

Figure 1. Site where construction barge *Athena 106* dropped a 5-ton mooring spud on the West Cote Blanche Bay natural gas sales pipeline. The pipeline carried excess natural gas from the Gulfport sales platform (where extracted natural gas was processed and injected back into oil-producing wells to aid in oil production) to a junction with Chevron’s Vermilion Bay gas sales pipeline. The pipeline between the Gulfport sales platform and the Chevron bay junction platform was about 19,650 feet long. The pipeline between the Vermilion Bay platform and the bay junction platform was about 32,300 feet long.

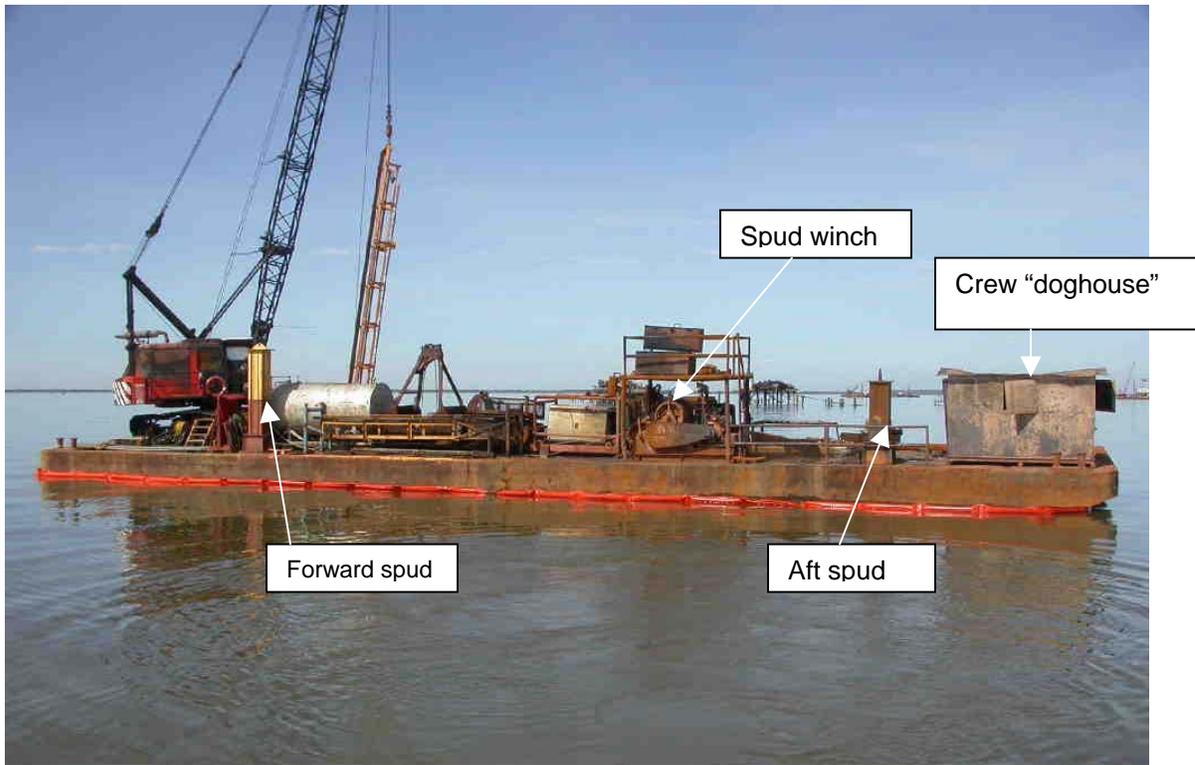


Figure 2. *Athena 106* after the fire. The construction barge was equipped with two mooring spuds (shown in the lowered position), both on the port side, one forward and one aft, controlled by a single winch. At the front of the barge was the crane used to hoist and position pilings for driving or to maneuver them to a barge alongside for storage.

