All members of the Society receive a complimentary subscription.

## Table of Contents

### A SECTION

#### SWCS CONFERENCE ECHOES

- 119A **SWCS Annual International Conference reflections**  
Jim Gulliford

#### FEATURES

- 120A **The courage to connect**  
Curt Meine

- 122A **Improving conservation practices programming to protect water quality in agricultural watersheds: Lessons learned from the National Institute of Food and Agriculture–Conservation Effects Assessment Project**  
Deanna Osmond, Don Meals, Dana Hoag, Mazdak Arabi, Al Luloff, Greg Jennings, Mark McFarland, Jean Spooner, Andrew Sharpley, and Dan Line

- 128A **Branching out: Agroforestry as a climate change mitigation and adaptation tool for agriculture**  
Michele Schoeneberger, Gary Bentrup, Henry de Gooijer, Raju Soolanayakanahally, Tom Sauer, James Brandle, Xinhua Zhou, and Dean Current

- 137A **Plant nutrient management and risks of nitrous oxide emission**  
Clifford S. Snyder and Paul E. Fixen

#### IDEAS & INNOVATIONS

- 145A **Maps help landowners think beyond human scale**  
Jean Eells, Michael F. Dahlstrom, and Raeann Ritland

### A SECTION Call for Papers

Are you working on cutting edge research in soil and water conservation? Does your work involve new tools, technologies, or materials that others should be aware of? Have you observed or been a part of conservation practices that are worth sharing with the journal audience?

If you answered “Yes” to any of these questions, you are invited to submit your article ideas for the A Section of the *Journal of Soil and Water Conservation*.

Your work could be published in one of the A Section topic areas: Conservation in Practice, Viewpoint, Ideas & Innovations, Conservation in Action, In the News, Feature, etc.

To submit your article ideas or for more information, contact the editor Oksana Gieseman at [oksana.gieseman@swcs.org](mailto:oksana.gieseman@swcs.org).



**On the Cover**  
Withered Corn Field.  
Photo by kazenouta.



Printed on 100% post-consumer waste recycled paper with vegetable-based inks.

**JOURNAL OF SOIL AND WATER CONSERVATION**  
**Vol. 67, no. 5 (September/October 2012)**  
**Page 2 of 2**

## RESEARCH SECTION

### SPECIAL RESEARCH SECTION: CONSERVATION PRACTICES TO MITIGATE THE EFFECTS OF CLIMATE CHANGE

- 331 **Effects of climate change on soil carbon and nitrogen storage in the US Great Plains**  
R.F. Follett, C.E. Stewart, E.G. Pruessner, and J.M. Kimble
- 343 **The application of the Revised Universal Soil Loss Equation, Version 2, to evaluate the impacts of alternative climate change scenarios on runoff and sediment yield**  
S.M. Dabney, D.C. Yoder, and D.A.N. Vieira
- 354 **Characterization of maize inbred lines for drought and heat tolerance**  
J. Chen, W. Xu, J. Velten, Z. Xin, and J. Stout
- 365 **Carbon storage and nitrous oxide emissions of cropping systems in eastern Washington: A simulation study**  
C. Stöckle, S. Higgins, A. Kemanian, R. Nelson, D. Huggins, J. Marcos, and H. Collins
- 378 **Evaluating soil organic carbon sequestration potential in the Cotton Belt with the soil conditioning index**  
A.J. Franzluebbers, M.D. Hubbs, and M.L. Norfleet
- 390 **Modeling climate change effects on runoff and soil erosion in southeastern Arizona rangelands and implications for mitigation with conservation practices**  
Y. Zhang, M. Hernandez, E. Anson, M.A. Nearing, H. Wei, J.J. Stone, and P. Heilman
- 406 **Soil carbon sequestration in the dryland cropping region of the Pacific Northwest**  
T.T. Brown and D.R. Huggins
- RESEARCH MANUSCRIPTS**
- 416 **Response of reservoir atrazine concentrations following regulatory and management changes**  
K.W. King, N.R. Fausey, R. Dunn, P.C. Smiley, Jr., and B.L. Sohngen
- 425 **Sediment characteristics and accumulation rates in constructed ponds**  
A.S. Brainard and G.W. Fairchild
- 433 **Sorbent-amended compost filter socks in grassed waterways reduce nutrient losses in surface runoff from corn fields**  
M.J. Shipitalo, J.V. Bonta, and L.B. Owens
- RESEARCH EDITORIAL**
- 442 **Case study comparison between litigated and voluntary nutrient management strategies**  
A. Sharpley, P. Richards, S. Herron, and D. Baker

