Delivering Mitigation Solutions: Insights From A Leading Practitioner

Russ Krauss
Vice President, Marketing & Research
Helping Permittees Comply

Federal Law

– Clean Water Act §404
  • Waters of The United States
– Rivers and Harbors Act §10

Guiding Regulations: Compensatory Mitigation For Losses of Aquatic Resources; Final Rule

– DoD USACE: 33 CFR 325, 332
– EPA: 40 CFR 230
  • Watershed Approach
  • Assessment
  • Solutions
Regulatory Agencies

Interagency Review Team
- USACE
- US EPA
- US Fish and Wildlife Service
- USDA NRCS
- NOAA NMFS

Regional
- Texas Parks & Wildlife Department
- Texas General Land Office
- Texas Commission on Environmental Quality
- Texas Historical Commission
- Pennsylvania Department of Environmental Protection
- Pennsylvania Fish and Boat Commission
- Pennsylvania Game Commission
- Pennsylvania Department of Conservation and Natural Resources
- Louisiana Department of Wildlife and Fisheries

Local
- County Conservation Districts
- Watershed Councils
Addressing Regulatory Uncertainty and Permitting Delays
Mission

Resource Environmental Solutions develops and supplies ecological offsets to help companies obtain required permits for unavoidable project-related impacts to wetlands, streams and habitats.

We help clients proactively manage risk from operations in environmentally sensitive areas by providing proactive project impact analyses, streamlining permitting processes, and limiting liability and regulatory exposure.
Company Snapshot

Founded in 2007

Louisiana, Texas, Pennsylvania, West Virginia, Ohio

14 Corps Districts and 90+ Regulatory Agencies

Ecological offsets developed to fulfill client permits:
22,000 restored stream and wetland acres
4,000 acres of custom mitigation solutions
15 miles of stream restoration

47 wetland and stream mitigation banks
permitted/in process

100 satisfied Energy industry clients

Leading supplier for US Shale Plays
## Projects and Activities

<table>
<thead>
<tr>
<th>Louisiana Wetland Restoration</th>
<th>Texas Wetland Restoration</th>
<th>Pennsylvania/West Virginia Restoration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over 2,500 Acres Restored or In Process</td>
<td>Over 2,500 Acres Restored or In Process</td>
<td>Over 1,700 Acres Restored or In Process</td>
</tr>
<tr>
<td>New Orleans District</td>
<td>Fort Worth District</td>
<td>Multiple watersheds across Baltimore, Pittsburgh, Philadelphia Districts</td>
</tr>
<tr>
<td>Vicksburg District</td>
<td>Galveston District</td>
<td>232 Wetland Acres</td>
</tr>
<tr>
<td>8,809 Acres</td>
<td>327 Acres</td>
<td>2,218 Acres</td>
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### Louisiana Mitigation Supply
- 22 Mitigation Banks and Projects Approved
- 10 New Mitigation Banks and Projects In Process
- 8 Mitigation Projects in Louisiana Coastal Zone

### Texas Mitigation
- RES First Texas Wetland Bank: Brooks Creek, Bowie County
- Inter-District Mitigation Solution Delivery
- 10 New Mitigation Banks and Projects In Process

### Pennsylvania Mitigation
- Pennsylvania’s First Commercial Mitigation Bank
- Document and Test Newly Proposed Aquatic Resource Compensation Protocol

### 5-Year Track Record
- 97% of Proposed Projects Approved (32 of 33 proposed)
- RES’ New Orleans District Average: 21.28 Months from Bank Prospectus to Credit Release
- RES’ Vicksburg District Average: 12.99 Months from Bank Prospectus to Credit Release

### Addressing Key Issues
- Invasive Species Control
- Improving Plant Survivability
Clients Served

bp
Chesapeake Energy
QEP Resources, Inc.
Cargill
Denbury
Petrohawk
bhp billiton
EnCana
Enbridge
CenterPoint Energy
Cheniere
Kinder Morgan
Entergy
OXY
Williams
US Army Corps of Engineers
Enterprise Products Partners LP
Realty
Energy Transfer
National Park Service
Louisiana's on the Move
Texas Department of Transportation
Nursery at Pointe Aux Chenes

Gulf Coast’s Go-To Supplier of Coastal Marsh Grasses and Plants

Over 1,500,000 restoration stems grown, supplied and planted to restore Louisiana’s fragile coastal barrier islands, estuaries, marshes and wetlands.