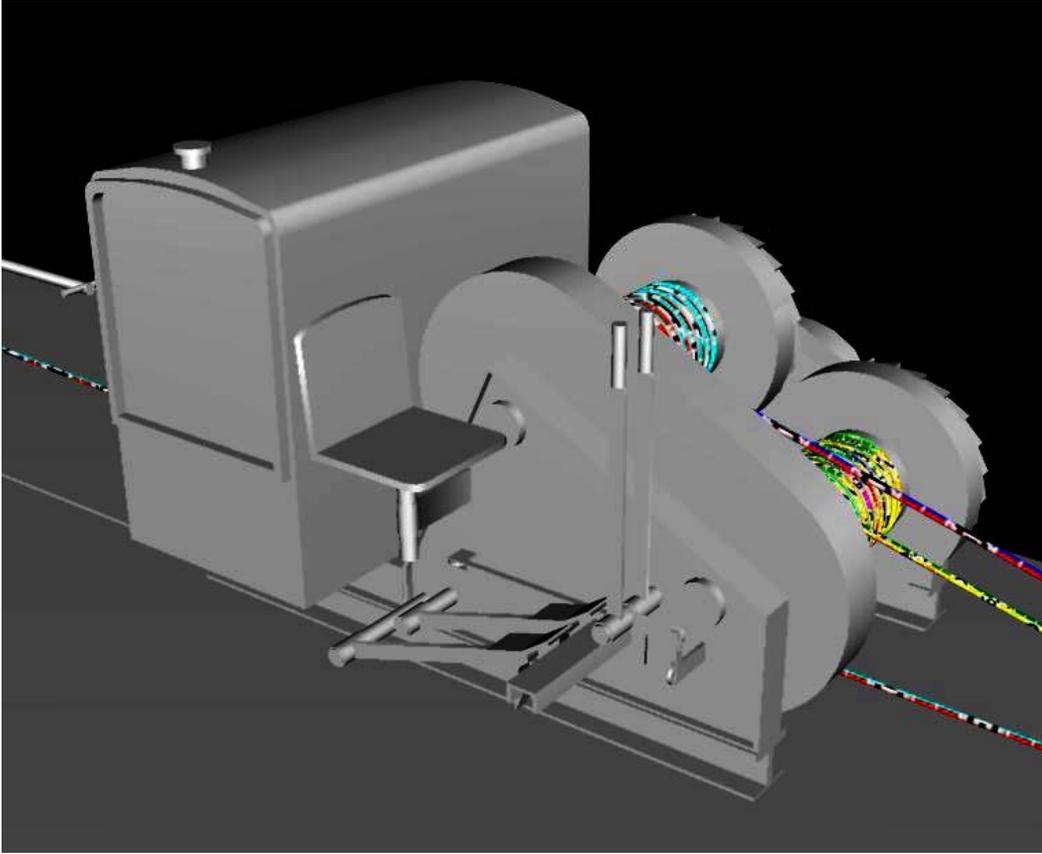


Figure 3. Computer-generated image of a spud winch unit. The spud-lifting cables are wound on the drums to the left of the operator's seat. The winch's foot brakes are below and forward of the seat.



Figure 4. Barge *IBR 234* loaded with pilings (being pushed by the *Miss Megan*).

