08-AFC-2

Desert Tortoise Survey for Beacon Solar Energy Project

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Desert Tortoise Survey Report

For Beacon Solar Energy Project Emergency Access Route

Report Number: NV 0229-02-0909-001rev2

Date of Field Operation: May 26, 2009

Project Location: The survey took place in the corridor east of Highway 14 and west of Neuralia Rd in Fremont Valley, south of Rancho Seco, CA. The legal description is: California, Mt. Diablo Meridian T31S, R37E, sec2.

Project Description: Southern Nevada Environmental biologists, Amanda Northrup, BIO IV, Tim Demers, BIO III, and Sean St. Marie, BIO II provided surveys of the emergency access route and zones of influence for the Beacon Solar Energy Project for desert tortoise.

Site Description: The emergency access route was on a site that was bordered by Neuralia Road on the east and the Highway 14 and railroad corridor on the far west. The right-of-way for the emergency access route was almost completely disturbed and a previously existing roadway followed the northern edge of the road. The habitat was highly disturbed salt scrub dominated by four winged saltbush *(Atriplex canescens)*, red brome *(Bromus rubens)*, storksbill *(Erodium cicutarium)*, and Russian thistle *(Salsola tragus)*. Photograph 1 in Appendix A is a photograph taken of the site. The soils were clay and sandy with a large amount of sinkholes with large deep caverns, some as deep as 10 feet. Also observed on site were large amounts of livestock scat and two sheep carcasses (one pictured in Photo 6 in Appendix A).

DESERT TORTOISE (*Gopherous agassizii*): The Mojave Desert Tortoise occurs in creosote bush (*Larrea tridentata*), burro-bush (*Ambrosia dumosa*), Joshua tree (*Yucca brevifolia*), and shadscale (*Atriplex Confertifolia*) vegetative community types. The tortoise prefers sandy and gravelly soils of desert valleys and alluvial fans. The desert tortoise also ranges in elevation from the desert valley to 4,000 feet in mountain washed and steep-sided canyons. Aestivation (semi-hibernation) may occur during the heat of summer; however, tortoises generally are active in early morning and late afternoon during this period. Occurrence of monsoonal rains in late summer may result in increased tortoise activity. There may be some low level tortoise activity during fall with brumation commencing in mid-to late November.

Tortoises are herbivores, and prefer to feed on succulent forbes (weedy, broad-leafed plants) and grasses. In the Mojave Desert, forbes are most plentiful during March and April. As the forbes dry and complete the life cycle, tortoises make increasing use of grasses and, to some extent, shrubs and cacti. During drought years with no annual vegetation growth tortoises will feed on dried forbes and grasses left over from the previous year. Tortoises do drink water when available and construct shallow depressions in the desert pavement to gather water during brief but intense showers.

Tortoises are semi-fossorial, spending over 90% of their lives underground. Tortoises construct their own burrows and pallets. Burrows are long tunnels often over 6 feet long. They are half-moon shaped and generally are a snug fit for the tortoise that uses it. Pallets are shorter, usually

less than two feet long. Burrows and pallets have a low entrance angle and are frequently placed at the base of a creosote bush (*Larrea tridentata*), or on a hillside, or the bank of a dry wash. Caliche caves are often used as shelter by tortoises and have been reported as communal brumation sites. During spring, while foraging, tortoises will seek temporary shade under bushes and rocks in order to regulate their body temperature.

Methodology for Desert Tortoise Survey: The Beacon Solar Energy Project emergency access route was surveyed on foot using 100 percent visual coverage transect techniques in an east/west direction focusing on visual signs of Desert Tortoise (i.e. burrows, shells, bones, scutes, scat, tracks, etc.). The objective of the pre-project survey is to determine the presence or absence and abundance of desert tortoises within the action area and to assess the distribution of tortoises within the area to minimize takes and areas for avoidance (as per the *Pre-Project Survey Protocol for the 2009 Field Season* (USFWS 2009)). All data was recorded with a Global Positioning System Garmin GPSmart 60 CSx and recorded in Table 2. In addition to 100 percent survey coverage in the proposed right-of-way, Zone of Influence surveys were conducted at 100 feet, 300 feet, 600 feet, and 1,200 feet from the centerline as per the USFWS *Field Survey Protocol for any Non-Federal Action That May Occur within the Range of the Desert Tortoise* (USFWS 1992).

