



The mission of the Mississippi Department of Environmental Quality is to safeguard the health, safety, and welfare of present and future generations of Mississippians by conserving and improving our environment and fostering wise economic growth through focused research and responsible regulation.

Mississippi Department of Environmental Quality Environmental News

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2014 ENHANCE AWARDS AND WORKSHOP

The sixth annual enHance awards luncheon and training workshop was held April 9 in Jackson. Three new members, seven renewal memberships, and two returning members were welcomed into the program for the 2014 class.

enHance is a voluntary stewardship program begun in 2009 that recognizes committed environmental leaders who accomplish goals beyond their legal requirements. enHance is open to facilities, cities, counties, and other entities who are interested in the program, and applicants can choose from three tiers: Associate, Steward, or Leader.

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During the workshop Toyota's Rosario Martinez (left) discussed the topic of "Optimizing Your Environmental Management System."



The new members for 2014 are:

Toyota Motor Manufacturing , Mississippi, Inc. (Blue Springs) — Leader.

Cooper Tire Company (Clarksdale) — Steward

DeSoto County Environmental Services — Associate

The renewing members are:

Columbus Air Force Base — Leader

Custom Engineered Wheels, Inc. (Tupelo) — Leader

Flexsteel Industries (Starkville) — Leader

Nissan North America, Inc. (Canton) — Leader

Cooper Tire Company (Tupelo) — Steward

Leaf River Cellulose, LLC (New Augusta) — Steward

City of Ridgeland — Steward

And, two members are returning to the program:

Gulf State Manufacturers (Starkville) — Leader

Northrop Grumman Electronic Systems (Ocean Springs) — Steward

MDEQ Executive Director Trudy Fisher presented the enhance awards to (L-R): Toyota Motor Manufacturing, Cooper Tire, DeSoto County Environmental Services, Columbus Air Force Base, Nissan North America, and Leaf River Cellulose.



The City of Ridgeland and Gulf States Manufacturers also received awards.

Bottom: Trudy Fisher presented a special Partnership Award to the Mississippi Manufacturers Association represented by John McKay for their support of the enHance program since its inception.





MISSISSIPPI IS THE FIRST GULF STATE TO RECEIVE RESTORATION PLANNING MONEY

MDEQ announced in April the receipt of a \$3.6 million grant from the National Fish and Wildlife Foundation. The money will be used by MDEQ to coordinate the views, visions, values, and plans of the people of the Gulf Coast as Mississippi puts together an integrated, coastal wide, restoration plan. The project award constitutes approximately one percent of the overall NFWF dollars which will be made available under the consent decree. Mississippi is the only Gulf state to receive dedicated planning money from NFWF to date.

“This money will support Mississippi in developing a comprehensive far reaching road map that ensures that every restoration dollar coming to our state is spent wisely and effectively. We will seize this historic opportunity to coordinate the vision of the people of the Gulf Coast with science-based plans as we identify priority projects that remedy harm, optimize environmental benefits along our coast, and reduce the risk of future harm to natural resources that were affected by the 2010 Deepwater Horizon oil spill.

“This multi-phase, three year project allows Mississippi to carry out an assessment of current ecological conditions and restoration efforts, compile and evaluate existing resource management plans, determine habitat and living resource focal areas, draft a comprehensive restoration plan to identify priority restoration projects and programs that maximize environmental benefits for Mississippi’s coast, and review and update the planning effort periodically.

“We only have one chance to get this right. This planning money is the best instrument at our disposal for making sure everything we do in this state is coordinated, comprehensive, and realistic. It is critical that all the pieces work well together. We want to hear from the people of the Coast and today’s announcement gives us the opportunity to invite every person in the Gulf to take their seat at the table,” said Trudy Fisher, MDEQ Executive Director.

Over the coming year, Mississippi will conduct robust vision mapping, through innovative upstream stakeholder engagement, soliciting the views, and visions, of the people of the Gulf Coast.

The planning process will continue through 2017 as relevant planning documents, current restoration efforts, and stakeholder input are merged with science based data to help determine the most effective, and comprehensive plan for restoring our Gulf Coast.

This project represents some of the first obligations of funds received by NFWF's Gulf Environmental Benefit Fund. In early 2013, a U.S. District Court approved two plea agreements resolving certain criminal charges against BP and Transocean related to the Deepwater Horizon oil spill. Provisions within the plea agreements direct a total of \$2.544 billion to the National Fish and Wildlife Foundation over a five-year period. From that amount, NFWF will receive more than \$356 million for projects to protect or restore natural resources in Mississippi in the aftermath of the oil spill.

"NFWF's approval of Mississippi's Restoration Planning Project represents a significant step in the identification and prioritization of projects and programs to restore and conserve Mississippi's coastal habitats and replenish its important living resources," said Jeff Trandahl, Executive Director and CEO of NFWF. "We appreciate the strong leadership the state of Mississippi has shown and support their desire to utilize a portion of the funds available under the Gulf Environmental Benefit Fund for this important effort. Together, we'll work to remedy harm to Gulf Coast natural resources affected by the 2010 Deepwater Horizon Oil Spill."

