

# Appendices

- 1. Discharge data tables**
- 2. General Information on Wildlife Impacts**
- 3. Statistical Data**
- 4. Shoreline Survey Report**

**Table 1 Summary of Bellozane storm overflows**

Bellozane WWTW – Storm overflows

Summary 2011

362 days reported tot volume 197883  
 81 spill days  
 62 >100m3  
 42 >1000m3  
 6 >10000m3

Summary 2010

365 days reported tot volume 318422  
 130 spill days  
 95 >100m3  
 64 >1000m3  
 8 >10000m3

All spills greater than 10000m3 occurred during December

Spills greater than 1000m3 occurred in most months

No months had no spills

Month	Spill days	Low vol	High vol	Month vol	Vol % of tot
January	8	13	7227	13465	6.8%
February	12	20	5011	14413	7.3%
March	6	8	3158	3316	1.7%
April	2	12	36	48	0.0%
May	3	41	2429	3040	1.5%
June	3	318	2949	5205	2.6%
July	8	81	7032	27129	13.7%
August	3	448	5370	8112	4.1%
September	7	9	4847	9098	4.6%
October	5	80	1075	2371	1.2%
November	4	158	2650	4157	2.1%
December	20	40	16621	107529	54.3%
81					

Months contributing >10% of total: Jul, Dec.

Months contributing >2% of total: Mar, Apr, May, Oct

Spills greater than 10000m3 occurred in Feb, Mar, Jun, Oct, Nov and Dec

Spills greater than 1000m3 occurred in all months

No months had no spills

Month	Spill days	Low vol	High vol	Month vol	Vol % of tot
January	18	3	4916	21550	6.8%
February	17	6	22515	53996	17.0%
March	11	3	14012	24549	7.7%
April	3	60	1174	1364	0.4%
May	9	1	5588	11444	3.6%
June	5	17	11407	14411	4.5%
July	5	2	4188	5483	1.7%
August	9	7	9001	18431	5.8%
September	3	15	2997	5931	1.9%
October	9	307	10545	36282	11.4%
November	22	9	21492	87023	27.3%
December	19	5	20755	37958	11.9%

Months contributing >10% of total: Feb, Oct, Nov, Dec

Months contributing <2% of total: Apr, Jul, Sep

Table 2 Spills from Pumping Stations 2010.

Location	Date	Time	Duration of discharge	Storm or Emergency Sewage Spillage	Mechanical Failure	Certified Discharge (Yes/No)	Pollution Incident	Spill minutes	Spill decimal hours
Paul Mill	28/02/2010	11.46 – 20:51 2nd March	57 hrs 5 mins	storm	no	yes	no	3425	57.08333333
Petit Ponterrin	28/02/2010	01.19 – 05.05 2nd March	51hrs 36 mins	storm	no	yes	no	3096	51.6
Archirondel	28/02/2010	06.11 – 06.38 1 <sup>st</sup> March	24hrs 27 mins	storm	no	yes	no	1467	24.45
Le Hocq Lane	28/02/2010	05.28 – 17.29	12hrs 1 minutes	storm	no	yes	no		12.01666667
Bashfords	28/02/2010	06.47 – 16.47	10hrs	storm	no	yes	no		10
St Martins	28/02/2010	05.52 – 15.31	9hrs 39 mins	storm	no	yes	no		9.65
Maufant	28/02/2010	04.27 – 09.33	8hrs 6 mins	storm	no	yes	no		8.1
Le Dicq	28/02/2010	00.29 – 07.47	7hrs 18 mins	storm	no	yes	no		7.3
Maupertuis	28/02/2010	03.03 – 09.07	6hrs 4 mins	storm	no	yes	no		6.06666667
Pontac	28/02/2010	04.04 – 09.28	5hrs 24mins	storm	no	yes	no		5.4
West of albert/Weighbridge	28/02/2010	04.03 - 08.26	4hrs 23mins	storm	no	yes	no	263	4.383333333
Beaumont	28/02/2010	03.20 – 06.30	3hrs 10 mins	storm	no	yes	no		3.166666667
West of albert/Weighbridge	28/02/2010	17:48 - 20.09	2hrs 21 mins	storm	no	yes	no	141	2.35
Le Hocq	28/02/2010	04.48 – 06.16	1hrs 28mins	storm	no	yes	no		1.466666667
Pontac	28/02/2010	10.29 – 11.20	51 mins	storm	no	yes	no		0.85
Fauvic	28/02/2010	15.26 – 16.10	44 mins	storm	no	yes	no		0.733333333
Pontac	28/02/2010	12.45 – 13.12	27 mins	storm	no	yes	no		0.45
Archirondel	01/03/2010	08.38 – 09.21	43 mins	storm	no	yes	no		0.716666667
Petit Ponterin	26/08/2010	13:07 - 18:00	4 hrs 53 mins	storm	no	yes	no		4.883333333
West of albert/Weighbridge	26/08/2010	13:13 -17:45	4hrs 32mins	storm	no	yes	no	272	4.533333333
Bashfords	26/08/2010	15:31 - 19:13	3hrs 42 mins	storm	no	yes	no		3.7
La Rivage	26/08/2010	13:45 - 15:30	1hr 45 mins	storm	no	yes	no		1.75

Location	Date	Time	Duration of discharge	Storm or Emergency Sewage Spillage	Mechanical Failure	Certified Discharge (Yes/No)	Pollution Incident	Spill minutes	Spill decimal hours
Archirondel	26/08/2010	14:10 - 15:50	1hr 40 mins	storm	no	yes	no		1.666666667
Le Dicq	26/08/2010	13:15 -14:35	1hr 20 mins	storm	no	yes	no		1.333333333
West of albert/Weighbridge	13/11/2010	14:14-15:51	1hr 37mins	storm	no	yes	no	97	1.616666667
Petit Ponterin	27/11/2010	08:08-03:12 Sunday	19hrs 4mins	storm	no	yes	no		19.06666667
West of albert/Weighbridge	27/11/2010	18:25-22:53	4hrs 28mins	storm	no	yes	no	268	4.466666667
Petit Ponterrin	04/12/2010	18:53-14:20 Mon	55hrs 27 mins	storm	no	yes	no		55.45
West of albert/Weighbridge	04/12/2010	23:37-07:47 Sun	8hrs 10 mins	storm	no	yes	no	490	8.166666667
Archirondel	05/12/2010	07:31-19:08 Tues	59hrs 37 mins	storm	no	yes	no		59.61666667
Paul Mill	05/12/2010	09:50-04:49 Tues	42hrs 59 mins	storm	no	yes	no		42.98333333
Becquet Vincent	05/12/2010	22:32-14:59 Tues	40hrs 17 mins	storm	no	yes	no		40.28333333
Beaumont	05/12/2010	06:00-22:00	16hrs	storm	no	yes	no		16
St Martin	05/12/2010	03:03-17:15	14hrs 12 mins	storm	no	yes	no		14.2
West of albert/Weighbridge	05/12/2010	13:57-19:38	5hrs 41 mins	storm	no	yes	no	341	5.683333333
Becquet Vincent	05/12/2010	08:05-13:30	5hrs 25 mins	storm	no	yes	no		5.416666667
West of albert/Weighbridge	05/12/2010	21:27-00:24 Mon	3hrs 57 mins	storm	no	yes	no	237	3.95
West of albert/Weighbridge	05/12/2010	10:32-11:56	1hr 24 mins	storm	no	yes	no	84	1.4
West of albert/Weighbridge	06/12/2010	04:30-08:36	4hrs 6 mins	storm	no	yes	no	246	4.1

Table 3a. Pollution investigation water sample results (E. coli/cfu 100 ml) / collection date

Sample Point	03/06/2008	18/06/2008	04/08/2008	13/08/2008	14/08/2008	18/08/2008	19/08/2008	16/09/2008
<i>Gorey Pier</i>			No flow					
<i>Beach Hotel</i>								
<i>Longbeach</i>					No flow			1300
<i>Fort Henry</i>								
<i>Outfall between Fort Henry &amp; Fauvic</i>								
<i>Fauvic</i>								
<i>Le Hurel</i>	1,100	89,000	Sea water: 25					140
<i>Outfall between Le Hurel and Seymour</i>			20,000					
<i>Seymour slip</i>			2,400		No flow			
<i>Le Bourg 2</i>			8,900					
<i>Le Bourg 1</i>			3,200					
<i>Pontac 1</i>								
<i>Pontac 2</i>			5,900					
<i>Le Hocq</i>								
<i>La Rocque Harbour</i>					No flow			
<i>Highbury Farm</i>								
<i>Misc (No grid references or associated sample point locations provided)</i>				Water sample taken from sand near Fauvic	135 E. coli result from water sample collected from under beach between Le Hurel and Fauvic	Water sample taken from sand at Greve D'Azette	Water sample collected from under the RHS facing inland	140 E. coli result from water sample collected from outfall between Le Hurel & Fort Henry

Table 3b. Miscellaneous pollution investigation results

Sample Point	03/06/2008	18/06/2008	04/08/2008	13/08/2008	14/08/2008	18/08/2008	19/08/2008	16/09/2008
<i>Misc (No grid references or associated sample point locations provided)</i>				Water sample taken from sand near Fauvic	135 E. coli result from water sample collected from under beach between Le Hurel and Fauvic	Water sample taken from sand at Greve D'Azette	Water sample collected from under the RHS facing inland	140 E. coli result from water sample collected from outfall between Le Hurel & Fort Henry
					Water sample taken under sand at La Rocque Harbour	Water sample taken from just past Le Hurel slipway	Second water sample collected from silt under water near RHS?	1450 E. coli result from repeat sea water sampling
							Water sample collected from under beach opposite Tower 5	300 E. coli result from water sample taken from noncleared area of beach
							Water sample collected from under beach between two sets of steps opposite pink house extension	600 E. coli result from water sample taken from cleared area of beach

Indicates water samples were taken but no results were recorded in the pollution report

## General Information on Wildlife Impacts

### Pinnipeds

Two species of pinniped (seals, sea lions, walruses) are commonly found around the coasts of Scotland: These are the European harbour, or common, seal (*Phoca vitulina vitulina*) and the grey seal (*Halichoerus grypus*). Both species can be found along the west coast of Scotland.

Common seal surveys are conducted every 5 years and an estimate of minimum numbers is available through Scottish Natural Heritage.

According to the Scottish Executive, in 2001 there were approximately 119,000 grey seals in Scottish waters, the majority of which were found in breeding colonies in Orkney and the Outer Hebrides.

Adult Grey seals weigh 150-220 kg and adult common seals 50-170kg. They are estimated to consume between 4 and 8% of their body weight per day in fish, squid, molluscs and crustaceans. No estimates of the volume of seal faeces passed per day were available, though it is reasonable to assume that what is ingested and not assimilated in the gut must also pass. Assuming 6% of a median body weight for harbour seals of 110kg, that would equate to 6.6kg consumed per day and probably very nearly that defecated.

The concentration of *E. coli* and other faecal indicator bacteria contained in seal faeces has been reported as being similar to that found in raw sewage, with counts showing up to  $1.21 \times 10^4$  CFU (colony forming units) *E. coli* per gram dry weight of faeces (Lisle *et al* 2004).

Both bacterial and viral pathogens affecting humans and livestock have been found in wild and captive seals. *Salmonella* and *Campylobacter* spp., some of which were antibiotic-resistant, were isolated from juvenile Northern elephant seals (*Mirounga angustirostris*) with *Salmonella* found in 36.9% of animals stranded on the California coast (Stoddard *et al* 2005). *Salmonella* and *Campylobacter* are both enteric pathogens that can cause acute illness in humans and it is postulated that the elephant seals were picking up resistant bacteria from exposure to human sewage waste.

One of the *Salmonella* species isolated from the elephant seals, *Salmonella typhimurium*, is carried by a number of animal species and has been isolated from cattle, pigs, sheep, poultry, ducks, geese and game birds in England and Wales. Serovar DT104, also associated with a wide variety of animal species, can cause severe disease in humans and is multi-drug resistant (Poppe *et al* 1998).

### Cetaceans

As mammals, whales and dolphins would be expected to have resident populations of *E. coli* and other faecal indicator bacteria in the gut. Little is known about the concentration of indicator bacteria in whale or dolphin

faeces, in large part because the animals are widely dispersed and sample collection difficult.

It is reasonable to expect that whales would not routinely affect shellfisheries located in shallow coastal areas. It is more likely that dolphins and harbour porpoises would be found in or near fisheries due to their smaller physical size and the larger numbers of sightings near the coast.

## **Birds**

Information is gathered where available related to shorebird surveys at local bird reserves when present. Surveys of overwintering geese are queried to see whether significant populations may be resident in the area for part of the year. In many areas, at least some geese may be present year round. Geese can be found grazing on grassy areas adjacent to the shoreline during the day and leave substantial faecal deposits. Geese and ducks can deposit large amounts of faeces in the water, on docks and on the shoreline.

A study conducted on both gulls and geese in the northeast United States found that Canada geese (*Branta canadensis*) contributed approximately  $1.28 \times 10^5$  faecal coliforms (FC) per faecal deposit and ring-billed gulls (*Larus delawarensis*) approximately  $1.77 \times 10^8$  FC per faecal deposit to a local reservoir (Alderisio and DeLuca, 1999). An earlier study found that geese averaged from 5.23 to 18.79 defecations per hour while feeding, though it did not specify how many hours per day they typically feed (Bedard and Gauthier, 1986).

Waterfowl can be a significant source of pathogens as well as indicator organisms. Gulls frequently feed in human waste bins and it is likely that they carry some human pathogens.

## **Other**

### **References:**

Alderisio, K.A. and N. DeLuca (1999). Seasonal enumeration of fecal coliform bacteria from the feces of Ring-billed gulls (*Larus delawarensis*) and Canada geese (*Branta canadensis*). *Applied and Environmental Microbiology*, 65:5628-5630.

Bedard, J. and Gauthier, G. (1986) Assessment of faecal output in geese. *Journal of Applied Ecology*, 23:77-90.

Lisle, J.T., Smith, J.J., Edwards, D.D., and McFeters, G.A. (2004). Occurrence of microbial indicators and *Clostridium perfringens* in wastewater, water column samples, sediments, drinking water and Weddell Seal feces collected at McMurdo Station, Antarctica. *Applied and Environmental Microbiology*, 70:7269-7276.



### Statistical Data

#### Results for: Oysters

#### One-way ANOVA: Log\_A28\_oyst, Log\_A23\_oyst, Log\_A24\_oyst, Log\_A1\_oyste, ...

Source	DF	SS	MS	F	P
Factor	11	62.858	5.714	17.30	0.000
Error	785	259.275	0.330		
Total	796	322.133			

S = 0.5747    R-Sq = 19.51%    R-Sq(adj) = 18.39%

Level	N	Mean	StDev	Individual 95% CIs For Mean Based on Pooled StDev
Log_A28_oysters	73	2.0582	0.5525	(--*--)
Log_A23_oysters	64	1.9249	0.5343	(--*--)
Log_A24_oysters	81	1.9951	0.6390	(--*--)
Log_A1_oysters	81	1.9239	0.5520	(--*--)
Log_A21_oysters	81	1.9505	0.6527	(--*--)
Log_A6_oysters	81	2.1066	0.5406	(--*--)
Log_A27_oysters	82	2.0310	0.5734	(--*--)
Log_A8_oysters	83	1.8546	0.6297	(--*--)
Log_A25_oysters	32	1.9349	0.5851	(----*----)
Log_A12_oysters	42	2.4142	0.6920	(----*----)
Log_A26_oysters	78	1.2116	0.3831	(--*--)
Log_A20_oysters	19	1.2953	0.4777	(----*----)

-----+-----+-----+-----+-----  
 1.20            1.60            2.00            2.40

Pooled StDev = 0.5747

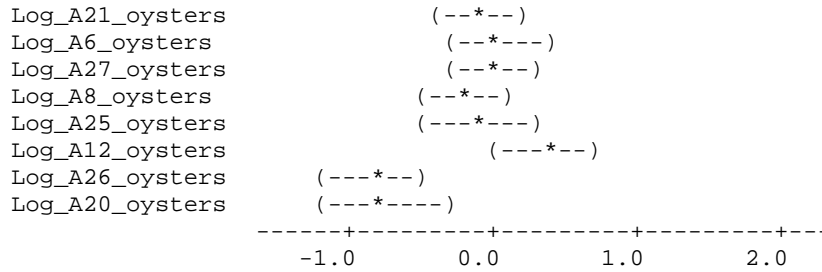
Tukey 95% Simultaneous Confidence Intervals  
 All Pairwise Comparisons

Individual confidence level = 99.89%

Log\_A28\_oysters subtracted from:

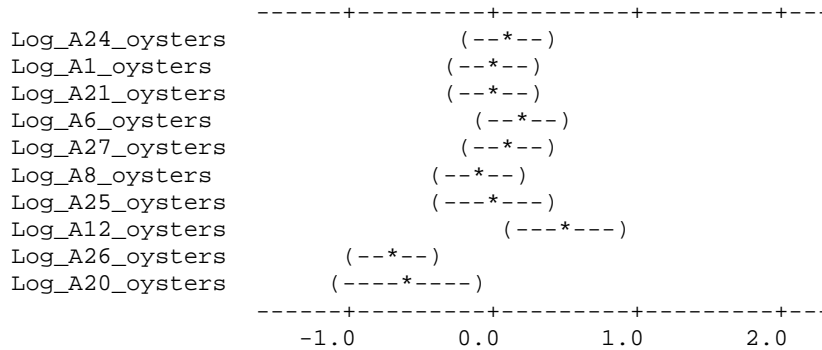
	Lower	Center	Upper
Log_A23_oysters	-0.4548	-0.1333	0.1882
Log_A24_oysters	-0.3661	-0.0631	0.2399
Log_A1_oysters	-0.4373	-0.1343	0.1687
Log_A21_oysters	-0.4106	-0.1076	0.1953
Log_A6_oysters	-0.2546	0.0484	0.3514
Log_A27_oysters	-0.3293	-0.0272	0.2749
Log_A8_oysters	-0.5049	-0.2036	0.0976
Log_A25_oysters	-0.5213	-0.1233	0.2748
Log_A12_oysters	-0.0076	0.3560	0.7196
Log_A26_oysters	-1.1523	-0.8466	-0.5408
Log_A20_oysters	-1.2464	-0.7629	-0.2794