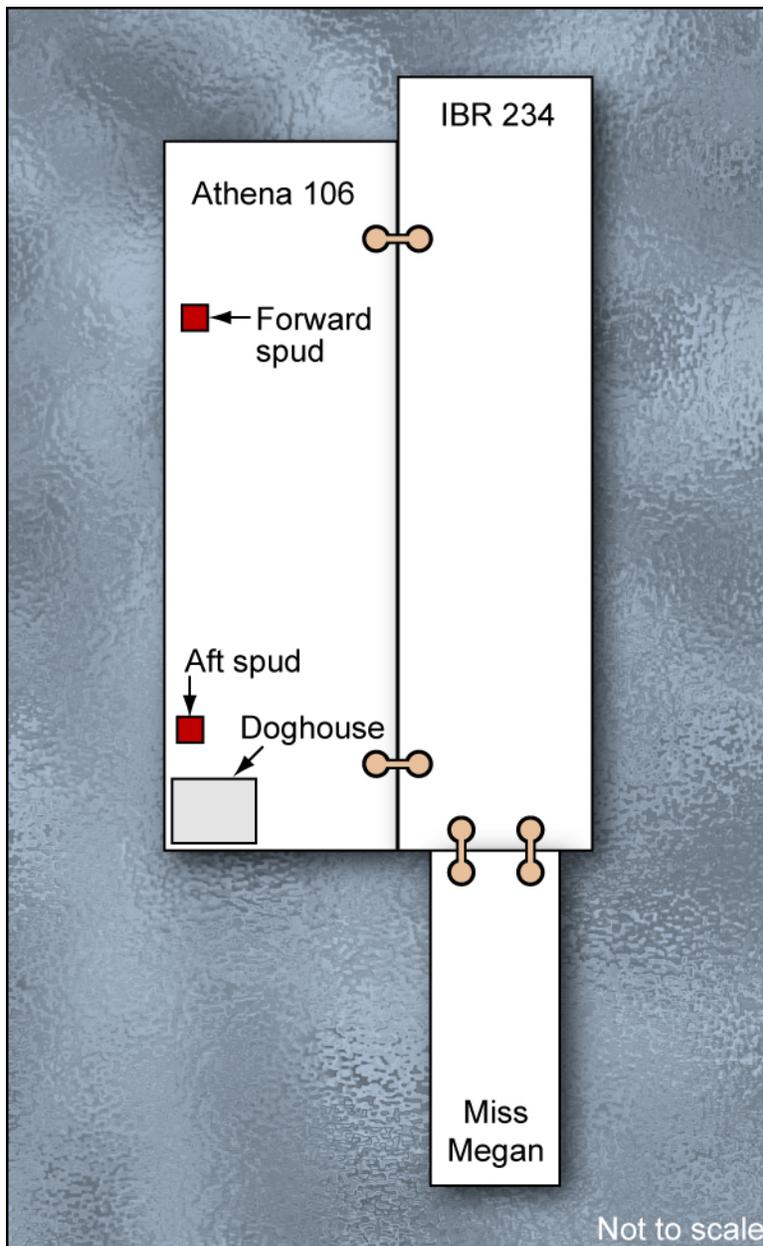


Figure 5. Towing arrangement of the *Miss Megan* and the two barges. The barges were tied together, with the *Miss Megan* secured to the aft end of the *IBR 234* and pushing both barges.



Figure 6. Photo showing cable “birdneste’d” on the winch drum (upper rear) that led to the *Athena 106*’s aft spud. The cable on the lower winch, which led to the forward spud, is properly wound.