To learn more about the State of Mississippi's process for identifying priority Gulf Coast restoration projects, visit www.restore.ms.

To learn more about NFWF's Gulf Environmental Benefit Fund in Mississippi: <http://www.nfwf.org/gulf/Pages/GEBF-Mississippi.aspx>.



PUBLIC AND PRIVATE PARTNERS CELEBRATE BROWNFIELD REDEVELOPMENT IN STARKVILLE

The approval of a Brownfield Agreement between the Commission on Environmental Quality and a developer in February 2014 cleared the way for the official groundbreaking of a \$40-million brownfield redevelopment project in Starkville on March 20.



The Mill at MSU features four main projects: remediating environmental hazards at the site; transforming the former cotton mill into a conference center and related office space; building an adjacent Courtyard Marriott Hotel and parking garage, and developing mixed-use business parcels on the land around the university's old physical plant. A crowd of several hundred joined university leaders, elected officials and the developer at the historic E.E. Cooley Building, the former home to MSU's Facilities Management operations, for the public groundbreaking event. The afternoon ceremony was the culmination of a multi-year, collaborative effort by public and private stakeholders to renovate the mill while creating new economic opportunities.

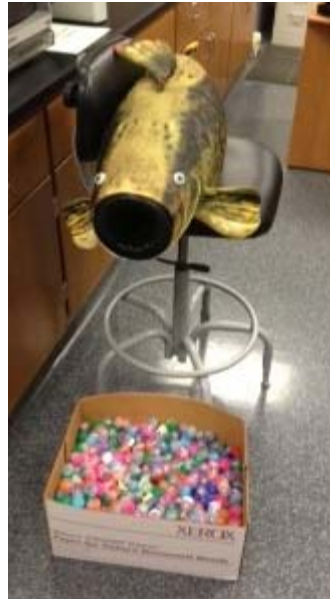
"What we are about to build here will have both immediate and far-reaching benefits for Mississippi State University and for the surrounding area. It will also be a testament to the power of partnerships, without which none of this would have been accomplished," MSU President Mark Keenum said.

Mark Castleberry and Peachtree Hotel Group are leading the development of The Mill at MSU with Dale Partners providing architectural services and Copeland & Johns Inc. serving as construction manager. The City of Starkville, the National Park Service, the Mississippi Department of Archives and History, the Mississippi Development Authority, and the Mississippi Department of Environmental Quality have been integrally involved in the project. (Information courtesy MSU Office of Public Affairs, Photo by Russ Houston)

FIELD SERVICES OUTREACH

MDEQ's Field Services Division has many obligations, but among its more enjoyable tasks is interacting with the public and explaining the impact and the enjoyment of Mississippi's natural resources.

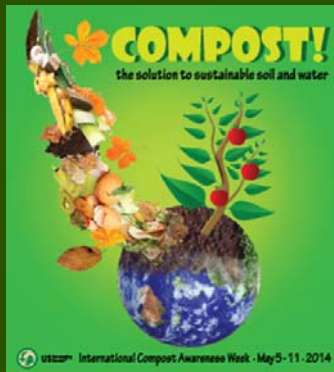
Right: MDEQ's Jessica Brewster and Lee Barnes at the Stone County Soil and Water Conservation District's Environmental Field Day in April.



Burpy the Catfish was created by Field Services staff, and his mouth contains "Grow an Insect" capsules that grow when placed in water. Burpy has been well received by kids of all ages!

Right: Coen Perrott, Emily Cotton, Matt Carr, and Barb Viskup at the Celebrate the Gulf Marine Education Festival explaining watersheds, beach monitoring, and the environment of South Mississippi. The event was held April 5 in Pass Christian.





Poster designed by Tam Pham Hoang Buu, 17, of Ho Chi Minh City, Vietnam, the grand prize winner of the 2014 ICAW poster contest.

INTERNATIONAL COMPOST AWARENESS WEEK

It's that time of year again! MDEQ is joining the U.S. Composting Council and other organizations across the country to promote the benefits of composting through the International Compost Awareness Week (ICAW), May 5-11. The ICAW was started in 1999 by the U.S. Composting Council and is held annually during the first full week of May. The purpose of this multi-media event is to educate the public on home composting and encourage the support of larger scale composting operations through participation in community programs and the purchase of compost from locally owned businesses. The theme for ICAW 2014 is *Compost: The Solution to Sustainable Soil & Water*.

Due to the success of last year's event, MDEQ will again conduct a twitter campaign to spread the message of composting. Each day of the week of May 5-11, the department will tweet tips on home composting, links to important websites, MDEQ Composting Program notes, and information on composting businesses in your area. Make sure to follow @MDEQ to receive all the ICAW tweets. Also, feel free to re-tweet, reply, and comment on these tweets as well using the hashtag #ICAWMS.

