

# *FISH BANKS LTD.*

## ROLE DESCRIPTION AND OPENING SCENARIO

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. The rules and information required for your success are provided below.

### CRITERION OF SUCCESS

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.

### RESOURCES

You begin the game with a fleet of ships, a bank account equal to  $(\$200 \times \text{number of ships})$ , 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 allocate 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 at the end of the game.

### **Income**

You can earn income by:

- Selling your fish catch at a fixed price of \$20 per fish.
- Selling your ships to other companies at a negotiated price.
- Earning 10% interest on your minimum bank balance during years when it remains positive.

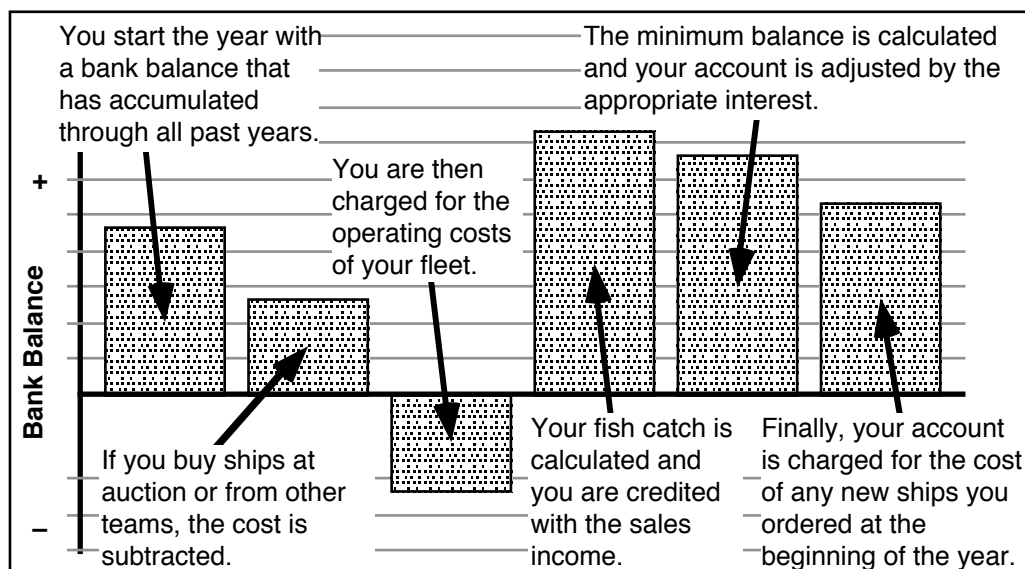
## Expenses

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 minimum bank balance during years when your bank account becomes negative.

## Interest

Interest earnings and charges are based on your minimum bank balance during the year. This is calculated for you automatically by the computer, so you do not need to do the mathematics yourself. Interest income and expenses are normally a relatively minor part of each year's profits. The bank is willing to lend you whatever money is required to implement the decisions you make. Normally it is not worth the effort for you to calculate manually the precise value of your minimum bank balance each year. However, if you wish to check the computer's calculations, you must keep in mind the precise sequence of credits and debits to your account.



## 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 effective in fishing as new ships ordered from the factory. And the annual operating costs implicitly maintain ships in new condition.

### Auctions:

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 each auction, but two or more teams could agree ahead of time to divide the ships later (during the trading session) at a negotiated price.

### Trades:

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.

### Construction:

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, and they can only be used in fishing in the next year. So there is effectively a one-year construction delay. In each year your order for new ships may not exceed half your existing fleet.

### Salvage:

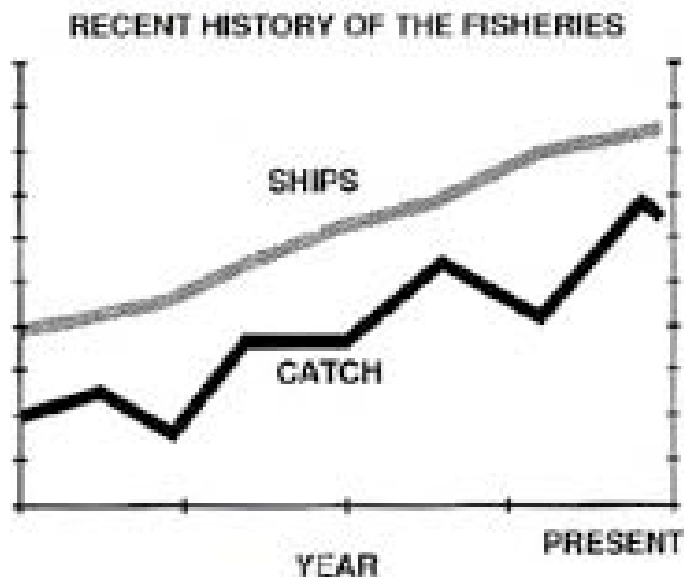
At the end of the game your ships will be scrapped. Their salvage value, the average value of annual profits earned by all ships in the ocean during the past two years, is included in your total assets. You may not scrap ships before the end of the game.

## 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 2,000 and 4,000 fish, while the Coastal area could support between 1,000 and 2,000 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.