Log_A23_oysters	(---*--)
Log_A24_oysters	(--*--)
Log_A1_oysters	(--*--)



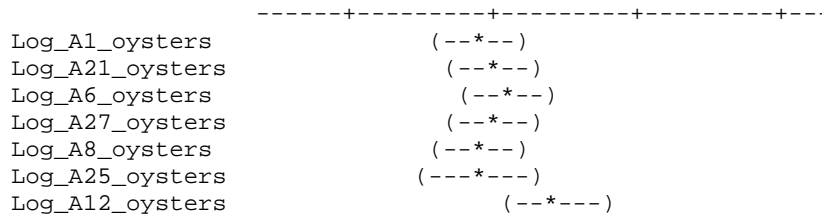
Log\_A23\_oysters subtracted from:

	Lower	Center	Upper
Log_A24_oysters	-0.2438	0.0702	0.3842
Log_A1_oysters	-0.3150	-0.0010	0.3130
Log_A21_oysters	-0.2884	0.0256	0.3396
Log_A6_oysters	-0.1323	0.1817	0.4957
Log_A27_oysters	-0.2071	0.1061	0.4192
Log_A8_oysters	-0.3826	-0.0703	0.2420
Log_A25_oysters	-0.3965	0.0100	0.4165
Log_A12_oysters	0.1164	0.4893	0.8621
Log_A26_oysters	-1.0299	-0.7133	-0.3966
Log_A20_oysters	-1.1201	-0.6296	-0.1391



Log\_A24\_oysters subtracted from:

	Lower	Center	Upper
Log_A1_oysters	-0.3662	-0.0712	0.2238
Log_A21_oysters	-0.3396	-0.0446	0.2504
Log_A6_oysters	-0.1835	0.1115	0.4065
Log_A27_oysters	-0.2582	0.0359	0.3300
Log_A8_oysters	-0.4338	-0.1405	0.1527
Log_A25_oysters	-0.4522	-0.0602	0.3318
Log_A12_oysters	0.0621	0.4191	0.7761
Log_A26_oysters	-1.0813	-0.7835	-0.4857
Log_A20_oysters	-1.1784	-0.6998	-0.2212



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Log_A26_oysters      (---*---)
Log_A20_oysters      (----*----)
-----+-----+-----+-----+-----+
          -1.0          0.0          1.0          2.0

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Log\_A1\_oysters subtracted from:

	Lower	Center	Upper
Log_A21_oysters	-0.2684	0.0266	0.3216
Log_A6_oysters	-0.1123	0.1827	0.4777
Log_A27_oysters	-0.1870	0.1071	0.4012
Log_A8_oysters	-0.3626	-0.0693	0.2239
Log_A25_oysters	-0.3810	0.0110	0.4030
Log_A12_oysters	0.1333	0.4903	0.8472
Log_A26_oysters	-1.0101	-0.7123	-0.4145
Log_A20_oysters	-1.1072	-0.6286	-0.1500