The 640-acre Nursery at Pointe Aux Chenes, Terrebonne Parish, Louisiana was established in 2008. The nursery operates multiple greenhouses and founded multi-acre growing ponds in 2009. The nursery is now growing plants in ponds and also in containers for packaged delivery and installation.

We are Louisiana’s go-to supplier for coastal restoration materials and installation.

The Nursery sources seed stock from the USDA NRCS Plant Materials Center.

Louisiana Contractor’s License #51750
Specializations: Coastal Restoration and Habitat Enhancement and Earthwork, Drainage and Levees
Native Grasses
Plants and Trees

We grow in volume to address the diverse needs of our commercial, government and non-profit customers.

Custom growing and delivery are available.

Contact Aaron Pierce at 985-637-9720 or aaron@res.us

A. Bitter panicum (*Panicum amarum*)
B. California bulrush – bare root plugs (*Schoenoplectus californicus*)
C. California bulrush – one gallon root bundle
D. Gulf blue stem – 4-inch pots (*Schizachyrium maritimum*)
E. Gulf blue stem – 1-gallon pots
A. Smooth cordgrass (*Spartina alterniflora* cultivar *Loisel 'Vermillion') – shown at the beginning stage of a smooth cordgrass pond

B. Smooth cordgrass – one-gallon pots with seed heads forming

C. Smooth cordgrass – shown in pond flooded to mimic tide

D. Smooth cordgrass (*Spartina alterniflora* cultivar *Terrebonne*)

E. Smooth cordgrass plugs ready for delivery

*Certified Seed Stock
DNA Fingerprinted by LSU Agricultural Center
Black mangrove (*Avicennia germinans*)

A. Collected propagules ready for potting  B. Sprouting in the greenhouse  C. 2 months old  
D. 4-inch pots  E. 1-gallon pots  F. Root structure of established mangrove
Multidisciplinary Team

WETLAND AND STREAM MITIGATION

- WATERSHED MANAGEMENT
- FOREST MANAGEMENT
- ENVIRONMENTAL ENGINEERING & PERMITTING
- GEOGRAPHIC INFORMATION SYSTEMS
- FINANCE PROJECT MANAGEMENT
- LAND SURVEY
- WETLAND ECOLOGY
- GEOMORPHOLOGY
- HYDROLOGY
- ZOOLOGY
Lockstep Collaboration with Engineering and Environmental Consultants

Environmental and Engineering Consulting Firm Activities

- Initial Route
- Land and Environmental Survey
- Route Optimization
- Resource Reports
- Permit Applications
- Agency Review Comments and Updates
- Approvals

Environmental and Engineering Consulting Firm Activities

- Project Feasibility
- Planning & Design
- Project Sanction
- Regulatory Approval Process
- Agency Decisions
- Construct

Value Added Activities and Deliverables

- Impact Analysis
- Wetlands, Streams, Habitats
- Route Assessment
- Avoidance and Minimization Guidance
- Mitigation Alternatives
- Mitigation Solutions

- Resource Report Drafts
- Mitigation Solutions
- Mitigation Plans
- Agency Comments Response

- Post Construction
- Restorative Planting

- Mitigation Site Monitoring and Reporting
Sequencing for Reduction of Impact (Mitigation Sequencing)

Avoid
Minimize
Compensate
Stream Crossings: Choices

Open Cut/Trenching
More Impacts, More Time

HDD/Boring
Fewer Impacts, Faster
Solution Set

Preference hierarchy for mitigation options:

