

From: [Grizzle, Betty](#)
To: [Guinotte, John](#)
Subject: Re: den site/altitude/latitude
Date: Tuesday, April 4, 2017 8:28:46 AM
Attachments: [Results from R Regression Analysis March 20.docx](#)

See attached (this analysis used R statistic program) for **preliminary** results.

On Mon, Apr 3, 2017 at 3:54 PM, Guinotte, John <john_guinotte@fws.gov> wrote:

Hi Betty, Can you send me your final graph/data for the den site/elevation/latitude issue? I was talking to Steve about it today.

Thanks John

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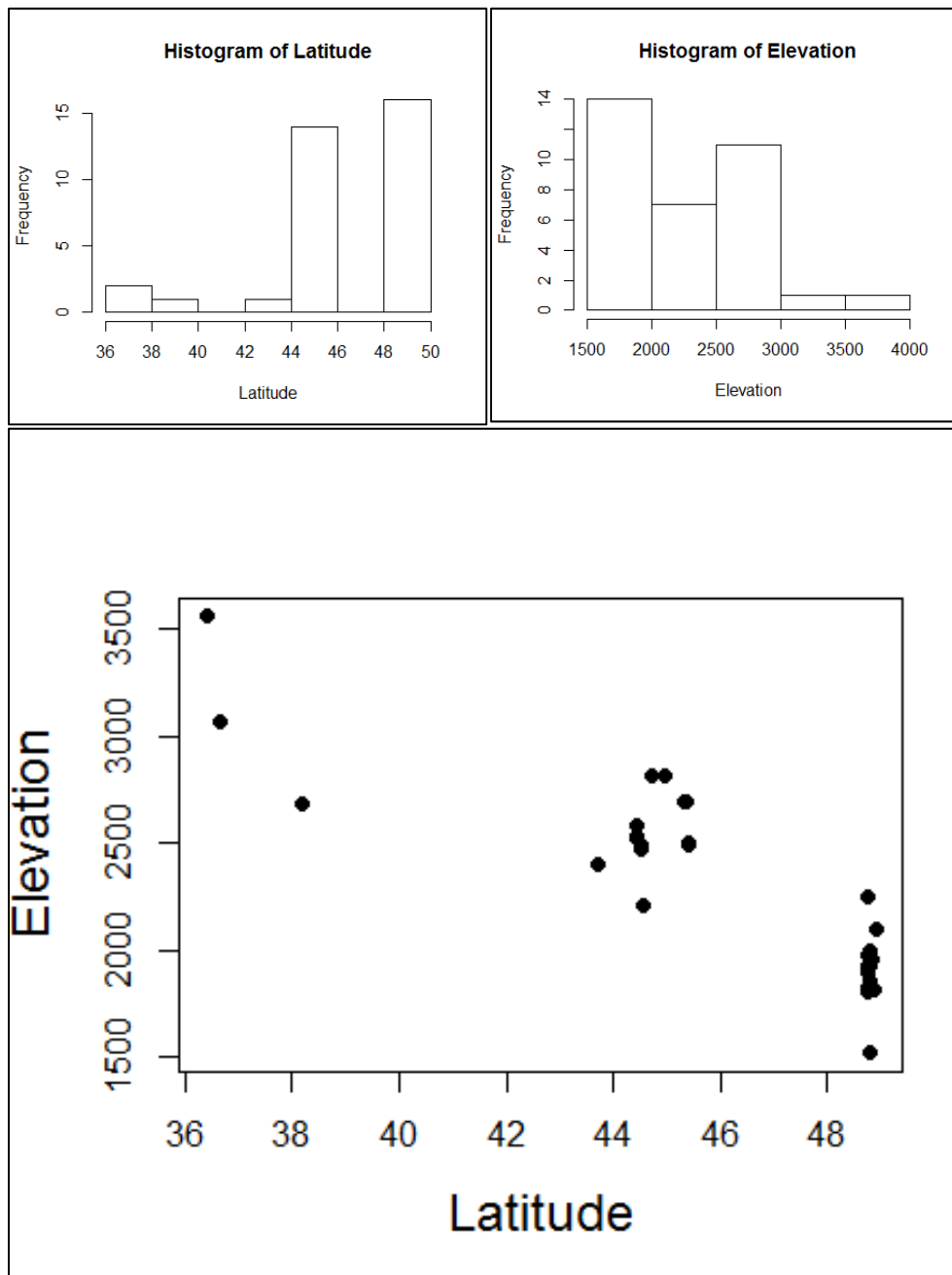
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Results from R Regression Analysis, March 20, 2017:

Descriptive Statistics and test of normality:

```
> shapiro.test(Latitude)$p.value  
[1] 4.327426e-06  
> shapiro.test(Elevation)$p.value  
[1] 0.04497151  
> hist(Latitude)  
> hist(Elevation)  
> plot(Latitude, Elevation, pch=16, xlab="Latitude", ylab="Elevation", cex.lab=1.5)
```



If you assume Elevation is normally distributed (but Latitude is not) and is dependent on Latitude, proceed with Linear Regression:

```
> mod = lm(Elevation ~ Latitude)
> summary(mod)
```

```
Call:
lm(formula = Elevation ~ Latitude)
```

```
Residuals:
    Min       1Q   Median       3Q      Max
-482.63 -135.42    1.07   122.44   410.25
```

```
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  7462.82    497.09   15.01 4.85e-16 ***
Latitude    -112.39     10.79  -10.42 8.24e-12 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Residual standard error: 213.7 on 32 degrees of freedom

Multiple R-squared: 0.7723, Adjusted R-squared: 0.7652

F-statistic: 108.5 on 1 and 32 DF, p-value: 8.241e-12

Slope is different than zero, $p = 8.24 \times 10^{-12}$; Overall test for regression.

Add best-fit regression line:

```
lines(Latitude,fitted(mod))
```

