



Hero Lands, LLC v. Chevron U.S.A. Inc., Total Petrochemicals & Refining USA, Inc., Pioneer Natural Resources, Inc., Key Operating & Production Company, L.L.C., Key Exploration Company, Wagner Oil Company, Hilcorp Energy L.L.P., Manti Operating Company, and Henderson Oil Company, Inc. Plaquemines Parish, Louisiana

Site Assessment and Expert Report of Helen Connelly, Ph.D. and John H. Rodgers Jr., Ph.D.

Hero Lands LLC v. Chevron U.S.A. Inc. et al
Docket No. 64320, Div. "A" 25th JDC

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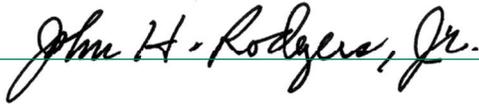
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1. INTRODUCTION

Environmental Resources Management, Inc. (ERM) has prepared this expert report pertaining to the action entitled "Hero Lands, LLC v. Chevron U.S.A. Inc., Total Petrochemicals & Refining USA, Inc., Pioneer Natural Resources, Inc., Key Operating & Production Company, L.L.C. Key Exploration Company, Wagner Oil Company, Hillcorp Energy L.L.P., Manti Operating Company, and Henderson Oil Company, Inc., Docket No. 64320, Div. "A," 25th JDC, Plaquemines Parish, Louisiana." ERM was retained by Kean Miller LLP on behalf of defendant Chevron U.S.A. Inc. (Chevron).

We were retained to evaluate the ecological and environmental status of the Hero Lands Property in Plaquemines Parish, Louisiana. We reviewed Plaintiff's experts' reports, conducted a site inspection, reviewed available information for the site involved in this case, and consulted with other experts. Of particular interest for this site were the current ecological conditions of the plants and animals and their habitats, surface soils, and sediments on the property, as well as any potential remediation or remedy that may be needed.

1.1 Background

Plaintiff alleges that its property has been contaminated or otherwise damaged by the Defendants' historic oil and gas production and management activities. These activities included exploration and production of oil and gas and management of wells and associated facilities, including but not limited to pits, tanks, sumps, pipelines, and wellheads. Plaintiff also alleges that leaks, spills, and other discharges of oil or produced water from tanks, wells, pipelines, and other equipment have polluted Plaintiff's property, resulting in potential adverse effects on vegetation and wildlife. Further, the Plaintiff (through its experts) indicates a need for extensive hauling, filling and construction to "restore" the property.

The property involved in this case (Hero Lands Property, ~ 155 acres total) is located in the Stella Oil and Gas Field near Belle Chasse, Louisiana. Situated in Plaquemines Parish, Louisiana, the property is located within Section 2, Township 15 South, Range 24 East; and Sections 16, 17 and 18, Township 14 South, Range 24 East, on the west side of the Mississippi River. The property consists of four tracts on both sides of LA Highway 23, east of the United States Naval Air Station and south of the City of Belle Chasse (Holloway 2019). The Hero Lands tracts are located on the west natural levee of the Mississippi River. A portion of the property lies on the batture side of the Mississippi River Levee. This area is periodically flooded. The remainder of the Hero Lands property is located west of the levee and is bisected by LA Highway 23 and the New Orleans and Gulf Coast Railway Company line that runs north to south between the east and west property tracts. For purposes of this report, the four Hero Lands tracts are designated as northeast (NE), southeast (SE), northwest (NW) and southwest (SW). All four tracts total approximately 155 acres. Elevations on the Hero Lands tracts range from 2 to 12 feet. Historically, the land was used for pasture and crops. Drainage has been altered to support these and subsequent activities on the property. In more recent times, the property has been used for oil and gas development, and some exploration and production is still ongoing. The property will not likely be used recreationally for hunting due to limitations associated with its proximity to residential housing and highways. A house and two trailers are located on the northwest side of the property. The southwest tract has an impoundment that is operated by the Chevron Oronite Company that is located across the highway/railroad tracks to the east. Future use of the property will most likely continue to be exploration and production, or industrial/commercial, based on Plaintiff's stated desire that the property be used for these purposes (Hero 1442 Deposition, May 28, 2020).

Of particular interest for this report were the current ecological conditions of the Hero Lands Property, as well as any potential remediation that may be necessitated by adverse effects on plants or animals and their habitats and ecosystems.

1.2 Approach

This report provides: (1) a review and analysis of background information and currently available data on the Hero Lands Property pertinent to this case; (2) a review and analysis of Plaintiff's experts' reports; and (3) recommendations for a feasible and reasonable (i.e., scientifically defensible) course of action for this property based in fundamental principles of environmental toxicology and risk mitigation. The approach used in this report is scientifically based on the ecological assessment and risk mitigation process as well as fundamental principles of environmental toxicology such as: a demonstrable exposure is required to elicit a dose, response, and consequent risk due to that exposure; any remediation proposed should mitigate or alleviate risks or damages (i.e., we should not attempt to disrupt ecosystems that are not damaged or "broken"); and, a remediation strategy should not cause more harm than it mitigates (USEPA, 1992; USEPA 1997).

1.3 Sources of Information

In addition to documents attached to and referenced in this report and its appendices, we considered the following information and reports in formulating our opinions:

Chevron's experts' reports:

Expert reports by:

- Mr. Michael Pisani and Mr. Dave Angle
- Dr. Luther Holloway
- Dr. John Frazier
- Ms. Angela Levert
- Dr. John Kind
- Mr. Calvin Barnhill

Plaintiff's experts' reports:

- Rogers, William J. 2019. Toxicological Evaluation and Risk Assessment Associated With Oil and Gas Operations on the Hero Lands, L.L.C. Property Within Stella Oil and Gas Field, Plaquemines Parish, Louisiana. Omega EnviroSolutions, Inc., Canyon, TX. Prepared for Swanson, Huddell and Garrison, LLC, New Orleans, Louisiana (August 26, 2019).
- Wilson, Walker 2019. Ecological Impacts Associated with Oil and Gas Exploration and Production Activities on Hero Lands Company, L.L.C. Property within Stella Oil and Gas Field, Plaquemines Parish, LA. Coastal Environments, Inc., Baton Rouge, LA. Prepared for Swanson, Huddell and Garrison, LLC, New Orleans, Louisiana (August 12, 2019).
- Templet, Paul H. 2018. An Expert Report by Paul H, Templet, Ph.D., Hero Lands. v. Chevron USA, Inc. et al; Docket #64320, Div. "A", 25h JDC, Stella Oil Field, Plaquemines Parish, Louisiana. Prepared for Swanson, Huddell and Garrison, LLC, New Orleans, Louisiana (August 12, 2019).
- Miller, Gregory W. and J.S. Sills. 2019. Expert Report and Restoration Plan for the Landowners; Hero Lands Company v Chevron USA Inc., et al; Docket #64320, Div "A"; 25th JDC; Stella Oil Field, Plaquemines Parish, LA Prepared for Swanson, Huddell and Garrison, LLC, New Orleans, Louisiana (July 12, 2019).