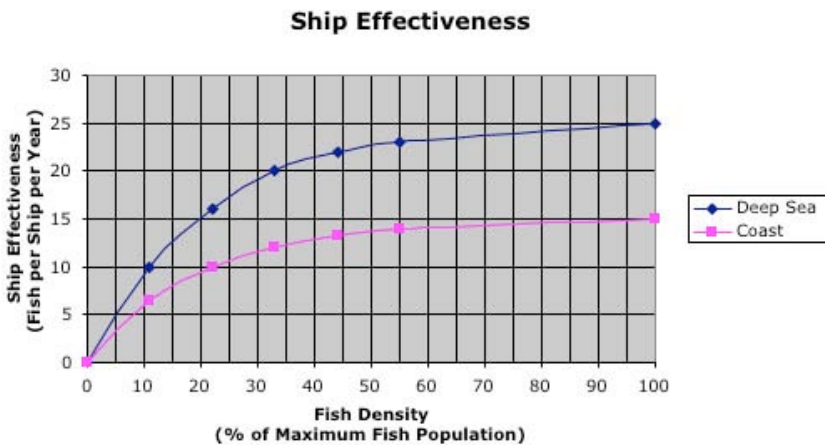
The normal yearly catch in the Deep Sea, 25 fish per ship, is higher than that in the Coastal area, 15 fish per ship. However, it costs \$250 per year to operate a ship in the Deep Sea, while in the Coastal area the cost is only \$150 per year for each ship. Operating costs remain fixed, but the catch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



## Harvest

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 increased by as much as 20%, while bad weather may reduce catch by up to 20%. In any given year, weather is the same in both areas and for all teams.

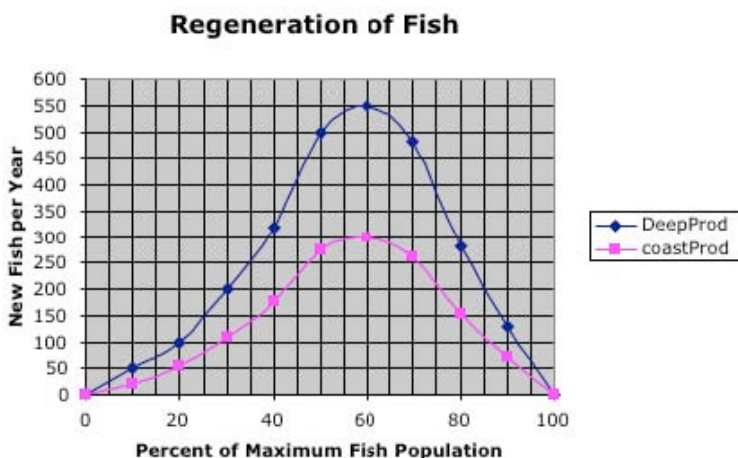
Ship effectiveness – the number of fish caught per ship each year with average weather – depends on the normal productivity of the area where the ship is operating, and on the density of fish in the area. The general relationship between fish density and ship effectiveness is shown below.



The number of ships in an area does not affect ship effectiveness; in other words ship crowding is not a factor. Therefore it is not useful for you in any year to wait and see where the other teams are placing their ships, before you decide on your allocation. However, if many ships are sent to one area the fish population may be somewhat reduced, and the next year's harvest in that area could 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 – natural deaths), is shown at right.



# TERMS ON THE DECISION SHEET

## ANNUAL REPORT

- R:1 Deep Sea Catch: This is the total number of fish caught by the ships your team sent to the deep sea fishery in the last year.
- R:2 Coastal Catch: This is the total number of fish caught by the ships your team sent to the coastal fishery in the last year.
- R:3 Price of Fish: The price of fish is fixed at \$20 per fish. Every fish caught is sold.
- R:4 Total Fish Sales: This is the product of two factors: your total catch (the sum of the R:1 and R:2 above) and the price for each fish sold (R:3).
- R:5 Interest: When your minimum bank balance during the year is negative, you are charged 15% interest. This may happen even when fish sales at the end of the year leave you with a positive bank balance. If the figure for interest on your report is positive, that means your minimum bank balance during the year was positive and you earned 10% interest on the minimum balance. You can calculate your bank balance yourself by adding the credits and debits which result from your decisions, and doing it in the sequence shown in the Bank Balance section of the Role Description.
- R:6 Initial Bank Balance: In the first year this is typically \$200 per ship in your fleet. Thereafter the amount is calculated by the computer program.
- R:7 Ship Fleet: This is the number of ships you start with at the beginning of the year, before auctions or trades. It will equal D8 in the last year plus any new ships ordered (D7) in the last year.