JOURNAL OF SOIL AND WATER  
**CONSERVATION**  
**o n l i n e**

The *Journal of Soil and Water Conservation* is online.

#### AUTHORS

Please submit manuscripts using the online manuscript review system.

#### MORE INFORMATION

Go to [www.jswconline.org](http://www.jswconline.org)

### TABLE OF CONTENTS

#### RESEARCH ARTICLES

##### HUMAN DIMENSIONS

- 1331 Learning to Live With Black Bears: A Psychological Model of Acceptance  
*Ryan M. Zajac, Jeremy T. Bruskotter, Robyn S. Wilson, and Suzanne Prange*

##### MANAGEMENT AND CONSERVATION

- 1341 Translocation as a Conservation Tool for Agassiz's Desert Tortoises: Survivorship, Reproduction, and Movements  
*K. E. Nussear, C. R. Tracy, P. A. Medica, D. S. Wilson, R. W. Marlow, and P. S. Corn*
- 1354 Harvest of Red-Legged Partridge in Central Spain  
*Silvia Díaz-Fernández, Javier Viñuela, and Beatriz Arroyo*
- 1364 Cougars Are Recolonizing the Midwest: Analysis of Cougar Confirmations During 1990–2008  
*Michelle A. Larue, Clayton K. Nielsen, Mark Dowling, Ken Miller, Bob Wilson, Harley Shaw, and Charles R. Anderson, Jr.*
- 1370 Multi-Scale Assessment of Greater Sage-Grouse Fence Collision as a Function of Site and Broad Scale Factors  
*Bryan S. Stevens, John W. Connelly, and Kerry P. Reese*
- 1381 Roadway Mortality of Barn Owls in Idaho, USA  
*Than J. Boves and James R. Belthoff*
- 1393 Spring Snow Goose Hunting Influences Body Composition of Waterfowl Staging in Nebraska  
*Aaron T. Pearse, Gary L. Krapu, and Robert R. Cox, Jr.*
- 1401 Black-Capped Vireo Nest Predator Assemblage and Predictors for Nest Predation  
*Tara J. Conkling, Theresa L. Pope, Kathryn N. Smith, Heather A. Mathewson, Michael L. Morrison, R. Neal Wilkins, and James W. Cain, III*
- 1412 Immobilization of White-Tailed Deer With Telazol, Ketamine, and Xylazine, and Evaluation of Antagonists  
*Kevin L. Monteith, Kyle B. Monteith, Joshua A. Delger, Lowell E. Schmitz, Todd J. Brinkman, Christopher S. Deperno, and Jonathan A. Jenks*
- 1420 Predation by Coyotes on White-Tailed Deer Neonates in South Carolina  
*John C. Kilgo, H. Scott Ray, Mark Vukovich, Matthew J. Goode, and Charles Ruth*
- 1431 Influence of Habitat Features and Hunter Behavior on White-Tailed Deer Harvest  
*François Lebel, Christian Dussault, Ariane Massé, and Steeve D. Côté*

- 1441 Quantifying Telemetry Collar Bias When Age Is Unknown: A Simulation Study With a Long-Lived Ungulate  
*Alexander K. Prichard, Kyle Joly, and Jim Dau*

- 1450 Duck Nest Success Adjacent to Predator-Reduced Sites  
*Matthew R. Pieron, Margaret J. K. Darr, and Frank C. Rohwer*