- Norman, Charles R. 2019. Engineering and Operations Report on Stella Oil Field, (Properties of Hero Lands Company LLC), Operated by Chevron USA Inc., et al Assessment Report, in the case of Hero Lands Company LLC vs. Chevron USA, Inc., et al 25th JDC for the Parish of Plaquemines, State of Louisiana, Docket No. 64320, Div. A, Report No. 1. Prepared for Swanson, Huddell and Garrison, LLC, New Orleans, Louisiana (August 12, 2019).

In addition, we reviewed peer-reviewed scientific literature (included in the Literature Cited and References in this report) and aerial photographs. Dr. Connelly conducted a site inspection on July 6 – 8, 2020, and photographed areas on and adjacent to the property along with colleagues from ERM. Drs. Connelly and Rogers reviewed photographs of animals and plants on the property taken by ERM personnel. Photographs and site inspection reports are included in Appendix B. We also reviewed data from samples collected and submitted for analysis by ERM (ERM 2020), HET (2020), and Plaintiff's experts (ICON 2019).

1.4 Authors' Qualifications

Dr. Helen Connelly is a toxicologist and ecological and human health risk assessor. Dr. Connelly has a Bachelor of Science degree in geology from Louisiana State University and a Ph.D. from Louisiana State University School of Veterinary Medicine, Department of Physiology, Pharmacology and Toxicology. Dr. Connelly is an adjunct professor at Louisiana State University in the Department of Environmental Science. Dr. Connelly has taught graduate and undergraduate classes in environmental science, environmental sampling, conservation biology, ecology, biology, and ecological risk assessment at Louisiana State University and Baton Rouge Community College. She has been a mentor for many students receiving their graduate degrees in natural sciences over the years. For more than 20 years, she has been involved with research and investigation of the effects of oil and gas production and exploration on aquatic and terrestrial life in Louisiana wetlands, lakes, bayous, estuaries, and other water bodies.

Dr. Connelly is a member of the Society of Environmental Toxicology and Chemistry (SETAC) and the Baton Rouge Geological Society. Dr. Connelly began working for the Louisiana Department of Environmental Quality (LDEQ) in 1991 in the Inactive and Abandoned Sites division, and it was at LDEQ that she became interested in ecological risk assessment. After obtaining her Ph.D. in 1997, she worked as an environmental consultant first for Michael Pisani and Associates, and then ERM, while also teaching concurrently. Dr. Connelly's research investigations have been a part of her consulting work and have been focused on ecological risk assessment of the effects of organic and inorganic compounds, including metals and hydrocarbons associated with oil and gas production and exploration, on vegetation and wildlife. A copy of Dr. Connelly's Curriculum Vitae is appended to this report (Appendix A).

Dr. John Rodgers is currently an Emeritus Professor in the Department of Forestry and Environmental Conservation and former Director of the Ecotoxicology Program at Clemson University. Immediately prior to coming to Clemson University in January 1998, he was Professor of Biology and Adjunct Professor in the School of Pharmacy at the University of Mississippi, located in Oxford, Mississippi. He conducted research, taught, and directed programs at the University of Mississippi for nine years. He was Director of the Biological Field Station at the University of Mississippi and Director of the Center for Water and Wetland Resources.

Dr. Rodgers received a Bachelor of Science degree in Botany/Biology from Clemson University in South Carolina in 1972. He earned a Master of Science degree in Plant Ecology/Aquatic Biology from Clemson University in 1974. In 1977, he obtained a Ph.D. degree in Aquatic Ecology/Ecotoxicology from Virginia Polytechnic Institute and State University in Blacksburg, Virginia, and he held a post-doctoral research position at Virginia Polytechnic Institute and State University in 1977.

Dr. Rodgers has conducted research and taught graduate and undergraduate classes in biology, ecology, ecotoxicology, risk assessment, sediment toxicology, wetlands and aquatic toxicology at Clemson University, the University of Mississippi, the University of North Texas, and East Tennessee State University. For more than 40 years, he has been involved with research on a variety of water bodies including rivers, streams, reservoirs, lakes, marsh areas (wetlands) and associated lands in various parts of the United States, both east and west of the Mississippi River. Essentially, his research has been focused on the health and well-being of the ecosystems within water bodies and the surrounding areas. Among other places, he has studied the impact of both man and nature on plant and animal life in Texas, South Carolina, Mississippi, Alabama, and Louisiana wetlands, rivers, streams, and reservoirs. For example, he has investigated the effects of point sources (e.g. effluents, spills, production and refining activities) as well as non-point sources (e.g. cropland runoff) on wetlands, streams and rivers in Mississippi and Louisiana. He has conducted research on materials released to aquatic systems from a variety of processes and facilities. For more than four decades, he has studied the responses of wetlands and other aquatic systems to discharges. He has also designed and constructed wetlands for

mitigation of contaminants, wildlife habitat and rehabilitation. These studies have resulted in more than 100 peer reviewed scientific publications and books. He incorporates this information in his undergraduate and graduate classes as well as short courses that are presented for postgraduates.

Dr. Rodgers has extensive experience with organics and inorganics as well as mixtures such as crude oil, brine and produced waters. He has also been involved with development of national water quality criteria and sediment guidelines as a consultant to the USEPA. He was an author of the USEPA protocol on Ecological Risk Assessment for field studies. Dr. Rodgers continues to be involved in reviews of ecological risk assessments for the USEPA under contract. He taught courses for the U.S. Army Corps of Engineers, Waterways Experiment Station in Vicksburg, Mississippi, on wetland construction and remediation. He has also taught short courses at international meetings of the Society of Environmental Toxicology and Chemistry on Constructed Wetlands for remediation and rehabilitation. Dr. Rodgers currently serves on the Science Advisory Panel for the Aquatic Ecosystem Restoration Foundation.

Dr. John Rodgers has served on the Board of Directors of the Society of Environmental Toxicology and Chemistry (SETAC), as the elected President of that scientific organization and as a Board representative from North America to the SETAC World Council. He was also President of the Aquatic Plant Management Society. He has also served in a variety of advisory capacities for government agencies. For example, he was on the review panel for the U.S. Environmental Protection Agency's (USEPA) Ecorisk Program as well as the Environmental Biology Panel that makes technical and scientific recommendations regarding prioritizing environmental research. He recently served as an invited scientist to a joint SETAC/USEPA workshop on Ecological Risk Assessment focused on Problem Formulation. He was also retained by the USEPA to provide scientific advice and oversight in problem formulation and ecological risk assessment. He has also served on the Expert Advisory Panel for the Canadian Network of Toxicology Centres funded by Environment Canada and Health Canada and chaired that Panel for three years. He advised the USEPA regarding water quality criteria and water quality based toxics control. He served on the Society of Environmental Toxicology and Chemistry/USEPA Expert Advisory Panel on Whole Effluent Toxicity Testing and recently served as a member of the Science Advisory Panel (and was elected to chair that panel) for the California Environmental Protection Agency and USEPA on water borne materials. He recently won an award for research on risk mitigation in wetlands from the U.S. Department of Energy and a Water Resources award for a constructed wetland in Oconee County, SC. He also was recently retained to evaluate risk assessments for the state of California. A copy of Dr. Rodgers' Curriculum Vitae is appended to this report (Appendix A).

