

Rules for the Game of Fish and Men, Starlogo Edition

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1 Overview

The scenario is this: Each player represents a school of fish. At the beginning of the game, each of the schools is born in a river, with 20 health (aka population in the school), and must move out to the ocean to feed and grow. When a school reaches 80 health or more, it returns to a river (any river, not necessarily the one it started from) to breed the next generation of fish. See Section 5 for a detailed description of this. The first school to find itself in a river with 80 or more health wins.

Unfortunately for the fish, there are humans in this world. Humans pollute. Pollution is made on land and roams the seas, fouling things up for the poor fish.

Also unfortunately, humans are known to engage in fishing from time to time. Boats of fishermen materialize in the sea and irritate the fish.

Fortunately, the fish are sentient, and know where the pollution is made and where it travels, and where the fishermen are, and can make strategic decisions to avoid them.

Also fortunately, Poseidon, the god of the sea, listens to prayers, and allows the fish a great deal of control over various “random” events — the cards. More on that topic in Section 6.

Even more fortunately, fish are immortal. Nothing may ever, under any circumstances, reduce the health of a fish below the minimum 1. Admittedly, a fish with health 1 will find it precious difficult to grow healthy enough to win, but it is still in the game, and cannot become any worse off (unless, of course, the player quits). The flip side of this immortality is that fish

have an upper bound on their health as well. Nothing may ever, under any circumstances, increase the health of a fish beyond 100.

The game is turn based, and everything else is described in the following sections.

2 Computer

The Game of Fish and Men, Starlogo Edition has one rather unusual feature — it has a computer-maintained board. Unlike computer chess, which is an original board game that can be played on the computer (although the board is often preferable), or Quake, which is an original computer game and cannot be played on a board (except, perhaps, with *extreme* difficulty), this game is intended to be played as a hybrid. The “board” is a Starlogo program, and the “pieces” are images on the screen, but the game also has cards, which should be physical cards the players physically shuffle and play with. In an ideal arrangement, the screen would be projected from above onto a table, and each player would have a mouse they could use to interact with the board as needed on their turn. As arrangements are unlikely to be ideal, even a regular computer in a reasonably open space (so that everyone can see it and each other easily) would do.

When the FishAndMen Starlogo project is loaded, the screen will contain a large game board, and various buttons, sliders, and monitors around it. The buttons and the sliders are the way the players interact with the computer portion of the game. The game board and the monitors are the way the computer portion of the game interacts back. The game board has a blue ocean, green land masses, light blue rivers, likewise light blue ocean currents, and very light blue polar ice caps. The latter are arrows. The other game elements are industries, which are little factories of various colors on the land masses, blobs of pollution, which are green blobs in the sea (there aren't any in the beginning), fishermen, which are light blue ships on the sea (there aren't any in the beginning), and fish, which are fish of various colors. The fish may be obscured by other things in the same places as they are from time to time, but they quickly return to visibility.

3 Startup

To begin a game, someone should set the “Number of Players” slider in the top left corner of the screen to the desired value, and then press the “New Game” button. This button clears the board and resets it for a new game, and creates the fish that the players represent.

Players randomly determine order of placement, and then each player places their fish in a river, on the last square before the sea. Only one fish may start in each river. This placement can most easily be conducted by dragging one’s fish to the river of one’s choice with the mouse. Players start with no cards in hand.

4 The Phases of a Turn

4.1 Fish Move:

To begin the Fish Move phase of a turn, press the “Fish Move” button below the “New Game” button. The computer randomly decides the order of play for the current turn, and tells the person whose turn it is that it is their turn. The turn is actually conducted using the column of six buttons to the right of the “Fish Move” button.

On their turn, each fish may feed or move (but not both). A fish that feeds gains two health, plus two health for each non-polluted sea square it is adjacent to. A fish in the same square as a pollution cannot feed. A fish cannot feed on its first turn. To feed, press the Feed button at the top of the column. If you may legally feed, the computer will adjust your health accordingly, and advance the turn to the next player. If not, it is still your turn, and you should press the “Move” button.

To move, press the “Move” button right below the “Feed” button. The computer will randomly determine the number of spaces you may move, evenly distributed between 1 and 6 (except the first turn, when you automatically get 6) and display it. You move by clicking the “Turn Left”, “Turn Right”, and “Go Forward” buttons below the “Move” button. The turn buttons turn your fish by 45 degrees in either direction, and cost you nothing. The “Go Forward” button will move you forward a space. When you are done moving, press the “Done Moving” button at the bottom of the column. Note that you are not required to move for all of the movement points that

you have.