In addition to participating in ICAW, MDEQ's Composting Program is continuing ongoing efforts to grow composting of solid wastes in the state. As a part of these efforts, MDEQ is conducting a number of public education and outreach activities, initiatives, and agency policy changes with the overall goal of increasing the recycling of organic wastes. These efforts include:

- Revision of the state's Composting Regulations to streamline the permitting process for composting businesses and operations.

- Implementation of a new Pilot Composting Facility Program for start-up commercial and local government composting facilities that allows composting facility operators ample time to grow and determine the viability of their business.
- Development of updated web resources including important information concerning home composting, business and government composting, composting activities for kids, and much more.
- Leadership of a Food Waste Task Force on the Mississippi Gulf Coast that has helped grow composting of food wastes at military bases, casinos, food banks, and other entities on the Gulf Coast and spurred new composting facilities and a new sustainability curriculum with lesson plans on composting.

MDEQ also continues to work closely with other organizations which share the agency's goals of promoting composting including Keep Mississippi Beautiful, the Mississippi Recycling Coalition, and the U.S. Environmental Protection Agency.

If you have any questions about ICAW, MDEQ's Composting Program, or composting in general, please contact Jennifer Milner at 601-961-5171, by e-mail to Jennifer_Milner@deq.state.ms.us, or visit the composting web page at www.deq.state.ms.us/composting.



MDEQ TO HOST RUBBISH SITE OPERATOR TRAINING

MDEQ is hosting the Mississippi training course for Class I rubbish site operators on June 11 and 12, at the Cabot Lodge – Millsaps on North State Street in Jackson. The course offers an opportunity to fulfill state training and testing requirements for the Class I Rubbish Site Operator Certification and updates general knowledge of Class I Rubbish Site regulatory and operational requirements. MDEQ also allows currently certified operators to attend as a refresher course for Continuing Education Units (CEUs).

The course is a day and a half class with a written examination on the second day. Persons who attend the course, pass the written examination, and meet the experience and education requirements may apply to MDEQ for a certificate of competency as a Class I rubbish site operator. The examination will not be required for those operators attending for CEUs only. All attendees that complete the class will receive 10 hours of CEUs that can be applied towards renewal of their certification. There is no registration cost for the training; however, all lodging, meal and transportation costs are the responsibility of the attendees.

Course instructors will include the staff of MDEQ and FTN Associates, Ltd. Advance registration for the course is required. For additional information on the training course and details about registration, contact Mark Williams with MDEQ at 601-961-5304 or visit the MDEQ solid waste program web page at: www.deq.state.ms.us/solidwaste.





ADOPT-A-STREAM WORKSHOP

The Mississippi Wildlife Federation along with the Mississippi Department of Environmental Quality will hold a two-day Adopt-A-Stream workshop at Holmes County State Park near Durant on June 17 to 18, 2014.

Adopt-A-Stream is a program that promotes environmental stewardship through training workshops, outdoor field activities and by introducing participants to watershed action projects.

The two-day program provides an in-depth study of watersheds, as well as hands-on training in chemical and biological parameters important to a healthy stream. In addition, the workshop will:

- ▶ Increase awareness of nonpoint source pollution
- ▶ Introduce surveying and mapping of a watershed
- ▶ Increase watershed protection awareness and possible actions that can be taken to help your watershed.
- ▶ A new model of - *It Begins at Home*. With ideas about projects such as:
 - ▶ Storm Drain Marking
 - ▶ Stream Clean-ups
 - ▶ Recycling
 - ▶ Advocacy and More

Who Should Participate?

Educators, land managers, advocacy groups, Scout troop leaders, Envirothon Team advisors, watershed team leaders, environmental educators, concerned citizens, and others. For teachers, two CEU credits are available.

Registration Information

Registration is available on the Mississippi Wildlife Federation/ Adopt-A-Stream website: www.mswildlife.org/AAS/ or by contacting Debra Veeder, Adopt-A-Stream Coordinator at (601)605-1790 or dveeder@mswf.org.

FORENSIC GEOLOGY

David T. Dockery III, Office of Geology

The modern science of geology traces its origin to Scotland with the presentation of James Hutton's *Theory of the Earth* to the Royal Society of Edinburgh in 1785 and to England in 1799, where William Smith produced the first large-scale geologic map of the geology around Bath in Somerset County. In 1801, Smith drew a rough-sketch geologic map of England and Wales with part of Scotland, which became known as "The Map that Changed the World." The map was published in color in 1815 (Figure 1). With Britain's rich history in geology, it is no surprise that, when Sir Arthur Conan Doyle created the Sherlock Holmes series, Detective Holmes would be the first to use forensic geology in solving crimes. Holmes memorized the exposed geology of London to the extent that he could identify where a person had been by examining the clay on their shoe (Figure 2).

