

## Haiti 155: Summary of “A Fishing Community” Assessment

**Trip Duration:** August 13-20 2012, visited fishermen Aug. 14

### **Personnel:**

1. Lionel Bernard, Co-Founder and Project Director of Haiti 155
2. Constant Bernard, Co-Founder and Project Director of Haiti 155
3. Mark Booker, Assistant volunteer
4. Anthony Giamella, Assistant volunteer



### **Need:**

- 1) A group of fishermen living in Carrefour, near Port-au-Prince, fish everyday for food in handmade wooden boats. In order to catch more fish, they have requested a means to motorize their boats. We hope that with these motors the fishermen can go out farther to sea, and catch enough fish to not only feed themselves and their families but also sell fish and make money. *This is key to helping the fishermen lift themselves out of poverty. [Long-Term]*
- 2) During the trip we identified that the fishermen were also in dire need of fishing equipment such as hooks and line. This is a low cost means we can provide right now. [Short-Term]

### **Key Highlights:**

<b>Number of engines needed</b>	<b>6</b>
<b>Engine Power recommended</b>	<b>20 HP</b>
<b>Engine type recommended</b>	<b>Two-Stroke, outboard</b>
<b>Additional Notes</b>	<ul style="list-style-type: none"><li>• The fishermen have agreed to form a collective to share money and resources to support operation (buy gas, etc.)</li><li>• Major concerns with implementing and operating the engines were addressed</li><li>• Haiti 155 has also agreed to support the fishermen further by providing hooks, line, etc.</li></ul>

### **Background:**

This was the second time the Haiti 155 Team visited the fishermen. A few people and organizations had visited them in the past promising to help, but this came to no avail. Hence, many of the fishermen were very skeptical that we would actually help. However, by the end of our visit many of them had been reassured of our commitment, seeing that we had visited them a second time and actually ran an assessment rather than just made promises.

### **The Visit:**

Haiti 155 staff met up with approximately twelve fishermen on August 14 2012. Each staff member had a distinct role in the meeting. Anthony provided technical background and presented the major challenges to the motor's implementation and subsequent operation to the fishermen. Lionel and

Constant acted as interpreters, while Mark was on hand to take pictures and provide additional input. Eli and Mackenzie also attended the meeting to provide feedback as well.

During the talk the fishermen addressed their concerns about the motors, and agreed to work with us to meet the challenges. This dialogue is highlighted in the section “Challenges to Engine Delivery...” We also found out about their dire need for fishing equipment and support as outlined in the main section “Supporting Fishing”.

After the talk, Anthony and the fishermen measured the boat’s dimensions for motor sizing. We ended the visit with a ride in two of the boats to observe how the hulls perform in the open water.

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## Picking an Engine

### Quantity:

There are **6** fishing boats which are looking to motorize, they are of similar size and shape. The boats were chosen because of the vertical stern where it is easier to mount a motor.

### Sizing:

Because the boats are made by hand by the fishermen, they do not have a specified maximum power rating as required by boats sold in the United States. The boats are also made of wood, rather than aluminum or fiberglass, and are sealed on the bottom with resin, but prone to leaks. All these present a unique challenge in picking an engine.

The US Coast Guard’s *Boatbuilder’s Handbook* provides a methodology for selecting a power rating for a boat engine based on the boats size (length, width at transom). Each boat measures approximately 17 ft. long by 5 ft. wide at the transom. Thus, according to the chart the power rating would be  $((17 \times 5) \times 0.8) - 25 = 40$  HP.



However, given the hydrodynamic considerations outlined above, and also considering the weight of the motor, to begin it was devised to cut the power rating in half. Therefore ***the optimal engine for these boats would be rated at 20 HP***

### Engine Type:

Four-stroke engines are rapidly taking precedence over two-strokes in marine applications in the United States due to emission regulations. On the other hand, two-strokes are lighter and have fewer moving parts for a the same power. As highlighted in the section “Loading” under “Challenges”, weight is a significant concern in for the fishing boats. ***A two stroke (or two-cycle) engine will best serve the fishermen’s needs due to its lighter weight and lesser complexity.***

Two-strokes require a mixture of gasoline and motor oil to run, and Haiti 155 will address these concerns as the motors are delivered.