Results: Seven (7) burrow locations were marked in Table 2 below (See Table 2 for burrow class descriptions). No tortoises were observed during the survey period.

The following equation gives an estimation of the number of tortoises within an action area:

$$\begin{pmatrix}\text{Estimated number of tortoises}\\ \text{within an action area}\end{pmatrix} = \frac{\begin{pmatrix}\text{Number of Tortoises}\\ \text{observed above ground}\end{pmatrix}}{\begin{pmatrix}\text{Probability that a}\\ \text{tortoise is above}\\ \text{ground (Pa)}\end{pmatrix}\begin{pmatrix}\text{Probability of}\\ \text{detecting a tortoise}\\ \text{if above ground (Pd)}\end{pmatrix}}\left(\frac{\text{Action area(A)}}{\text{Area surveyed(a)}}\right)$$

The action area (A) is the area of the emergency access route which is a length of 0.5 miles and 12 feet wide which equals 31,680 square feet then the conversion to kilometers squared where 1 kilometer squared=10,763,910.4 square feet, therefore A=0.0029431 km^2. The area surveyed (a) equals the number of transects (only 1 due to width of access route) multiplied by the length of the route (km) multiplied by the width of each transect (0.01), therefore a=0.0080467 km^2.

$$N = \frac{(0)}{(0.80)(0.63)}\left(\frac{0.0029431\ \text{km2}}{0.0080467\ \text{km2}}\right),\ N = 0$$

Pa = 0.80, value determined from the probability table contained in the April 2009 USFWS document titled "Preparing for any action that may occur within the range of the Mojave Desert Tortoise". To determine this probability, first the previous winter's rainfall was calculated from the Western Regional Climate Center site: http://www.wrcc.dri.edu/summary/Climsmsca.html. For the winter prior to this survey (October 2008 to March 2009) the total rainfall was 2.05 inches). There were two possible probability values according to rainfall amount, 0.64 for total winter rainfall of less than 1.5 inches and 0.80 for winter rainfall greater than 1.5 inches.

Pd = 0.63, value is a given, also contained in the April 2009 USFWS document referenced above. Their description of how the value was determined is: "For the past five years, surveyors in the USFWS range-wide monitoring program have undergone training on established transects with artificial tortoises. Trained surveyors detected and average of ~63% of model tortoises that were within 5-m of either side of the transect center-line."

Density= , where N=0 and A=0.0029431 km^2, therefore D=0.

Conclusion: The estimated number of tortoises within the proposed action area was calculated to be zero tortoises, therefore making it a density of zero tortoises per kilometer squared. The soil was very sandy and loose making a structurally sound burrow difficult to construct. There were no rocky soil types like caliche in the vicinity making the area deficient of desert tortoise burrowing sites. In addition, the high level of disturbance and salinity on the site do not produce quality native forbes which are necessary for the diet of desert tortoises. Though seven (7) burrows were encountered and recorded in and around the project site, only one was noted as being potentially utilized by a desert tortoise and there was an absence of other sign such as scat, drinking rings, bones, etc. The data collected on the site corroborates the estimates for desert tortoise abundance as shown in the above equation and therefore a minimal amount of take would be expected in the action area of the emergency access route.

Table 1. Observed Fauna:

Ash-throated Flycatcher *(Myiarchus cinerascens)*
Black-tailed Jackrabbit *(Lepus californicus)*
Common Raven *(Corvus corax)*
Horned Lark *(Eremophila alpestris)*
Loggerhead Shrike *(Lanius ludovicianus)*
Mourning Dove *(Zenaida macroura)*
Whiptail *(Aspidoscelis tigris)*

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Table 2. GPS Data for Marked Waypoints with Burrow Class Definitions. Collected with a Garmin GPSmart 60CSx in degree format in Nad 83.