• Mitigation bank credits
• In-lieu fee program credits
• Permittee-responsible mitigation under a watershed approach
  On-site and/or in-kind permittee-responsible mitigation
  Off-site and/or out-of-kind permittee-responsible mitigation
Compensatory Mitigation Type
USACE District 2009

Legend
Compensatory Mitigation Report (2009)
- In-Lieu Fee
- Mitigation Bank
- Permittee Responsible

Sources: Esri, GEBCO, NOAA, National Geographic, DeLorme, HERE, Geonames.org, and other contributors
Compensatory Mitigation Type
USACE District 2013

Legend
Compensatory Mitigation Report (2013)
- Blue: Permittee Responsible
- Orange: In-Lieu Fee
- Red: Mitigation Bank

Sources: Esri, GEBCO, NOAA, National Geographic, DeLorme, HERE, Geonames.org, and other contributors.
Which Solution?
Where?
When?
How?
How Much?

Will it be ready yesterday?
Begin with the End in Mind

 ✓ Impact Scope and Magnitude
 ✓ Project Timetable
 ✓ Regulatory Framework
 ✓ Solution Options
# Approach

<table>
<thead>
<tr>
<th>Execution Phases</th>
<th>Impact Analysis</th>
<th>Permit Process Optimization</th>
<th>Ecological Offset Supply</th>
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</thead>
<tbody>
<tr>
<td>Key Initiatives</td>
<td>Quantify Risk from Surface Impacts</td>
<td>Streamline Regulatory Interaction</td>
<td>Improve timing, availability, and delivery of offset</td>
</tr>
<tr>
<td>Solution Provided</td>
<td>Proprietary GIS process using client operational plan</td>
<td>Map deliverables process between all parties to regulatory</td>
<td>Deliver a flexible, cost-effective credit solution</td>
</tr>
<tr>
<td>Benefits And Outcomes</td>
<td>• Better, earlier understanding of risk, liability, and cost</td>
<td>• Reduce operational risk and time-to-permit</td>
<td>• Fix future costs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Transfer liability</td>
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Operating Advantages

1. Permit Painlessly
2. Eliminate unnecessary stops and starts
3. Build operating reputation with regulators
4. Receive offset credits on demand

“RES surpassed expectations.” “Your team really does good work!” “I look forward to working with you on any future projects”

Executive VP, Petrohawk
Impact Analysis

1. Forecast offset needs for an operating plan
2. Understand risks/liabilities and plan
3. Avoid fines, penalties, and costly delays

Analysis may include:

- Drilling Pads
- Reserve Pits
- Access Roads
- Flowlines and Laterals
- Gathering Lines
- Storage Tanks
- Gas Processing Plants
- Gas Storage Brine Ponds
- Water Processing Facilities
- Water Storage Ponds
- Gathering Systems
- Hydrocarbon On/Offloading Facilities
Impact Analysis

- Base Map Area of Interest Leases and Fields
- Add Surface Impacts
- Conduct multi-layered GIS analysis
- Allocate Impacts to Watersheds
- Calculate Required Mitigation Credits
- Add Project-based Timetables

Process discussed in SPE 141949 and SPE 163804
Supplying Offsets

RES builds a flexible, multi-year credit supply that contributes to ease of permitting

1. A multi-year supply of dedicated wetlands and stream credits
2. Land options that meet regulators’ technical requirements
3. Wholesale purchase options for client that speed credit delivery
Investment and Return

Return
On
Investment

Capital Investments
- Team
- Technology
- Land Acquisition
- Consultants and Contractors
- Operating Funds
- Site Restoration Activities
- Financial Assurances
Example: Linear Corridor Project
Full Lifecycle Mitigation

• Corridor analysis
  – Trenching vs. boring
  – Double mitigation
  – Temporary vs. permanent
• Local regulatory models review
  – Many existing relationships with mitigation sections
• Implications on budget, timing, offset availability, project success
• Mitigation plan creation and support for 404 decisions
• Execute & maintain project until all success criteria are reached
To see the Video, go to: http://res.us/video
Resource Environmental Solutions

www.res.us

Houston  Baton Rouge  Lafayette  Pittsburgh