##### POPULATION ECOLOGY

- 1456 Effect of Neckband Color on Survival and Recovery Rates of Ross's Geese  
*Jason H. Caswell, Ray T. Alisauskas, and James O. Leafloor*
- 1462 Colony Connectivity of Pacific Coast Double-Crested Cormorants Based on Post-Breeding Dispersal From the Region's Largest Colony  
*Karen N. Courtot, Daniel D. Roby, Jessica Y. Adkins, Donald E. Lyons, D. Tommy King, and R. Scott Larsen*
- 1472 Citizen Science and Observer Variability During American Pika Surveys  
*Lucas Moyer-Horner, Matthew M. Smith, and Jami Belt*

##### HABITAT RELATIONS

- 1480 Influence of Forest Structure on the Abundance of Snowshoe Hares in Western Wyoming  
*Nathan D. Berg, Eric M. Gese, John R. Squires, and Lise M. Aubry*
- 1489 Sampling Large Landscapes With Small-Scale Stratification  
*Jonathan Bart, Leah Dunn, Amy Leist, and Laura Sabin*
- 1499 The Utility of Normalized Difference Vegetation Index for Predicting African Buffalo Forage Quality  
*Sadie J. Ryan, Paul C. Cross, John Winnie, Craig Hay, Justin Bowers, and Wayne M. Getz*
- 1509 Habitat and Landscape Correlates of Southern Flying Squirrel Use of Red-Cockaded Woodpecker Clusters  
*Susan C. Loeb, Shawna L. Reid, and Donald J. Lipscomb*
- 1519 Effect of Winter Flooding on Mass and Gross Energy of Bottomland Hardwood Acorns  
*Alan G. Leach, Jacob N. Straub, Richard M. Kaminski, Andrew W. Ezell, Tracy S. Hawkins, and Theodor D. Leininger*

##### BOOK REVIEWS

- 1523 Dynamics of Large Herbivore Populations in Changing Environments  
*Mark S. Boyce*
- 1524 Cumulative Effects in Wildlife Management: Impact Mitigation  
*Michael L. Morrison*



## MINExpo International 2012

- 32 MINExpo 2012: Mining's largest trade show continues to grow**  
Steve Kral
- 38 It's not just trucks and shovels: Mineral processing equipment will be on hand, too**  
Emily Wortman-Wunder
- 54 Software: Digital tools for all facets of mining**  
Georgene Renner
- 64 Engines and tires: Technology improves emissions, wear**  
William Gleason
- 72 Biggest names in mining will be at MINExpo showing off their machines**  
William Gleason
- 102 Health and safety: Tools to keep miners safe will be on display**  
Georgene Renner

## Feature Articles

- 109 Climax Mine: Back in business after a 17-year layoff**  
William Gleason



## Special Editorial Section Tunneling & Underground Construction

- 33 Proactive approach to addressing environmental concerns for tunneling under Austin**  
Ray Brainard, Stacie Long, Robyn Smith and Clay Haynes
- 42 Design and construction challenges of hardrock TBMs at the Gotthard Base Tunnel**  
Michael Rehbock Sander and Yves Boissonnas

Copyright 2012 by the Society for Mining, Metallurgy and Exploration, Inc. All rights reserved.  
MINING ENGINEERING (ISSN 0026-5187) is published monthly by the Society for Mining, Metallurgy, and Exploration, Inc., at 12999 E. Adam Aircraft Circle, Englewood, CO, 80112 USA. Phone +1-800-763-3132 or +1-303-973-9550. Fax: +1-303-973-3845 or e-mail: sme@smenet.org. Website: www.smenet.org. Periodicals postage paid at Englewood, CO USA and additional mailing offices. Canadian post: publications mail agreement number 0689688.  
**POSTMASTER:** Send changes of address to MINING ENGINEERING, 12999 E. Adam Aircraft Circle, Englewood, CO, 80112 USA.  
Printed by Cummings Printing Co.

