Shifting Fishes Simulation Activity Worksheet

Instructions:
1. **Outline** all of the cells (habitat) that your fish could occupy in 1980 based on temperature.
2. Place your one fish in one of those cells, and **record** the year in the cell on the map.
3. **Record** in the table below:
   a. latitude of the cell your one fish occupies
   b. total amount of cells (habitat) you could occupy
   c. whether it was Easy, OK, or Hard to find cells (habitat) to occupy
4. After 20 years, **find** a new cell, which is a temperature habitat your fish could occupy, to move one step:
   a. has to be next to your current cell, so either up/down OR right/left
   b. you can go back to a previous cell
6. Fill in all of the cells that you could occupy in 2100, based on temperature, with hash marks.

Questions:
What temperatures were preferred by your fish?
- Colder
- Intermediate
- Warmer

Describe the range size of temperatures preferred by your fish.
- Broad
- Intermediate
- Narrow
**Plot the trends over time:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Fish Latitude (°N)</th>
<th>Total Habitat (# Cells)</th>
<th>How easy* was it to find habitat?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2040</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2060</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2080</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Ease of Finding Habitat:  
Easy = >20 cells  
OK = 10-20 cells  
Hard = <10 cells

**Questions to Consider: Circle the appropriate response**

How did the distribution of your one fish change with warming along the coast?  
Move North  Stay the same  Move South

How did total habitat suitable for your fish species change with warming?  
Increase  Stay the same  Decrease

**Check for Understanding:**

Make a claim about the relationship between the distribution of your fish species and temperature over time.

What is your evidence from your simulation data and reasoning for your claim?