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-----+-----+-----+-----+-----+
Log_A21_oysters      (---*---)
Log_A6_oysters       (---*---)
Log_A27_oysters      (---*---)
Log_A8_oysters       (---*---)
Log_A25_oysters      (----*----)
Log_A12_oysters      (----*----)
Log_A26_oysters      (---*---)
Log_A20_oysters      (----*----)
-----+-----+-----+-----+
          -1.0          0.0          1.0          2.0

```

Log\_A21\_oysters subtracted from:

	Lower	Center	Upper
Log_A6_oysters	-0.1390	0.1561	0.4511
Log_A27_oysters	-0.2137	0.0804	0.3746
Log_A8_oysters	-0.3892	-0.0960	0.1973
Log_A25_oysters	-0.4076	-0.0156	0.3764
Log_A12_oysters	0.1066	0.4636	0.8206
Log_A26_oysters	-1.0368	-0.7389	-0.4411
Log_A20_oysters	-1.1338	-0.6552	-0.1767

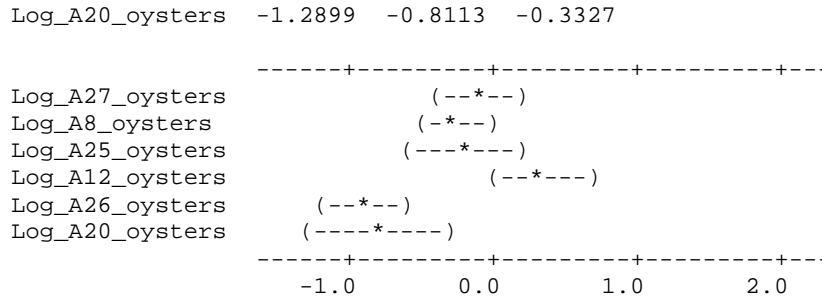
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Log_A6_oysters       (---*---)
Log_A27_oysters      (---*---)
Log_A8_oysters       (---*---)
Log_A25_oysters      (----*----)
Log_A12_oysters      (----*----)
Log_A26_oysters      (---*---)
Log_A20_oysters      (----*----)
-----+-----+-----+-----+
          -1.0          0.0          1.0          2.0

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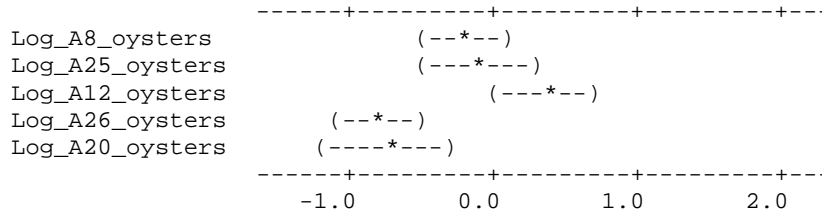
Log\_A6\_oysters subtracted from:

	Lower	Center	Upper
Log_A27_oysters	-0.3697	-0.0756	0.2185
Log_A8_oysters	-0.5452	-0.2520	0.0412
Log_A25_oysters	-0.5637	-0.1717	0.2203
Log_A12_oysters	-0.0494	0.3076	0.6646
Log_A26_oysters	-1.1928	-0.8950	-0.5971



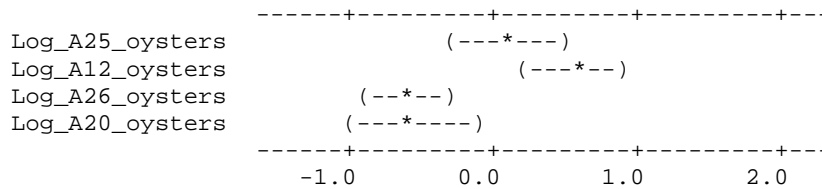
Log\_A27\_oysters subtracted from:

	Lower	Center	Upper
Log_A8_oysters	-0.4687	-0.1764	0.1159
Log_A25_oysters	-0.4874	-0.0961	0.2952
Log_A12_oysters	0.0269	0.3832	0.7394
Log_A26_oysters	-1.1163	-0.8194	-0.5224
Log_A20_oysters	-1.2137	-0.7357	-0.2577



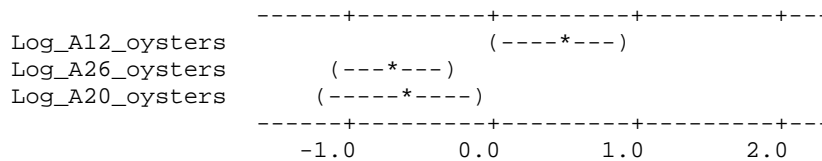
Log\_A8\_oysters subtracted from:

	Lower	Center	Upper
Log_A25_oysters	-0.3103	0.0803	0.4710
Log_A12_oysters	0.2041	0.5596	0.9151
Log_A26_oysters	-0.9390	-0.6430	-0.3469
Log_A20_oysters	-1.0368	-0.5593	-0.0818



Log\_A25\_oysters subtracted from:

	Lower	Center	Upper
Log_A12_oysters	0.0387	0.4793	0.9198
Log_A26_oysters	-1.1174	-0.7233	-0.3292
Log_A20_oysters	-1.1834	-0.6396	-0.0959



Log\_A12\_oysters subtracted from:

	Lower	Center	Upper
Log_A26_oysters	-1.5619	-1.2026	-0.8432
Log_A20_oysters	-1.6380	-1.1189	-0.5998

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-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Log_A26_oysters  (---*---)
Log_A20_oysters  (----*----)
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
                    -1.0       0.0       1.0       2.0

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Log\_A26\_oysters subtracted from:

	Lower	Center	Upper
Log_A20_oysters	-0.3966	0.0837	0.5640

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-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Log_A20_oysters  (----*----)
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
                    -1.0       0.0       1.0       2.0

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## Results for: Stacked oyster data

### General Linear Model: LogEC versus Date2, Area

Factor	Type	Levels	Values
Date2	fixed	63	01.02.10, 01.03.10, 01.08.11, 02.12.09, 03.06.08, 04.08.08, 04.11.09, 05.01.11, 05.12.05, 06.05.08, 06.12.06, 06.12.10, 07.04.08, 07.04.09, 07.07.08, 07.09.10, 07.11.06, 09.11.10, 10.02.09, 10.03.08, 10.03.09, 11.02.08, 11.08.10, 11.09.06, 11.12.07, 12.01.09, 12.07.06, 13.06.06, 13.06.07, 13.07.10, 14.04.10, 14.06.10, 14.08.06, 15.05.06, 15.05.07, 15.06.11, 15.11.05, 15.12.08, 16.07.07, 16.09.08, 17.04.07, 17.05.11, 18.04.11, 19.02.07, 19.03.07, 19.10.09, 21.09.09, 22.01.07, 22.01.08, 22.07.09, 23.03.11, 24.06.09, 25.10.10, 26.04.06, 26.05.09, 26.09.07, 26.09.11, 26.11.07, 28.02.06, 28.03.06, 28.08.07, 29.10.07, 30.01.06
Area	fixed	8	Log_A1_oysters, Log_A21_oysters, Log_A24_oysters, Log_A26_oysters, Log_A27_oysters, Log_A28_oysters, Log_A6_oysters, Log_A8_oysters

Analysis of Variance for LogEC, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Date2	62	60.5262	60.5262	0.9762	4.03	0.000
Area	7	37.7943	37.7943	5.3992	22.31	0.000
Error	434	105.0217	105.0217	0.2420		
Total	503	203.3421				

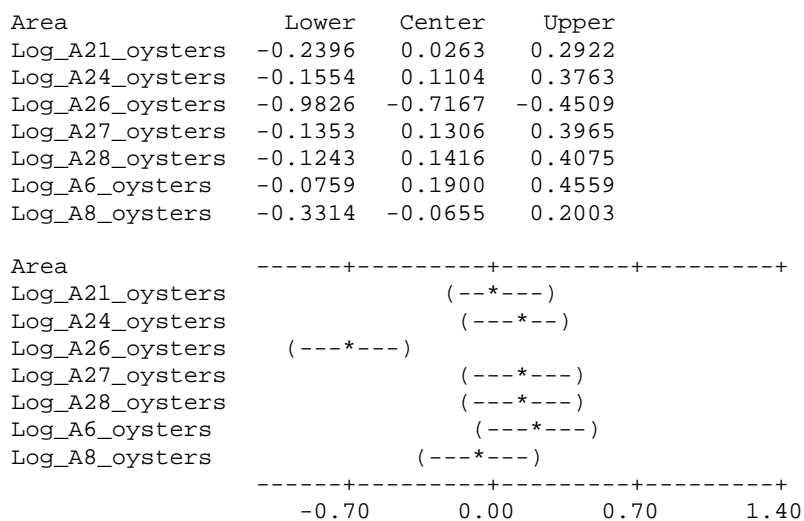
S = 0.491920    R-Sq = 48.35%    R-Sq(adj) = 40.14%

Unusual Observations for LogEC

Obs	LogEC	Fit	SE Fit	Residual	St Resid
37	1.30103	2.61650	0.18333	-1.31547	-2.88 R
63	3.54407	2.45242	0.18333	1.09165	2.39 R
78	2.69897	1.76244	0.18333	0.93653	2.05 R
126	1.00000	2.42126	0.18333	-1.42126	-3.11 R
144	1.00000	2.10392	0.18333	-1.10392	-2.42 R
173	2.89763	1.92035	0.18333	0.97728	2.14 R
178	1.00000	1.93797	0.18333	-0.93797	-2.05 R
181	2.79934	1.87348	0.18333	0.92586	2.03 R
187	1.00000	1.97537	0.18333	-0.97537	-2.14 R
193	3.11394	1.84999	0.18333	1.26396	2.77 R
206	3.14613	2.21715	0.18333	0.92898	2.04 R
215	3.04139	2.00178	0.18333	1.03961	2.28 R
230	2.66276	1.60867	0.18333	1.05409	2.31 R
231	1.00000	2.53311	0.18333	-1.53311	-3.36 R
247	1.00000	2.01854	0.18333	-1.01854	-2.23 R
250	1.00000	2.00167	0.18333	-1.00167	-2.19 R
280	3.54407	2.43453	0.18333	1.10954	2.43 R
313	3.44716	2.16536	0.18333	1.28180	2.81 R
321	3.54407	1.87692	0.18333	1.66714	3.65 R
331	1.00000	1.95402	0.18333	-0.95402	-2.09 R
365	1.00000	1.95084	0.18333	-0.95084	-2.08 R
384	2.69897	1.68077	0.18333	1.01820	2.23 R
396	3.04139	2.03839	0.18333	1.00301	2.20 R
399	1.00000	2.34836	0.18333	-1.34836	-2.95 R
413	3.73239	2.55513	0.18333	1.17727	2.58 R
415	3.96379	2.40936	0.18333	1.55443	3.41 R
457	2.69897	1.10666	0.18333	1.59231	3.49 R
472	1.00000	1.94056	0.18333	-0.94056	-2.06 R

R denotes an observation with a large standardized residual.

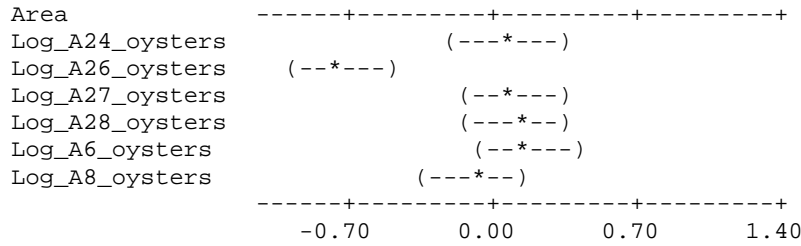
Tukey 95.0% Simultaneous Confidence Intervals  
 Response Variable LogEC  
 All Pairwise Comparisons among Levels of Area  
 Area = Log\_A1\_oysters subtracted from:



Area = Log\_A21\_oysters subtracted from:

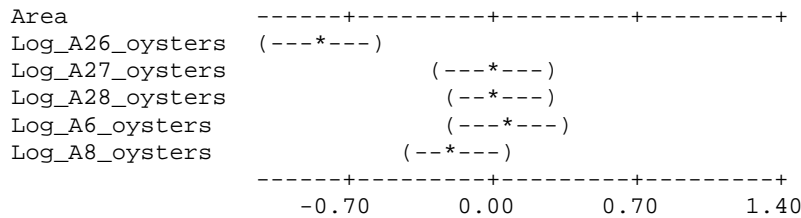
Area	Lower	Center	Upper
Log_A24_oysters	-0.182	0.0842	0.3500

Log_A26_oysters	-1.009	-0.7430	-0.4772
Log_A27_oysters	-0.162	0.1043	0.3702
Log_A28_oysters	-0.151	0.1153	0.3812
Log_A6_oysters	-0.102	0.1637	0.4296
Log_A8_oysters	-0.358	-0.0918	0.1740

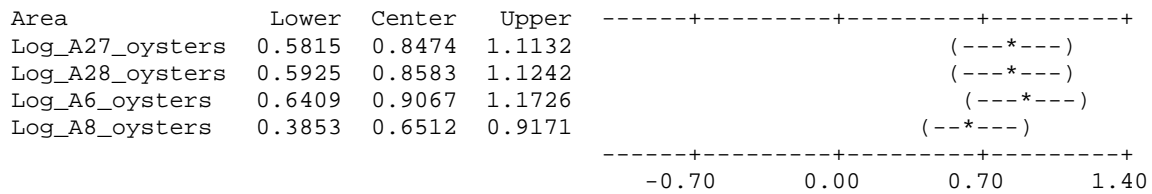


Area = Log\_A24\_oysters subtracted from:

Area	Lower	Center	Upper
Log_A26_oysters	-1.093	-0.8272	-0.5613
Log_A27_oysters	-0.246	0.0202	0.2861
Log_A28_oysters	-0.235	0.0312	0.2970
Log_A6_oysters	-0.186	0.0795	0.3454
Log_A8_oysters	-0.442	-0.1760	0.0899

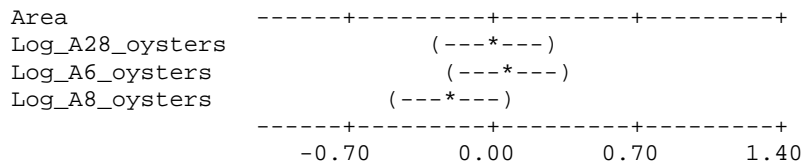


Area = Log\_A26\_oysters subtracted from:



Area = Log\_A27\_oysters subtracted from:

Area	Lower	Center	Upper
Log_A28_oysters	-0.2549	0.0110	0.27686
Log_A6_oysters	-0.2065	0.0594	0.32524
Log_A8_oysters	-0.4620	-0.1962	0.06972



Area = Log\_A28\_oysters subtracted from:

Area	Lower	Center	Upper
Log_A6_oysters	-0.2175	0.0484	0.31426
Log_A8_oysters	-0.4730	-0.2071	0.05874

Area	-----+-----+-----+-----+			
Log_A6_oysters			(---*--)	
Log_A8_oysters			(---*---)	
	-----+-----+-----+-----+			
	-0.70	0.00	0.70	1.40

Area = Log\_A6\_oysters subtracted from:

Area	Lower	Center	Upper
Log_A8_oysters	-0.5214	-0.2555	0.01036

Area	-----+-----+-----+-----+			
Log_A8_oysters			(--*---)	
	-----+-----+-----+-----+			
	-0.70	0.00	0.70	1.40

Tukey Simultaneous Tests

Response Variable LogEC

All Pairwise Comparisons among Levels of Area

Area = Log\_A1\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A21_oysters	0.0263	0.08765	0.300	1.0000
Log_A24_oysters	0.1104	0.08765	1.260	0.9134
Log_A26_oysters	-0.7167	0.08765	-8.178	0.0000
Log_A27_oysters	0.1306	0.08765	1.490	0.8130
Log_A28_oysters	0.1416	0.08765	1.616	0.7410
Log_A6_oysters	0.1900	0.08765	2.168	0.3715
Log_A8_oysters	-0.0655	0.08765	-0.748	0.9955

Area = Log\_A21\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A24_oysters	0.0842	0.08765	0.960	0.9798
Log_A26_oysters	-0.7430	0.08765	-8.478	0.0000
Log_A27_oysters	0.1043	0.08765	1.190	0.9350
Log_A28_oysters	0.1153	0.08765	1.316	0.8933
Log_A6_oysters	0.1637	0.08765	1.868	0.5734
Log_A8_oysters	-0.0918	0.08765	-1.048	0.9670

Area = Log\_A24\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A26_oysters	-0.8272	0.08765	-9.438	0.0000
Log_A27_oysters	0.0202	0.08765	0.230	1.0000
Log_A28_oysters	0.0312	0.08765	0.355	1.0000
Log_A6_oysters	0.0795	0.08765	0.908	0.9855
Log_A8_oysters	-0.1760	0.08765	-2.008	0.4764



Area = Log\_A26\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A27_oysters	0.8474	0.08765	9.668	0.0000
Log_A28_oysters	0.8583	0.08765	9.793	0.0000
Log_A6_oysters	0.9067	0.08765	10.345	0.0000
Log_A8_oysters	0.6512	0.08765	7.430	0.0000

Area = Log\_A27\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A28_oysters	0.0110	0.08765	0.125	1.0000
Log_A6_oysters	0.0594	0.08765	0.677	0.9976
Log_A8_oysters	-0.1962	0.08765	-2.238	0.3288

Area = Log\_A28\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A6_oysters	0.0484	0.08765	0.552	0.9994
Log_A8_oysters	-0.2071	0.08765	-2.363	0.2596

Area = Log\_A6\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A8_oysters	-0.2555	0.08765	-2.915	0.0695

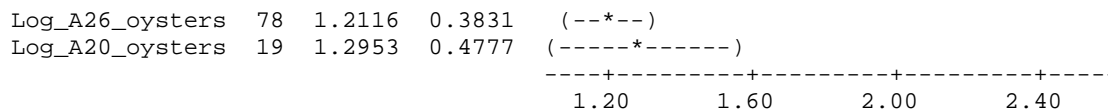
## Results for: Oysters

### One-way ANOVA: Log\_A28\_oyst, Log\_A23\_oyst, Log\_A24\_oyst, Log\_A1\_oyste, ...

Source	DF	SS	MS	F	P
Factor	11	62.858	5.714	17.30	0.000
Error	785	259.275	0.330		
Total	796	322.133			

S = 0.5747    R-Sq = 19.51%    R-Sq(adj) = 18.39%

Level	N	Mean	StDev	Individual 95% CIs For Mean Based on Pooled StDev
Log_A28_oysters	73	2.0582	0.5525	(--*--)
Log_A23_oysters	64	1.9249	0.5343	(--*--)
Log_A24_oysters	81	1.9951	0.6390	(--*--)
Log_A1_oysters	81	1.9239	0.5520	(--*--)
Log_A21_oysters	81	1.9505	0.6527	(--*--)
Log_A6_oysters	81	2.1066	0.5406	(--*--)
Log_A27_oysters	82	2.0310	0.5734	(--*--)
Log_A8_oysters	83	1.8546	0.6297	(--*--)
Log_A25_oysters	32	1.9349	0.5851	(----*-----)
Log_A12_oysters	42	2.4142	0.6920	(----*-----)



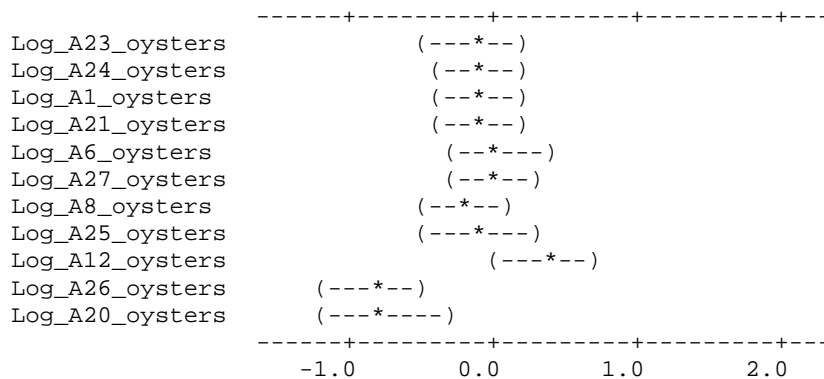
Pooled StDev = 0.5747

Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons

Individual confidence level = 99.89%

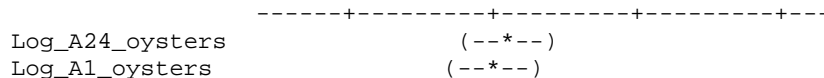
Log\_A28\_oysters subtracted from:

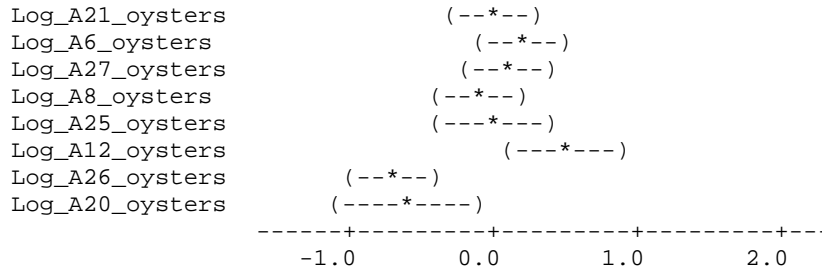
	Lower	Center	Upper
Log_A23_oysters	-0.4548	-0.1333	0.1882
Log_A24_oysters	-0.3661	-0.0631	0.2399
Log_A1_oysters	-0.4373	-0.1343	0.1687
Log_A21_oysters	-0.4106	-0.1076	0.1953
Log_A6_oysters	-0.2546	0.0484	0.3514
Log_A27_oysters	-0.3293	-0.0272	0.2749
Log_A8_oysters	-0.5049	-0.2036	0.0976
Log_A25_oysters	-0.5213	-0.1233	0.2748
Log_A12_oysters	-0.0076	0.3560	0.7196
Log_A26_oysters	-1.1523	-0.8466	-0.5408
Log_A20_oysters	-1.2464	-0.7629	-0.2794



Log\_A23\_oysters subtracted from:

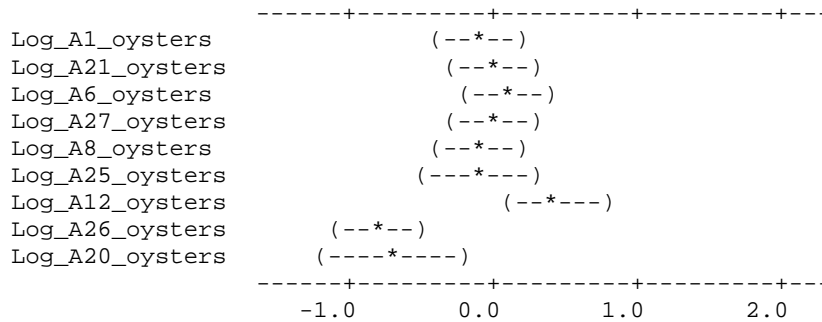
	Lower	Center	Upper
Log_A24_oysters	-0.2438	0.0702	0.3842
Log_A1_oysters	-0.3150	-0.0010	0.3130
Log_A21_oysters	-0.2884	0.0256	0.3396
Log_A6_oysters	-0.1323	0.1817	0.4957
Log_A27_oysters	-0.2071	0.1061	0.4192
Log_A8_oysters	-0.3826	-0.0703	0.2420
Log_A25_oysters	-0.3965	0.0100	0.4165
Log_A12_oysters	0.1164	0.4893	0.8621
Log_A26_oysters	-1.0299	-0.7133	-0.3966
Log_A20_oysters	-1.1201	-0.6296	-0.1391





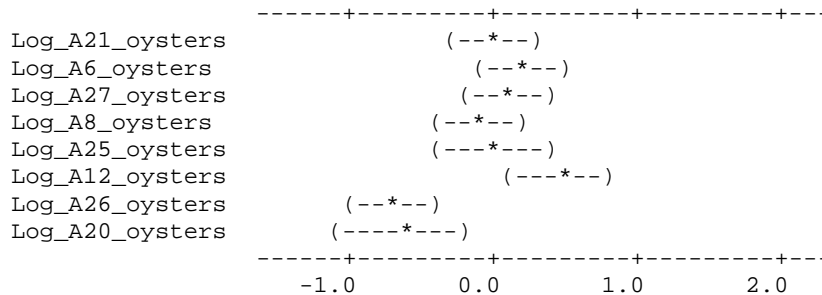
Log\_A24\_oysters subtracted from:

	Lower	Center	Upper
Log_A1_oysters	-0.3662	-0.0712	0.2238
Log_A21_oysters	-0.3396	-0.0446	0.2504
Log_A6_oysters	-0.1835	0.1115	0.4065
Log_A27_oysters	-0.2582	0.0359	0.3300
Log_A8_oysters	-0.4338	-0.1405	0.1527
Log_A25_oysters	-0.4522	-0.0602	0.3318
Log_A12_oysters	0.0621	0.4191	0.7761
Log_A26_oysters	-1.0813	-0.7835	-0.4857
Log_A20_oysters	-1.1784	-0.6998	-0.2212



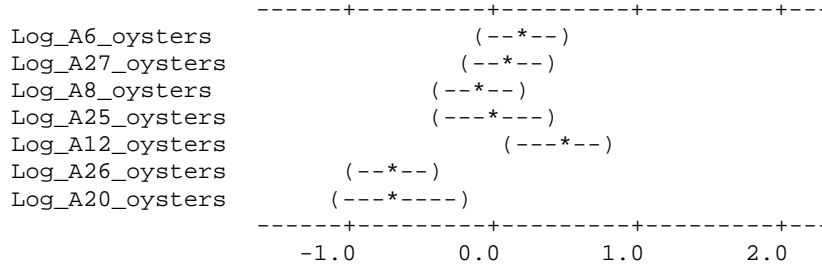
Log\_A1\_oysters subtracted from:

	Lower	Center	Upper
Log_A21_oysters	-0.2684	0.0266	0.3216
Log_A6_oysters	-0.1123	0.1827	0.4777
Log_A27_oysters	-0.1870	0.1071	0.4012
Log_A8_oysters	-0.3626	-0.0693	0.2239
Log_A25_oysters	-0.3810	0.0110	0.4030
Log_A12_oysters	0.1333	0.4903	0.8472
Log_A26_oysters	-1.0101	-0.7123	-0.4145
Log_A20_oysters	-1.1072	-0.6286	-0.1500



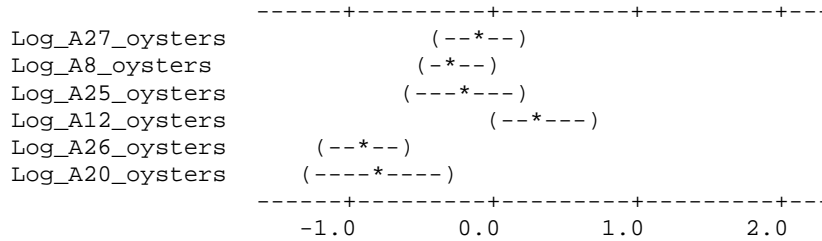
Log\_A21\_oysters subtracted from:

	Lower	Center	Upper
Log_A6_oysters	-0.1390	0.1561	0.4511
Log_A27_oysters	-0.2137	0.0804	0.3746
Log_A8_oysters	-0.3892	-0.0960	0.1973
Log_A25_oysters	-0.4076	-0.0156	0.3764
Log_A12_oysters	0.1066	0.4636	0.8206
Log_A26_oysters	-1.0368	-0.7389	-0.4411
Log_A20_oysters	-1.1338	-0.6552	-0.1767



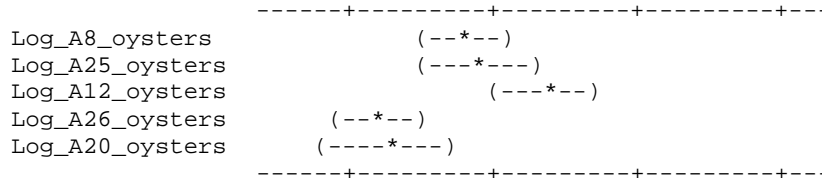
Log\_A6\_oysters subtracted from:

	Lower	Center	Upper
Log_A27_oysters	-0.3697	-0.0756	0.2185
Log_A8_oysters	-0.5452	-0.2520	0.0412
Log_A25_oysters	-0.5637	-0.1717	0.2203
Log_A12_oysters	-0.0494	0.3076	0.6646
Log_A26_oysters	-1.1928	-0.8950	-0.5971
Log_A20_oysters	-1.2899	-0.8113	-0.3327



Log\_A27\_oysters subtracted from:

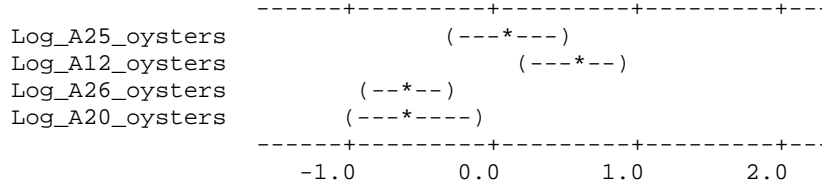
	Lower	Center	Upper
Log_A8_oysters	-0.4687	-0.1764	0.1159
Log_A25_oysters	-0.4874	-0.0961	0.2952
Log_A12_oysters	0.0269	0.3832	0.7394
Log_A26_oysters	-1.1163	-0.8194	-0.5224
Log_A20_oysters	-1.2137	-0.7357	-0.2577



-1.0            0.0            1.0            2.0

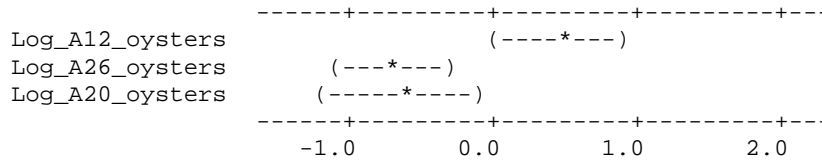
Log\_A8\_oysters subtracted from:

	Lower	Center	Upper
Log_A25_oysters	-0.3103	0.0803	0.4710
Log_A12_oysters	0.2041	0.5596	0.9151
Log_A26_oysters	-0.9390	-0.6430	-0.3469
Log_A20_oysters	-1.0368	-0.5593	-0.0818



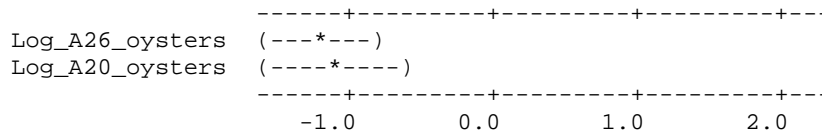
Log\_A25\_oysters subtracted from:

	Lower	Center	Upper
Log_A12_oysters	0.0387	0.4793	0.9198
Log_A26_oysters	-1.1174	-0.7233	-0.3292
Log_A20_oysters	-1.1834	-0.6396	-0.0959



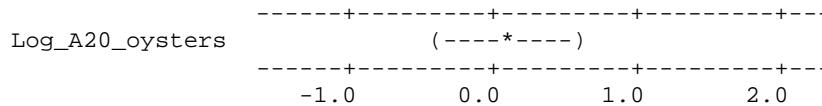
Log\_A12\_oysters subtracted from:

	Lower	Center	Upper
Log_A26_oysters	-1.5619	-1.2026	-0.8432
Log_A20_oysters	-1.6380	-1.1189	-0.5998



Log\_A26\_oysters subtracted from:

	Lower	Center	Upper
Log_A20_oysters	-0.3966	0.0837	0.5640



**Results for: Stacked oyster data**

**General Linear Model: LogEC versus Subscripts, Date**

Factor	Type	Levels	Values
Subscripts	fixed	12	Log_A1_oysters, Log_A12_oysters, Log_A20_oysters, Log_A21_oysters, Log_A23_oysters, Log_A24_oysters, Log_A25_oysters, Log_A26_oysters, Log_A27_oysters, Log_A28_oysters, Log_A6_oysters, Log_A8_oysters
Date	fixed	96	11.01.05, 08.02.05, 30.03.05, 11.04.05, 25.05.05, 22.06.05, 25.07.05, 22.08.05, 20.09.05, 18.10.05, 15.11.05, 05.12.05, 30.01.06, 28.02.06, 28.03.06, 26.04.06, 15.05.06, 13.06.06, 12.07.06, 14.08.06, 11.09.06, 09.10.06, 07.11.06, 06.12.06, 22.01.07, 19.02.07, 19.03.07, 17.04.07, 15.05.07, 13.06.07, 16.07.07, 28.08.07, 26.09.07, 29.10.07, 26.11.07, 11.12.07, 22.01.08, 11.02.08, 10.03.08, 07.04.08, 06.05.08, 03.06.08, 07.07.08, 04.08.08, 18.08.08, 16.09.08, 29.09.08, 14.10.08, 28.10.08, 12.11.08, 26.11.08, 15.12.08, 12.01.09, 28.01.09, 10.02.09, 25.02.09, 10.03.09, 30.03.09, 07.04.09, 27.04.09, 26.05.09, 24.06.09, 22.07.09, 24.08.09, 21.09.09, 05.10.09, 19.10.09, 04.11.09, 02.12.09, 04.01.10, 18.01.10, 01.02.10, 01.03.10, 14.04.10, 28.04.10, 17.05.10, 26.05.10, 14.06.10, 13.07.10, 11.08.10, 07.09.10, 25.10.10, 09.11.10, 23.11.10, 06.12.10, 05.01.11, 02.02.11, 22.02.11, 23.03.11, 18.04.11, 17.05.11, 15.06.11, 04.07.11, 19.07.11, 01.08.11, 26.09.11

Analysis of Variance for LogEC, using Adjusted SS for Tests

Source	Model DF	Reduced	
		DF	Seq SS
Subscripts	11	11	62.8579
Date	95	95	100.0836
Subscripts*Date	1045	501+	119.1542
Error	-355	189	40.0368
Total	796	796	322.1325

+ Rank deficiency due to empty cells, unbalanced nesting, collinearity, or an undeclared covariate. No storage of results or further analysis will be done.

S = 0.460255    R-Sq = 87.57%    R-Sq(adj) = 47.65%

\* NOTE \* Column lengths not equal.

**Results for: Oyster- Paired data across sites****Two-way ANOVA: LogEC versus Date2, Area**

Source	DF	SS	MS	F	P
Date2	62	60.526	0.97623	4.03	0.000
Area	7	37.794	5.39918	22.31	0.000
Error	434	105.022	0.24199		
Total	503	203.342			

S = 0.4919    R-Sq = 48.35%    R-Sq(adj) = 40.14%

**General Linear Model: LogEC versus Date2, Area**

Factor	Type	Levels	Values
Date2	fixed	63	01.02.10, 01.03.10, 01.08.11, 02.12.09, 03.06.08, 04.08.08, 04.11.09, 05.01.11, 05.12.05, 06.05.08, 06.12.06, 06.12.10, 07.04.08, 07.04.09, 07.07.08, 07.09.10, 07.11.06, 09.11.10, 10.02.09, 10.03.08, 10.03.09, 11.02.08, 11.08.10, 11.09.06, 11.12.07, 12.01.09, 12.07.06, 13.06.06, 13.06.07, 13.07.10, 14.04.10, 14.06.10, 14.08.06, 15.05.06, 15.05.07, 15.06.11, 15.11.05, 15.12.08, 16.07.07, 16.09.08, 17.04.07, 17.05.11, 18.04.11, 19.02.07, 19.03.07, 19.10.09, 21.09.09, 22.01.07, 22.01.08, 22.07.09, 23.03.11, 24.06.09, 25.10.10, 26.04.06, 26.05.09, 26.09.07, 26.09.11, 26.11.07, 28.02.06, 28.03.06, 28.08.07, 29.10.07, 30.01.06
Area	fixed	8	Log_A1_oysters, Log_A21_oysters, Log_A24_oysters, Log_A26_oysters, Log_A27_oysters, Log_A28_oysters, Log_A6_oysters, Log_A8_oysters

Analysis of Variance for LogEC, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Date2	62	60.5262	60.5262	0.9762	**	
Area	7	37.7943	37.7943	5.3992	**	
Date2*Area	434	105.0217	105.0217	0.2420	**	
Error	0	*	*	*		
Total	503	203.3421				

\*\* Denominator of F-test is zero.

S = \*

\* NOTE \* Could not graph the specified residual type because MSE = 0 or the degrees of freedom for error = 0.

**General Linear Model: LogEC versus Date2, Area**

Factor	Type	Levels	Values
Date2	fixed	63	01.02.10, 01.03.10, 01.08.11, 02.12.09, 03.06.08, 04.08.08, 04.11.09, 05.01.11, 05.12.05, 06.05.08, 06.12.06, 06.12.10, 07.04.08, 07.04.09, 07.07.08, 07.09.10, 07.11.06, 09.11.10, 10.02.09, 10.03.08, 10.03.09, 11.02.08, 11.08.10, 11.09.06, 11.12.07, 12.01.09, 12.07.06, 13.06.06, 13.06.07, 13.07.10, 14.04.10, 14.06.10, 14.08.06, 15.05.06, 15.05.07, 15.06.11, 15.11.05, 15.12.08, 16.07.07, 16.09.08, 17.04.07, 17.05.11, 18.04.11, 19.02.07, 19.03.07, 19.10.09, 21.09.09, 22.01.07, 22.01.08, 22.07.09, 23.03.11, 24.06.09, 25.10.10, 26.04.06, 26.05.09, 26.09.07, 26.09.11, 26.11.07, 28.02.06, 28.03.06, 28.08.07, 29.10.07, 30.01.06
Area	fixed	8	Log_A1_oysters, Log_A21_oysters, Log_A24_oysters, Log_A26_oysters, Log_A27_oysters, Log_A28_oysters, Log_A6_oysters, Log_A8_oysters

## Analysis of Variance for LogEC, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Date2	62	60.5262	60.5262	0.9762	4.03	0.000
Area	7	37.7943	37.7943	5.3992	22.31	0.000
Error	434	105.0217	105.0217	0.2420		
Total	503	203.3421				

S = 0.491920    R-Sq = 48.35%    R-Sq(adj) = 40.14%

## Unusual Observations for LogEC

Obs	LogEC	Fit	SE Fit	Residual	St Resid
37	1.30103	2.61650	0.18333	-1.31547	-2.88 R
63	3.54407	2.45242	0.18333	1.09165	2.39 R
78	2.69897	1.76244	0.18333	0.93653	2.05 R
126	1.00000	2.42126	0.18333	-1.42126	-3.11 R
144	1.00000	2.10392	0.18333	-1.10392	-2.42 R
173	2.89763	1.92035	0.18333	0.97728	2.14 R
178	1.00000	1.93797	0.18333	-0.93797	-2.05 R
181	2.79934	1.87348	0.18333	0.92586	2.03 R
187	1.00000	1.97537	0.18333	-0.97537	-2.14 R
193	3.11394	1.84999	0.18333	1.26396	2.77 R
206	3.14613	2.21715	0.18333	0.92898	2.04 R
215	3.04139	2.00178	0.18333	1.03961	2.28 R
230	2.66276	1.60867	0.18333	1.05409	2.31 R
231	1.00000	2.53311	0.18333	-1.53311	-3.36 R
247	1.00000	2.01854	0.18333	-1.01854	-2.23 R
250	1.00000	2.00167	0.18333	-1.00167	-2.19 R
280	3.54407	2.43453	0.18333	1.10954	2.43 R
313	3.44716	2.16536	0.18333	1.28180	2.81 R
321	3.54407	1.87692	0.18333	1.66714	3.65 R
331	1.00000	1.95402	0.18333	-0.95402	-2.09 R
365	1.00000	1.95084	0.18333	-0.95084	-2.08 R
384	2.69897	1.68077	0.18333	1.01820	2.23 R
396	3.04139	2.03839	0.18333	1.00301	2.20 R
399	1.00000	2.34836	0.18333	-1.34836	-2.95 R
413	3.73239	2.55513	0.18333	1.17727	2.58 R
415	3.96379	2.40936	0.18333	1.55443	3.41 R
457	2.69897	1.10666	0.18333	1.59231	3.49 R
472	1.00000	1.94056	0.18333	-0.94056	-2.06 R

R denotes an observation with a large standardized residual.

**General Linear Model: LogEC versus Date2, Area**

Factor	Type	Levels	Values
Date2	fixed	63	01.02.10, 01.03.10, 01.08.11, 02.12.09, 03.06.08, 04.08.08, 04.11.09, 05.01.11, 05.12.05, 06.05.08, 06.12.06, 06.12.10, 07.04.08, 07.04.09, 07.07.08, 07.09.10, 07.11.06, 09.11.10, 10.02.09, 10.03.08, 10.03.09, 11.02.08, 11.08.10, 11.09.06, 11.12.07, 12.01.09, 12.07.06, 13.06.06, 13.06.07, 13.07.10, 14.04.10, 14.06.10, 14.08.06, 15.05.06, 15.05.07, 15.06.11, 15.11.05, 15.12.08, 16.07.07, 16.09.08, 17.04.07, 17.05.11, 18.04.11, 19.02.07, 19.03.07, 19.10.09, 21.09.09, 22.01.07, 22.01.08, 22.07.09, 23.03.11, 24.06.09, 25.10.10, 26.04.06, 26.05.09,



26.09.07, 26.09.11, 26.11.07, 28.02.06, 28.03.06,  
28.08.07, 29.10.07, 30.01.06

Area fixed 8 Log\_A1\_oysters, Log\_A21\_oysters, Log\_A24\_oysters,  
Log\_A26\_oysters, Log\_A27\_oysters, Log\_A28\_oysters,  
Log\_A6\_oysters, Log\_A8\_oysters

Analysis of Variance for LogEC, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Date2	62	60.5262	60.5262	0.9762	4.03	0.000
Area	7	37.7943	37.7943	5.3992	22.31	0.000
Error	434	105.0217	105.0217	0.2420		
Total	503	203.3421				

S = 0.491920 R-Sq = 48.35% R-Sq(adj) = 40.14%

Unusual Observations for LogEC

Obs	LogEC	Fit	SE Fit	Residual	St Resid
37	1.30103	2.61650	0.18333	-1.31547	-2.88 R
63	3.54407	2.45242	0.18333	1.09165	2.39 R
78	2.69897	1.76244	0.18333	0.93653	2.05 R
126	1.00000	2.42126	0.18333	-1.42126	-3.11 R
144	1.00000	2.10392	0.18333	-1.10392	-2.42 R
173	2.89763	1.92035	0.18333	0.97728	2.14 R
178	1.00000	1.93797	0.18333	-0.93797	-2.05 R
181	2.79934	1.87348	0.18333	0.92586	2.03 R
187	1.00000	1.97537	0.18333	-0.97537	-2.14 R
193	3.11394	1.84999	0.18333	1.26396	2.77 R
206	3.14613	2.21715	0.18333	0.92898	2.04 R
215	3.04139	2.00178	0.18333	1.03961	2.28 R
230	2.66276	1.60867	0.18333	1.05409	2.31 R
231	1.00000	2.53311	0.18333	-1.53311	-3.36 R
247	1.00000	2.01854	0.18333	-1.01854	-2.23 R
250	1.00000	2.00167	0.18333	-1.00167	-2.19 R
280	3.54407	2.43453	0.18333	1.10954	2.43 R
313	3.44716	2.16536	0.18333	1.28180	2.81 R
321	3.54407	1.87692	0.18333	1.66714	3.65 R
331	1.00000	1.95402	0.18333	-0.95402	-2.09 R
365	1.00000	1.95084	0.18333	-0.95084	-2.08 R
384	2.69897	1.68077	0.18333	1.01820	2.23 R
396	3.04139	2.03839	0.18333	1.00301	2.20 R
399	1.00000	2.34836	0.18333	-1.34836	-2.95 R
413	3.73239	2.55513	0.18333	1.17727	2.58 R
415	3.96379	2.40936	0.18333	1.55443	3.41 R
457	2.69897	1.10666	0.18333	1.59231	3.49 R
472	1.00000	1.94056	0.18333	-0.94056	-2.06 R

R denotes an observation with a large standardized residual.

Tukey 95.0% Simultaneous Confidence Intervals

Response Variable LogEC

All Pairwise Comparisons among Levels of Area

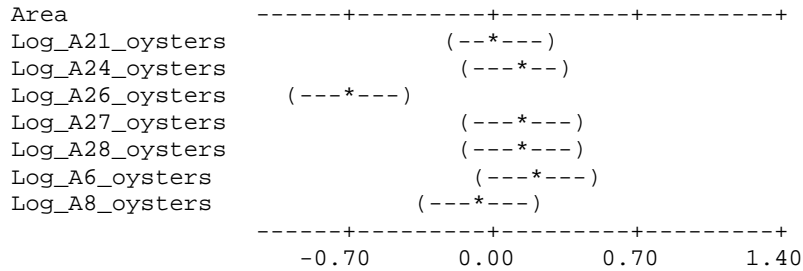
Area = Log\_A1\_oysters subtracted from:

Area	Lower	Center	Upper
Log_A21_oysters	-0.2396	0.0263	0.2922
Log_A24_oysters	-0.1554	0.1104	0.3763