## AUCTIONS, TRADES AND ORDERS

- D1 Ships Purchased in Auction: Enter the number of ships your team purchased at auction. Normally this will be zero, since auctions are not always held, and only one firm can make the highest bid. If you win the auction, record here how many ships you obtained.
- D2 Money Spent on Auction Purchases: Enter the amount of money your team spent on auction purchases. If the term above in D1 is zero, then this will also be zero. If your team did win the auction, record here the total amount of money you paid for all the ships you received.
- D3 Ships Purchased in Trade: Enter the number of ships your team purchased in trades. If you bought ships from one or more of the other teams, record here the total number of ships you obtained from all other teams combined.
- D4 Money Spent on Trade Purchases: Enter the amount of money spent on your team's trade purchases. If you bought ships from one or more of the other teams, record here the total amount of money you paid to all other teams combined.
- D5 Ship Sold in Trade: Enter the number of ships your team sold in trade. If you sold some of your ships to one or more of the other teams, record here the total number of ships you transferred to all other teams combined.
- D6 Money Received from Trade Sales: Enter the amount of money your team received from trade sales. If you sold some of your ships to one or more of the

other teams, record here the total amount of money you received from all other teams combined.

Note: You can effectively rent or lease ships with another team by agreeing to buy a ship this year for some price and then to sell it back in the next year to the same team for zero dollars. But be careful how you record these two transactions—the numbers of ships and amounts of money recorded by each team must be equal in each year.

D7 New Ship Ordered: Enter the number of new ships your team decided to order. This is where you record your decision about the number of new ships you wish to have constructed for use in the next year. The cost is \$300 each, but you can borrow the money from the bank, if your bank balance is inadequate to finance your desired purchases.

## SHIP ALLOCATION DECISIONS

D8 Ship Fleet after Auctions & Trades: This is the calculated number of ships in your fleet after auctions and trades. It is what you have available for use in fishing this year. It equals  $(R:7 + D1 + D3 - D5)$  and is not influenced by your decision this year regarding, New Ships Ordered (D7.) These ships ordered can only become available to you at the beginning of next year, because there is a one year construction delay.

D9 Ships Sent to Deep Sea Bank: Enter the number of ships sent to the Deep Sea area. Each ship sent to the deep sea fishery costs you \$250 in operating costs. This money may be borrowed from the bank. However, if the total operating costs exceed your bank balance, you will then have to pay interest on the loan.

D10 Ships Sent to Coastal Bank: Enter the number of ships your team sent to the Coastal area. Each ship sent to the coastal fishery costs you \$150 in operating costs. This money may be borrowed from the bank. However, if the total operating costs exceed your bank balance, you will then have to pay interest on the loan.

D11 Ships Remaining in Harbor: This is the calculated number of ships remaining in Harbor. Each ship left in the harbor costs \$50 in operating costs.

# FISH BANKS QUICK REFERENCE SHEET

## FISHING AREAS

	Deep Sea	Coastal	Harbor
Operating Cost:(per ship per year)	\$250	\$150	\$50
Normal Yield (fish per ship per year)	25	15	0
Estimated maximum fish population	2000-4000	1000-2000	0

## SHIP PURCHASES

	Availability	Cost
Purchase in auction	Immediate	Highest bid
Purchase in trade session	Immediate	Negotiated price
Order from shipyard	One year delay	\$300

## SAMPLE SEASON

Team #1 starts the year with 12 ships and a bank balance of \$2400. Weather = 1.03.  
Order for new ships to be constructed is 1.

Transaction	Income	Expenses	Bank Balance
Initial bank balance			\$2400
Buy 4 ships at auction		\$1200	\$1200
Sell 2 ships in trade @ \$350 ea.	\$700		1900
Operate 8 ships in Deep Sea		\$2000	-\$100
Operate 6 ships in Coast		\$900	-\$1000
Sell fish from Deep Sea	\$4120		\$3120
Sell fish from Coast	\$1860		\$4980
Pay interest on minimum bank balance (-\$1000)		\$150	\$4830
Pay for new ship ordered		\$300	\$4530
Final bank balance			\$4530

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STEPS OF PLAY

1. Receive computer printout and record on Decision Sheet under "Annual Report."
2. Collect ships.
3. Bid for auctioned ships, if there is an auction.
4. Buy or sell ships in trading session.
5. Place orders for new ship construction.
6. Calculate and record fleet size.
7. Allocate ships among fishing areas and harbor and record decisions on Decision Sheet.
8. Place ships on game board.
9. Give Decision Sheet to operator.

# DECISION SHEET

Company:

<b>Annual Report</b>	<b>Year</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
R:1 Deep Sea Catch (# fish last year)											
R:2 Coastal Catch (# fish last year)											
R:3 Price of Fish (\$ / fish last year)											
R:4 Total Fish Sales (\$ last year)											
R:5 Interest (\$ last year)											
R:6 Initial Bank Balance (\$ this year)											
R:7 Ship Fleet Before Auctions and Trades											

<b>Auctions, Trades, &amp; Orders</b>	<b>Year</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
D:1 Ships Purchased in Auction											
D:2 Money Spent on Auction Purchases											
D:3 Ships Purchased in Trades											
D:4 Money Spent on Trade Purchases											
D:5 Ships Sold in Trade											
D:6 Money Received from Trade Sales											
D:7 New Ships Ordered											

<b>Ship Allocations</b>	<b>Year</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
D:8 Ship Fleet after Auctions & Trades											
D:9 Ships Sent to Deep Sea Fishery											
D:10 Ships Sent to Coastal Fishery											
D:11 Ships Remaining in Harbor											