Waypoint	Latitude	Longitude	Notes
B01	35.27227	-117.987	Rodent burrow, Class 5, Sandy soil, 0.09 x 0.065m
B02	35.27249	-117.992	Sinkhole, Class 4, no sign, 0.14 x 0.05m
B03	35.27297	-117.988	Sinkhole, Class 4, no sign, 0.7 x 0.18m
B04	35.27378	-117.991	Sinkhole, Class 4, no sign, 0.22 x 0.86m
B05	35.26881	-117.987	Sinkhole, Class 4, Beehive inside, 0.3 x 0.2m
B06	35.26896	-117.988	Sinkhole, Class 4, Avian splash near entrance, rodent scat inside, 0.15 x .2m
B07	35.26895	-117.988	Rabbit pallet, Class 4, 0.12 x 0.2m

Definitions of Burrow Classes:

Class 1: Currently active with tortoise or recent tortoise sign.
Class 2: Good condition, definitely tortoise; no recent sign.
Class 3: Deteriorated condition; definitely tortoise.
Class 4: Deteriorated condition; possibly tortoise.
Class 5: Good condition; possibly tortoise.

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Appendices

Appendix A: Site Photos

Photo 1. Photograph of emergency access route taken from the eastern side facing west.

Photo 2. Photograph of southern 500 foot buffer taken from the west side facing southeast.

Photo 3. Photograph of 1200 foot southern ZOI transect facing west just west of the old homestead near the site.

Photo 4. Photograph of the 1200 foot northern ZOI transect. There was a large embankment and dense patches of saltbush along the northern edge of the site.

Photo 5. Sheep carcass with avian excrement found on access route near western end.

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Burrow Photos

Photo 6 . Rodent burrow, marked B01.

Photo 7. Burrow B02.

Photo 8. Burrow B03.

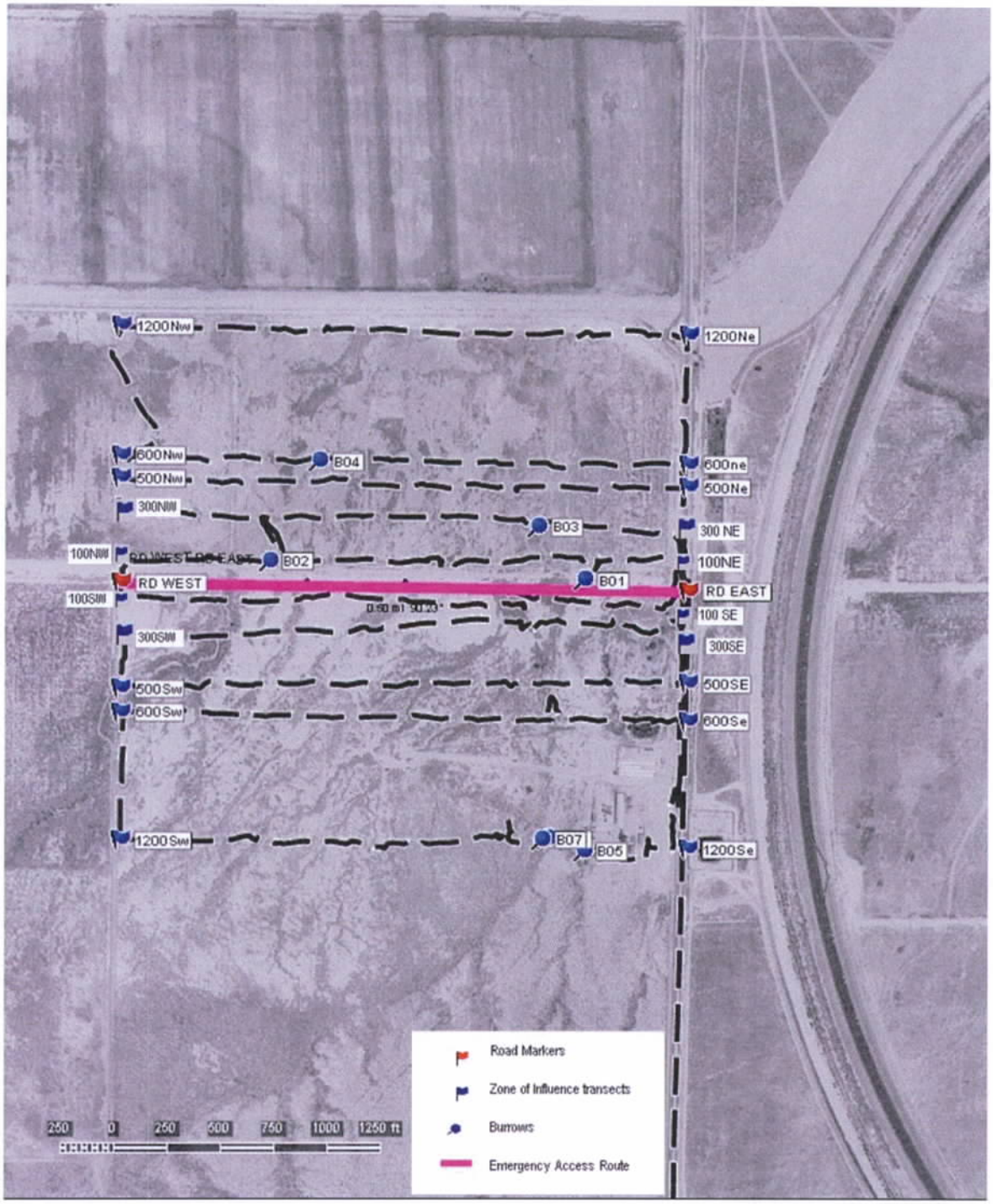
Photo 9. Burrow B04.