2. SUMMARY OF FINDINGS

The available data clearly illustrate that the Hero Lands Property provides some habitat for wildlife species and vegetation. The property is mostly bottomland hardwood wetland and herbaceous wetland and accommodates exploration and production activities. During site investigation, we observed numerous plants, animals, and signs of wildlife, which indicates a healthy, fully-functioning ecosystem. There is clear evidence of healthy wildlife, and there is no evidence of adverse effects on wildlife from past exploration and production activities. In areas of the property east of Highway 23 that have been used and continue to be used for ongoing operations, there is no evidence of lasting impact that alters function and habitat. These areas are as expected for operational areas and the areas adjacent to these locations provide functioning habitat. The Hero Lands Property is providing extensive services (Appendix B; Barbier 2013) that would be disrupted or destroyed by unnecessary and intrusive remedial actions. The property is a very diverse bottomland hardwood wetland and herbaceous wetland.

Dominant factors influencing the ecological status of the Hero Lands Property include the following:

- a. Historical hydrology/drainage alterations (roads, ditches, etc.) that capture water and dissolved solids (and subsequent evaporation, transpiration)
- b. Proximity to the Mississippi River and Gulf of Mexico
- c. Legacy oil and gas exploration and production

The reported concentrations, locations, and forms of contaminants (COPECs) in the sediments and surface soils of the Hero Lands Property that are of potential ecological concern are not at concentrations or in forms that currently or potentially provide exposures presenting unacceptable risks to ecological receptors or their habitats.

Plaintiff's experts' conclusions regarding potential ecological risks are not substantiated and were not observed during site inspection. The risk mitigation approach proposed by the Plaintiff for the property would cause an unjustified reduction in surface water storage, an increase in carbon release, and an increase in temperature on the Property (see Appendix E). The Plaintiff's proposed risk mitigation plan would cause more harm than it repairs and does not clearly specify what species would be protected by the plan.

3. CURRENT ECOLOGICAL STATUS OF THE PROPERTY (HERO LANDS PROPERTY, PLAQUEMINES PARISH, LOUISIANA)

The property involved in this case (Hero Lands Property, ~ 155 acres total) is located in the Stella Oil and Gas Field south of Belle Chase, Louisiana. Situated on the west side of the Mississippi River in Plaquemines Parish, Louisiana, the property is located within Section 2, Township 15 South, Range 24 East; and Section 16, 17 and 18, Township 14 South, Range 24 East. The subject property is designated as the Hero Lands Property in this report. The property has hosted oil and gas exploration and production activities in the past and some activity is still ongoing. The Hero Lands Property is part of the Stella Oil and Gas Field, which was initially developed during the 1940s. The Hero Lands Property is normally accessed by vehicles from the adjacent road (LA Highway 23). The property consists of four tracts or parcels and is located east of the US Naval Air Station. Almost all of the Hero Lands Property is sufficiently low elevation that it supports bottomland hardwood wetland and herbaceous wetland.

3.1 Soils and Climate on the Hero Lands Property

The soil survey for Plaquemines Parish prepared by the Soil Conservation Service (SCS; Trahan 2000) indicates that this area has a mild, humid subtropical climate. Summers are hot, with the sun shining the majority of the time. Average daily temperatures are 82 degrees Fahrenheit (°F) and an extreme high of 97° F has been recorded (Trahan 2000). Winters are mild with few cold days, and the sun shines approximately 64% of the time. Average winter daily temperature is about 55° F. The average low temperature in the winter is 48° F and an extreme low temperature of 15° F was recorded. Thunderstorms occur in Plaquemines Parish about 70 days a year and annual precipitation is approximately 58 inches. Average relative humidity is relatively high ranging from about 60% to 87%. Prevailing winds are out of the south to southeast. Hurricanes occur occasionally severely impacting Plaquemines Parish.

Plaquemines Parish is entirely within the Mississippi Delta and is bounded on the south by the Gulf of Mexico. Elevations across Plaquemines Parish range from about 5 feet below sea level to about 12 feet above sea level. Several general soil types are found in Plaquemines Parish (Trahan 2000) and the Hero Lands Property contains remnants of several of these soils. Soils on the Hero Lands Property are ponded and frequently flooded, mucky, fluid soils form a bottomland hardwood wetland and herbaceous wetland. The soils on the Hero Lands Property are heterogeneously distributed and contain some upland soils that have been moved by historic floods (Trahan 2000). As would be expected, lowland soils are dominant on the property due to depressions and low elevations. Clays and clayey alluvial soils are found on the property (e.g. silty clay loams, silt loams and clays). The soils on the Hero Lands Property have not been substantially altered by agriculture, and due to low elevations on the property, soils are poorly drained. The hydrology has been altered in the area and the soils on the Hero Lands are frequently flooded and ponded. The Hero Lands Property supports wetland and upland vegetation due to hydrology and accompanying soil redox potential, which controls biogeochemistry and bioavailability of elements and compounds. A portion of the property was altered to support exploration and production in the past.

3.2 Factors Influencing the Ecological Status of the Hero Lands Property

Dominant factors influencing the ecological status of the Hero Lands Property include the following:

- a. Historical hydrology/drainage alterations (roads, ditches, etc.) that capture water and dissolved solids (and subsequent evaporation, transpiration)
- b. Proximity to the Mississippi River and Gulf of Mexico
- c. Legacy and ongoing oil and gas exploration and production

These factors are discussed briefly below.

Hydrology/drainage alterations on the Hero Lands Property

The Hero Lands Property has been altered by construction of the adjacent road (LA Highway 23) as well as other roads, levees and drainages in the area. Indeed, Numa C. Hero & Son were involved with work that affected drainage of the property in 1970 (Barnhill and Kennedy, 2020). This control of water depth provides access for legacy and ongoing exploration and production. The altered hydrology has also affected vegetation. These alterations have served in general to increase diversity on the property. Hydrology/drainage alterations are clearly a major factor influencing ecological conditions on the Hero Lands Property.

Proximity to the Mississippi River and the Gulf of Mexico

The Hero Lands Property is located adjacent to the Mississippi River. The Hero Lands Property is subject to flooding and inundation by the Mississippi River, transporting to the property any materials that the floodwaters may carry. Much of Plaquemines Parish is subject to storm surge from hurricanes in the Gulf of Mexico as well as flooding from rainfall. For example, Hurricane Andrew made landfall at Point Chevreuil, Louisiana, on August 26, 1992, at approximately 3:30 a.m. The hurricane produced a storm tide that affected much of the Louisiana coastline, including many coastal waterways and lakes hydraulically connected to the coast. In Plaquemines Parish, the storm surge was about 4 to 7 feet. Wind can also cause major changes in water movement and stage in a relatively short period of time, and floods caused by winds have been recorded in Plaquemines Parish. Recent hurricanes severely affecting Plaquemines Parish included Hurricanes Katrina and Rita, which occurred August 29 and September 24, 2005, respectively. Important to the area around the Hero Lands Property is the water storage that the wetlands on the property provide. Water storage on the property has produced some open water areas.