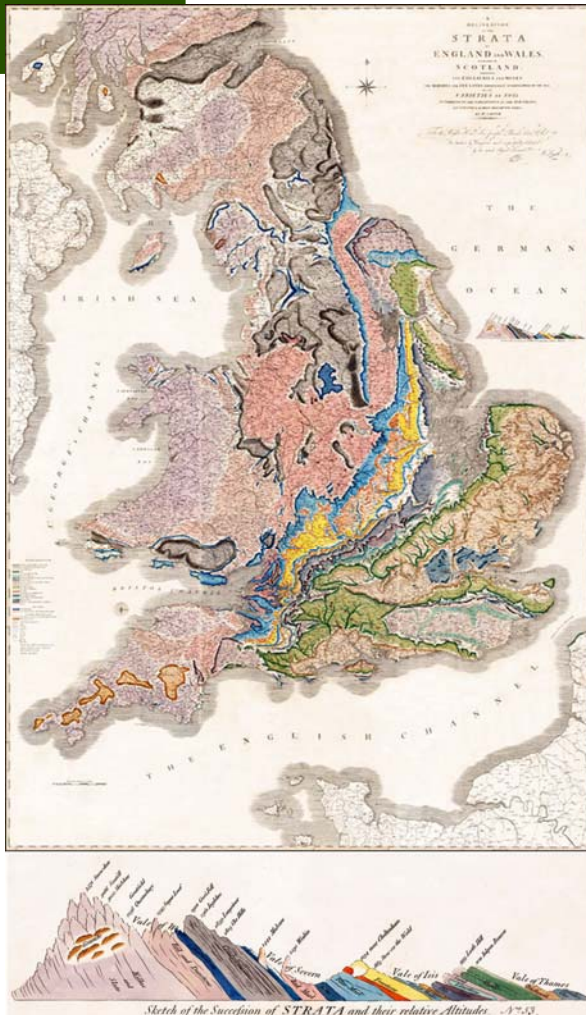
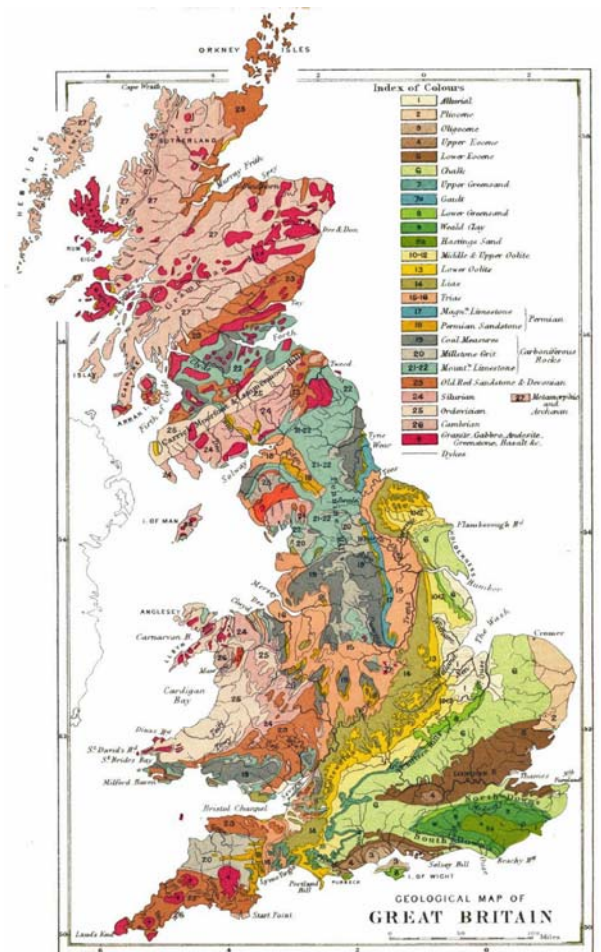


Figure 1. William Smith's 1815 geologic map of the Strata of England, Wales, and southern Scotland (top) and a cross section of strata from the Thames River Valley in the London area to the hills of central Wales (bottom).



After Horace B. Woodward (1984), Stanford's Geological Atlas, based on Reynolds's Geological Atlas of 1860 and 1889. Ian West, 2009.

Figure 2. This Geological Map of Great Britain is based on Reynold's Geological Atlas of 1889, and shows the geologic knowledge at the time of the Sherlock Holmes series.

In the story, *The Five Orange Pips*, published in 1891, we have this conversation:

Holmes: “You have come from the Southwest, I see.”

Visitor: “Yes, from Horsham.”

Holmes: “That clay-and-chalk mixture which I see on your toe caps is quite distinctive.”

