**[Fishbanks, Ltd.](http://shawhighstudents.org/apes/activity/fishbanks-ltd/)**

**Role Description and Opening Scenario**

[**Download the Excel File**](http://shawhighstudents.org/apes/files/2010/12/Fishbanks.xls)**!**

Congratulations! You have just been hired to manage one of the principal fishing companies in your country. Together with the others in your company—captain and crew members—you will operate your fishing fleet each year according to policies you design to maximize your assets. Your team’s goal is to achieve the greatest possible assets by the end of the game. Your assets equal the sum of your accumulated bank balance plus the salvage value of your ships at the end of the final year in the game.  You begin the game with a fleet of ships, a bank account of $2000, and access to two offshore fishing areas.

**Decisions**

Each round you must determine your fleet size by deciding whether to bid for ships at auction, make ship trades with other teams, order new ships to be constructed by the shipyard, or maintain your fleet at its current size. Then you must decide how to divide your ships among the Coastal and Deep Sea fishing areas and the Harbor. You, will be most successful if your decisions are based on a long-term strategy for fleet size and allocation. You must also take into account the actions of the other teams and modify your strategy accordingly.

**Bank Balance**

Your bank balance is increased by income from fish and ship sales, and decreased by expenditures for ship purchases and operation. Additionally, your account is subject to interest earnings and charges.  Your total assets equal the sum of your bank balance plus the salvage value of your ships, $250 per ship, at the end of the game.  You can earn income by:

1. selling your fish catch at a fixed price of $20 per fish
2. selling your ships to other companies at a negotiated price
3. earning 10% interest on your bank account during seasons when your minimum bank account remains positive

You incur expenses by:

* buying ships at auction
* buying ships from other companies at a negotiated price
* ordering the construction of new ships at $300 per ship
* operating and maintaining your ships in one or both of the two fishing areas or leaving them in the harbor
* paying 15% interest on your loans during years when your minimum bank balance becomes negative

Interest earnings and charges are based on your minimum bank balance during the year.

**Ships**

You may change the size of your fleet by buying ships at auction, negotiating to buy or sell ships from another company, and ordering new ships from the shipyard.  Ships cannot be lost or damaged, and used ships purchased in an auction or trade are as good as new ships ordered from the factory.  From time to time a fishing company in a neighboring country will go bankrupt. Its ships are then sold in one lot to the highest bidder, and they may be used immediately.  Only one company can win the ships, but two or more teams can agree ahead of time to divide the ships later (during the trading session) at a negotiated price.  During the trading session all companies are free to negotiate the purchase or sale of ships. Ships that are traded are available to the purchaser for fishing immediately.  Rentals can be arranged by a prior agreement to buy ships and sell them back for a lower price in a later year.

Every year the shipyard accepts orders for new ships. These are available at a fixed price of $300 per ship. The ships are picked up and paid for at the end of the year, so there is effectively a one-year construction delay before the ships may be used.  At the end of the game your ships will be sold. Their salvage value will be $250 per ship.  You may not sell your ships for salvage before the end of the game.

**Fish Areas**

Two fishing areas are available to you: a large Deep Sea fishery, and a smaller Coastal fishery. Biologists have estimated that the Deep Sea could potentially support between 2000 and 4000 fish, while the Coastal area could support between 1000 and 2000 fish. Since there has been no sign of over harvesting in the past, you are probably safe to assume that the actual populations are somewhere near these upper limits.

The normal yearly catch in the Deep Sea, 25 fish per ship, is higher than that in the Coastal area, 15 fish per ship. However, it costs $250 per year to operate a ship in the Deep Sea, while in the Coastal area the cost is only $150 per year. Operating costs remain fixed, but the catch in each area may vary according to factors explained below.

Your total fish catch is influenced by the number of ships you send to sea, the ship effectiveness, and the weather. With good weather, catch can be as much as 20% above normal, while bad weather may reduce catch by up to 20%. Weather is the same in both areas and for all teams in any given year.

Ship effectiveness—the number of fish caught per ship each year—depends on the normal productivity of the area where the ship is operating, and on the density of fish in the area. The general relationship between fish density and ship effectiveness is shown at right.

The number of ships in an area does not affect ship effectiveness; in other words, ship crowding is not a factor. However, if there are many ships in one area, the fish population may be somewhat reduced, and the next year’s harvest will be affected.

**Population Dynamics**

The fish population is increased by natural births; it is decreased by natural deaths and by harvesting. The fertility of the fish and their lifetime are both influenced by the density of fish. The general shape of the relationship governing new fish, net additions to the fish stock each year (births to natural deaths), is shown at right.

**Team Strategy Worksheet**

Your goal is to maximize your assets (assets = bank balance + salvage value of ships) by the end of the game (approximately 10 rounds). With this in mind, plan your company strategy.

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| Company #: \_\_\_\_\_\_ Year #: \_\_\_\_\_\_ List the plan of action for how your company will achieve its goals. |
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1. Why didn’t you use all of your boats (for the most part) in any particular year?
2. What was the general population trend in the coast and the deep sea?
3. What could be done to make this situation more sustainable? Consider that fishing companies are always looking to maximize their profit.
4. What was the relationship between fish price and catch?
5. How does the “tragedy of the commons” relate to this activity?