```

Log_A26_oysters -0.9826 -0.7167 -0.4509
Log_A27_oysters -0.1353  0.1306  0.3965
Log_A28_oysters -0.1243  0.1416  0.4075
Log_A6_oysters  -0.0759  0.1900  0.4559
Log_A8_oysters  -0.3314 -0.0655  0.2003

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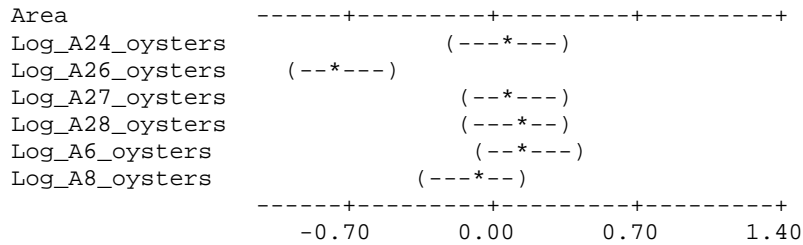


Area = Log\_A21\_oysters subtracted from:

```

Area      Lower   Center   Upper
Log_A24_oysters -0.182  0.0842  0.3500
Log_A26_oysters -1.009 -0.7430 -0.4772
Log_A27_oysters -0.162  0.1043  0.3702
Log_A28_oysters -0.151  0.1153  0.3812
Log_A6_oysters  -0.102  0.1637  0.4296
Log_A8_oysters  -0.358 -0.0918  0.1740

```

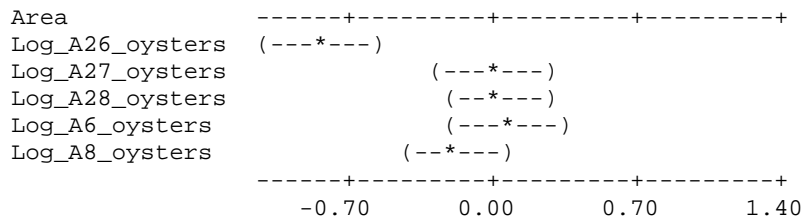


Area = Log\_A24\_oysters subtracted from:

```

Area      Lower   Center   Upper
Log_A26_oysters -1.093 -0.8272 -0.5613
Log_A27_oysters -0.246  0.0202  0.2861
Log_A28_oysters -0.235  0.0312  0.2970
Log_A6_oysters  -0.186  0.0795  0.3454
Log_A8_oysters  -0.442 -0.1760  0.0899

```

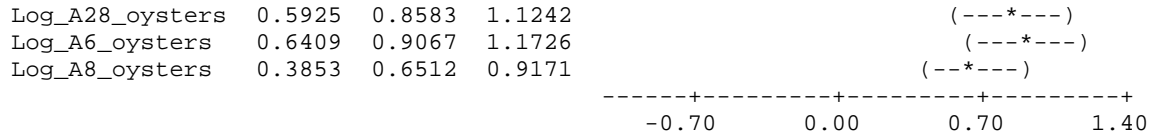


Area = Log\_A26\_oysters subtracted from:

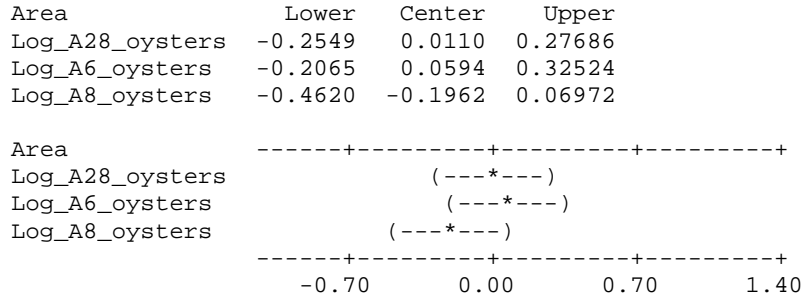
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Area      Lower   Center   Upper
Log_A27_oysters  0.5815  0.8474  1.1132

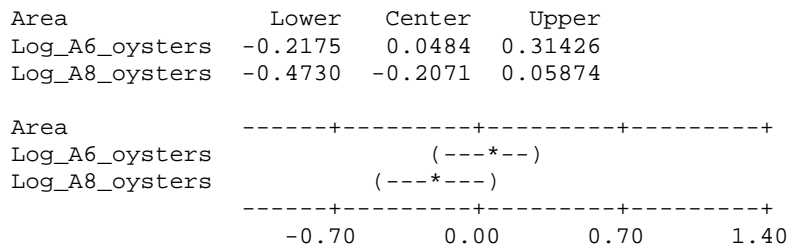
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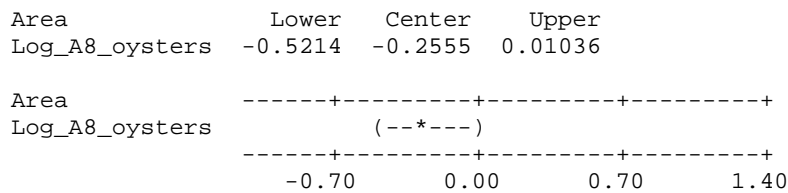
Area = Log\_A27\_oysters subtracted from:



Area = Log\_A28\_oysters subtracted from:



Area = Log\_A6\_oysters subtracted from:



Tukey Simultaneous Tests  
 Response Variable LogEC  
 All Pairwise Comparisons among Levels of Area  
 Area = Log\_A1\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A21_oysters	0.0263	0.08765	0.300	1.0000
Log_A24_oysters	0.1104	0.08765	1.260	0.9134
Log_A26_oysters	-0.7167	0.08765	-8.178	0.0000
Log_A27_oysters	0.1306	0.08765	1.490	0.8130
Log_A28_oysters	0.1416	0.08765	1.616	0.7410
Log_A6_oysters	0.1900	0.08765	2.168	0.3715
Log_A8_oysters	-0.0655	0.08765	-0.748	0.9955

Area = Log\_A21\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A24_oysters	0.0842	0.08765	0.960	0.9798
Log_A26_oysters	-0.7430	0.08765	-8.478	0.0000
Log_A27_oysters	0.1043	0.08765	1.190	0.9350
Log_A28_oysters	0.1153	0.08765	1.316	0.8933
Log_A6_oysters	0.1637	0.08765	1.868	0.5734
Log_A8_oysters	-0.0918	0.08765	-1.048	0.9670

Area = Log\_A24\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A26_oysters	-0.8272	0.08765	-9.438	0.0000
Log_A27_oysters	0.0202	0.08765	0.230	1.0000
Log_A28_oysters	0.0312	0.08765	0.355	1.0000
Log_A6_oysters	0.0795	0.08765	0.908	0.9855
Log_A8_oysters	-0.1760	0.08765	-2.008	0.4764

Area = Log\_A26\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A27_oysters	0.8474	0.08765	9.668	0.0000
Log_A28_oysters	0.8583	0.08765	9.793	0.0000
Log_A6_oysters	0.9067	0.08765	10.345	0.0000
Log_A8_oysters	0.6512	0.08765	7.430	0.0000

Area = Log\_A27\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A28_oysters	0.0110	0.08765	0.125	1.0000
Log_A6_oysters	0.0594	0.08765	0.677	0.9976
Log_A8_oysters	-0.1962	0.08765	-2.238	0.3288

Area = Log\_A28\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A6_oysters	0.0484	0.08765	0.552	0.9994
Log_A8_oysters	-0.2071	0.08765	-2.363	0.2596

Area = Log\_A6\_oysters subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Log_A8_oysters	-0.2555	0.08765	-2.915	0.0695

## Results for: Stacked oyster data

### General Linear Model: LogEC versus Subscripts, Season

Factor	Type	Levels	Values
Subscripts	fixed	12	Log_A1_oysters, Log_A12_oysters, Log_A20_oysters, Log_A21_oysters, Log_A23_oysters, Log_A24_oysters, Log_A25_oysters, Log_A26_oysters, Log_A27_oysters, Log_A28_oysters, Log_A6_oysters, Log_A8_oysters
Season	fixed	4	Autumn, Spring, Summer, Winter

Analysis of Variance for LogEC, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Subscripts	11	62.8579	60.5840	5.5076	17.02	0.000
Season	3	0.7978	2.3209	0.7736	2.39	0.067
Subscripts*Season	33	16.1679	16.1679	0.4899	1.51	0.033
Error	749	242.3090	242.3090	0.3235		
Total	796	322.1325				

S = 0.568779    R-Sq = 24.78%    R-Sq(adj) = 20.06%

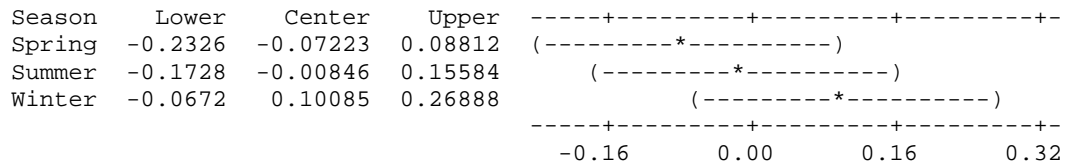
## Unusual Observations for LogEC

Obs	LogEC	Fit	SE Fit	Residual	St Resid	
20	1.00000	2.12040	0.13049	-1.12040	-2.02	R
65	3.51851	2.12040	0.13049	1.39811	2.53	R
71	3.14613	2.02159	0.13049	1.12454	2.03	R
98	3.54407	2.21396	0.13795	1.33011	2.41	R
163	3.38021	1.90929	0.14219	1.47092	2.67	R
207	3.11394	1.89565	0.13049	1.21829	2.20	R
255	3.11394	1.94183	0.12412	1.17212	2.11	R
271	3.73239	1.94183	0.12412	1.79057	3.23	R
336	3.34242	1.75444	0.12412	1.58798	2.86	R
346	3.04139	1.92205	0.13049	1.11934	2.02	R
420	3.14613	1.94001	0.12412	1.20611	2.17	R
434	3.32222	1.77917	0.12412	1.54305	2.78	R
444	3.54407	1.99647	0.13049	1.54760	2.80	R
451	3.11394	1.94001	0.12412	1.17393	2.11	R
463	3.38021	2.09784	0.12718	1.28237	2.31	R
529	3.54407	2.03411	0.12412	1.50996	2.72	R
545	3.38021	1.98630	0.12718	1.39391	2.51	R
561	3.23045	1.98630	0.12718	1.24415	2.24	R
584	3.44716	2.30486	0.12412	1.14230	2.06	R
604	3.54407	2.03538	0.12412	1.50869	2.72	R
653	3.54407	2.28479	0.12412	1.25928	2.27	R
668	1.00000	2.28479	0.12412	-1.28479	-2.31	R
715	3.04139	1.90544	0.12412	1.13595	2.05	R
732	3.32222	1.65038	0.12412	1.67184	3.01	R
740	3.73239	2.02944	0.12412	1.70295	3.07	R
743	3.96379	2.02944	0.12412	1.93435	3.48	R
761	3.38021	1.90544	0.12412	1.47477	2.66	R
848	1.30103	1.44609	0.25437	-0.14506	-0.29	X
849	1.69897	1.44609	0.25437	0.25288	0.50	X
878	1.00000	1.44609	0.25437	-0.44609	-0.88	X
880	2.23045	1.44609	0.25437	0.78436	1.54	X
881	1.00000	1.44609	0.25437	-0.44609	-0.88	X
934	4.20412	2.52991	0.15201	1.67421	3.05	R
936	3.73239	2.58427	0.17149	1.14812	2.12	R
966	1.00000	2.52991	0.15201	-1.52991	-2.79	R
967	1.30103	2.52991	0.15201	-1.22888	-2.24	R
969	3.96379	2.58427	0.17149	1.37952	2.54	R
1007	2.69897	1.23614	0.12412	1.46283	2.64	R
1153	1.30103	1.06021	0.25437	0.24082	0.47	X
1155	1.00000	1.06021	0.25437	-0.06021	-0.12	X
1161	1.30103	1.12041	0.25437	0.18062	0.36	X
1162	1.30103	1.12041	0.25437	0.18062	0.36	X
1163	1.00000	1.12041	0.25437	-0.12041	-0.24	X
1164	1.00000	1.12041	0.25437	-0.12041	-0.24	X
1165	2.69020	1.56340	0.32838	1.12680	2.43	RX
1166	1.00000	1.56340	0.32838	-0.56340	-1.21	X
1167	1.00000	1.56340	0.32838	-0.56340	-1.21	X
1169	1.00000	1.06021	0.25437	-0.06021	-0.12	X
1170	1.00000	1.06021	0.25437	-0.06021	-0.12	X
1171	1.00000	1.06021	0.25437	-0.06021	-0.12	X
1176	1.00000	1.12041	0.25437	-0.12041	-0.24	X

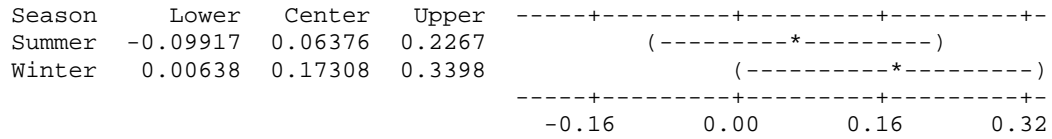
R denotes an observation with a large standardized residual.  
X denotes an observation whose X value gives it large leverage.

Tukey 95.0% Simultaneous Confidence Intervals  
Response Variable LogEC  
All Pairwise Comparisons among Levels of Season

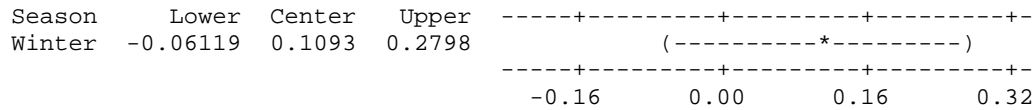
Season = Autumn subtracted from:



Season = Spring subtracted from:



Season = Summer subtracted from:



Tukey Simultaneous Tests  
 Response Variable LogEC  
 All Pairwise Comparisons among Levels of Season  
 Season = Autumn subtracted from:

Season	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Spring	-0.07223	0.06247	-1.156	0.6546
Summer	-0.00846	0.06401	-0.132	0.9992
Winter	0.10085	0.06546	1.541	0.4132

Season = Spring subtracted from:

Season	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Summer	0.06376	0.06348	1.005	0.7468
Winter	0.17308	0.06494	2.665	0.0385

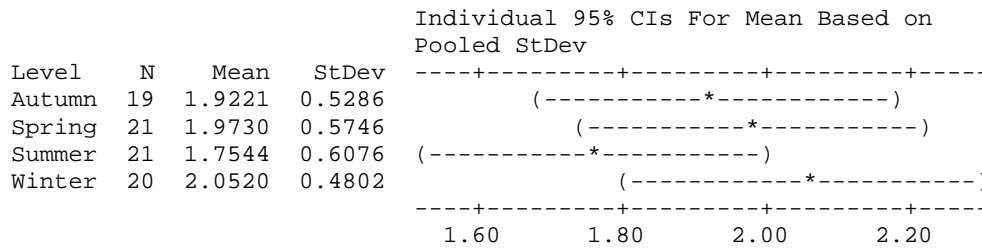
Season = Summer subtracted from:

Season	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Winter	0.1093	0.06642	1.646	0.3529

**One-way ANOVA: Log\_A1\_oysters versus Season**

Source	DF	SS	MS	F	P
Season	3	0.982	0.327	1.08	0.364
Error	77	23.398	0.304		
Total	80	24.380			

S = 0.5512 R-Sq = 4.03% R-Sq(adj) = 0.29%

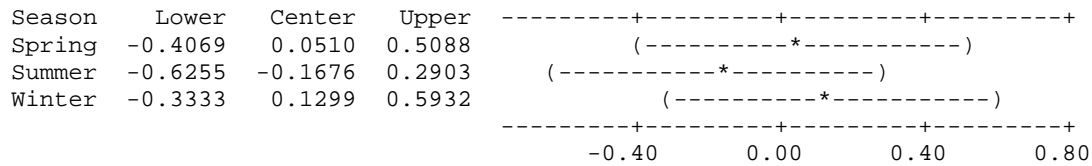


Pooled StDev = 0.5512

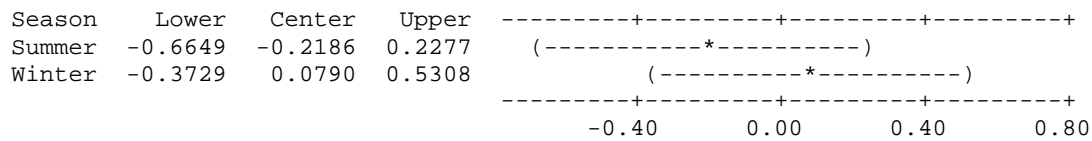
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.95%

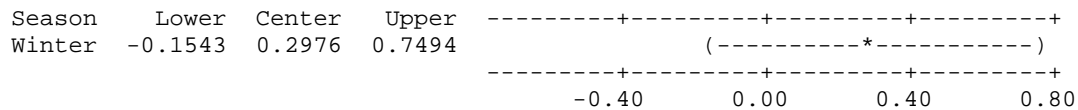
Season = Autumn subtracted from:



Season = Spring subtracted from:



Season = Summer subtracted from:

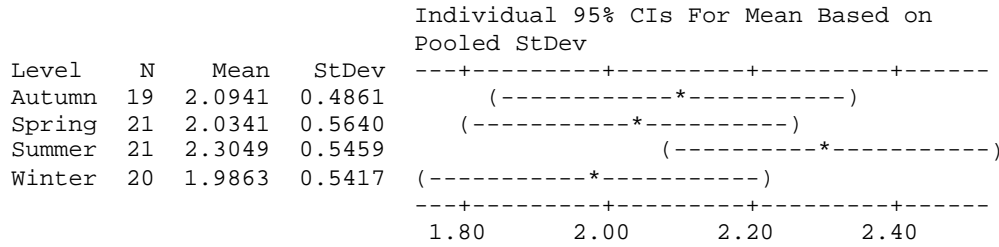




**One-way ANOVA: Log\_A6\_oysters versus Season**

Source	DF	SS	MS	F	P
Season	3	1.228	0.409	1.42	0.242
Error	77	22.149	0.288		
Total	80	23.378			

S = 0.5363    R-Sq = 5.25%    R-Sq(adj) = 1.56%

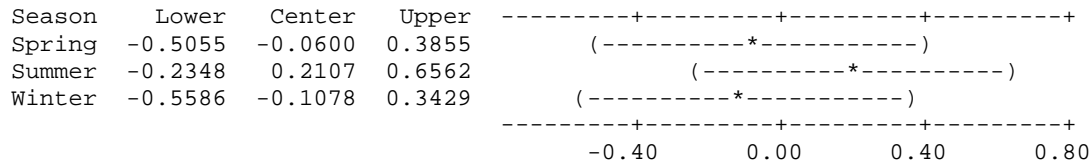


Pooled StDev = 0.5363

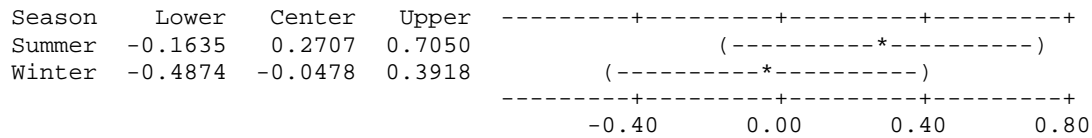
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.95%

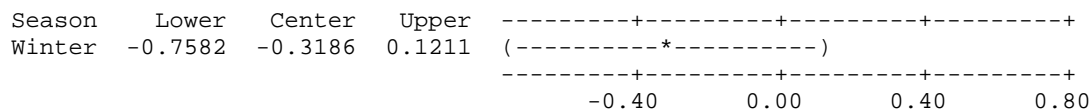
Season = Autumn subtracted from:



Season = Spring subtracted from:



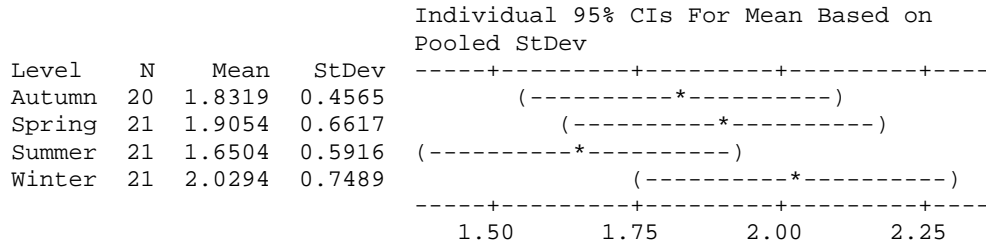
Season = Summer subtracted from:



**One-way ANOVA: Log\_A8\_oysters versus Season**

Source	DF	SS	MS	F	P
Season	3	1.582	0.527	1.35	0.265
Error	79	30.930	0.392		
Total	82	32.513			

S = 0.6257    R-Sq = 4.87%    R-Sq(adj) = 1.25%

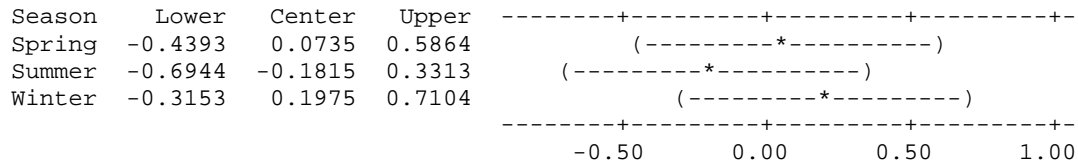


Pooled StDev = 0.6257

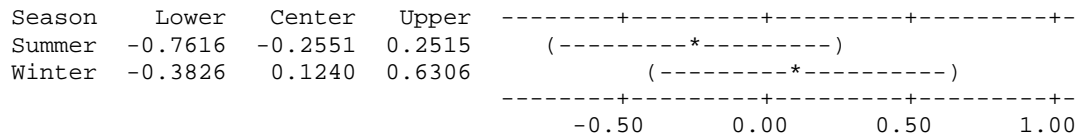
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.96%

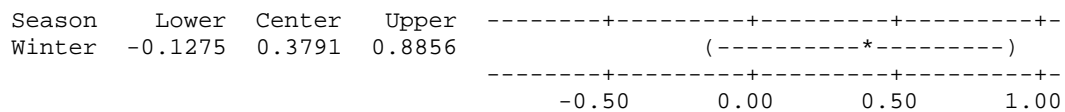
Season = Autumn subtracted from:



Season = Spring subtracted from:



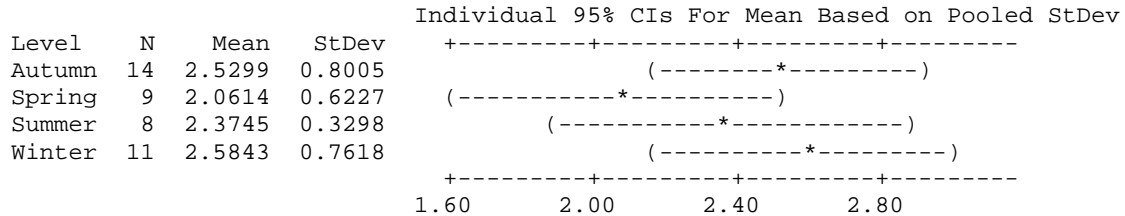
Season = Summer subtracted from:



**One-way ANOVA: Log\_A12\_oysters versus Season**

Source	DF	SS	MS	F	P
Season	3	1.639	0.546	1.15	0.340
Error	38	17.996	0.474		
Total	41	19.634			

S = 0.6882 R-Sq = 8.35% R-Sq(adj) = 1.11%

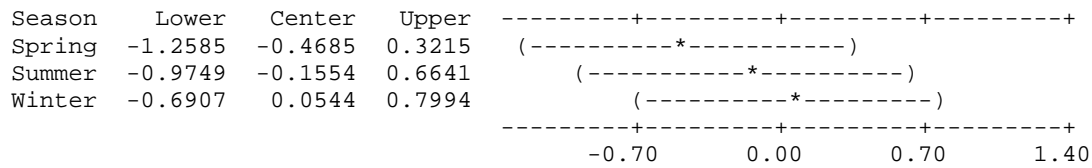


Pooled StDev = 0.6882

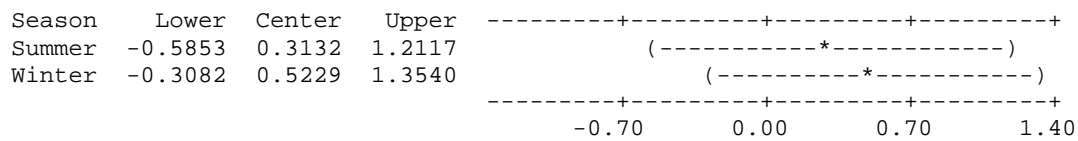
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.94%

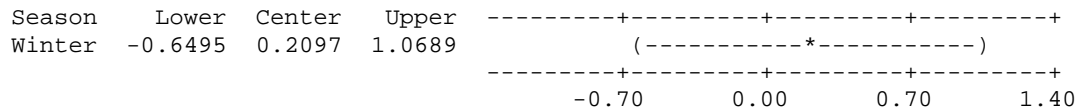
Season = Autumn subtracted from:



Season = Spring subtracted from:



Season = Summer subtracted from:



**One-way ANOVA: Log\_A21\_oysters versus Season**

Source	DF	SS	MS	F	P
Season	3	1.093	0.364	0.85	0.471
Error	77	32.991	0.428		
Total	80	34.084			

S = 0.6546    R-Sq = 3.21%    R-Sq(adj) = 0.00%

Level	N	Mean	StDev	Individual 95% CIs For Mean Based on Pooled StDev
Autumn	19	1.9965	0.6268	+-----+-----+-----+-----+----- (-----*-----)
Spring	21	1.9400	0.6335	(-----*-----)
Summer	21	1.7792	0.6317	(-----*-----)
Winter	20	2.0978	0.7223	(-----*-----) +-----+-----+-----+-----+-----
				1.50      1.75      2.00      2.25

Pooled StDev = 0.6546

Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.95%

Season = Autumn subtracted from:

Season	Lower	Center	Upper	-----+-----+-----+-----+-----
Spring	-0.6001	-0.0565	0.4872	(-----*-----)
Summer	-0.7610	-0.2173	0.3264	(-----*-----)
Winter	-0.4487	0.1014	0.6515	(-----*-----)
				-----+-----+-----+-----+-----
				-0.50      0.00      0.50      1.00

Season = Spring subtracted from:

Season	Lower	Center	Upper	-----+-----+-----+-----+-----
Summer	-0.6908	-0.1608	0.3691	(-----*-----)
Winter	-0.3787	0.1578	0.6943	(-----*-----)
				-----+-----+-----+-----+-----
				-0.50      0.00      0.50      1.00

Season = Summer subtracted from:

Season	Lower	Center	Upper	-----+-----+-----+-----+-----
Winter	-0.2178	0.3187	0.8552	(-----*-----)
				-----+-----+-----+-----+-----
				-0.50      0.00      0.50      1.00

**One-way ANOVA: Log\_A24\_oysters versus Season**

Source	DF	SS	MS	F	P
Season	3	0.468	0.156	0.37	0.772
Error	77	32.202	0.418		
Total	80	32.671			

S = 0.6467    R-Sq = 1.43%    R-Sq(adj) = 0.00%

Level	N	Mean	StDev	Individual 95% CIs For Mean Based on Pooled StDev
Autumn	19	1.8957	0.6335	+-----+-----+-----+-----+ (-----*-----)
Spring	21	1.9418	0.7313	(-----*-----)
Summer	21	2.0712	0.6300	(-----*-----)
Winter	20	2.0656	0.5780	(-----*-----)

+-----+-----+-----+-----+  
1.60      1.80      2.00      2.20

Pooled StDev = 0.6467

Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.95%

Season = Autumn subtracted from:

Season	Lower	Center	Upper	-----+-----+-----+-----+
Spring	-0.4910	0.0462	0.5833	(-----*-----)
Summer	-0.3616	0.1755	0.7127	(-----*-----)
Winter	-0.3735	0.1700	0.7135	(-----*-----)

-----+-----+-----+-----+  
-0.35      0.00      0.35      0.70

Season = Spring subtracted from:

Season	Lower	Center	Upper	-----+-----+-----+-----+
Summer	-0.3942	0.1293	0.6529	(-----*-----)
Winter	-0.4063	0.1238	0.6538	(-----*-----)

-----+-----+-----+-----+  
-0.35      0.00      0.35      0.70

Season = Summer subtracted from:

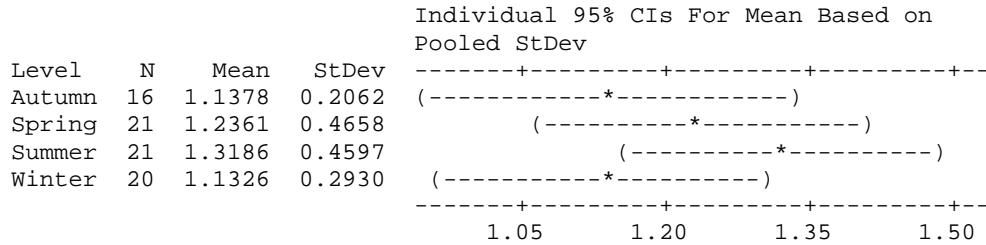
Season	Lower	Center	Upper	-----+-----+-----+-----+
Winter	-0.5356	-0.0056	0.5245	(-----*-----)

-----+-----+-----+-----+  
-0.35      0.00      0.35      0.70

**One-way ANOVA: Log\_A26\_oysters versus Season**

Source	DF	SS	MS	F	P
Season	3	0.465	0.155	1.06	0.372
Error	74	10.836	0.146		
Total	77	11.301			

S = 0.3827    R-Sq = 4.12%    R-Sq(adj) = 0.23%

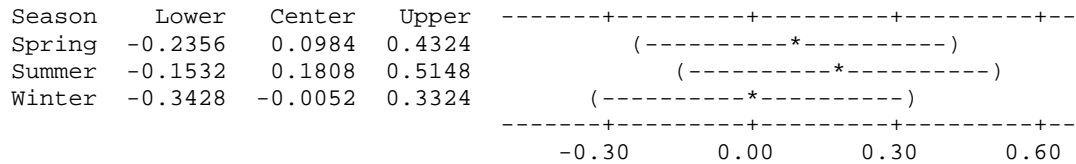


Pooled StDev = 0.3827

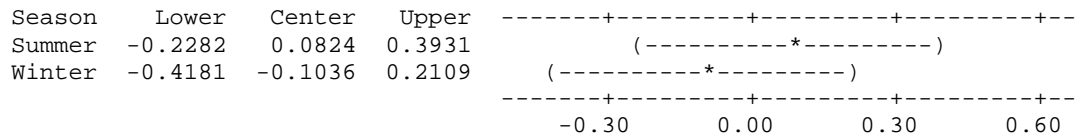
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.96%

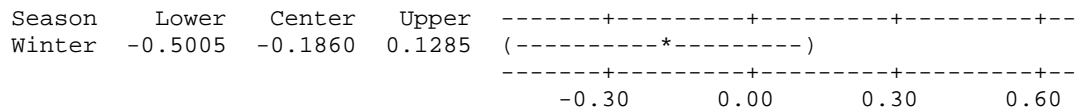
Season = Autumn subtracted from:



Season = Spring subtracted from:



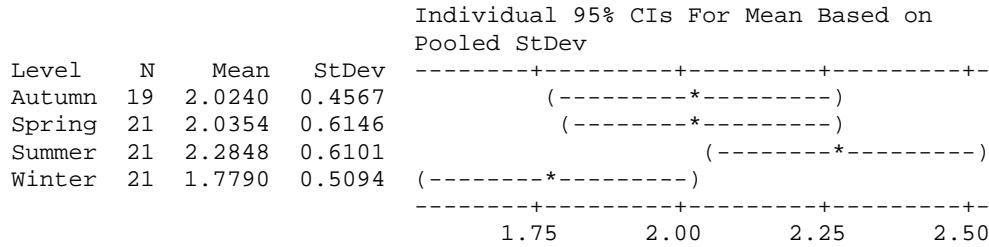
Season = Summer subtracted from:



**One-way ANOVA: Log\_A27\_oysters versus Season**

Source	DF	SS	MS	F	P
Season	3	2.687	0.896	2.92	0.039
Error	78	23.943	0.307		
Total	81	26.630			

S = 0.5540    R-Sq = 10.09%    R-Sq(adj) = 6.63%

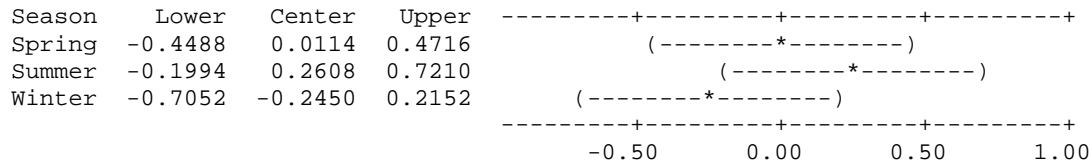


Pooled StDev = 0.5540

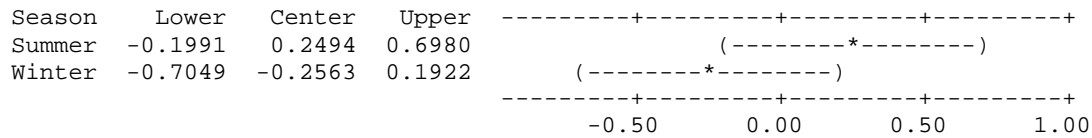
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.95%

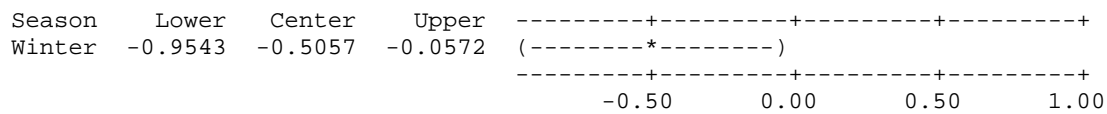
Season = Autumn subtracted from:



Season = Spring subtracted from:



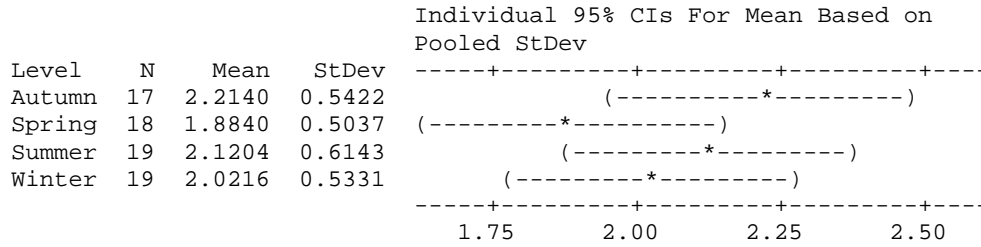
Season = Summer subtracted from:



**One-way ANOVA: Log\_A28\_oysters versus Season**

Source	DF	SS	MS	F	P
Season	3	1.058	0.353	1.16	0.330
Error	69	20.924	0.303		
Total	72	21.981			

S = 0.5507    R-Sq = 4.81%    R-Sq(adj) = 0.67%

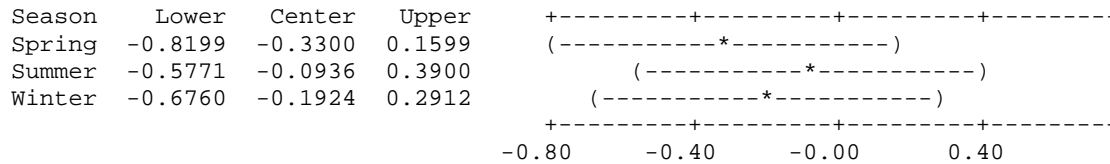


Pooled StDev = 0.5507

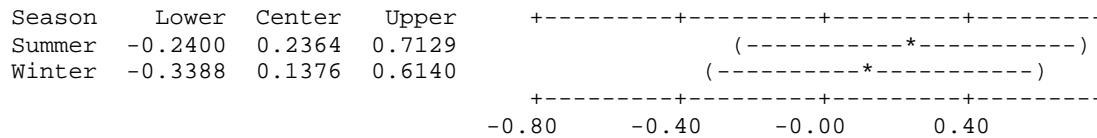
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.95%

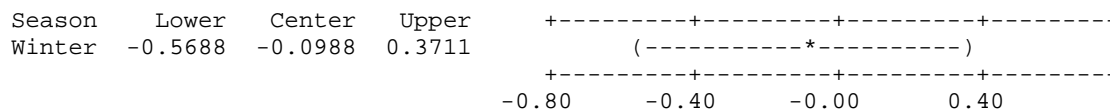
Season = Autumn subtracted from:



Season = Spring subtracted from:



Season = Summer subtracted from:





**Results for: Oysters****Correlations: MSL 1-d rank, MSL 2-d rank, MSL 7-d rank, A24 rank, A1 rank, ...**

	MSL 1-d rank	MSL 2-d rank	MSL 7-d rank	A24 rank
MSL 2-d rank	0.870 0.000			
MSL 7-d rank	0.613 0.000	0.787 0.000		
A24 rank	0.071 0.529	0.127 0.258	0.244 0.028	
A1 rank	0.068 0.546	0.089 0.431	0.211 0.058	0.395 0.000
A21 rank	0.296 0.007	0.296 0.007	0.326 0.003	0.297 0.007
A6 rank	0.156 0.166	0.166 0.139	0.183 0.102	0.535 0.000
A8 rank	0.241 0.028	0.300 0.006	0.310 0.004	0.335 0.003
A26 rank	-0.018 0.878	-0.020 0.864	-0.022 0.850	0.332 0.004
	A1 rank	A21 rank	A6 rank	A8 rank
A21 rank	0.439 0.000			
A6 rank	0.150 0.181	0.347 0.002		
A8 rank	0.388 0.001	0.345 0.002	0.202 0.080	
A26 rank	0.065 0.582	0.023 0.848	0.202 0.082	0.146 0.209

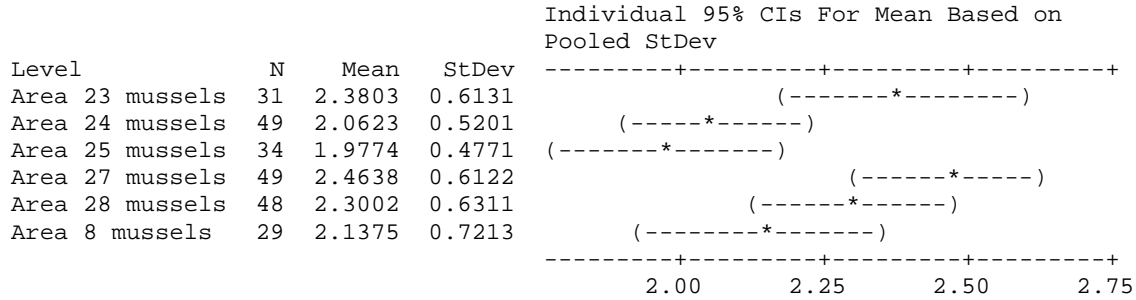
Cell Contents: Pearson correlation  
P-Value

**Results for: Mussels**

**One-way ANOVA: LogEC versus Area**

Source	DF	SS	MS	F	P
Area	5	7.411	1.482	4.18	0.001
Error	234	83.051	0.355		
Total	239	90.462			

S = 0.5958 R-Sq = 8.19% R-Sq(adj) = 6.23%



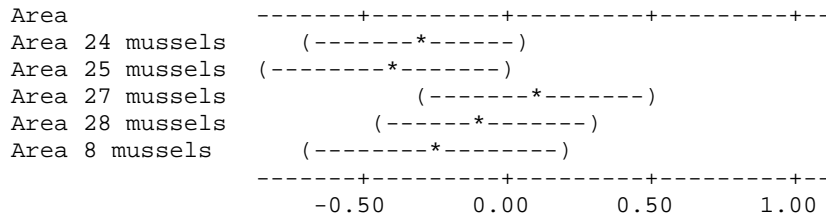
Pooled StDev = 0.5958

Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Area

Individual confidence level = 99.55%

Area = Area 23 mussels subtracted from:

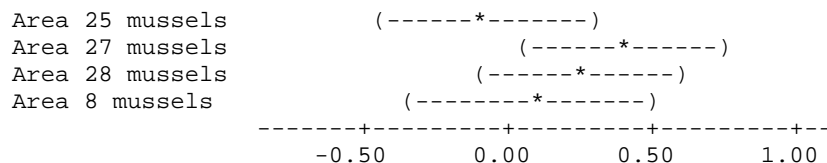
Area	Lower	Center	Upper
Area 24 mussels	-0.7105	-0.3180	0.0745
Area 25 mussels	-0.8276	-0.4029	0.0218
Area 27 mussels	-0.3090	0.0835	0.4760
Area 28 mussels	-0.4743	-0.0802	0.3139
Area 8 mussels	-0.6847	-0.2428	0.1990



Area = Area 24 mussels subtracted from:

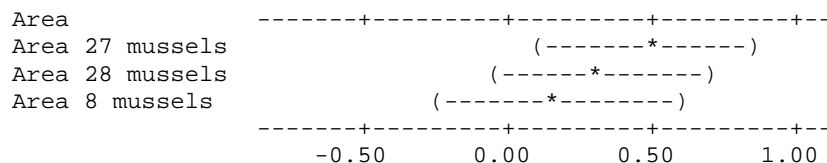
Area	Lower	Center	Upper
Area 25 mussels	-0.4666	-0.0849	0.2969
Area 27 mussels	0.0560	0.4015	0.7471
Area 28 mussels	-0.1095	0.2379	0.5852
Area 8 mussels	-0.3255	0.0752	0.4759





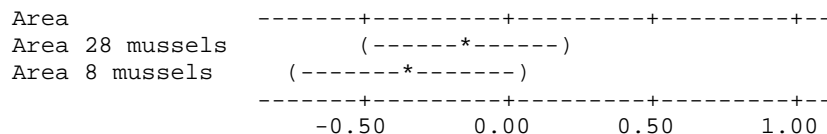
Area = Area 25 mussels subtracted from:

Area	Lower	Center	Upper
Area 27 mussels	0.1046	0.4864	0.8681
Area 28 mussels	-0.0606	0.3227	0.7061
Area 8 mussels	-0.2722	0.1601	0.5924



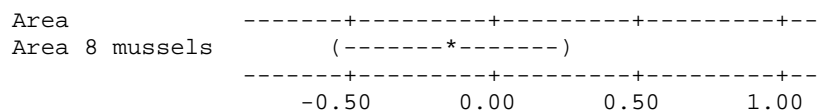
Area = Area 27 mussels subtracted from:

Area	Lower	Center	Upper
Area 28 mussels	-0.5110	-0.1637	0.1837
Area 8 mussels	-0.7270	-0.3263	0.0744



Area = Area 28 mussels subtracted from:

Area	Lower	Center	Upper
Area 8 mussels	-0.5649	-0.1626	0.2396



### General Linear Model: LogEC versus Area, DATE2

Factor	Type	Levels	Values
Area	fixed	3	Area 24 mussels, Area 27 mussels, Area 28 mussels
DATE2	fixed	47	01.02.10, 01.03.10, 01.08.11, 02.12.09, 03.06.08, 04.07.11, 04.08.08, 04.11.09, 05.01.11, 06.12.10, 07.04.09, 07.07.08, 07.09.10, 09.11.10, 10.02.09, 10.03.09, 11.08.10, 12.01.09, 12.11.08, 13.07.10, 14.04.10, 14.10.08, 15.06.11, 15.12.08, 16.09.08, 17.05.10, 17.05.11, 18.01.10, 18.04.11, 18.06.08, 18.08.08, 19.10.09, 21.07.08, 21.09.09, 22.02.11, 22.07.09, 23.03.11, 24.06.09, 24.08.09, 25.02.09, 25.10.10, 26.05.09, 26.11.08, 28.01.09, 28.10.08, 29.09.08, 30.03.09

## Analysis of Variance for LogEC, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Area	2	3.3004	3.3004	1.6502	11.42	0.000
DATE2	46	34.6721	34.6721	0.7537	5.22	0.000
Error	92	13.2952	13.2952	0.1445		
Total	140	51.2678				

S = 0.380149 R-Sq = 74.07% R-Sq(adj) = 60.54%

## Unusual Observations for LogEC

Obs	LogEC	Fit	SE Fit	Residual	St Resid
10	4.20412	3.01462	0.22410	1.18950	3.87 R
21	1.30103	1.99503	0.22410	-0.69400	-2.26 R
53	1.30103	2.03839	0.22410	-0.73736	-2.40 R
70	2.34242	3.21305	0.22410	-0.87063	-2.84 R
73	1.00000	1.62456	0.22410	-0.62456	-2.03 R
104	2.23045	3.15477	0.22410	-0.92432	-3.01 R
117	4.38021	3.58412	0.22410	0.79609	2.59 R

R denotes an observation with a large standardized residual.

## Tukey 95.0% Simultaneous Confidence Intervals

Response Variable LogEC

All Pairwise Comparisons among Levels of Area

Area = Area 24 mussels subtracted from:

Area	Lower	Center	Upper
Area 27 mussels	0.18421	0.3711	0.5579
Area 28 mussels	0.04406	0.2309	0.4178

-----+-----+-----+-----+-----  
 (-----\*-----)  
 (-----\*-----)  
 -----+-----+-----+-----+-----  
 -0.25      0.00      0.25      0.50

Area = Area 27 mussels subtracted from:

Area	Lower	Center	Upper
Area 28 mussels	-0.3270	-0.1401	0.04672

-----+-----+-----+-----+-----  
 (-----\*-----)  
 -----+-----+-----+-----+-----  
 -0.25      0.00      0.25      0.50

## Tukey Simultaneous Tests

Response Variable LogEC

All Pairwise Comparisons among Levels of Area

Area = Area 24 mussels subtracted from:

Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Area 27 mussels	0.3711	0.07842	4.732	0.0000
Area 28 mussels	0.2309	0.07842	2.945	0.0113

Area = Area 27 mussels subtracted from:

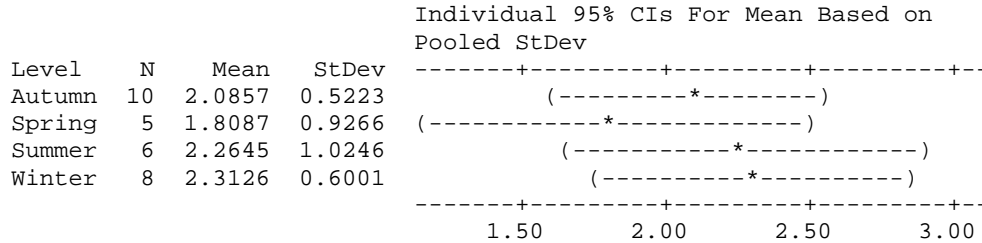
Area	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Area 28 mussels	-0.1401	0.07842	-1.787	0.1796

**Results for: Mussels**

**One-way ANOVA: Log\_A8\_mussels versus Season**

Source	DF	SS	MS	F	P
Season	3	0.909	0.303	0.55	0.650
Error	25	13.660	0.546		
Total	28	14.569			

S = 0.7392 R-Sq = 6.24% R-Sq(adj) = 0.00%

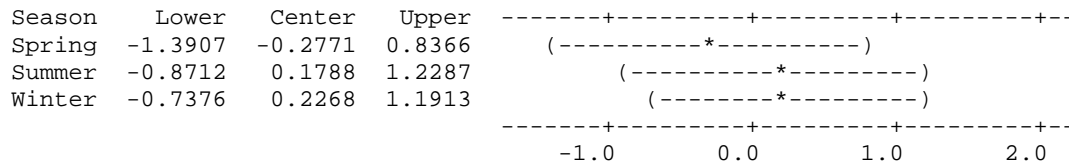


Pooled StDev = 0.7392

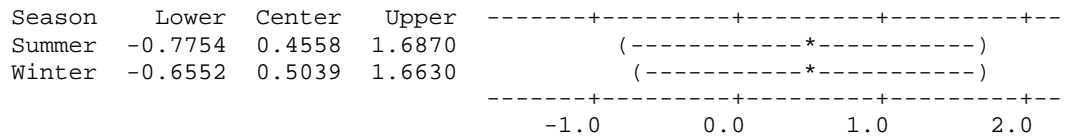
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.91%

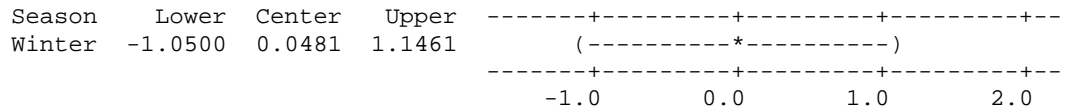
Season = Autumn subtracted from:



Season = Spring subtracted from:



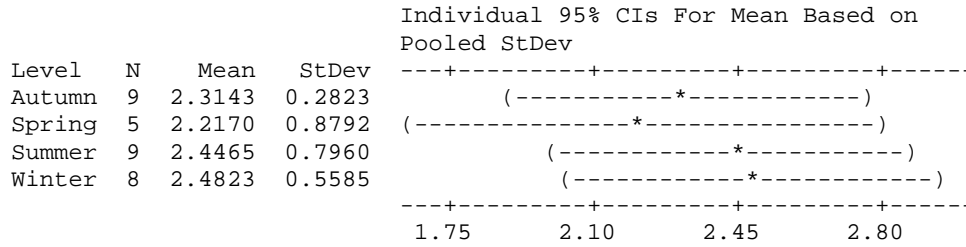
Season = Summer subtracted from:



**One-way ANOVA: Log\_A23\_mussels versus Season**

Source	DF	SS	MS	F	P
Season	3	0.295	0.098	0.24	0.866
Error	27	10.982	0.407		
Total	30	11.277			

S = 0.6378 R-Sq = 2.62% R-Sq(adj) = 0.00%

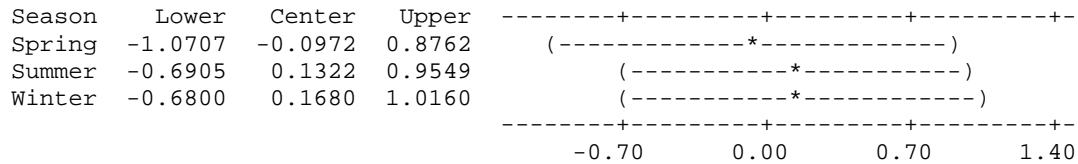


Pooled StDev = 0.6378

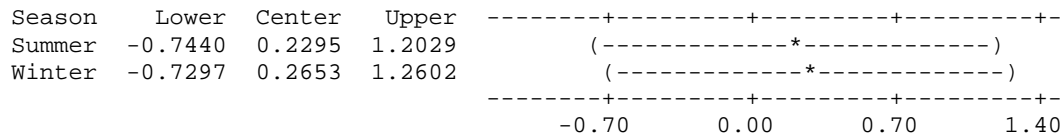
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.92%

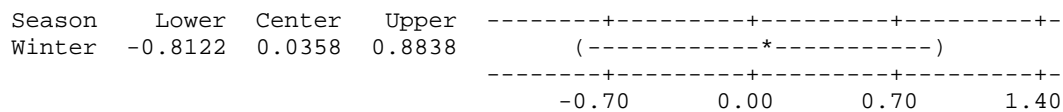
Season = Autumn subtracted from:



Season = Spring subtracted from:



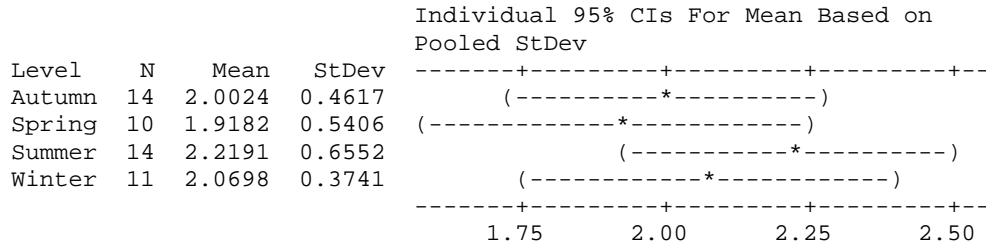
Season = Summer subtracted from:



**One-way ANOVA: Log\_A24\_mussels versus Season**

Source	DF	SS	MS	F	P
Season	3	0.603	0.201	0.73	0.539
Error	45	12.381	0.275		
Total	48	12.984			

S = 0.5245 R-Sq = 4.64% R-Sq(adj) = 0.00%

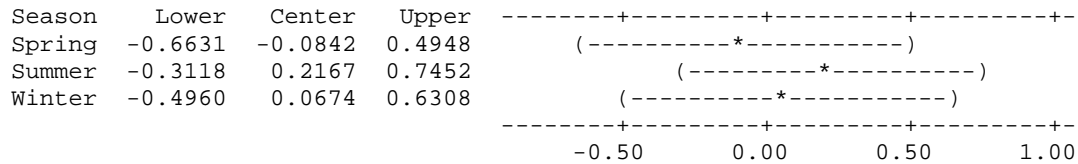


Pooled StDev = 0.5245

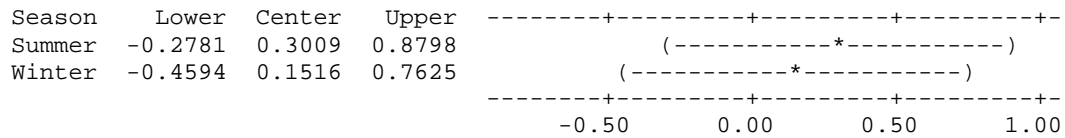
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.94%

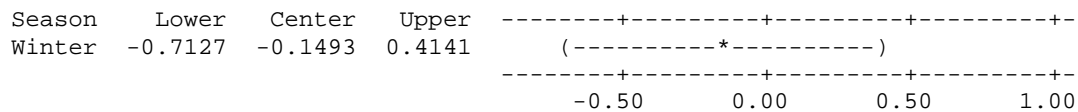
Season = Autumn subtracted from:



Season = Spring subtracted from:



Season = Summer subtracted from:

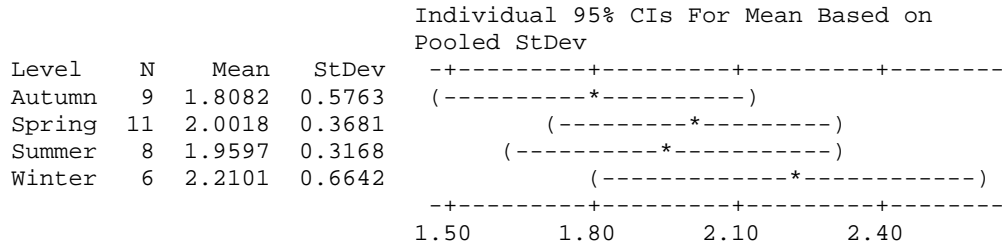




**One-way ANOVA: Log\_A25\_mussels versus Season**

Source	DF	SS	MS	F	P
Season	3	0.592	0.197	0.85	0.475
Error	30	6.920	0.231		
Total	33	7.511			

S = 0.4803 R-Sq = 7.88% R-Sq(adj) = 0.00%

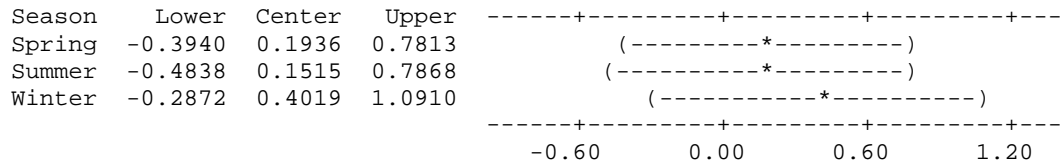


Pooled StDev = 0.4803

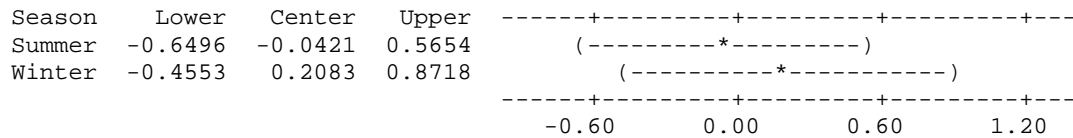
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.93%

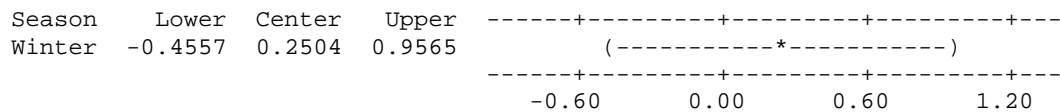
Season = Autumn subtracted from:



Season = Spring subtracted from:



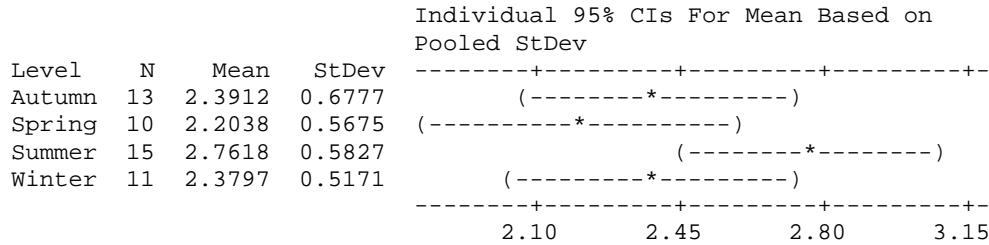
Season = Summer subtracted from:



**One-way ANOVA: Log\_A27\_mussels versus Season**

Source	DF	SS	MS	F	P
Season	3	2.154	0.718	2.04	0.122
Error	45	15.837	0.352		
Total	48	17.991			