Legacy Oil and Gas Exploration and Production on the Hero Lands Property

Oil and gas exploration and production have occurred on a portion of the Hero Lands Property that consists of about 155 acres. In order to accommodate this activity, roads and facilities were constructed. These features altered water flow and helped to produce the wetlands that exist today. They also helped to produce the habitat and species diversity observed on the property.

3.3 Biota – Plants and Animals on the Hero Lands Property

The bottomland hardwood wetland areas on the Hero Lands Property contain iconic plant species such as Water Oak (*Quercus nigra*), Persimmon (*Diastroy virginiana*), Sugarberry (*Celtis laevigata*), Box Elder (*Acer negundo*), Green ash (*Fraxinus pennsylvanica*), Sweetgum (*Liquidambar styraciflua*), White Mulberry (*Morus alba*), Red Mulberry (*Morus rubra*), Pecan (*Carya illinoensis*), Eastern baccharis (*Baccharis halimifolia*), and Dwarf palmetto (*Sabal minor*). Adjacent wetlands and uplands with different elevations and hydrology are populated with other herbaceous and some woody plant species such as American elm (*Ulmus americana*), Chinese tallow (*Triadeca Sebifera*), Chinese privet (*Ligustrum*

senense), Deciduous holly (*Ilex decidua*), Rough leaved dogwood (*Cornus drummondii*), Red Maple (*Acer rubrum var. drummondii*), and Arrowhead (*Sagittaria latifolia*).

Other areas on the property support herbaceous species such as Dwarf palmetto (*Sable minor*), Sedges (*Carex spp.*), Poison ivy (*Toxicodendron radicans*), Sawtooth blackberry (*Rubus argutus*), Muscadine (*Vitis rotundiflora*), Trumpet creeper (*Campsis radicans*), Hairy cat's ear-False dandelion (*Hypochaeris radicata*), Tall goldenrod (*Solidago altissima*), Greenbrier (*Smilax sp.*), Frog fruit (*Phylla nodiflora*), Spanish moss (*Tillandsia useneoides*), and Seaside goldenrod (*Solidago simpervirens*).

Woody or tree species are located on portions of the Hero Lands Property that are frequently wet with appropriate soils and hydrology. Tree species include Live oak (*Quercus virginiana*), Water oak (*Quercus nigra*), American elm (*Ulmus americana*), Sugarberry (*Celtis laevigata*), Persimmon (*Diospyros virginiana*), Wax myrtle (*Morella cerifera*), Deciduous holly (*Ilex decidua*), Red Maple (*Acer rubrum var. drummondii*), and Chinese tallow (*Triadica sebifera*). The trees are growing vigorously and some support Dodder (*Cuscuta sp.*), Spanish moss (*Tillandsia usneoides*), as well as Japanese climbing fern (*Lygodium japonicum*). Adjacent areas on the property that are usually wet contain Broadleaf arrowhead (*Sagittaria latifolia*).

Wetlands and vegetation in Louisiana have changed with time and changes in hydrology (Teal et al. 2012; Chabreck 1972). On the Hero Lands Property, bottomland hardwood wetlands and herbaceous wetlands are found where they would be expected based on elevation and water depth (Chabreck 1970) as well as hydrologic conditions. As noted above, the property supports diverse and densely growing plants. Plants observed on the property during our inspection are reported in Appendix B. These plants are growing vigorously and do not exhibit any diagnostic symptoms of exposure or adverse effects due to oil and gas exploration and production on the property (National Acid Precipitation Assessment Program 1987, Holloway 2020).

The Hero Lands Property is largely bottomland hardwood wetland and herbaceous wetland with a small area dedicated to legacy and ongoing oil and gas exploration and production operations. Based on aerial photographs, the property has changed somewhat due to altered hydrology and vegetation has responded accordingly. Ecosystems observed at the property included herbaceous wetland and bottomland hardwood wetland with adjacent upland. The property provides habitat that currently supports terrestrial and aquatic animals, plants, and local as well as migratory birds. No evidence was found to indicate any commercial or other fishing on the property.

3.4 Iconic species, apex and keystone species, and sentinel species on the Hero Lands Property

Biodiversity (or the number and variety of species that a site supports) contributes to structural and functional integrity. In assessing a site, a useful scientific approach is to evaluate the indicator species utilizing habitats on the property since these species indicate that their environmental requirements and tolerances are met (Tabor and Aguirre 2004; Van der Schalie et al. 1999). Importantly, one would seek **iconic** species at a site as these are species that are usually readily apparent and would be expected to be observed. Their presence at a site is informative, while their absence leaves the question, "Why is this species or are these species not found at this site?" Other recognized categories of species important to a site include **apex** and **keystone** species. Apex species are also called apex predators. They are important because apex predators reliably indicate that the species and environmental conditions required to support an animal at the top of the food web are present and that the food web is intact and functioning. Keystone species are those species at a site that control the appearance (structure) and functioning of the site. These can be herbivores, carnivores, and invasive or noxious species (large and small; e.g. a voracious herbivore such as nutria (*Myocastor coypus*)). **Sentinel** species are species that are relatively sensitive to any constituents of potential ecological concern at a site. These species are

somewhat analogous to canaries in coal mines. They respond before other species to indicate that there has been an exposure of a bioavailable constituent of sufficient concentration and in an accessible form to cause an adverse effect. These indicator species, including identified iconic, apex, keystone, and sentinel species are readily apparent on the Hero Lands Property. We observed plant and animal species on the Hero Lands Property during a site inspection in the summer (July 6 – 8, 2020; Appendix B). For this analysis and report, we also used the observations of plants and animals on the property by CEI (2019, Tables 2 – 4).

(1) Iconic species

Iconic species are species that have reliable site fidelity. In other words, iconic species are those that would “represent” or clearly indicate healthy bottomland hardwood wetland and herbaceous wetland in Plaquemines Parish, Louisiana. These species are the plants and animals that you would expect to find if the site and the ecosystem are structurally intact and functional.

Iconic Plant species

The Hero Lands Property is mostly a bottomland hardwood wetland with some herbaceous wetland and upland interspersed. Site inspection demonstrates that the property is largely bottomland hardwood wetland. The bottomland hardwood wetland areas on the Hero Lands Property contain iconic plant species such as Water Oak (*Quercus nigra*), Persimmon (*Diastyrus virginiana*), Sugarberry (*Celtis laevigata*), Box Elder (*Acer negundo*), Green ash (*Fraxinus pennsylvanica*), Sweetgum (*Liquidambar styraciflua*), White Mulberry (*Morus alba*), Red Mulberry (*Morus rubra*), Pecan (*Carya illinoensis*), Eastern baccharis (*Baccharis halimifolia*), and Dwarf palmetto (*Sabal minor*). Adjacent wetlands and uplands with different elevations and hydrology are populated with other herbaceous (e.g. *Sagittaria latifolia*) and some woody plant species such as American elm (*Ulmus americana*), Chinese tallow (*Triadeca sebifera*), Chinese privet (*Ligustrum senense*), Deciduous holly (*Ilex decidua*), Rough leaved dogwood (*Cornus drummondii*), and Red Maple (*Acer rubrum* var. *drummondii*).