Movement causes loss of one health per step made, plus two extra health per pollution moved through (or into). A fish that does not have enough health to pay these costs is reduced to 1 health, but suffers no further adverse effects. It is legal to move for 0 steps (and not feed). Moving along an ocean current is easy — no health is lost to movement (although one still loses health to pollution on the way). Moving against a current is difficult — lose an extra health for each step moved against the ocean current. The computer will keep track of these losses of health for you, and prevent you from making an illegal step. Note that you always move a distance of 1 when you move, so if you are moving diagonally you may spend more than one step in the same square. This is a function of the fact that the Starlogo patches are all squares and not hexagons.

Obviously, fish may not move onto land or polar ice caps, with the exception of rivers. Furthermore, fish may not move onto other fish. See Section 5 below.

4.2 Draw a Card:

Each player, in the same order as for moving, draws a card. This includes playing the card, if it requires playing. See Section 6 for details on how this works. If there is no deck left, reshuffle the discard pile into a new deck. This part the computer has nothing to do with, so it is a good idea to remember the order in which players moved.

4.3 Generate Pollution:

Industries generate pollution. Which ones do depends on how much pollution is already present in the world, according to Figure 1.

Pollution is dumped into the sea, into a random sea square adjacent to the industry, one per industry that produces it. All pollution is created equal. The computer performs this phase of the move for you — one person should press the “Make Pollution” button (just once!) to carry this out for the turn.

4.4 Move Pollution:

The board has arrows representing ocean currents. Pollution moves thus: If the pollution is on a square with a current through it, it travels one space

Amount of pollution	Industries that pollute
0-9	all of them
10-19	all except the blue ones
20-29	yellow, red, and black
30-39	red and black
40-49	black only
50+	none

Figure 1: Industry Pollution Production

along the current. Then it travels one space in a random direction. Then it repeats this pair two more times (for a total of up to six steps of movement). If a pollution moves onto or through a fish, that fish loses half its health, rounded down, to a maximum loss of 10 health. The same pollution can cause multiple losses, if it traverses the same square more than once. Pollution carried by the current does not cause loss of health, but when it makes its step afterwards it does. Pollution blobs move independently of each other, and more than one may pass through and/or occupy the same square. Pollution never moves on land or polar ice (not even rivers). Note that, like fish, pollution blobs may spend more than one move in the same square, in which case woe to the fish that was sitting in it! The computer does this phase automatically as well. To do it, one person should press the “Move Pollution” button below the “Make Pollution” button (just once!).

4.5 Vanish Pollution:

Any pollution that is not adjacent to any other pollution after all pollution has moved has a 50/50 chance of disappearing. Guess what — this phase is automatic too. To do it, one person should press the “Vanish Pollution” button below the “Move Pollution” button (just once!). This phase ends the turn, and someone should press the “Fish Move” button again to start the next turn.

5 Of Rivers

Generally, the land is the land and the sea is the sea. The land holds industries which dump pollution into the sea, and the sea holds fish and the pollution and fishermen that bother them. All would be simple, except for one thing — rivers. There are several land squares on the board that contain rivers. The rivers flow into the sea. The river squares are land in all respects, except that the fish start in them, and the rivers may be entered and left through any adjacent sea square. Moving out of a river into the sea is considered moving with the current, whereas reentering a river counts as movement against the current. Pollution is not generated in and does not enter rivers. On the other hand, fish must leave the river of their birth on their first move, and no fish may enter a river unless that fish would have 80 or more health upon completing that move (in which case said fish wins). Furthermore, a river in a square that has an industry on it may not be entered at all, and may only be started on and then left, even if the industry is not currently producing pollution.

6 Of Cards

After moving each turn, every player draws a card. Some cards may specify that they must be played immediately, others will say that they may be kept and played later. The latter cards can be played whenever applicable. There are no further limits — players may hold as many cards in hand as they wish, they may play multiple cards per turn, etc. Since it would be an incredible pain to spell out detailed timing rules (the interested can peruse the Magic: The Gathering rules on timing), none are specified, and players are encouraged to be logical and follow the spirit of the rules and the cards. In general, cards should not be played while some other “atomic” action is being resolved (unless, of course, the card says it should be...)

Cards that may be kept represent favors Poseidon, god of the sea, grants to fish. As such, they can (in general) be bestowed on other fish, and fish may trade them (i.e. hand the cards to each other) as they see fit. Card trades are not possible between the drawing and playing (and resolution) of a card that must be played immediately on being drawn.

Cards that must be played immediately represent unavoidable events. All the fish get to do is pray to Poseidon to influence where and/or to whom the

event happens.