# NATURAL RESOURCES & ENVIRONMENT

ABA SECTION OF ENVIRONMENT, ENERGY, AND RESOURCES

VOLUME 27, NUMBER 1, SUMMER 2012

## FEATURES

- 3 A (Mostly) Civil War Over Clean Air Act SIPs  
*Steven G. McKinney and Stephen Gidiere*
- 8 Federalism in European Environmental  
Decision Making  
*Roger Martella and Glory Francke*
- 14 TSCA Reform and Preemption: A Walk on  
the Third Rail  
*Charles Franklin and Allison Reynolds*
- 19 Federalism in Renewable Energy Policy  
*Jeremiah I. Williamson and Matthias L. Sayer*
- 24 Power Grab: Preempting States' Rights to  
Turn Off Nuclear Power  
*Kenneth J. Rumelt*
- 28 Regulation of Surface Coal Mining:  
The End of a Thirty-year Balancing Act?  
*Stephen C. Braverman and Michael R. Braverman*
- 36 State Dynamism, Federal Constraints:  
Possible Constitutional Hurdles to  
Cross-Border Cap-and-Trade  
*Shelley Welton*
- 41 Coastal Planning, Federal Consistency, and  
Climate Change: A Recent Divergence of  
Federal and State Interests  
*Chad J. McGuire*
- 47 Tribes as Managers of Federal Natural  
Resources  
*Brett Kenney*

## DEPARTMENTS

- VANTAGE POINT INSIDE FRONT COVER
- THE LEADING EDGE 2
- INSIGHTS
- Department of Energy 2012 Congestion Study  
*Scott B. Grover* 51
- A Reminder About Alien Ownership Restrictions  
*Jean Feriancek* 53
- Tar Sands Development: A Test for Our Energy Future  
*James Murphy* 54
- Michigan Loves Mining . . . Again  
*Barry Malone* 56
- Regulatory Relations in Light of *Sackett v. EPA*  
*James Andreasen* 57
- LITERARY RESOURCES 60
- LETTERS TO THE EDITOR 63
- THE BACK PAGE 64

### Issue Editor:

*Jonathan Scoll*

### Assistant Issue Editors:

*Gale Lea Rubrecht, John Barkett, and Craig Donovan*

### Cover design

*Sonya Taylor*

### Department art

*Mike Callaway*



Printed on recycled paper

The views expressed in *Natural Resources & Environment* are those of the authors and do not necessarily represent the policies of the American Bar Association; the Section of Environment, Energy, and Resources; or the employers of the authors. For more information about NR&E, visit online at [www.ShopABA.org](http://www.ShopABA.org). Send comments to [nrecomments@americanbar.org](mailto:nrecomments@americanbar.org).

**Volume 34 No. 4  
August 2012**

Published bimonthly:  
February, April, June, August, October, December  
Copyright 2012 by the Society for Range Management

**EDITOR-IN-CHIEF**

**Lori Hidingier**  
Managing Director/  
Consortium for Science, Policy and Outcomes  
Arizona State University  
PO Box 875603  
Tempe, AZ 85287-5603, USA

**MANAGING EDITOR**

**Joel T. Luber**  
Allen Press, Inc.  
810 E. 10th St.  
Lawrence, KS 66044, USA  
jluber@allenpress.com

**YOUTH EDITOR**

**Kim McReynolds**  
University of Arizona Cooperative Extension  
450 S Haskell Avenue  
Willcox, AZ 85643, USA  
kimmi@cals.arizona.edu

**RANGELANDS STEERING COMMITTEE**

**Joel Brown** – Chair  
**Mark Brunson**  
**Dave Engle**  
**Mel George**  
**Chan Gildewell**  
**Ann Hild**  
**Jamin Johanson**  
**John Tanaka**  
**Jim Thorpe**

**RANGELANDS EDITORIAL BOARD**

**Jerry Barker**, Boulder, Colorado – Chair  
**Matt Barnes**, Cimarron, Colorado  
**Jay Davison**, Fallon, Nevada  
**Michael Frisina**, Butte, Montana  
**Kimberly Haile**, Bryan, Texas  
**Kim McReynolds**, Willcox, Arizona  
**John Mitchell**, Fort Collins, Colorado  
**Tom Monaco**, Logan, Utah  
**Ed Rhodes**, College Station, Texas

RANGELANDS (ISSN 0190-0528) is an official publication of the Society for Range Management (SRM, 10030 W 27th Ave, Wheat Ridge, CO 80215-6601) and is published bimonthly in February, April, June, August, October, and December. Publishing services are provided by Allen Press Publishing Services, 810 East 10th Street, Lawrence, Kansas 66044. Calendar-year subscription prices are \$100–125 for individuals and \$160–235 for institutions. Additional surface charges may apply to subscribers located outside of the USA. The online version of Rangelands can be found online at [www.srmjournals.org](http://www.srmjournals.org). Subscriptions, changes of address, and requests for missing issues should be sent to Allen Press Association Management, P.O. Box 7065, Lawrence, Kansas 66044. Claims for copies lost in the mail must be received within two months (four months foreign) of the issue date to insure replacement at no charge.