Photo 10. Burrow B05.

Photo 11. Burrow B06.

Photo 12. Rabbit pallet marked B07.

Appendix B: Site Map



Appendix C: Regional Map

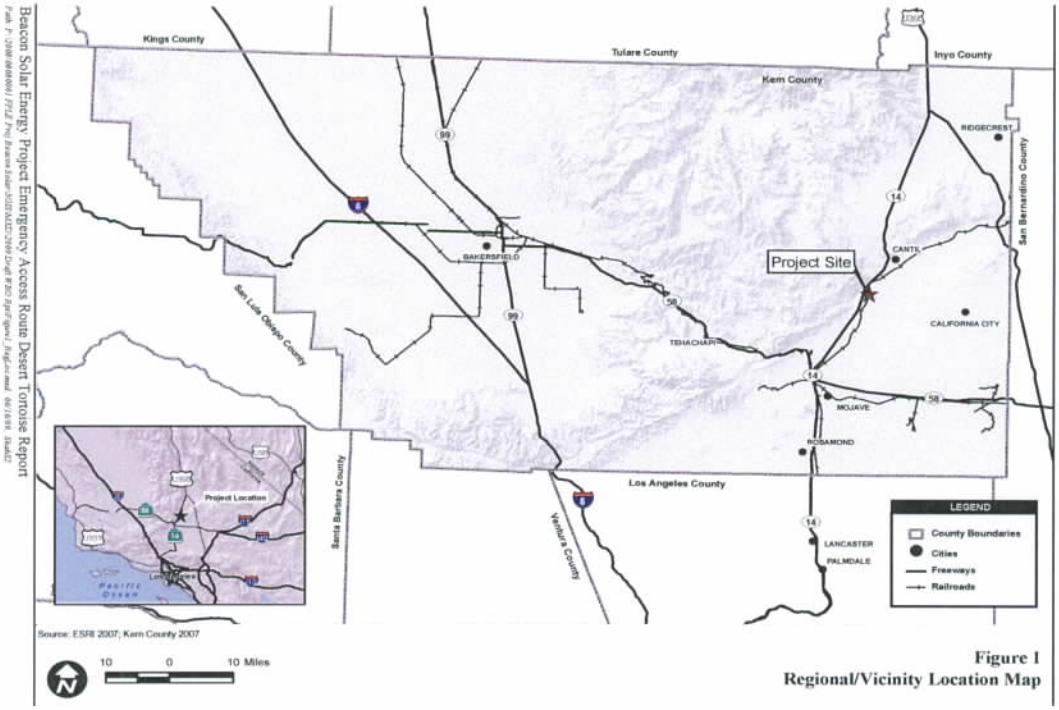


Figure 1
Regional/Vicinity Location Map

Appendix D: Survey Site in Relation to Project Site

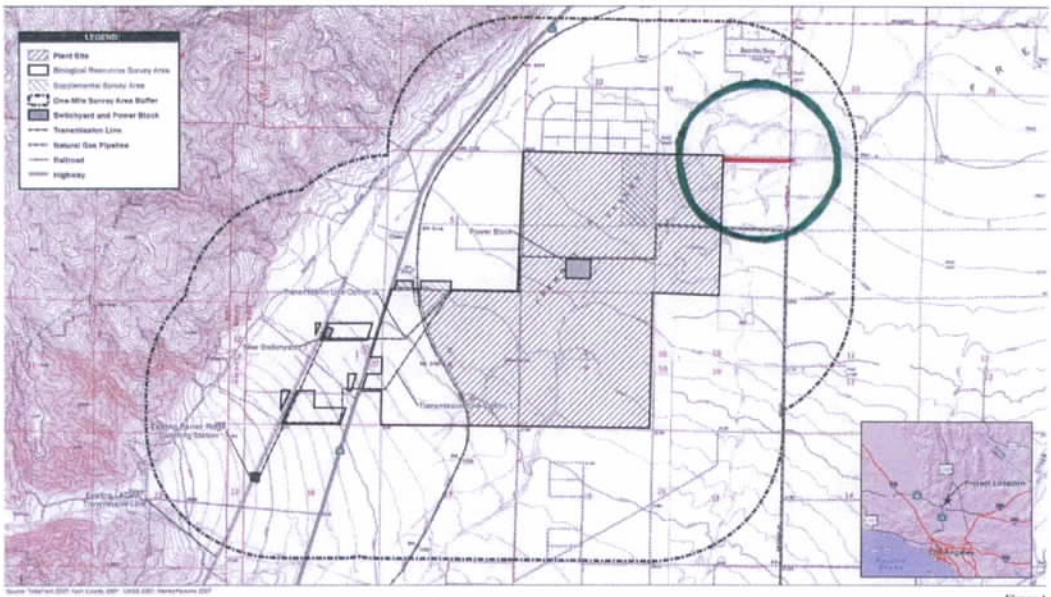


Figure 1
Project Site Boundary and Survey Area

Beacon Solar Energy Project Biological Technical Report

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Appendix E: References

The Desert Tortoise Council. July 1994 (revised 1999). Guidelines for Handling Desert Tortoises during Construction Projects. United States Fish and Wildlife Service.

United States Fish and Wildlife Service. 1992. Field Survey Protocol for Any Federal Action that may occur Within the Range of the Desert Tortoise.

United States Fish and Wildlife Service. April 2009. Pre-Project Survey Protocol for the 2009 Field Season.

USFWS 2009 DESERT TORTOISE PRE-PROJECT SURVEY DATA SHEET

Date of survey: 26 May 09 (day, month, year) Survey biologist(s): Amanda Northrup, Sean St. Marie, Tim Demers

Site description: Beacon Solar, 31,680 sq ft, Rancho Seco, CA (project name and size; general location)

County: Kern Quad: Tehachapi Location: 35.27227, 117.987 (UTM coordinates, lat-long, and/or TRS; map datum)

Transect #: 1 Transect length: 0.5 miles Type of survey: 31,680 sq ft, 100% coverage (project area size to be surveyed; 100% coverage/probabilistic sampling)

GPS Start-point: 410356.04E 3903669.42N 2169.80ft (easting, northing, elevation in meters) Start time: 0815 am/pm

GPS End-point: 409548.42E 3903680.81N 2307.50ft (easting, northing, elevation in meters) End time: 1445 am/pm

Start Temp: 75 °C Weather: Clear, Sunny

End Temp: 104 °C

Intentionally left blank **Live Tortoises** Ø Tortoises Found

Detection number	GPS location Easting	Northing	Time	Tortoise location (*in burrow*: all of tortoise beneath plane of burrow opening, or *not in burrow*)	Approx MCL >160-mm? (*Yes, No or Unknown*)	Existing tag # and color, if present
1						
2						
3						
4						
5						
6						
7						
8						