Cards will often have variables that are not set on the card. (e.g. something happens to “one fish”) Any such can be set in any way desired by the player playing the card. Poseidon always hears the prayers of fish.

6.1 Card List

The list below displays all the cards of The Game of Fish and Men, Starlogo Edition. Cards that are marked with a number in parentheses after them are played by selecting that number on the “Card to Play” slider and clicking on the “Play Card” button. Starlogo will prompt whomever is playing the card for the target, and either abort if the target is illegal, in which case this procedure should be attempted again, or execute the action. Certain cards (primarily those affecting fish movement) must be played during the fish movement phase. Such cards must be played *after* the “Fish Move” button has been pressed, but *before* the targeted fish starts moving (pressed either of the “Feed” or “Move” buttons on its turn).

Cards that are not marked with a number in parentheses either do not affect the computer board at all, or are readily executable with the existing buttons.

- **Economic Collapse (1)**
Must play. 1 industry, player’s choice which, is permanently removed.
- **Economic Growth (2)**
Must play. 1 industry is permanently added. Player may choose the square, provided it is on the shore (rivers and polar ice caps are legal) and contains no industries, but the color is determined randomly.
- **DotCom Boom (3)**
Every fisherman has a 50% chance of quitting. Must play.
- **DotCom Bust (4)**
Every sea square has a 5% chance of producing a fisherman. Must play.
- **Attack of the Environmentalists (5)**
Remove all pollution from one square. May be kept.
- **Oil Spill (6)**
Must play. Add 3 pollution to one square that contains no fish.

- **Flowering of Flounder (7)**
Add 20 health to any one fish. Must play.
- **Abundant Seaweed (8)**
Add 10 health to any one fish. May keep.
- **Shark Attack (9)**
Remove 1 pollution per square, and 10 health from each player's fish from any one 3 by 3 square all-sea region. Must play.
- **Planets Aligned**
Must play. Draw two cards. Play both immediately, even if they are normally keepable.
- **Metagaming**
Take a card from another player's hand and play it immediately. May keep.
- **Memory Loss**
Another player discards all of his/her cards. May keep.
- **Active Fishing (10)**
Place a swarm of 10 fishermen starting on any one sea square. Must play.
- **Inordinate Fishing (11)**
Place a swarm of 25 fishermen starting on any one sea square. Must play.
- **Fins of Iron**
One fish does not move (or feed) this turn. May keep. If played, must play before that fish's movement.
- **Fins of Steel (12)**
One fish may move without loss of health due to motion this turn. Loss of health due to moving through pollution or against the current still applies. On the other hand, movement *with* the current permits the fish to gain one health per step moved. May keep. If played, must play before that fish's movement.

- **Fishoportation**
Move any one fish instantly to any one sea square (not a river!) that contains no pollution and no other fish. May keep. This counts as the fish's move for that turn, so cannot be played on a fish that has already moved (or fed) that turn. If played, must be during Movement. The fish loses no health for travel.
- **Fins of Rubber (13)**
One fish may move up to three extra spaces this turn. Normal losses of health apply. May keep. If played, must play before that fish's movement.
- **Scales of Protection (14)**
One fish may move through pollution without loss of health this turn. Has no effect on pollution moving through fish. May keep. If played, must play before that fish's movement.
- **Scales of Porousness (15)**
One fish loses double health every time it moves through pollution this turn. No effect on pollution moving through fish. May keep. If played, must play before that fish's movement.
- **Evasion (16)**
For the rest of the turn, pollution moving onto one fish reduces its health by a maximum of 2, not 10. May keep.
- **Attraction (17)**
All the fishermen in the world congregate atop one fish (and then spread out normally). Must play. Pity the fish this happens to!
- **Invincibility (18)**
One fish will lose no health at all for any reason this turn. Must play.
- **Nullification**
The next card you play does not happen. Must play when next you play a card (forced or voluntary, but not counting any Nullifications). No impact on card trades, and may be traded. Multiple Nullifications are used one at a time and do not affect each other, naturally.
- **Time Freeze**
All fish move once more this turn (including gaining health for feeding,

if desired), after this card drawing phase. Fish do not draw cards again after the extra move. Must play. Rare.

- **Fish Population Burst (19)**
Add 1/4 of the health to every fish. Excess wasted. Must play. Rare.
- **Double Trouble**
Pollution is generated twice in a row this turn. On the other hand, pollution is vanished twice in a row this turn as well. Must play. Rare.
- **Fish Plague (20)**
Remove 1/4 of the health from every fish. Must play. Rare.