Forensic geology is the use of geology, including evidence relating to minerals, oil, petroleum, and other materials found on Earth, to answer questions raised by the legal system in both criminal and civil cases. Forensic geology is also used by paleontologists studying fossil deposits to answer the question: “What happened to all these animals and/or plants.” Fossil deposits are of two general types: (1) Biocoenosis contains the remains of organisms buried together in the habitat in which they lived (Figure 3), and (2) thanatocoenosis contains a death assemblage of fossils that were not associated in life and have been removed from their habitat and deposited elsewhere (Figure 4).



Figure 3. Biocoenosis of a community of mollusk shells, that lived in the same habitat, excavated in place from the Coon Creek Tongue of the Ripley Formation at the type Coon Creek locality in McNairy County, Tennessee, and displayed at the Pink Palace Museum in Memphis. Picture from the Pink Palace Museum website.



Figure 4. This one meter square slab was excavated by the staff of the Pink Palace Museum in Memphis, Tennessee, from the road bed of the Highway 45 bypass around Frankstown, Mississippi, and is now exhibited at the museum. The slab shows the original road bed and the excavated sections on each side to expose the many fossils, which are a thanatocoenosis of shark teeth, rare dinosaur teeth, and petrified wood. Picture is from the Pink Palace Museum website.

The detective work for the forensic paleontologist is to distinguish a biocoenosis from a thanatocoenosis. Indications of a biocoenosis are animal remains preserved in their burrows, intact remains of fragile echinoderms such as sanddollars and sea urchins, and clams with both valves (shells) closed together. Clams have abductor muscles that keep the shells closed and an organic hinge that opens the shells when the muscles relax. So when a clam dies in its burrow, its shells remain closed together. This is especially true for deep burrowing clams such as the geoduck, an edible saltwater elongate clam in the genus *Panopea* (Figure 5). When a clam dies and is transported to another place by ocean currents, its shells butterfly and separate. So a bed containing disarticulated shells of clams from different habitats would indicate a thanatocoenosis, while a natural mix of disarticulated shells and articulated shells from a common habitat would indicate a biocoenosis. These forensic observations are not just of academic concern but have legal applications.



Figure 5. Fossil shells of the geoduck *Panopea* in life position in the Owl Creek Formation at a construction site on Highway 15 north of New Albany, Mississippi. Pictures were taken by George Phillips on February 19, 2012.

Forensic geology and differentiating a biocoenosis from a thanatocoenosis became an important issue 1998 when the Office of Geology was called upon by the Secretary of State's office to drill core-holes on property owned by Biloxi Grand Casino in Biloxi and determine if the land was reclaimed from tidal waters by fill or if the land was natural. The state laid claim to that portion of the property reclaimed from the sea, as the tidal waters belonged to the state, and the state could require a lease on that property. The land was seaward of the shoreline as indicated on old maps dating to 1851 (Figure 6). However, the argument could be made that these old maps were incorrectly drawn. To prove that the land was reclaimed from the Mississippi Sound required drilling core holes on the site to determine if the land portion above sea level was fill, as indicated by a human-induced (i.e. oyster shells used as fill) thanatocoenosis and other evidence, or was ground underlain by natural sediments as indicated by a biocoenosis. Cores were obtained from the site using MDEQ's Failing 1500 drilling rig. Examination of the cores found five stratigraphic units. The upper two units comprised all the land above sea level and contained a thanatocoenosis of disarticulated and even ground-up (for chicken grit) oyster shells hauled in from the area's seafood industry.