Tortoise Sign (burrows, scats, carcasses, etc)

Detection number	GPS location Easting	Northing	Type of sign (*burrows, scats, carcass, etc*)	Description and comments
1	0410207	3903685	No tortoise sign, only potential for use.	Rodent burrow, potential use by tortoise hatchling, Class 5, sandy soil, 0.09m x 0.065m.
2				
3				
4				
5				
6				
7				
8				

2009 Field Season

MOJAVE, CALIFORNIA

Monthly Total Precipitation (inches)

(045756)

File last updated on Jun 11, 2009
*** Note *** Provisional Data *** After Year/Month 200902
a = 1 day missing, b = 2 days missing, c = 3 days, ..etc..,
z = 26 or more days missing, A = Accumulations present
Long-term means based on columns; thus, the monthly row may not
sum (or average) to the long-term annual value.
MAXIMUM ALLOWABLE NUMBER OF MISSING DAYS : 5
Individual Months not used for annual or monthly statistics if more than 5 days are missing.
Individual Years not used for annual statistics if any month in that year has more than 5 days missing.

YEAR(S)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1904	0.00z	0.76	0.12y	0.00	0.00	0.00	0.00	0.00z	0.00z	0.00	0.00	0.00z	0.76
1905	0.30z	1.00z	2.90	0.00	0.00	0.00z	0.00	0.00	0.00	0.00	1.00z	0.00z	2.90
1906	1.00	1.00	0.00z	1.50	0.00	0.00z	0.00	0.00z	0.00z	0.00	0.65	2.25	6.40
1907	3.07	0.50	2.62	0.00z	0.00	0.00	0.00	0.00	0.00	1.26z	0.00z	0.00z	6.19
1908	1.25z	0.00z	0.00z	0.51z	0.00	0.00z	0.00	0.00	0.87	0.00	0.00	0.62	1.49
1909	3.14	2.50	0.00	0.00	0.00	0.00	0.00z	0.12	0.00z	0.00z	0.75	2.10	8.61
1910	0.00	0.00	0.00	0.00	0.00	0.00z	0.00	0.00	0.00z	0.40	0.00	0.10	0.50
1911	3.27	3.10	1.75	0.50	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	9.12
1912	0.00	0.00	5.00	0.50	0.50	0.00	0.00	0.00	0.00	0.25	0.00	0.00	6.25
1913	0.35	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.35
1914	0.00z	0.48	0.00z	0.07z	0.00z	0.00z	0.00	0.00z	0.00	0.00z	0.00	1.80	2.28
1915	4.09a	2.16	0.07z	0.26z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	6.25
1916	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1917	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1918	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1919	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1920	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1921	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1922	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1923	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1924	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1925	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1926	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1927	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1928	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1929	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1930	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1931	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1932	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1933	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00