These iconic plant species were present and flourishing on the Hero Lands Property as would be expected.

Iconic Animal species

Iconic animal species that would be expected on the Hero Lands Property include mammals, amphibians, insects, crustaceans (arthropods), and birds. Iconic mammals would include swamp rabbit, white-tailed deer and American beaver. Amphibians that would be expected on the property would include frogs such as the Gulf coast toad and Cope’s Gray Tree Frog. Insects that would use the habitat on the property include dragonflies, predaceous diving beetles and mosquitos. Iconic crustaceans on the property include crawfish species and red swamp crayfish. Iconic birds are often ephemeral on a property, but observations of iconic species here were recorded such as the Bald eagle, Great egret, Killdeer, Snowy egret, Mississippi Kite, Red-winged blackbird, and Barred owl. Species that would be expected on the property were observed (Appendix B of this report; Wilson, 2019, Tables 2 – 4).

(2) Apex, Keystone and Sentinel species on the Hero Lands Property

Apex species or apex predators

Apex species or apex predators occurring on or using the Hero Lands Property include the bald eagle (*Haliaeetus leucocephalus*), and coyotes (*Canis latrans*). These animals feed at the top of the food web and are maximally exposed by this feeding to any constituents of ecological concern on the property. Their presence indicates the health of the ecosystem and these species contribute to that condition. The apex predators likely range widely or can migrate from the area on an annual basis.

Keystone species

Keystone species are plants or animals that control the functioning (organization and diversity) of the ecosystem and their loss would cause a readily observable change in the structure and function of that system. Thus, they play a very important role in the ecosystem (Mills et al. 1993). Keystone animals on this property include herbivores such as deer (*Odocoileus virginianus*) and Swamp rabbit (*Sylvilagus aquaticus*), as well as the carnivorous coyote (*Canus latrans*). Keystone plants include Water oak (*Quercus nigra*), Green ash (*Fraxinus pennsylvanica*), Chinese tallow (*Triadica sebifera*), and Black willow (*Salix nigra*).

Sentinel species

Sentinel species are sensitive to chemical or physical constituents of potential ecological concern or conditions at a site, and their presence is an additional line of evidence of a fully functioning system and lack of impact at a site. Sentinel species on or using the Hero Lands Property include (1) birds such as the bald eagle (*Haliaeetus leucocephalus*) [Bowermann et al. 2002] and Mississippi Kite (*Ictinia mississippiensis*); (2) amphibians (Waddle 2006) such as Gulf coast toad (*Incilius nebulifer*) and Cope's Gray Tree Frog (*Hyla chrysocelis*); (3) crustaceans such as Red swamp crayfish (*Procambarus clarkii*) and (4) insects such as dragonflies (suborder Anisoptera) [Merritt and Cummins 1996]. The presence of sentinel species in ecosystems on the property is another line of evidence regarding the lack of adverse effects due to constituents of potential ecological concern (Tabor et al. 2004).

3.5 Expected Plants and Animals on or using the Hero Lands Property

The vegetation and wildlife on the property are thriving and as expected for the region, as recorded by ERM (2020), Holloway (2020), and CEI (2019) during their field surveys. Together, ERM, Holloway, and CEI recorded 155 plant taxa (Appendix B) on the property. Of the 155 different plant taxa observed, the majority are wetland species categorized as obligate, facultative wetland, and facultative (USDA 2020, Appendix B).

Per Louisiana Department of Wildlife and Fisheries (LDWF), there are 15 different genera of trees and shrubs that characterize Louisiana bottomland forests. Thirteen (13) of these 15 genera have been observed at the property (Appendix B). Trees and shrubs make up 27% of the plant community on at Hero Lands and herbs/other are 65%, which is representative of community structure in bottomland hardwood forests (USGS 2004, see also Appendix B).

The structure of the avian community at the property is as expected in a bottomland hardwood forested wetlands of the region and is similar to the avian population in the Barataria Preserve forests, seven miles west of the Hero Lands Property (see Appendix B). The avian population at the property is dominated by secondary consumers (68%), whose diets primarily contain insects and aquatic invertebrates. Top predators and scavengers are 20% of species and primary consumers are 12% of Hero Lands Property avian species.

A diverse count of non-avian fauna (51 taxa) was also recorded on the property, including a number of mammals, herpetofauna (reptiles and amphibians), and insects, among others (Appendix B). The largest predator recorded on the property is the coyote (*Canis latrans*), with secondary trophic-level omnivorous and herbivorous species including raccoon (*Procyon lotor*), swamp rabbit (*Sylvilagus aquaticus*), nine-banded armadillo (*Dasypus novemcinctus*), Eastern gray squirrel (*Sciurus carolinensis*), and white-tailed deer (*Odocoileus virginianus*).

The presence of expected wildlife and vegetation on the property, typical of bottomland hardwood wetland and herbaceous wetland and upland ecosystems, is an important line of evidence regarding the lack of adverse effects due to constituents of potential ecological concern.

3.6 Summary of Plants and Animals on or using the Hero Lands Property

Numerous plants and animals were identified during site examinations (species references: Godfrey and Wooten 1979; Godfrey and Wooten 1981; Martin et al. 1991; Merritt and Cummins 1996; Radford et al. 1968; Sibley, 2003; Smith 2001; Tiner 1993). The vegetation on the Hero Lands Property is typical of bottomland hardwood wetland and herbaceous wetland in this part of Plaquemines Parish, Louisiana. The Hero Lands Property is mostly a bottomland hardwood wetland with some herbaceous wetland and upland interspersed. The bottomland hardwood wetland areas on the Hero Lands Property contain iconic plant species such as Water Oak (*Quercus nigra*), Persimmon (*Diostyros virginiana*), Sugarberry (*Celtis laevigata*), Box Elder (*Acer negundo*), Green ash (*Fraxinus pennsylvanica*), Sweetgum (*Liquidambar styraciflua*), White Mulberry (*Morus alba*), Red Mulberry (*Morus rubra*), Pecan (*Carya illinoensis*), Eastern baccharis (*Baccharis halimifolia*), and Dwarf palmetto (*Sabal minor*). Adjacent wetlands and uplands with different elevations and hydrology are populated with other herbaceous and some woody plant species such as American elm (*Ulmus americana*), Chinese tallow (*Triadeca Ssebifera*), Chinese privet (*Ligustrum senense*), Deciduous holly (*Ilex decidua*), Rough leaved dogwood (*Cornus drummondii*), Red Maple (*Acer rubrum var. drummondii*), Broadleaf arrowhead (*Sagittaria latifolia*), and sedges (*Carex* spp.). Saltwort (*Salicornia* sp.) is found in very limited areas on the property. Vegetation on the property is growing vigorously. A synopsis of the plant species observed during site inspections is contained in the description above, in Appendix B of this report, and in CEI (2019; Table 2). These data clearly show that this property is currently supporting a variety of flora. Based on the location of the land and elevations, the plants are thriving as would be expected for this property. The property supports extensive and vigorous plant growth and is a prolific bottomland hardwood wetland and herbaceous wetland and upland ecosystem.

