Grassy Narrow Bonus Assignment Information

DUE DATE: Wednesday, 27 April at 9AM (NO LATE SUBMISSIONS)

Recall that in Part 2 (8 April) of the Grassy Narrows Activity, you learned how to conduct a t-test for the hypotheses

H0:  μ = 0.5

H1:  μ > 0.5

and an α (significance level) of 0.05.

The actual data from Large Mouth Bass in Separation Lake was

Sample Mean:   

Sample Standard Deviation:  s = 0.3,

Sample size:  n = 22

Degrees of Freedom (df = n-1) = 21

t-value calculation

A picture containing table

Description automatically generated

Because the alternative hypothesis direction is to the right, you used the following formula in Excel to find the probability (i.e., p-value) that a t-value would be greater than 0.469, assuming the null hypothesis was true.

Excel Formula for finding the p-value if the direction of extreme is to the right:

=T.DIST.RT(t value,df)

**NOTE: the equal sign is important when you type this into the Excel cell**

For this test,

=T.DIST.RT(0.469,21)

= 0.322

The p-value of 0.322 is **greater than the level of significance of 0.05**.  Therefore, the data supports the null hypothesis, so we would conclude that the average mercury concentration in the population of fish is **not significantly greater than 0.5 mg/kg** (t = 0.469, p = 0.322, n = 22).

But, large-mouth Bass is one of the fish species most frequently consumed by Grassy Narrows and Wabaseemong First Nation community members.  Walleye (*Stizostedion vitreum vitreum*), Northern Pike (*Esox lucuis*) and Whitefish (*Coregonus clupeaformis*) are three other commonly harvested fish species in the English-Wabigoon river system.

For the bonus activity, use what you have just learned above to test the hypotheses about each of the other fish species (i.e., Northern Pike, Walleye, and White Fish) with the data in the table below provided for Separation Lake, write your conclusion for each fish and make a recommendation (safe or unsafe).  Did the methylmercury levels differ among the fish species?  Why might this be? Combine all of the methylmercury data for the fish species of Separation Lake and propose a series of fish consumption recommendations for the First Nations community members. Consider the provided scientific data, as well as other factors that you have identified.

An Excel file has been posted to Moodle under “Data for Grassy Narrows Bonus Activity” with the data entered for you already. A blank template has been posted to Moodle under “Grass Narrrows Bonus Activity Submission” that you will complete with your answers and turn in.

Table 4: Amount of mercury (mg per kg of fish tissue) in fish collected in the English–Wabigoon river system in Ontario, Canada (Kinghorn et al., 2007).

|  |  |  |
| --- | --- | --- |
| Northern Pike | Walleye | White Fish |
| 0.15 | 0.63 | 0.23 |
| 0.76 | 1.40 | 0.28 |
| 0.76 | 0.65 | 0.19 |
| 1.20 | 0.46 | 0.13 |
| 0.49 | 1.20 | 0.18 |
| 0.39 | 1.30 | 0.16 |
| 0.57 | 0.04 | 0.23 |
| 0.11 | 0.69 | 0.20 |
| 0.72 | 1.10 | 0.19 |
| 0.50 | 0.54 | 0.17 |
|  | 0.67 | 0.15 |
|  | 1.40 | 0.13 |
|  |  | 0.27 |
|  |  | 0.12 |
|  |  | 0.27 |