Editorial correspondence should be addressed to Lori Hidingier, Consortium for Science, Policy and Outcomes, Arizona State University, PO Box 875603, Tempe, AZ 85287-5603. Page proofs should be returned to the Managing Editor, Joel T. Luber, [jluber@allenpress.com](mailto:jluber@allenpress.com).

PERIODICALS POSTAGE paid at Denver, Colorado, and additional offices.

POSTMASTER: Address service requested to Rangelands, PO Box 7065, Lawrence, Kansas 66044.

PRINTED IN USA

## Agency Accomplishments on the Ground

- Guest Editors: Joel Brown and Linda Coates-Markle
- 2 Special Issue Acknowledgments
- 3 Agency Accomplishments: Making a Difference on the Ground  
*Linda Coates-Markle*
- 5 The Interagency Creeks and Communities Strategy: Creating Healthy Streams and Wetlands by Bringing People Together  
*Laura Van Riper*
- 11 A Collaborative Program to Provide Native Plant Materials for the Great Basin  
*Nancy Shaw, Mike Pellant, Matthew Fisk, and Erin Denney*
- 17 Government Success in Partnerships: The USDA-ARS Areawide Ecologically Based Invasive Annual Grass Management Program  
*Brenda Smith and Roger L. Sheley*
- 25 An Interdisciplinary Approach for Watershed-Scale Assessment and Management  
*Ryan Martin, Pat Fosse, and Brian Thrift*
- 31 Innovative Partnership Formed to Restore the West Potrillo  
*Ray Lister, Phil Smith, Steven Torrez, and Stephen Baker*
- 35 Estimating Effects of Targeted Conservation on Nonfederal Rangelands  
*Mark Weltz and Ken Spaeth*
- 41 Forty-Five Years of Public-Private Partnership in the Rawlins Field Office  
*Andy Warren and Amanda Jones*
- 45 Glacial Ridge National Wildlife Refuge: A Partnership from the Beginning  
*Mark Hayek*
- 50 Texas GLCI: Growing Partnerships on Texas Grazing Lands  
*Jeff Goodwin and Mark Moseley*
- 54 Research to Practical Use: On-the-Ground Successes  
*Charlie D. Clements, James A. Young, Daniel N. Harmon, and Mark Weltz*

## Departments

- 61 Listening to the Land
- 63 Highlights, *Rangeland Ecology & Management*, July 2012
- 66 Browsing the Literature

**Front Cover:** BLM Dillon Field Office's East Grasshopper Watershed interdisciplinary team, 2011. Photo by Aly Pivowar, BLM Dillon Field Office.