1934	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1935	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1936	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1937	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1938	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1939	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00
1940	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00	1.32	1.32
1941	0.86	3.59	6.57t	0.92	0.00	0.00	0.00	0.00	0.00	0.61	0.31	3.28	9.57
1942	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.40	0.85
1943	4.90	1.22	1.37	0.00	0.00	0.00	0.00	0.00	0.35	0.16	0.14	5.33	13.47
1944	1.08	5.27	1.32	0.06	0.00	0.00	0.00	0.00	0.00	0.00	2.81	0.19	10.73
1945	0.28	1.80	2.51	0.01	0.00	0.00	0.00	0.00	0.15	1.67	0.00	2.37	8.79
1946	0.04	0.57	1.14	0.12	0.02	0.00	0.56	0.00	0.00	0.12	0.00z	0.00z	2.57
1947	0.31	0.31	0.08	0.14	0.00	0.00	0.00	0.03	0.00	0.17	0.04z	1.07	2.11
1948	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00	0.00	0.00	0.07	0.00	0.63	0.70
1949	0.68	0.44	0.06d	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.20	1.04	2.44
1950	0.42	0.32	0.32	0.28	0.00	0.00	0.00	0.00	0.24	0.00	0.10	0.00	1.68
1951	0.00z	0.24	0.11	0.48	0.28	0.00	0.00	0.00	0.00	0.50	0.35	1.24	3.20
1952	2.88a	0.00	3.21	0.13	0.00	0.00	0.00	0.00	0.02	0.00a	1.57a	1.92	9.73
1953	0.35	0.02	0.15	0.29	0.15	0.00	0.00	0.02	0.00	0.00	0.37	0.12	1.47
1954	1.43	0.55	0.99	0.02	0.00	0.00	0.00	0.00	0.02	0.00	0.77	0.42	4.20
1955	1.21	0.19	0.00	0.11	0.19	0.00	0.00	0.00	0.00	0.00	0.24	0.61	2.55
1956	1.27	0.01a	0.00	1.15	0.44	0.00	0.24	0.00	0.00	0.06	0.00	0.00	3.17
1957	1.85	0.82	0.57	0.29	0.02	0.01	0.00	0.00	0.00	0.59	0.27	1.53	5.95
1958	0.54	2.58	1.74	1.75	0.05	0.00	0.00a	0.01	0.33	0.16	0.13	0.00	7.29
1959	1.13	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.92	3.63
1960	0.99	1.08	0.03	0.09	0.00	0.00	0.00	0.00	0.20	0.00	0.97	0.00	3.36
1961	0.32	0.00	0.07	0.00	0.00	0.00	0.00	0.69	0.00	0.00	0.97	1.01	3.06
1962	0.48	2.85	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	3.82
1963	0.08	0.83	0.80	0.27	0.00	0.41	0.00	0.29	1.64	1.03	0.90	0.04	6.29
1964	0.53	0.02	0.32	0.20	0.18	0.00	0.06	0.00	0.00	0.30	0.52	0.12	2.25
1965	0.00	0.00	1.31	2.08	0.00	0.01	0.24	0.26	0.00	0.00e	3.76	2.82	10.48
1966	0.55	0.23	0.15	0.00	0.00	0.00	0.00	0.00	0.45	0.06	1.07	1.15	3.66
1967	1.54	0.00	0.58	1.51	0.00	0.00	0.01	0.00	0.67	0.00	3.78	0.62	8.71
1968	0.26	0.53	0.43	0.32	0.00z	0.00	0.28	0.00	0.00	0.14	0.48	0.27	2.71
1969	4.35	4.89	0.14	0.62	0.01	0.18	0.20	0.00	0.00	0.00	0.47	0.00	10.86
1970	0.40	0.00z	1.65	0.06	0.00	0.00	0.35	0.00	0.00	0.00	2.68	1.48	6.62
1971	0.04	0.15	0.00	0.11	0.41	0.00	0.00	0.00	0.15	0.00	0.01	1.97	2.84
1972	0.00	0.00	0.00	0.05	0.00	0.31	0.00	0.08	0.04	0.00	0.93	0.17	1.58
1973	0.64	3.00	1.10	0.06	0.20	0.00	0.00	0.11	0.00	0.00	0.71	0.65	6.47
1974	1.62	0.06	0.31	0.33	0.35	0.00	0.13	0.03	0.00	1.74	0.00	0.97	5.54
1975	0.02	0.35	0.84	0.63	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.07	2.00
1976	0.00	1.32	0.00	0.10	0.04	0.00	0.13	0.00	2.94	0.05	0.00z	0.24	4.82
1977	2.12	0.02	1.09	0.00	1.28	0.00	0.00	1.30	0.00	0.12	0.00	2.39	8.32
1978	2.63	6.24	3.02	0.77	0.00z	0.00	0.00	0.00	0.00z	0.05	0.00z	0.38	13.09
1979	3.74	0.39	2.23	0.00	0.00z	0.00z	0.05	0.00z	0.00z	0.06	0.00	0.00z	6.47
1980	3.39	0.00z	1.56	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00z	0.00b	5.13