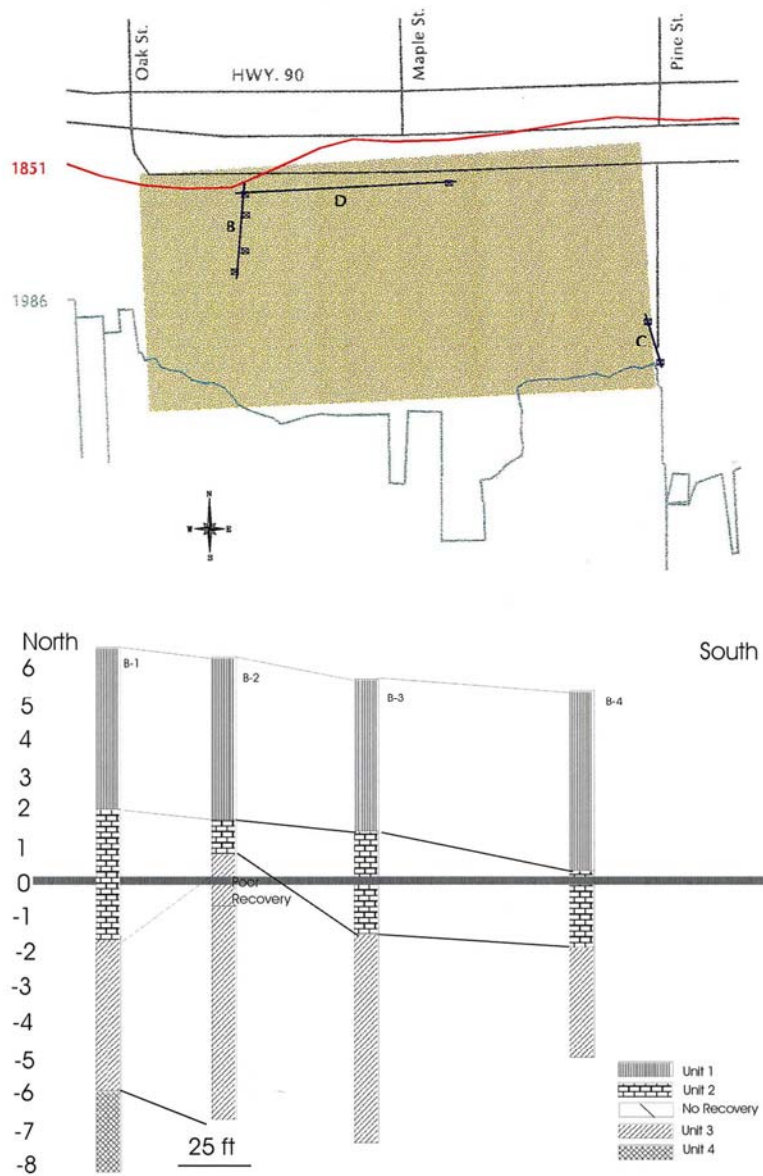


Figure 6. Top: The Grand Casino Property Base Map, Biloxi, Mississippi, as prepared in October 1998. The red line is the 1851 coastline as digitized by the Office of Geology from the U.S. Coast and Geodetic Survey shoreline (1851). The 1986 shoreline is drawn from aerial photography. Bottom: Core holes for the north-south Cross Section B-B' are in the northwest quarter of the property; units 1 and 2 are fill.

Core evidence from the Biloxi Grand Casino site was so convincing that MDEQ was asked to drill another casino site in 2002, the Imperial Palace Casino on Back Bay Biloxi (figures 7-8). As given in the site report's Executive Summary, "it was recognized that a significant portion of the site had at one time been a natural water bottom that was subsequently filled with a variety of materials." Biloxi Grand Casino and Imperial Palace Casino now lease their reclaimed property from the State of Mississippi.

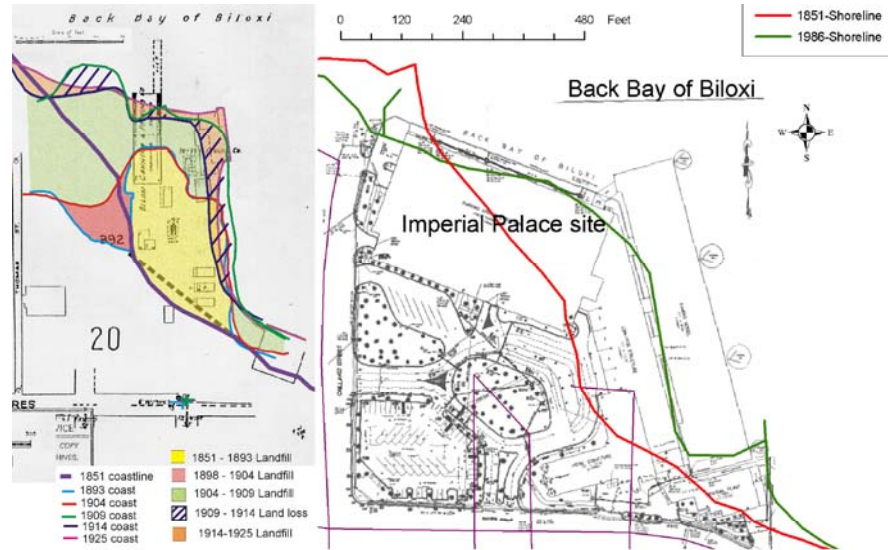


Figure 7. Left: Historical shoreline progression from Sanborn maps in a portion of Back Bay of Biloxi; background image is 1925 Sandborn map; fill is colored by age. Right: 1851 shoreline in red and 1986 shoreline in green; between these lines is a portion of the bay reclaimed by fill.



Figure 8. Core of the Imperial Palace property on Back Bay of Biloxi, showing the contact (at 3-foot mark) of fill (at left) and natural seafloor sediment (right).

During the war years of the 1940s, the Mississippi Geological Survey (now Office of Geology) worked in cooperation with the U.S. Geological Survey to explore for strategic minerals and to create the Geologic Map of Mississippi published in 1945 at a scale of 1:500,000. At the time, MGS employed Dr. Virginia Kline as a paleontologist. Dr. Kline left Mississippi in May of 1943 to become assistant petroleum analyst in the Chicago office of the Petroleum Administration for War. The U.S. Government picked some of the best paleontologists and geologists for the war effort. The following account from John McPhee's (1997) *Irons in the Fire* shows how some of the government's "best and brightest" used forensic geology to solve a pressing military problem.