Bottomland hardwood wetlands and herbaceous wetlands provide many benefits, not only to organisms living in and around these areas, but also to local communities. Benefits provided include storm attenuation, flood protection, water quality enhancement, wildlife habitat and aesthetic beauty, and food and resting sites for migratory birds (Costanza et al. 2008). Functions and services associated with this property were inventoried during the site inspection (Functions and Services Assessment, Appendix B). This bottomland hardwood wetland and herbaceous wetland are providing services as expected.

The portion of the Hero Lands property east of Highway 23 in this case currently has a clear presence of exploration and production (E&P) as well as legacy E&P structures (concrete pads, etc.). When E&P activities in this area have ceased and decommissioning can be completed, this property can readily provide the habitat and services expected of bottomland hardwood forest and associated ecosystems in the area. Evidence for this is that adjacent areas in this portion of the property currently provide expected services and habitat, there are currently sources of propagules (seeds, etc.) in the area for succession, there are appropriate soils and elevations in the area, and soil constituents are demonstrated to not adversely affect vegetation productivity. Decommissioning these areas by removal of the built environment is not similar to the proposed Miller (2020) "restoration".

On the property, there is clear evidence of healthy wildlife and game animals, and no evidence of adverse effects on wildlife from past exploration and production activities. Wildlife observed directly or indirectly (i.e. by tracks, scat, calls, etc.) on this property included mammals such as deer, a variety of birds, as well as crayfish and many other species. The Hero Lands Property provides some excellent ecological habitat for numerous animal species. The property is also providing habitat for species of special interest such as the Bald eagle and Mississippi kite. Other services expected for similar properties in this area such as water storage and soil stabilization are clearly being provided.

3.7 Ecosystem Services

Due to historic and ongoing activity (e.g. legacy oil and gas exploration and production, etc.) on the Hero Lands Property and claims by the plaintiff's experts (e.g. Rogers 2019; CEI 2019), a Functions and Services Assessment was performed to determine whether ecosystem services and functions were provided on the property or if there was evidence of adverse effects from any releases of COECs to surface soils or sediments. Evaluation of the property for evidence of services and functions (Appendix B) at this property indicates the property is providing these services as expected. The areas on the property proposed for remediation by ICON were included in this assessment and were considered for the risk of remedy.

4. REVIEW OF PLAINTIFF'S EXPERTS' REPORTS

Wilson, Walker 2019. Ecological Impacts Associated with Oil and Gas Exploration and Production Activities on Hero Lands Company, L.L.C. Property within Stella Oil and Gas Field, Plaquemines Parish, LA. Coastal Environments, Inc., Baton Rouge, LA. Prepared for Swanson, Huddell and Garrison, LLC, New Orleans, Louisiana (August 12, 2019).

The Wilson report (Wilson 2019) consists of nine sections (including references), and five appendices. In the Introduction, Mr. Wilson states his objective of performing an environmental investigation for the Hero Lands Property (p. 1-1). The approach used to prepare this report is presented: surveys of flora and fauna were performed and field observations were made. Conclusions and opinions were based on observations from the field (p. 1-1). The field work for the Wilson report was conducted on August 3 and 4, 2019 (p. 1-1).

The initial sections of the Wilson (2019) report contain general information on the Plaquemines Parish area, but have little specific information on the Hero Lands Property (pp. 3.1 – 4.3). Mr. Wilson points out that much of the property is composed of wetlands and wetland soils (p. 4.1-4.3). As the property is a wetland, Mr. Wilson states (p. 13 - 14) that there are services and benefits that it provides. He did not indicate or measure any reduction or loss of ecological services provided by wetlands on the Hero Lands Property. The property is noted by Mr. Wilson to be affected by climate as well as periodic events such as hurricanes (p. 3.1). Soils in the area and on the Hero Lands Property are frequently to very frequently flooded mucks as would be expected in wetlands in this area (pp. 4.1 - 4.3). These soils are poorly drained in wetland areas and flooding and ponding of water are frequent to very frequent in most areas. The role of hydraulic changes in the area on the condition of the property was not specified in this report.

Several plants were noted on the Hero Lands Property by Mr. Wilson (Table 2 p. 7-7) in a very limited survey. Several animals were also observed and noted (Tables 3 and 4; pp. 7-9 – 7-10). As presented by Mr. Wilson, more than 95 species of plants were observed during his site visits (plants listed in Table 2 of Wilson 2019). This is a relatively diverse property in terms of supporting plant life. Mr. Wilson also observed 29 species of birds during his visits to the Hero Lands Property (Table 3, p. 7 - 9 of Wilson 2019). Some 370 species of birds are noted for Plaquemines Parish on the Plaquemines Parish Checklist for Birds (2019). The Hero Lands Property likely supports a significant number of species of birds found in the Parish, as 59 bird species were observed on the property, including birds observed by ERM and Wilson. Mr. Wilson surely recognizes that the birds and other animals migrate seasonally and it is likely that a short term fauna survey is inadequate to completely characterize a site such as the Hero Lands Property. Importantly, the property also supports other iconic species that were observed by Mr. Wilson such as rabbits, amphibians, crawfish, spiders and insects as well as beaver and white-tailed deer (p. 7 - 10; Table 4 of Wilson 2019). The species on the property represented multiple trophic levels, including herbivores, primary/secondary consumers, and carnivores. This is precisely what would be expected in a functioning ecosystem.

Mr. Wilson offers unsupported opinions and speculation regarding uptake of elements and compounds by plants and other organisms as exposure mechanisms (p. 8-1 – 8-2). Numerous birds, mammals and other animals are living on or using the Hero Lands Property (Tables 3 and 4, Wilson 2019, Appendix B, this report). Numerous plants were also observed on the Hero Lands Property indicating that the tract supports very diverse fauna and flora (Tables 2 - 4). During inspection, the "potential" impacts on populations described by Mr. Wilson's general opinions were not observed (pp. 8-1 – 8-2). No analytical evidence was presented by Mr. Wilson regarding alleged hydrocarbon sheens or odors alleged at any location on this property. No data or analyses were provided to support the general, speculative conclusions regarding "potential" adverse effects of legacy activities on the Hero Lands Property.

Mr. Wilson's opinions generally indicate that any changes on the Hero Lands Property were due to oil and gas exploration and production. This view ignores the changes caused by altered hydrology and extreme weather events on the property. He offers several opinions unsupported by any data or analyses in his report. For example, there is much made of nonnative plant species in Opinion 4. This opinion (Opinion 4) is fundamentally wrong and a primitive view of nonnative species (e.g. Sagoff 2005). The plant species reported by Wilson (2019) in Table 1 of his report clearly indicate that of the plant species that he observed on the property, only a fraction were nonnative. In comprehensive studies of plant species in Calcasieu Parish, Louisiana, about 15% of the plants in an area are typically nonnative (Neyland et al. 2000). Interestingly, Mr. Wilson presents photographs of plants on the property in his report that are missing from his listing of plants species found on the property.

