

**Title: *The Perfect Vector: Keeping Up with Marsh Birds***

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### **Background Information**

The Seaside Sparrow is a relatively small bird that is endemic to salt marsh habitats and has come into contact with oil from the BP Deepwater Horizon spill. Radiocarbon (i.e., Carbon-14) is being tested within the feathers and gut contents of these Seaside Sparrows for dating methods of geological and hydrogeological samples. Radiocarbon residue in the feathers and gut contents may be due to the combination of oil and dispersant. Dispersants have been used to break down the oil slicks, but that does not mean the oil has been cleaned, just reduced to smaller droplets to increase efficiency in microbial degradation. These smaller droplets of oil can still be transported into marsh and affect birds like the Seaside sparrow. It is believed that some birds have the capability to transport contaminants to other areas. If so, there may be alterations to the food web in specific areas where these birds have migrated.



### **Louisiana State Standards (Grade-Level Expectations)**

SI GLE: Use computers and/or calculators to analyze and interpret quantitative data (SI-M-A3).

Utilize mathematics, organizational tools, and graphing skills to solve problems (SI-H-A3).

SI GLE: Communicate ideas in a variety of ways (e.g., symbols, illustrations, graphs, charts, spreadsheets, concept maps, oral and written reports, equations) (SI-M-A7).

SI GLE: Choose appropriate models to explain scientific knowledge or experimental results (e.g., objects, mathematical relationships, plans, schemes, examples, role-playing, computer simulations) (SI-H-A4).

LS GLE: Explain and give examples of predator/prey relationships (LS-M-C4).

Analyze food webs by predicting the impact of the loss or gain of an organism (LS-H-D2).

SE GLE: Analyze positive and negative effects of human actions on ecosystems (SE-H-A7).

Give examples and describe the effect of pollutants on selected populations (SE-H-A11).

## **Ocean Literacy Principles**

Principle 5i: Estuaries provide important and productive nursery areas for many marine and aquatic species.

Principle 6e: Humans affect the ocean in a variety of ways. Laws, regulations and resource management affect what is taken out and put into the ocean. Human development and activity leads to pollution (such as point source, non-point source, and noise pollution) and physical modifications (such as changes to beaches, shores and rivers). In addition, humans have removed most of the large vertebrates from the ocean.

Principle 6f: Coastal regions are susceptible to natural hazards (such as tsunamis, hurricanes, cyclones, sea level change, and storm surges).

## **Time Requirement**

The teacher can create the spinner on the map prior to the activity, but it takes such a small amount of time that the students can do it themselves. Time required for printing the maps, cutting the arrows, and using the thumbtacks should take no longer than 5 minutes. The *Skittles* should be separated prior to this activity and distributed to each of the 5 groups. The actual spinning portion of the activity has simple multiplication and subtraction involved, so this may take up to 1-2 minutes per spin. Each group should receive the opportunity to spin up to 5 times, so the whole activity will take about 10 minutes. Completion of the essay depends on the time spent for researching the habitat, prey, and predators of the Seaside Sparrow.

## **Materials**

Thumbtacks

Index card or stock paper

Scissors

Calculator

41 oz. *Skittles* bag (2)

Gulf of Mexico printout (below)

Oil Impact by Percentage Chart printout (below)

## **Lesson Description**

### ***Creating the Oil & Bird Demography Spinner***

1. Print out the Gulf of Mexico map associated with this activity.
2. Cut out an arrow from index or stock paper; make sure the material used is heavier than regular typing paper.
3. Use a thumbtack to pin the base of the arrow to the blue circle on the Gulf of



Mexico map; the location is identified on the map.

**Methodology**

Students should be divided into five groups and each group will be given one *Skittles* color (e.g., yellow, orange, red, purple, green) to represent their group of Seaside sparrows. Each group should have their own Gulf of Mexico map. The groups may set their group of “sparrows” in only one Gulf of Mexico state to begin this activity. Once the students flick the spinner, they should “migrate” their sparrows to that state. If the spinner does not fall on any of the Gulf states, allow them to keep trying until the arrow land on a Gulf state. If the spinner falls on a state that will endanger their species, then multiply the sparrows by the chart below entitled ‘Oil Impact by Percentage’ and take away the difference between the original number of sparrows and the new product (i.e., 20 green *Skittles* x 25% oil impact=5, so subtract 20-5=15 and 15 is the new number for the green *Skittles*). If the spinner lands on a state that has prey that is consistent with the sparrow diet, then disregard the ‘Oil Impact by Percentage’ chart. Each group should use 5 spins to understand how the Seaside sparrow population may become affected due to oil interaction and demography.

**Oil Impact by Percentage**

<b>Skittles colors</b>	<b>Oil Impact</b>	<b>Percentage</b>
<b>Red</b>	Substantially covered by oil	40%
<b>Green</b>	Heavily impacted by oil	25%
<b>Orange</b>	Moderately impacted by oil	15%
<b>Yellow</b>	Partially impacted by oil	5%
<b>Purple</b>	Not impacted by oil	0%

**Gulf of Mexico Map Guide**

<b>State</b>	<b>Independent Variable</b>
Texas	Grasshoppers (prey)
Louisiana	Hurricane activity (endangerment)
Mississippi	Snails (prey)

Alabama	Wolf spiders (prey)
Florida	Salt marsh loss (endangerment)

**Standard Evaluation (Student Deductions)**

1. Have the groups write a detailed essay about the “migratory history” of their particular sparrows. Did the Seaside Sparrow population decrease or increase? Why or why not? Tell them to be specific about how and why the birds were endangered (e.g., predators, natural disasters) or stabilized (e.g., abundant prey). The groups may have to do some research to be descriptive of how the endangering forces influenced sparrow population.

The evaluation can be in the form of a test, essay, questions and answers worksheet, or any other mode of measuring retention or comprehension of material.