In the fall of 1944, Technical Major Teiji Takada, of Japan's Ninth Army Technical Research Laboratory, took a walk on the Ninety-nine League Beach at Ichinomiya, which faced east against the great expanse of the Pacific Ocean. Tests had proven satisfactory, and now Takada pondered matters of sand supply, ballast, lift, altitude, wind speed, U.S. War Department defenses, but not a thought of the U.S. Geological Survey. Takada's task would produce the war's only sustained attack against the U.S. mainland (Figure 9). Hydrogen-filled balloons with explosive and incendiary payloads would be launched by the thousands into the winter Jet Stream at an altitude above 30,000 feet, where wind speeds would take them across the Pacific Ocean and to the West Coast in just three days. Once over the target area, the balloons would release their explosive charges and self-destruct. To compensate for the loss of hydrogen along the route, the balloons carried a ballast of sand bags that were released two at a time when the balloons descended to 30,000 feet.

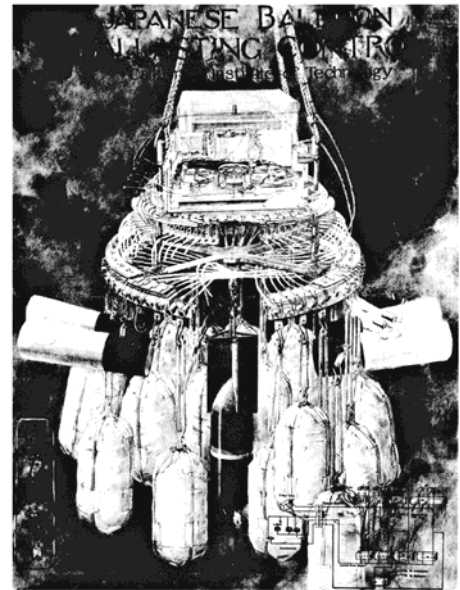
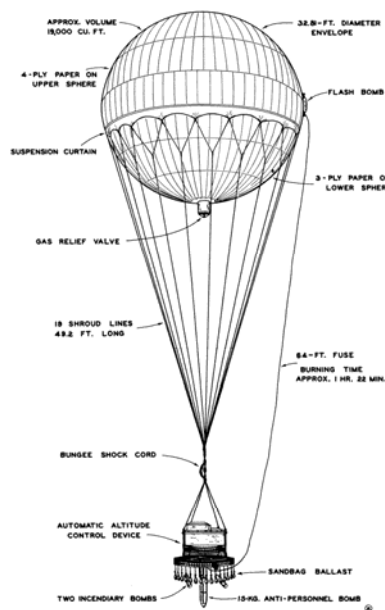


Figure 9. Left: Japanese balloon design as used in World War II. Right: Carousel-like attachment for sandbag ballast, incendiary bombs, and a central anti-personnel bomb.

The first balloons were launched on November 3, 1944; a few days later, balloons and explosions were sighted from California to Alaska; some 9,000 balloons would follow (Figure 10).