**CONTENTS**

**Feature Articles**

Genetic and conservation status of a relictual population of the hispid cotton rat ( <i>Sigmodon hispidus eremicus</i> ). <i>Robert D. Bradley, Justin B. Lack, Russell S. Pfau, Lottie L. Peppers, Dallas D. Henson, Andrew O. Stallings, Christine N. Hoang, and Ronald A. Van Den Bussche</i> . . . . .	231
Validation of aging techniques and growth of the river redhorse, <i>Moxostoma carinatum</i> , in the James River, Missouri. <i>Daniel W. Beckman and Christian A. Hutson</i> . . . . .	240
Spatial dynamics and growth of two native species of catostomids: are movements restricted? <i>Michael T. Booth and Andrea J. Shipley</i> . . . . .	248
Use of probability of detection when conducting analyses of surveys of mesopredators: a case study from the Ozark Highlands of Missouri. <i>Michael V. Cove, Liisa M. Niva, and Victoria L. Jackson</i> . . . . .	257
Temporal patterns of abundance of arthropods on sand dunes. <i>Cameron W. Barrows</i> . . . . .	262
Status and structure of two populations of the bluehead sucker ( <i>Catostomus discobolus</i> ) in the Weber River, Utah. <i>P. Aaron Webber, Paul D. Thompson, and Phaedra Budy</i> . . . . .	267
Assemblages of amphibians, reptiles, and mammals on an urban military base in Oklahoma. <i>Victor Bogosian III, Eric C. Hellgren, and Raymond W. Moody</i> . . . . .	277
Diversity of freshwater fishes in Reserva de la Biosfera Barranca de Metztilán, Hidalgo, Mexico, and recommendations for conservation. <i>Rafael Miranda, David Galicia, Scott Monks, and Griselda Pulido-Flores</i> . . . . .	285
Demography of the side-blotched lizard, <i>Uta stansburiana</i> , in sand dunes of the central Chihuahuan Desert. <i>Héctor Gadsden and Gamaliel Castañeda</i> . . . . .	292
Declining populations of yellow mud turtles ( <i>Kinosternon flavescens</i> ) in Iowa, Illinois, and Missouri. <i>James L. Christiansen, Neil P. Bernstein, Christopher A. Phillips, Jeffrey T. Briggler, and Don Kangas</i> . . . . .	304
Suitable habitats for cougars ( <i>Puma concolor</i> ) in Texas and northern Mexico. <i>Lorna Hernandez-Santin, Patricia M. Harveson, and Louis A. Harveson</i> . . . . .	314
Selection of seeds of an exotic and three native grasses by northern bobwhites ( <i>Colinus virginianus</i> ). <i>Jon A. Larson, Timothy E. Fulbright, Leonard A. Brennan, Fidel Hernández, and Fred C. Bryant</i> . . . . .	319

**Notes**

The chytrid fungus <i>Batrachochytrium dendrobatidis</i> in isolated populations of the Baja California treefrog <i>Pseudacris hypochondriaca curta</i> in Baja California Sur, Mexico. <i>Victor H. Luja, Ricardo Rodríguez-Estrella, Kris Ratzlaff, Gabriela Parra-Olea, and Aurelio Ramírez-Bautista</i> . . . . .	323
Postfire responses by southern arroyo willow forest and by southern-willow scrub dominated by <i>Salix lasiolepis</i> in San Diego County, California. <i>John F. O'Leary and William R. Bredemeyer</i> . . . . .	327
Adoption as a conservation strategy for the magnificent frigatebird ( <i>Fregata magnificens</i> ). <i>Monica González-Jaramillo, Christian Schloegl, and Horacio de la Cueva</i> . . . . .	332
First-year growth of longnose gar ( <i>Lepisosteus osseus</i> ) from zygote to autumn juvenile. <i>William J. Matthews, William L. Shelton, and Edie Marsh-Matthews</i> . . . . .	335
<i>Peniocereus greggii</i> variety <i>greggii</i> (Cactaceae) in Durango, Mexico. <i>Gisela Muro Pérez, Jaime Sánchez Salas, Eduardo Estrada Castellón, and Mario A. García Aranda</i> . . . . .	337
Red swamp crawfish ( <i>Procambarus clarkii</i> ) discovered in the San Pedro River, Arizona: a new invader in a threatened ecosystem. <i>Eric K. Moody and Christopher A. Taylor</i> . . . . .	339
Bats in riparian-restoration sites along the lower Colorado River, Arizona. <i>Allen W. Calvert and Sean A. Neiswenter</i> . . . . .	340
Breeding colonies of least terns ( <i>Sternula antillarum</i> ) in northern Sonora, Mexico, 2006–2008. <i>Alyssa Rosemartin and Charles van Riper III</i> . . . . .	342
<i>Ctenophthalmus pseudagyrtis</i> (Siphonaptera: Ctenophthalmidae): new to the flea fauna of Texas. <i>Chris T. McAllister and Nixon Wilson</i> . . . . .	345
The Alabama shad ( <i>Alosa alabamae</i> : Clupeiformes: Clupeidae) in the White River, Arkansas. <i>Thomas M. Buchanan, William G. Layher, Chris T. McAllister, and Henry W. Robison</i> . . . . .	347
<i>Vachellia</i> × <i>cedilloi</i> (L. Rico) Seigler & Ebinger (Fabaceae: Mimosoideae), a probable hybrid of two species of ant-acacias. <i>John E. Ebinger and David S. Seigler</i> . . . . .	349
Land snails in ephemeral pools at Ottine Swamp, Gonzales County, Texas. <i>Frank J. Dirrigl, Jr. and Robert H. Mohlenbrock</i> . . . . .	353
Announcements . . . . .	356