Based on our site inspection and assessment, we believe that the opinions provided by the Plaintiff's expert regarding exposures from legacy operations as well as impacts on the flora and fauna on the subject property are not supported by the data from the Hero Lands Property. There is no evidence that habitat for any species has been limited on the property by legacy oil and gas operations.

Rogers, William J. 2018. Toxicological Evaluation and Risk Assessment Associated With Oil and Gas Operations on the Hero Lands, L.L.C. Property Within Stella Oil and Gas Field, Plaquemines Parish, Louisiana. Omega EnviroSolutions, Inc., Canyon, TX. Prepared for Swanson, Huddell and Garrison, LLC, New Orleans, Louisiana (August 26, 2019).

Although the content and opinions expressed in the report by Dr. Jim Rogers ranged widely, this review is limited to the ecological risk assessment (ERA) and site assessment portions of Rogers' report. The author of this report does not follow scientific methods and standard ecological risk assessment procedures. No information is provided in the report supporting the notion that any species of plant, animal or other organism has been exposed to or has been harmed by any constituent at this property. Further, no information is provided indicating that "contaminants" or elements have dispersed throughout the property or off the property.

In Dr. Jim Rogers' report, the Ecological Risk Assessment that is provided includes an alleged baseline analysis (Attachment 2-C) that is intended to be site-specific, but site-specific parameters were largely omitted or replaced with default values (e.g. 1 or 100%). While a Screening-Level Ecological Risk Assessment (SLERA) is purposefully conservative to ensure that any location on the Hero Lands Property with any measureable constituents (greater than or approaching background) is examined further, a Baseline Ecological Risk Assessment (BERA) is intended to use more realistic values or exposure estimates for the property. It is also important not to skip steps in the process (USEPA 1997) without explicit and defensible reasons. It is crucial in ecological risk assessment to consider a pathway for exposure, but Dr. Rogers neither discerned nor confirmed any complete exposure pathways, which would be essential prior to concluding probable impacts or potential future impacts. Further, site-specific bioavailability of constituents of potential ecological concern on this property was not considered in Dr. Jim Rogers' assessment (Attachment 2-C) and inaccurate data were used for estimates of exposures. For example, measurements of concentrations of both barium and true total barium were used for ecological risk assessment in Dr. Jim Rogers' report, which is not scientifically defensible. Important calculations were made in his report interchanging data for barium and true total barium (see e.g. Attachment 2-C, Table 2 p. 107), clearly an error. Importantly, if accurate data are not used for development of an ecological risk assessment, then any opinions offered are based on inaccurate analysis and consequently will lead to inaccurate conclusions.

As an example, without basis in his report, Dr. Jim Rogers considers the area of contamination on this property of about 155 acres to be 150 acres (Table 1, p. 106). Another erroneous assumption used for

populations of animals modeled for the property is that every animal in the populations is continuously exposed for all of their lives to the highest concentration of analyte measured in a boring from the property (p. 106). It is further assumed that the animal populations in the area of this property will never move (for feeding or any other purposes) from the highest concentration of each analyte measured at the property (p. 106). Incorporation of factors such as Temporal Factors of 100% or "1" in the model means that the local population of animals is continuously on the property and specifically on the boring from which the highest concentration of a constituent was sampled. This analysis in the report by Dr. Jim Rogers, which is intended to be site-specific (Attachment 2-C), does not differ significantly from the Screening Level analysis conducted by Dr. Jim Rogers (Attachment 2-B, p. 80). For a site-specific analysis such as a BERA, more reasonable and realistic assumptions should be used (USEPA 1997). For example, an area use/exposure parameter of 10% or less (rather than 100% used by Rogers) is more reasonable for some animals given the movement and behavior of animal populations throughout their lives, availability of appropriate habitat and the distribution of constituents on the property. The model used for the analysis in Dr. Jim Rogers' report also assumes that 100% of analytes consumed in a food item will migrate to an active site in an organism and elicit an adverse effect on that organism (p. 65). This assumption regarding bioavailability of constituents is not consistent with any scientific information available. Further, this analysis does not lead to reliable site-specific conclusions (Suter 2007, pp.80, 98-103; Hill et al. 2000; Tannenbaum 2005). The ERA provided by Dr. Jim Rogers is not based on site-specific considerations as required by USEPA Guidance (USEPA 1997). The USEPA Guidance (1998) also requires that the risk of any proposed remedy or remediation be evaluated, but that evaluation was not included in Dr. Jim Rogers' report. There are numerous other examples of errors, omissions, and non-scientific assumptions and approaches in Dr. Jim Rogers' ecological risk assessment and some are noted below.

The plaintiffs' expert report (Rogers 2019) states: *Bioavailability of the COEC in dietary items was set at 100% due to the fact that the COEC has already been taken up and made available in the plant, earthworm, fish or benthic invertebrate tissue*" (p. 66). This is an impossibility based on fundamental science and thermodynamics, yet it is an assumption used to produce the risk assessment and conclusions contained in this report. Use of such values should be acknowledged as extreme and contributing to the uncertainty of the outcome of the analysis. If the USEPA risk assessment guidance (USEPA 1997) was followed, this extreme assumption would be included and thoroughly discussed in the Uncertainty Analysis section of the report (also missing from this report).

The analysis of barium in Dr. Jim Rogers' report (Rogers 2019) is another example of inaccurate use of information. Sediment or soil toxicity reference values for barium and true total barium were used interchangeably in the ecological risk calculations (see e.g. pp. 108-109). It is important to distinguish toxicity studies using true total barium measurements in sediments or soils from standard measurements of barium as well as to distinguish the species of barium at the property (Alberta Environment 2009). The true total barium analytical method utilizes an extremely aggressive acid digestion that does not reflect barium dissolution or bioavailability under natural environmental conditions (Alberta Environment 2009). Accordingly, the use of true total barium toxicity data in the baseline ecological risk assessment is entirely inappropriate. The bioavailability factors for barium and true total barium used in Dr. Jim Rogers' report assume that barium quantified by this method is biologically available, overstating the potential bioavailability of barium by orders of magnitude. The bioavailability factor for the standard measure of barium in sediments or soils also significantly and unrealistically overstates the potential exposure of sediment or soil dwelling organisms to barium. A bioavailability factor of 1.0 assumes that 100% of the barium in sediments or soil on the Hero Lands Property is available and taken up by organisms living in those sediments or encountering those soils. However, barium associated with exploration and production is composed of barium sulfate (barite), rather than the free barium ion (Payne et al. 2011) as in this case (Appendix C of this report). Barium sulfate has very low solubility in water (Menzie et al.

2008); therefore, a sediment bioavailability factor of 0.1 or 1.0 is not valid and is not based on sound science. In a paper regarding bioavailability of barium, Menzie et al. (2008) state that "solubility of barite is several orders of magnitude lower than those for soluble barium compounds (e.g., barium chloride, barium nitrate, and barium acetate) and that this incredibly low solubility limits the potential for barium from barite to be accumulated in the tissues of soil invertebrates and plants, organisms present in the diet of many wildlife species." There are no screening or other values for scientific evaluations of the toxicity of true total barium. These and numerous other errors make this ecological risk assessment unusable for this property.