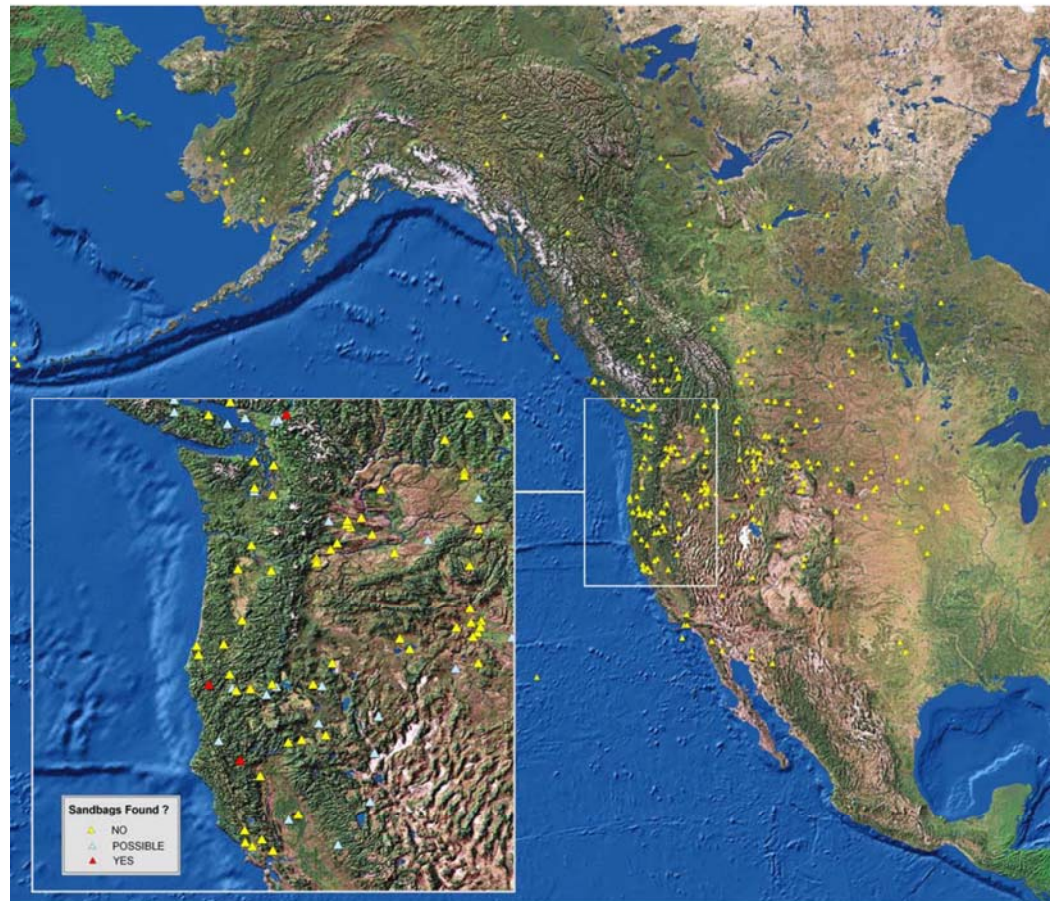


Figure 10. Balloon bomb incidents in North America marked by triangles; red triangles indicate that sandbags were found, from poster by Dave Tewksbury, Department of Geosciences, Hamilton College, Clinton, New York .

While damage created by the balloon strikes was low, authorities worried that some might get “lucky” and also worried that balloons carrying biowarfare agents could be a real threat. Colonel Sidman Poole, U.S. Army Intelligence and military liaison to the U.S. Geological Survey’s Military Geology Unit, came to the Survey from the War Department with a bag of sand and asked where the sand came from. At the time, it was inconceivable that balloons could have travelled 5,000 miles from Japan. It was thought that the balloons must be coming from North American beaches, launched by submarine parties. Wild theories speculated secret launches from U.S. German prisoner of war camps or even Japanese-American internment centers.

Fortunately, during the war years, the U.S.G.S. was staffed with paleontologists and mineralogists who were preeminent in their fields. These included paleontologists Ken Lohman, a diatoms specialist, Ken's wife Kathryn Lohman, a Foraminifera specialist, Julia Gardner, a mollusks specialist, and mineralogist Clarence Ross. Clarence Ross found the sand to be unlike any in North America or the Pacific islands. It contained igneous and metamorphic minerals such as hypersthene, augite, hornblende, garnet, high-titanium magnetite, and high-temperature quartz; hypersthene, a mineral common in the andesitic and basaltic volcanic rocks of northeastern Japan, comprised fifty-two percent of the total.

Ken Lohman examined the sand and found it to contain a hundred different species of recent and fossil diatoms; it was obviously beach sand. Julia Gardner searched the samples for reef coral fragments; such corals did not grow in the cold waters north of the 35th parallel, the latitude of Tokyo. The sand did not contain corals. The Foraminifera examined by Kathryn Lohman contained species known only from the east coast of Japan north of Tokyo. Further study by Ken Lohman found the fossil diatoms to be Pliocene in age and with the same species as found in the sands of the beach at Shiogama close to Sendai and the Ninety-nine League Beach at Ichinomiya, some one hundred miles to the south. Armed with this information, photoreconnaissance found the balloon plant and, according to Ken Lohman's quote as published by McPhee, "Jimmy Doolittle went over and bombed the ... out of the place." B-29s then destroyed two of the three hydrogen plants that supplied the balloon project. This destruction, coupled with the U.S. press blackout on balloon incidents (the Japanese learned of only one), ended the balloon launches and averted a feared balloon-borne bacteriological attack.

MDEQ ENVIRONMENTAL ACTION LINKS



- Draft permits currently at public notice, <http://opc.deq.state.ms.us/publicnotice.aspx>.
- Permits and certificates issued in the last 90 days, http://opc.deq.state.ms.us/report_permits.aspx.
- General permit coverages issued in the last 90 days, http://opc.deq.state.ms.us/report_gnp_issued.aspx.
- Notices of Intent for coverage under a Statewide General permit received by the Environmental Permits Division, http://opc.deq.state.ms.us/report_gnp_notice.aspx.
- List of the 401 Water Quality Certifications currently at public notice, http://opc.deq.state.ms.us/report_wqc_public_notice.aspx.
- List of the compliance inspections recently conducted, http://opc.deq.state.ms.us/report_eced_tasks.aspx.
- Orders issued by the Mississippi Commission on Environmental Quality, http://opc.deq.state.ms.us/report_orders.aspx.

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PICTURES OF THE MONTH

Natchez (top) and the
Mississippi River
Bridge at Natchez
(bottom).

Taken by Joe Wilson,
MDEQ.