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### **Challenges to Engine Delivery/Operation and How Haiti 155 will resolve them**

A boat engine is a very complex machine, and placing a few in service in Haiti, where maintenance and parts availability is limited, is a challenge. We want to ensure that not only do the fishermen have the boat engines, but that they can last and that the means to support their operation is in place. The following are some challenges to implementation:

- **Freshwater flush-out:** small outboards are water-cooled, and using them in seawater requires a regular flushing out of the engines with freshwater after use. If this is not done salt will accumulate inside the engine, ruining it over time. *A saltwater flush requires a regular supply of fresh water (i.e. a hose line).*
  - **Resolution:** The fishermen's locale has a freshwater line, and they have agreed to flush out the motors after every use.
- **Loading:** the outboards are internal combustion engines are thus very heavy, with dry weight on the order of \_\_\_\_ lbs. Loading of the boats and the hull stability is hence a concern.
  - **Resolution:** The fishermen noted that they store their catch inside coolers placed in the center. This may need to be moved around to provide balance in the boat. When the engines are delivered Haiti 155 will work with the fishermen to test run and determine the best means to load the boats with fuel, fish, etc.
- **Lubrication:** like all engines, outboards need periodic lubrication with grease and motor oil, usually 5W-30.
  - **Resolution:** The lubrication needed will be determined by the motors bought. Haiti 155 will supply lubrication and the fishermen have agreed to use and store it.
- **Spare parts and maintenance routine:** outboards in heavy use need to be serviced yearly at a minimum, and this requires replacement of some key parts notably spark plugs and corrosion indicators on the exterior. The nature of service intervals varies depending on the make and model of the engine.
  - **Resolution:** Haiti 155 will supply spare parts as needed. Fishermen have agreed to provide maintenance and monitor use to determine service times. Haiti 155 staff will train fishermen on basic maintenance and servicing.
- **Fuel quality:** modern internal combustion engines require a certain quality (octane level for gasoline or centane level for diesel) to perform optimally. While most engines will run with lower quality fuel, their performance and life are compromised. Because of Haiti's infrastructure issues it is likely the quality of fuel to the motors will vary. While marine applications usually allow for "rougher" fuel than automotive, etc. this is still a big concern and should be monitored.
  - **Resolution:** Haiti 155 will contact engine vendors (Mercury, Yamaha, etc.) to determine adequate range of fuel quality and discuss issues.

- **Storage:** in times of very inclement weather the boats should be removed from their mooring to prevent damage. If the engines are submersed in water they will be ruined. A storage area should be constructed near the boats. In addition, the motors must be drained of fluids and stowed in a certain position if they are being stored for a long time.
    - **Resolution:** Fishermen have agreed to work together to build a storage facility. Depending on this development they will figure out how to move the motors from the boats to the storeroom, if necessary. Haiti 155 staff will provide training on how to store engines properly.
  - **Support equipment:** screwdrivers, hardware, wrenches needed to mount the engines to the boats and service them.
    - **Resolution:** Will be supplied by Haiti 155. Staff will train fishermen on mounting engines to boats.
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### Addressing the Fishermen's Needs as a Community



Because the ultimate aim of this project is to assist the fishermen in developing an income to lift themselves out of poverty, there is a need for the group to take action together. Thus, the group of approximately 20 fishermen formed a collective, and agreed to share resources. This will eventually include building the storage facility, managing maintenance, and pooling revenues from fishing to pay for gas and parts. Other needs will be met as well with Haiti 155's support.

### Next Steps:

1. Consult power boating industry professionals on handling boat engines. Key areas include installation, actually viewing maintenance, runtime, storage, transport, etc.
2. Record a video demonstrating the procedures on an actual motor.
3. Look further into the hydrodynamics of the motor's placement on the wooden boat. This will require consultation of professionals as well. A good place to start will be looking at how sailboat owners motorize their boats.
4. Continue funding efforts. We still start with a used motor in the 20 HP range, depending on what further information we can find.
5. When we get one motor, we will bring this down to Haiti to run actual testing and installation. We will use the video as a reference, and train the fishermen how to use and maintain the engine. If the motor is not an appropriate size, we will know to pick a smaller size for the next motor, and keep the original for parts, etc.
6. Ensure that the fishermen will continue to form their collective in self-support.



*A two-stroke 20 HP outboard similar to what our assessment determined is appropriate for the boats. More follow-up will help us pick an even better size. Image: [www.boat-world.com](http://www.boat-world.com). This 1988 example is for sale for \$950.*

**References:**

US Coast Guard Boatbuilder's Manual: <http://www.uscgboating.org/assets/pdf/downloads/PART1.pdf>

Mercury Marine Outboard Owner's Manual:

[http://www.mercurymarine.com/media/mercury/documents/0911\\_maintenance-8to9\\_9FS.pdf](http://www.mercurymarine.com/media/mercury/documents/0911_maintenance-8to9_9FS.pdf)