Cover: Longnose gar (*Lepisosteus osseus*) spawning. Photo by Caryn C. Vaughn.

# Western North American Naturalist

Volume 72 No. 2

August 2012

ISSN 1527-0904

## CONTENTS

### Special Feature

- Information on black-footed ferret biology collected within the framework of ferret conservation  
..... Dean E. Biggins 129
- Use of multi-opening burrow systems by black-footed ferrets ..... Dean E. Biggins 134
- Black-footed ferret digging activity in summer ..... David A. Eads, Dean E. Biggins,  
Dustin Marsh, Joshua J. Millsbaugh, and Travis M. Livieri 140
- Digging behaviors of radio-tagged black-footed ferrets near Meeteetse, Wyoming, 1981–1984  
..... Dean E. Biggins, Louis R. Hanebury, and Kathleen A. Fagerstone 148
- Black-footed ferrets and recreational shooting influence the attributes of black-tailed prairie  
dog burrows ..... Dean E. Biggins, Shantini Ramakrishnan, Amanda R. Goldberg,  
and David A. Eads 158
- Patterns of surface burrow plugging in a colony of black-tailed prairie dogs occupied by black-  
footed ferrets ..... David A. Eads and Dean E. Biggins 172
- Importance of lunar and temporal conditions for spotlight surveys of adult black-footed ferrets  
..... David A. Eads, David S. Jachowski, Joshua J. Millsbaugh, and Dean E. Biggins 179
- Notes on behaviors of free-ranging black-footed ferrets: Conata Basin, South Dakota, 2007–2009  
..... David A. Eads 191
- Black-footed ferret home ranges in Conata Basin, South Dakota ..... Travis M. Livieri  
and Eric M. Anderson 196
- Resource selection models are useful in predicting fine-scale distributions of black-footed ferrets  
in prairie dog colonies ..... David A. Eads, David S. Jachowski, Dean E. Biggins,  
Travis M. Livieri, Marc R. Matchett, and Joshua J. Millsbaugh 206
- Fine-scale habitat use of reintroduced black-footed ferrets on prairie dog colonies in New Mexico  
..... Jennifer G. Chipault, Dean E. Biggins, James K. Detling, Dustin H. Long,  
and Robin M. Reich 216
- Challenges to black-footed ferret recovery: protecting prairie dogs ..... Brian Miller and Richard P. Reading 228

### Article

- Breeding system and interaccessional hybridization of *Purshia tridentata* plants grown in a  
common garden ..... Rosemary L. Pendleton, E. Durant McArthur,  
and Stewart C. Sanderson 241

### Notes

- Observation of dystocia in wild elk ..... Chad P. Lehman, Lowell E. Schmitz, Mark A. Rumble,  
Jackie J. Kragel, and Joshua J. Millsbaugh 250

(Continued on page 264)

# CONTENTS

(Continued from back cover)

Notes on the distribution of Bailey's eastern woodrat ( <i>Neotoma floridana baileyi</i> ) in Nebraska ..... Zebadiah R. Graham, Keith Geluso, and Russell A. Benedict	252
Evidence for an historical occurrence of the meadow jumping mouse ( <i>Zapus hudsonius luteus</i> ) in the Verde River watershed, Arizona ..... Jennifer K. Frey	257
<b>Announcement</b>	
Reviewers for 2009 .....	263

**WESTERN NORTH AMERICAN NATURALIST**  
**Vol. 72, no. 2 (August 2012)**  
**Page 2 of 2**