1981	0.00z	0.56	2.87	0.02	0.03	0.00	0.00	0.00	0.89	1.99	1.44	0.00z	7.80
1982	1.72	0.46	2.55	1.15	0.04	0.00	0.00	0.01	0.33	0.06	1.47	1.04	8.83
1983	2.55	3.35a	4.43	0.49	0.00	0.00	0.00	2.02	0.18	0.73	0.04	1.72	15.51
1984	0.00	0.01	0.13	0.00	0.00	0.40	2.43	0.29	0.27	0.00	0.70a	3.35	7.58
1985	0.11	0.21	0.00	0.00	0.00	0.00a	0.00	0.00	0.28	0.22	1.45	0.22	2.49
1986	1.12	1.43	0.89	0.07	0.00	0.00	0.00	1.00	0.00	0.00	0.66	0.57	5.74
1987	0.63	1.18	0.00	0.00	0.12	0.15	0.00	0.00	0.00	1.04	0.79	0.79	4.70
1988	2.06	0.30	0.00	0.47	0.15	0.00	1.06	0.00	0.00	0.00	0.22	0.65	4.91
1989	0.18	0.15a	0.20	0.00	0.30	0.00	0.00	0.00	0.19	0.00	0.00	0.00	1.02
1990	0.65	0.03	0.10	0.08	0.06	0.00	0.00	0.00	0.16	0.00	0.41	0.00a	1.49
1991	0.90	1.23	3.07	0.00	0.00	0.00	0.02	0.00	0.00	0.10	0.06	1.19	6.57
1992	0.40	5.25	2.59	0.34	0.08	0.00	0.00	0.00	0.00	0.71	0.00	2.72	12.09
1993	4.95	3.93	0.79	0.00	0.00	0.40	0.00	0.00	0.00	0.27	0.29	0.23	10.86
1994	0.07	1.19	0.32	0.09	0.08	0.00	0.00	0.00	0.01	0.36	0.55	0.27	2.94
1995	6.46	0.39	2.72	0.10	0.00	0.35	0.00	1.94	0.00	0.00	0.00	0.66	12.62
1996	0.50	1.14	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.65	1.41	4.55
1997	0.64	0.00	0.00	0.09	0.00	0.00	0.13	0.00	0.95	0.12	0.92	1.38	4.23
1998	0.87a	6.85	1.46	0.41	1.15	0.00	0.00	1.20	1.00	0.00	0.34	0.00	13.28
1999	0.50	0.08a	0.06	0.95	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	2.57
2000	0.21	1.67	1.16	0.00	0.12	0.00	0.00	0.11	0.00	0.24	0.00	0.00	3.51
2001	1.26	3.26	1.31	1.23	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.30	8.15
2002	0.00	0.21	0.15	0.00	0.00	0.00	0.00	0.00z	0.00	0.00	0.82	1.80	2.98
2003	0.08	2.66	0.27	0.65	0.13	0.00	1.41a	1.13	0.74b	0.00	0.00z	0.75	7.82
2004	0.03	1.08a	0.46	0.09	0.00	0.00	0.00	0.00	0.00z	2.47a	0.10	0.00z	4.23
2005	0.00z	3.51a	0.72e	0.30	0.00z	0.00z	0.00g	0.00z	0.00z	0.00z	0.01a	0.24	4.78
2006	0.00z	0.71	0.00b	0.24	0.00z	0.00z	0.00	0.00	0.00	0.29	0.00	0.00	1.24
2007	0.00	0.00	0.00	0.00	0.00z	0.00z	0.00	0.50	0.00z	0.00z	0.27	0.00	0.77
2008	2.20	0.00z	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00z	0.00a	2.20
2009	0.00	2.05	0.00	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	0.00z	2.05
Period of Record Statistics													
MEAN	1.19	1.27	0.94	0.30	0.09	0.03	0.11	0.15	0.21	0.25	0.54	0.87	5.96
S.D.	1.43	1.61	1.16	0.46	0.23	0.10	0.36	0.42	0.46	0.49	0.81	1.02	3.79
SKEW	1.60	1.64	1.43	2.03	3.84	3.01	4.62	3.13	3.73	2.83	2.46	1.74	0.65
MAX	6.46	6.85	5.00	2.08	1.28	0.41	2.43	2.02	2.94	2.47	3.78	5.33	15.51
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85
NO YRS	72	74	73	74	70	68	76	72	69	73	70	72	51