Based on our site inspection and ecological risk assessment, we believe that the opinions provided by the plaintiffs' expert regarding exposures from legacy operations as well as impacts on the flora and fauna on the subject property are not supported by data from the Hero Lands Property. There is no evidence that habitat for populations of any species has been limited on the property by legacy oil and gas operations.

Templet, Paul H. 2018. An Expert Report by Paul H, Templet, Ph.D., Hero Lands. v. Chevron USA, Inc. et al; Docket #64320, Div. "A", 25^h JDC, Stella Oil Field, Plaquemines Parish, Louisiana. Prepared for Swanson, Huddell and Garrison, LLC, New Orleans, Louisiana (August 12, 2019).

Much of the information presented in this report is generic in nature and unrelated to the Hero Lands Property. The opinions offered are not based on any unique data or analyses and do not differ from those offered by the Plaintiff's other experts.

Miller, Gregory W. and J.S. Sills. 2019. Expert Report and Restoration Plan for the Landowners; Hero Lands Company LLC v Chevron USA Inc, et al; Docket #64320, Div "A"; 25th JDC; Stella Oil Field, Plaquemines Parish. Prepared for Swanson, Huddell and Garrison, LLC, New Orleans, Louisiana (July 12, 2019).

The ICON report (Miller and Sills 2019) contains some data from field measurements and observations as well as analyses of samples collected from the Hero Lands Property.

Mr. Miller and Mr. Sills (2019) note that the Hero Lands Property in this case includes about 155 acres located in Plaquemines Parish.

"The subject property is comprised three tracts of land:

- *Tract A is approximately 93 acres located in Section 2-T15S-R24E and in Section 18-T14S-R24E. Tract A is bounded on the north by residences, on the east by the Chevron Oronite Company LLC Oak Point Refinery, and on the west and south by vacant land; and the Chevron Oronite Company operates a stormwater oil/water separator impoundment basin at the south end of the tract.*
- *Tract B (south portion) is approximately 23 acres located in Section 2-T15SR24E and in Section 18-T14S-R24E. Tract B (south) is bounded on the south by the Chevron Oronite refinery, on the east by the Mississippi River and on the north and west by vacant lots.*
- *Tract B (north portion) is approximately 48 acres located in Sections 16 and 17-T14S R24E. Tract B (north) is bound on the north, west and south by residential areas, and on the east by the Mississippi River.*

All tracts are located on the west natural levee bank of the Mississippi River at the southern end of the city of Belle Chasse, Louisiana (Figure 1). The property is bisected by a north-south section of La Hwy 23. Surface topography slopes to the west away from the Mississippi River where land elevation is approximately +6 feet NGVD to approximate elevation of 0 feet NGVD at the west edge of Tract A. The US Corps of Engineers flood control levee is approximately +18 feet NGVD, and ditches draining the properties are at approximately -2 feet NGVD (Figure 2)."

Mr. Miller and Mr. Sills noted that hydrology on the property had been altered over time (ICON 2019; pp. 6 - 7).

Mr. Miller and Mr. Sims did not provide a basis for the proposed "remediation". Mr. Miller and Mr. Sills had no scientific approach to indicate potential risks for organisms. Screening values and "background values" and any exceedances of those values are not used by scientists to indicate risks and to initiate an invasive remediation plan in a wetland. The risk of the proposed remediation is not analyzed.

Norman, Charles R. 2019. Engineering and Operations Report on Stella Oil Field, (Properties of Hero Lands Company LLC), Operated by Chevron USA Inc., et al Assessment Report, in the case of Hero Lands Company LLC vs. Chevron USA, Inc., et al 25th JDC for the Parish of Plaquemines, State of Louisiana, Docket No. 64320, Div. A, Report No. 1. Prepared for Swanson, Huddell and Garrison, LLC, New Orleans, Louisiana (August 12, 2019).

Mr. Norman notes that oil and gas operations were conducted on the Hero Lands Property for several decades (since the 1940's). He also notes that there are currently some ongoing operations on the property.

5. SUMMARY OF LINES OF EVIDENCE REGARDING ECOLOGICAL CONDITION ON THE HERO LANDS PROPERTY

As recommended by USEPA protocols for ecological risk assessment, this site assessment and evaluation used several lines of evidence to accurately assess the ecological status of the Hero Lands Property. The site investigation provided data regarding habitats and plant and animal species occupying or using the property. This important direct observation of the property revealed the presence of bottomland hardwood wetland and herbaceous wetland as well as adjacent upland along with exploration and production activity. Also noted in this fully-functioning ecosystem were predators, herbivores, detritivores and other animal species that would be expected. An evaluation of Wetland Services (Appendix B) indicated that the services provided by these special ecosystems were provided and had not been adversely impacted by legacy and ongoing exploration and production activities. Following USEPA protocols, a Screening Level Ecological Risk Assessment and a Site-Specific or Baseline Ecological Risk Assessment were conducted for this property and indicated that the concentrations and forms as well as spatial locations of Constituents of Potential Ecological Concern (COPECs) were not causing unacceptable risks for biota or habitats on this property.

6. SUMMARY OF OPINIONS

1. The available data clearly illustrate that the Hero Lands Property provides habitat for wildlife species and vegetation. The property is mostly bottomland hardwood wetland and herbaceous wetland with adjacent upland. During site investigation, we observed numerous plants, animals, and signs of wildlife during our site characterization, which indicates a healthy, fully-functioning ecosystem. There is clear evidence of healthy wildlife, and there is no evidence of adverse effects on wildlife or vegetation populations from past exploration and production activities. The Hero Lands Property is providing extensive services (see Appendix B of this report; Barbier 2013) that would be disrupted or destroyed by unnecessary and intrusive actions, including the remediation proposed by ICON (ICON 2019).
2. The portion of the Hero Lands property in this case east of Highway 23 currently has a clear presence of exploration and production (E&P), as well as legacy E&P structures (concrete pads, etc.). When E&P activities in this area have ceased and decommissioning can be completed, this property can readily provide the habitat and services expected of bottomland hardwood forest and associated ecosystems in the area.
3. Dominant factors influencing the ecological status of the Hero Lands Property include the following:
 - a. Historical hydrology/drainage alterations (roads, ditches, etc.) that capture and move water and dissolved solids (and subsequent evaporation, transpiration)
 - b. Proximity to the Mississippi River and Gulf of Mexico
 - c. Legacy and ongoing oil and gas exploration and production
4. The reported concentrations, locations, and forms of constituents (COPECs) in the surface soils of the Hero Lands Property that are of potential ecological concern are not at concentrations or in forms that currently or potentially provide exposures presenting unacceptable risks to ecological receptors or their habitats. The areas on the property that are designated for remediation by ERM, Inc. were included in this assessment to consider the risk posed by proposed remedies.
5. Plaintiff's experts' conclusions regarding potential ecological risks are not substantiated and were not observed during site inspection.
6. Intrusive remedial actions or disturbances such as the plan proposed by the Plaintiff's experts would cause unjustified harm to this sensitive ecosystem. Remediation proposals of the Plaintiffs' experts would not serve to remediate any adverse ecological impacts.

As new data or information become available, we reserve the right to amend, supplement, or revise this report.

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