6.2 Fishermen

Five of the card types mention fishermen. Fishermen have the following effects:

- When a swarm is created, it spreads out at random from the starting location, filling the water, until no two fishermen are in the same sea square.
- After being spread, they do not move (even with the current), except as caused by Attraction.
- They remove 5 health from every fish that enters the sea square they are in (per step!)
- They remove 5 health from every fish that is in the same square as they are at the beginning of a turn.
- If an individual fisherman has not removed health from any fish in the last three turns, that fisherman has a 50% chance of quitting (disappearing).
- If an individual fisherman finds himself on a polluted sea square at the beginning of a turn, he quits.

6.3 Cards by Regular Playing Cards

The cards can be simulated by the cards of two decks of playing cards, one with a blue back and one with a red, according to Figure 2. For convenience, the cards in 6.1 are listed in same order that they appear in this table.

	BH	RH	BD	RD	BS	RS	BC	RC
2	EC	EC	EC	EC	EG	EG	EG	EG
3	DCBo	DCBo	DCBo	DCBo	DCBu	DCBu	DCBu	DCBu
4	AoE	AoE	AoE	AoE	OS	OS	OS	OS
5	FF	FF	FF	FF	AS	AS	AS	AS
6	SA	SA	SA	SA	PA	PA	PA	PA
7	Mg	Mg	Mg	Mg	ML	ML	ML	ML
8	AF	AF	AF	AF	IF	IF	IF	IF
9	FS	FS	FS	FS	FI	FI	FI	FI
T	Fp	Fp	Fp	Fp	FR	FR	FR	FR
J	SPr	SPr	SPr	SPr	SPo	SPo	SPo	SPo
Q	E	E	E	E	A	A	A	A
K	I	I	I	I	N	N	N	N
A	TF	TF	FPB	FPB	DT	DT	FP	FP

Figure 2: Simulating Game Cards With Playing Cards

A joker can be used as any card that is neither a queen, a king, nor an ace. A joker may be used as a card that must be played immediately when it is drawn, but if kept it may only be used as a card that may be kept.

7 Flexibility

Being a game with a computer maintained board, The Game of Fish and Men, Starlogo Edition, comes with a surprising amount of builtin flexibility. First, all of the game's numerical parameters can be changed trivially. If one opens the observer control center in the Starlogo project, one will easily find the `init_values` function therein. This function sets the default values of all the numeric parameters of the game. These parameters, and their default values, are as in Figure 3. In addition, the user may adjust the parameters affecting the powers of the cards. Since each card is self-contained, rather

than cluttering the code with all kinds of global variables, I have instead left the card powers hardcoded in. The relevant numbers are easy enough to change — every card is implemented with a `do_<card-name>` function. In fact, a user with programming leanings may even add entirely new cards, as they see fit.

Additionally, the user may redraw the board as he or she sees fit. The given board is intended to represent the real world, as faithfully as is reasonable. The user may, however, choose to play on a different board for any of a number of reasons. Should one decide to change the board, two notes:

- There is no built-in way to restore the default board once it has been changed and the changes saved. So please save into a different project, or keep a copy of the original somewhere.
- The initial locations of industries are marked by extra turtles whose breed is `industry_spawn_sites`. These turtles normally spend their time being hidden, as they are only needed during startup.

8 Conclusion

That ends the rules of The Game of Fish and Men, Starlogo Edition. I hope you enjoy playing it, and playing with it.

Name	Value	Notes
sea_color	blue - 2	These should be the same as the actual colors of these things on the board.
land_color	lime + 2	
river_color	cyan + 1	
ice_color	cyan + 4	
current_color	river_color	
pollution_color	lime	
pollution_speed	3	
pollution_vanish_probability	50	% per turn
best_pollution_cutoff	10	
best_color	blue	
nice_pollution_cutoff	20	
nice_color	green - 1	
ok_pollution_cutoff	30	
ok_color	yellow	
bad_pollution_cutoff	40	
bad_color	red	
worst_pollution_cutoff	50	
worst_color	black	
current_player	-1	Set automatically
initial_health	20	
health_to_win	80	
fish_max_health	100	
fish_feed_rate	2	Per clean neighbor
max_damage_from_pollution	10	
damage_from_moving_no_current	1	Per step
damage_from_moving_with_current	-1	Cumulative with no_current, per step
damage_from_moving_against_current	1	
damage_from_entering_pollution	2	Per piece of pollution
fish_min_speed	1	
fish_max_speed	6	
spreading_fisherman_color	red	
fisherman_color	river_color	
fisherman_max_hunger_level	3	Turns he will last
fisherman_hunger_quit_prob	50	% per turn beyond

Figure 3: Parameters of the Game