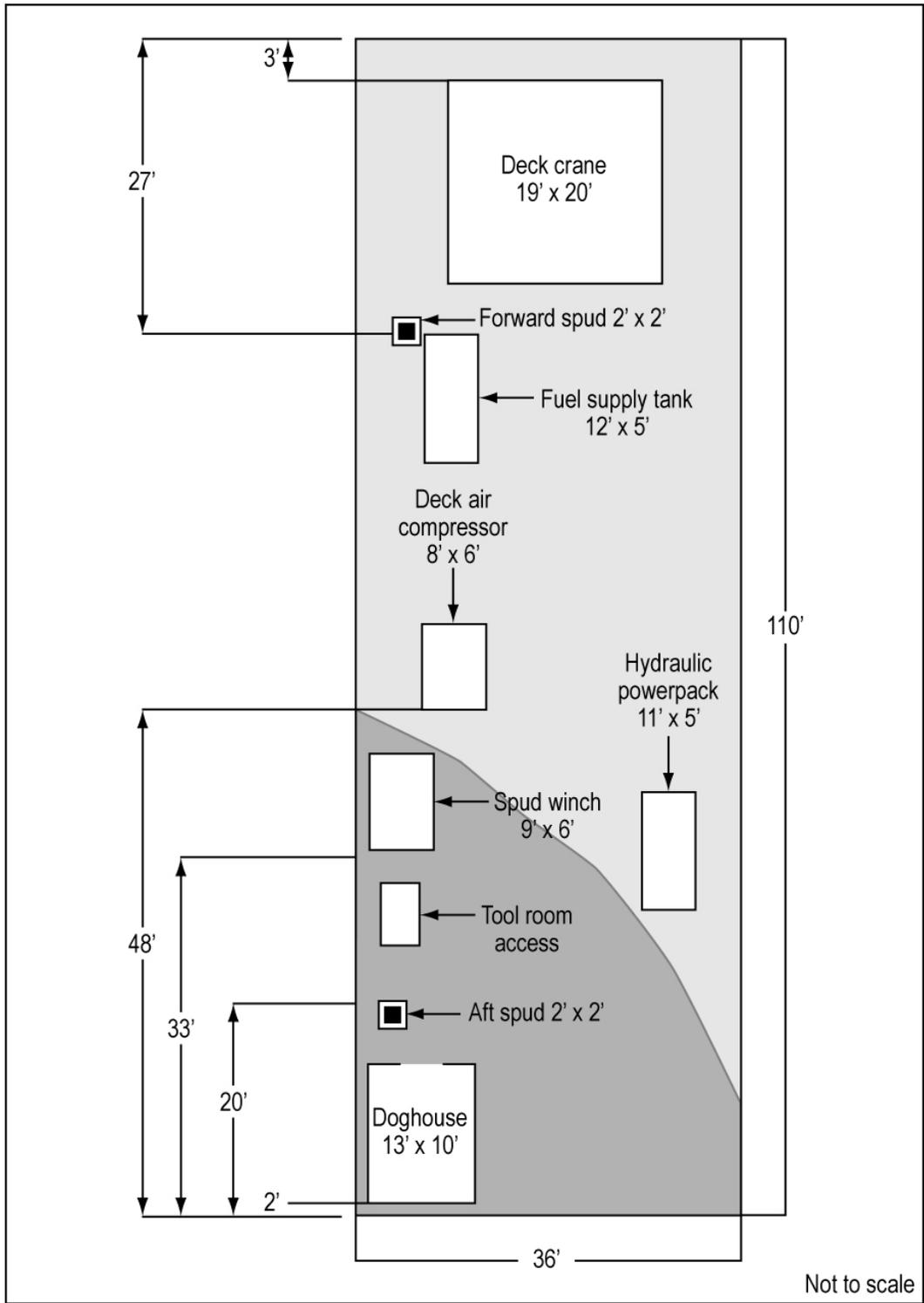


Figure 7. General layout of *Athena 106* construction barge. Fire damage to equipment on the barge deck was greatest in the dark-shaded area.

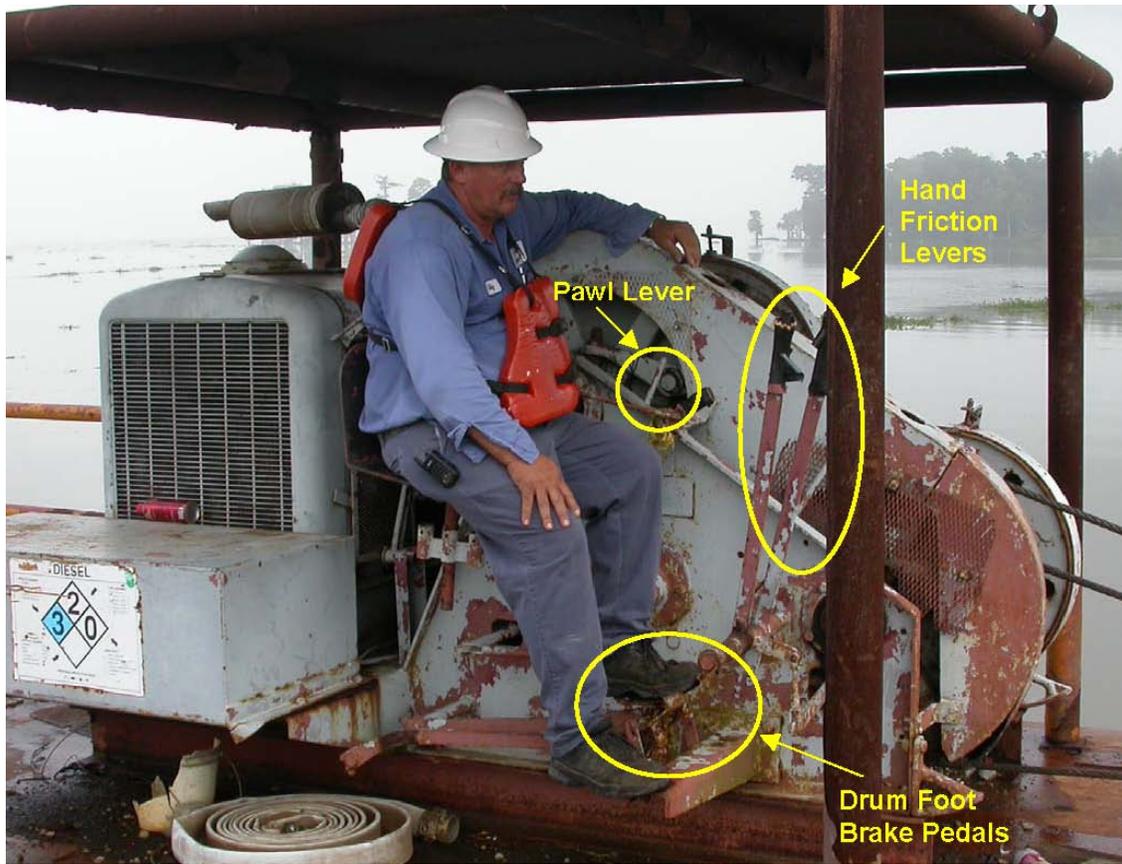


Figure 8. Operator in position at the spud winch on another Athena barge, not the *Athena 106*, used in the salvage operation after the accident. Highlighted are the foot brake pedals and hand levers that controlled the speed of the winch drums as they lowered or raised the spuds, and one of the levers that engaged or disengaged the drum pawls into a notched ring on the drums' outer edge to prevent the cables from paying out. Note the operator's work vest, the flotation device worn by barge workers on the job.

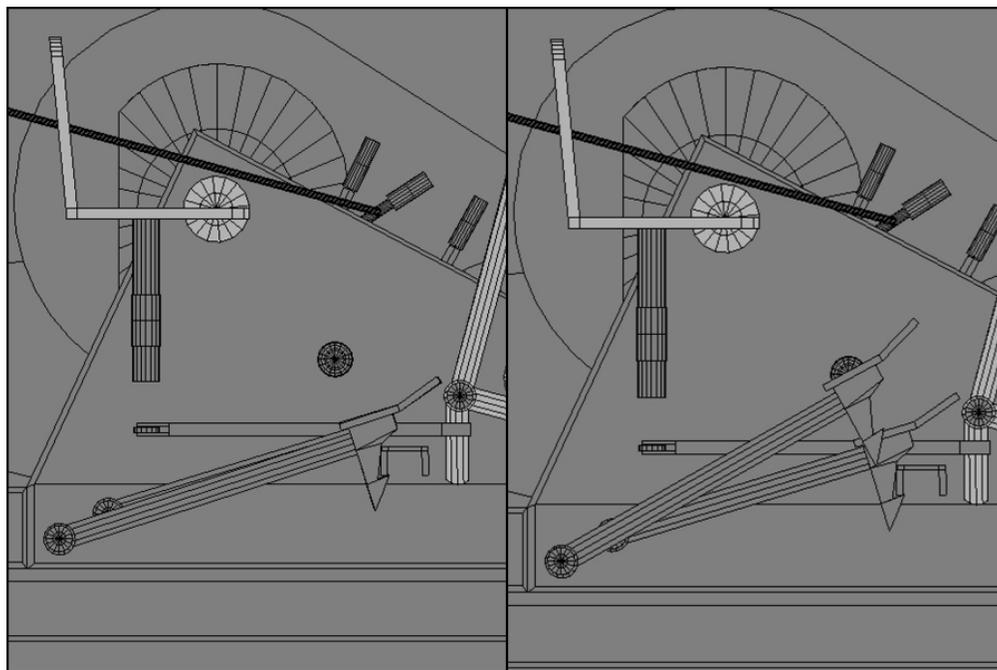


Figure 9. Operation of *Athena 106* foot brake pedals (shown at bottom of both illustrations). On the left, both pedals are engaged (depressed) and latched in place by the fixed steel piece shown pressing on a triangular section at the bottom of the pedals. On the right, the front pedal is released and the back pedal is still engaged. To release the pedal, the operator would push down on the pedal and twist the latch out of place, allowing a spring to raise the pedal. Objects in white are the operator's seat (upper left) next to a round bearing for the upper winch, and the hand friction control lever (lower right) that could be used to brake the winch if the foot pedals disengaged.

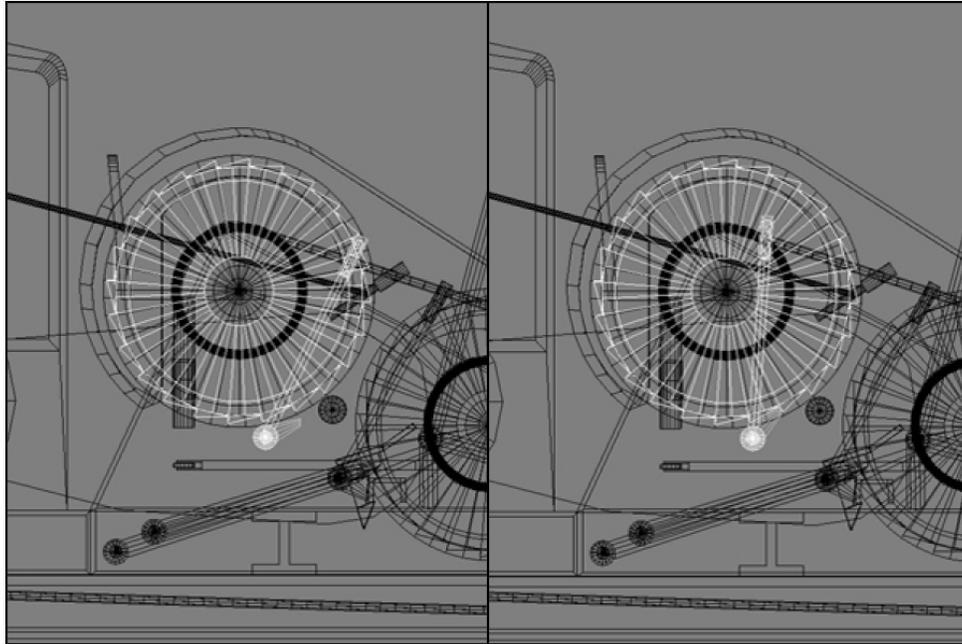


Figure 10. Operation of the winch pawl on the *Athena 106*. Both winch drums are shown. The white ring on the upper drum (which controlled the aft spud) is a ratcheted gear bolted to the outside of the drum. The operator engages or disengages the pawls using the lever, shown in white, that extends downward across the gear. The pawl is the tongue-shaped piece at the bottom of the lever. When disengaged (left illustration), the pawl is outside the gear teeth, allowing the gear to move freely in either direction. When engaged (right illustration), the pawl falls into the spaces between the notches so the gear can move in only one direction. (See **figure 8** for location of pawl lever at operator's station.)



Figure 11. Photos showing spud with securing pin lying alongside (left) and with securing pin inserted (right).



Figure 12. Aft spud of the *Athena 106* when raised after it had released from its fully raised position and hit a submerged, buried high-pressure natural gas pipeline.



Figure 13. Fracture on the east piece of the ruptured pipeline.



Figure 14. Beginning of the gas sales pipeline (vertical pipe entering water) at the Gulfport sales platform in the West Cote Blanche Bay oil field. The pipeline was ruptured by the *Athena 106*'s aft spud in an east-west section near the Gulfport platform. The pipe's concrete coating is visible above the waterline.



Figure 15. Towboats *Miss Joann* and *Yancy O* fighting the fire on the *Miss Megan* and the deck barge *IBR 234*. (Photo courtesy Louisiana Department of Wildlife and Fisheries)