S = 0.5932    R-Sq = 11.97%    R-Sq(adj) = 6.10%

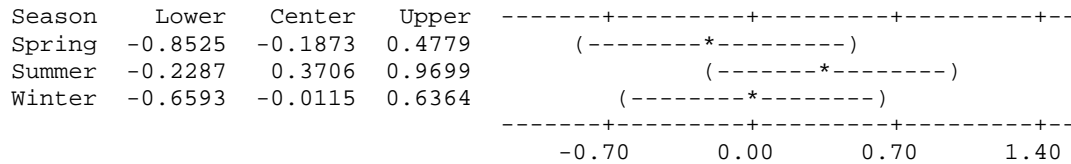


Pooled StDev = 0.5932

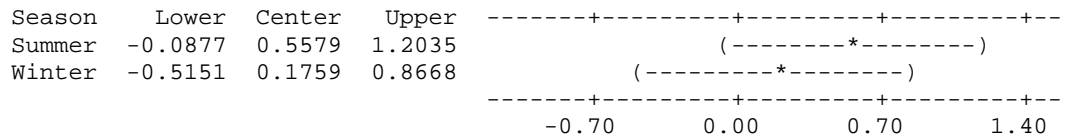
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.94%

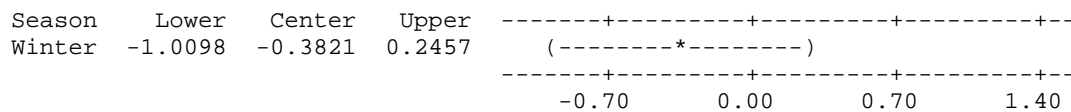
Season = Autumn subtracted from:



Season = Spring subtracted from:



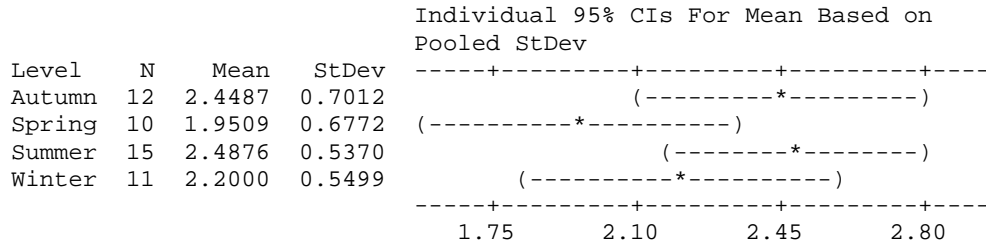
Season = Summer subtracted from:



**One-way ANOVA: Log\_A28\_mussels versus Season**

Source	DF	SS	MS	F	P
Season	3	2.122	0.707	1.88	0.148
Error	44	16.597	0.377		
Total	47	18.719			

S = 0.6142    R-Sq = 11.34%    R-Sq(adj) = 5.29%

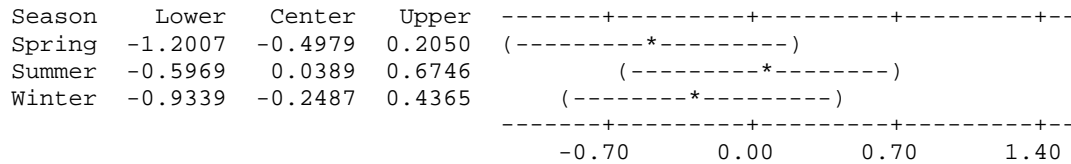


Pooled StDev = 0.6142

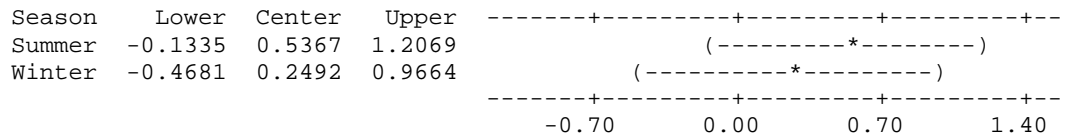
Tukey 95% Simultaneous Confidence Intervals  
All Pairwise Comparisons among Levels of Season

Individual confidence level = 98.95%

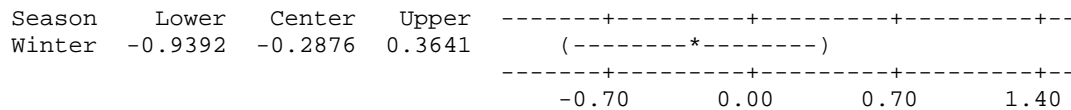
Season = Autumn subtracted from:



Season = Spring subtracted from:



Season = Summer subtracted from:



**Results for: Mussels****Correlations: MSL 1-d rank, MSL 2-d rank, MSL 7-d rank, A28 rank, A24 rank, ...**

	MSL 1-d rank	MSL 2-d rank	MSL 7-d rank	A28 rank
MSL 2-d rank	0.900 0.000			
MSL 7-d rank	0.688 0.000	0.836 0.000		
A28 rank	0.381 0.007	0.445 0.002	0.473 0.001	
A24 rank	0.358 0.012	0.467 0.001	0.447 0.001	0.704 0.000
A27 rank	0.241 0.096	0.195 0.180	0.238 0.100	0.539 0.000
				A24 rank
A27 rank				0.366 0.011

Cell Contents: Pearson correlation  
P-Value

## Shoreline Survey Report

Prod. area: See Table 1  
 Site name: See Table 1  
 Species: Pacific oysters and Common mussels  
 Responsible Authority: States of Jersey  
 Status: Existing

Date Surveyed: 28-29/11/11  
 Surveyed by: Ron Lee, Ashley Pinel and Hayley Guéno  
 Existing RMP: See Table 1  
 Area Surveyed: Grouville Bay: Gorey; Fort Henry to La Rocque Harbour  
 St Clement's Bay: La Rocque Harbour to Green Island

Table 1. Production areas and sites

Bed Name	Production Area	Species (a)	Class (b)	Sampling point (WGS84)
Area 1	La Hurel Main bed (La Rocque)	<i>C. gigas</i>	B	49° 10.293' 002° 00.875'
Area 21	La Hurel Main bed (La Rocque)	<i>C. gigas</i>	B	49° 10.021' 002° 00.838'
Area 24	La Hurel Main bed (La Rocque)	<i>C. gigas</i>	B	49° 10.508' 002° 01.101'
		<i>M. edulis</i>	B	Variable
Area 28	La Hurel Main bed (La Rocque)	<i>C. gigas</i>	B	49° 10.737'
		<i>M. edulis</i>	B	002° 01.318'
Area 6	La Hurel Holding bed (La Rocque)	<i>C. gigas</i>	B	49° 10.225' 002° 01.435'
Area 27	La Hurel Holding bed (La Rocque)	<i>C. gigas</i>	B	49° 10.392'
		<i>M. edulis</i>	B	002° 01.499'
Area 26	Seymour Tower (La Rocque)	<i>C. gigas</i>	A	49° 09.487' 001° 59.793'
Area 8	Le Hocq Main bed	<i>C. gigas</i>	B	49° 09.613' 002° 03.200'
Area 25	Le Hocq Main bed	<i>C. gigas</i>	B	49° 09.418'
		<i>M. edulis</i>	B	002° 02.768'
Area 12	Green Island	<i>C. gigas</i>	B	Variable
Area 20	Seymour Tower (La Rocque)	<i>C. gigas</i>	Provisional A	49° 09.487' 001° 59.793'
Area 29	La Hurel Holding bed (La Rocque)	<i>C. gigas</i>	New lease area	49° 10'.082N 2° 001'.416W

**Weather**

Approximately 1.5 mm of rain fell on the 27/11/11. This was the first rainfall for some time.

28/11/11: No rainfall. Wind: southerly, 5 knots.

29/11/11: Approximately 3.2 mm rain: most of this fell in the late afternoon.

Wind: southerly veering westerly in the afternoon, 10 knots.

**Site Observations**

Observations are listed in Table 2 and the locations shown in the maps in Figure 1.

**Fishery**

The fishery consists of several areas of trestles in both Grouville and St Clement's Bay. These hold poches of Pacific oysters. Mussels are also grown in poches on some of the areas (24, 25, 27 and 28). To seaward of the trestles at Area 24, mussels are grown on poles.

Designated poches of Pacific oysters and, where appropriate, mussels, are kept for the purposes of sampling. The location of these had been previously recorded by the Department of the Environment, States of Jersey, together with the outer limits of the trestles and poles.

Recreational low water fishing takes place on Jersey for a number of clam species. Minimum sizes are specified for these.

**Sewage/Faecal Sources**

The main Bellozane continuous sewage outfall discharges into the intertidal area of St Aubin's Bay. The location was recorded and sampled. There are sewage pumping stations with intermittent overflows [during extreme rainfall events](#), located at several points along Grouville and St Clement's Bays. The locations of the outfalls were recorded and, where flow was observed, measured and sampled. The discharge locations of some are also shared with streams and it was not possible to determine whether the flows were from the discharges or from streams. None of the flows at intermittent discharge locations smelt of sewage and no sewage fungus was observed [and no overflows were recorded during the survey period](#). Significant amounts of bright green algae were observed associated with some flap valve locations.

**Seasonal Population**

Jersey has a large seasonal population due to its popularity as a tourist destination. Several hotels are located along the shore road, principally along St Clement's Bay and towards Gorey.

### **Boats/Shipping**

A large number of boats (approximately 90) were moored in Gorey Harbour at the time of the survey. Most were leisure motor boats with some sailing yachts and fishing boats and a small number of small open boats. Elsewhere, only a small number of small open boats were seen on moorings. However, there were a significant number of unoccupied mooring buoys at several locations along the intertidal area of both bays. The port and marina at St Helier was not included in the shoreline survey.

### **Land Use**

There is housing along most of the coastal strip of both bays, located along either side of the coast road. There is a large golf course at Fort Henry. Behind the coastal strip is farmland, including horticulture.

### **Wildlife/Birds**

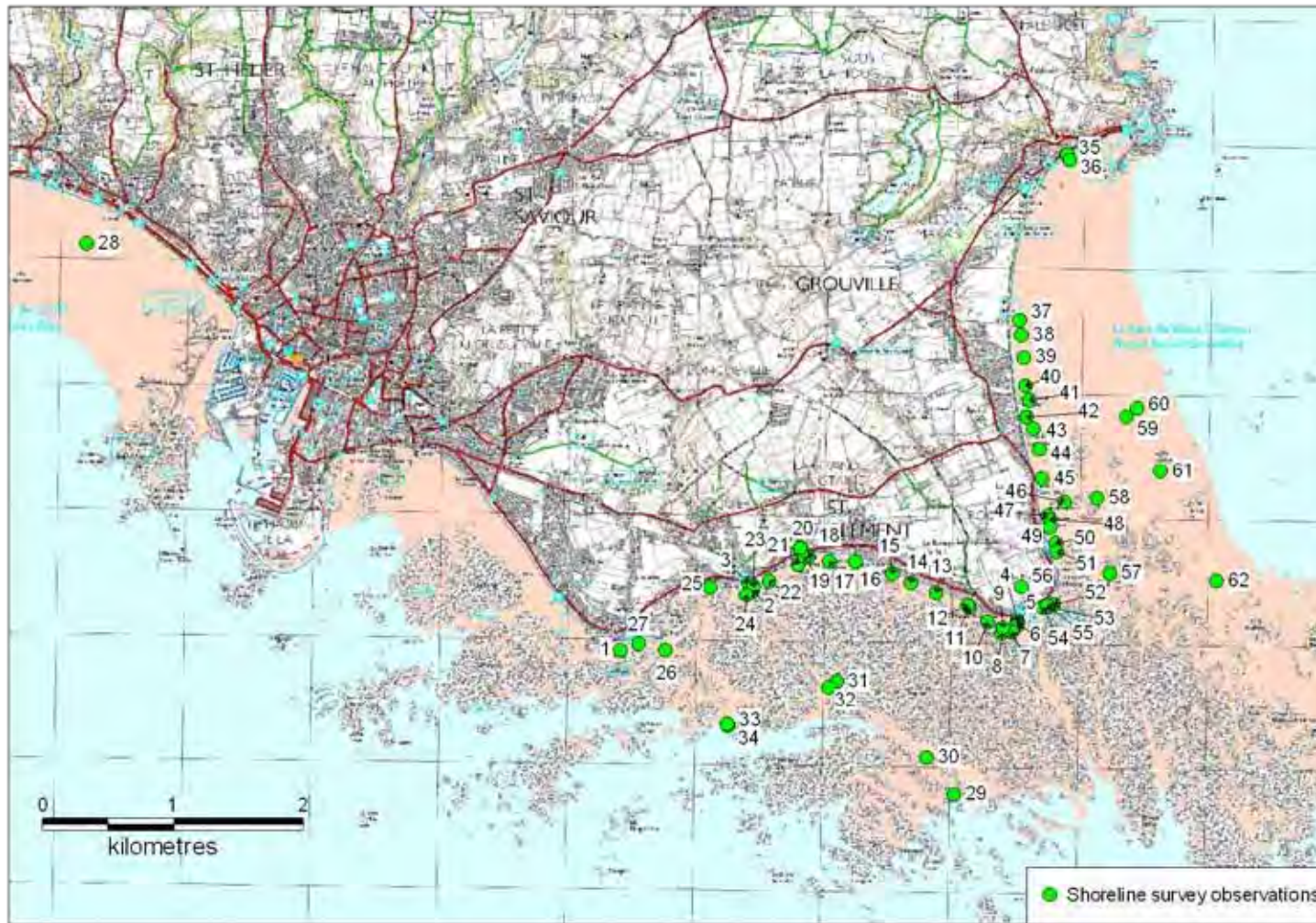
Large numbers of Brent geese were observed along the waterline: these were concentrated in Grouville Bay. Smaller numbers of gulls, crows and unidentified small brown birds were seen at several locations on the upper shore and intertidal area. In general, little in the way of seabird droppings was seen towards the top of the shore for much of the survey but moderate amounts were seen partway along the Grouville Bay shore.

### **Other**

Large amounts of seaweed were seen at the top of the shore near Gorey slip. Some was also seen at further south along Grouville Bay.

Recorded observations apply to the date of survey only. Animal numbers were recorded on the day from the observer's point of view. This does not necessarily equate to total numbers present as natural features may obscure individuals and small groups of animals from view.

Dimensions and flows of watercourses are estimated at the most convenient point of access and not necessarily at the point at which the watercourses enter the bay / shellfish containment area.



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Figure 1. Map of Shoreline Observations



Table 2. Shoreline Observations

No.	Date	Time	Location (WGS84)	Easting	Northing	Associated photograph	Sample	Description
1	28/11/11	09:59	N 49°.16270 W 02°.07518	44363	63073		SCBW01	Seawater sample; salinity at 0.5m: 36.3ppt; temp 12.9C
2	28/11/11	10:35	N 49°.16684 W 02°.06125	45378	63534	Figure 4	SCBW02	P.S. Outlet; slight flow approx 100ml in 30 secs; sample
3	28/11/11	10:45	N 49°.16735 W 02°.06170	45346	63591	Figure 4		Pumping station
4	28/11/11	10:57	N 49°.16475 W 02°.03334	47414	63304			Approx 60 Brent geese
5	28/11/11	10:58	N 49°.16451 W 02°.03335	47413	63278			Pumping station
6	28/11/11	11:06	N 49°.16447 W 02°.03328	47419	63273			Flap valve and two open pipe ends below P.S. And flow through wall
7	28/11/11	11:17	N 49°.16399 W 02°.03396	47369	63220		SCBW03	Flow from above: width 13cm, depth 1 cm, flow 0.290m/s; sample
8	28/11/11	11:19	N 49°.16388 W 02°.03494	47298	63207			Egret on shore; 13 Brent geese; 2 gulls; 2 pipes projecting from property above shore
9	28/11/11	11:22	N 49°.16425 W 02°.03489	47301	63249		SCBW04	Small stream appearing from sand; width 22cm, depth 7cm, flow 0.059m/s; sample
10	28/11/11	11:32	N 49°.16469 W 02°.03653	47181	63297			10 gulls on shore
11	28/11/11	11:36	N 49°.16565 W 02°.03834	47049	63404			Small open boat and 2 unoccupied mooring buoys
12	28/11/11	11:37	N 49°.16578 W 02°.03854	47035	63418			Water coming out through sand and then soaking back in
13	28/11/11	11:45	N 49°.16667 W 02°.04192	46788	63517			Small dinghy and 5 unoccupied mooring buoys
14	28/11/11	11:50	N 49°.16737 W 02°.04453	46598	63595	Figure 5		End of P.S. Outfall, no flow, some green algae; 5 unoccupied mooring buoys and 12 gulls offshore
15	28/11/11	11:56	N 49°.16797 W 02°.04648	46455	63661			5 unoccupied mooring buoys; large amount of seaweed
16	28/11/11	12:12	N 49°.16888 W 2°.05048	46164	63762	Figure 6	SCBW05	Outfall; some flow: width 47cm, depth 7.5cm, flow 0.076m/s; sample; bird droppings on shore; 9 crows; 3 gulls; 2 unoccupied mooring buoys; seaweed
17	28/11/11	12:16	N 49°.16889 W 02°.05317	45967	63763			8 crows; 4 unoccupied mooring buoys

No.	Date	Time	Location (WGS84)	Easting	Northing	Associated photograph	Sample	Description
18	28/11/11	12:19	N 49°.16924 W 02°.05536	45808	63802	Figure 7	SCBW06	Culverted outflow, ?stream; width 41cm, depth 4.5cm, flow 0.322m/s; sample; moderate amount of bird droppings on shore
19	28/11/11	12:24	N 49°.16922 W 02°.05580	45776	63800	Figure 8	SCBW07	Flap valve, some flow; approx 600ml in 10 sec (not all of flow captured); sample; 1 crow; 1 gull
20	28/11/11	12:32	N 49°.16979 W 02°.05622	45745	63863	Figure 9		Pontac P.S.
21	28/11/11	12:36	N 49°.16864 W 02°.05646	45727	63735			10 gulls
22	28/11/11	12:40	N 49°.16755 W 02°.05954	45503	63614			4 open boats; 13 unoccupied mooring buoys
23	28/11/11	12:43	N 49°.16711 W 02°.06118	45383	63564	Figure 10		Flap valve; no flow; 1 gull
24	28/11/11	12:47	N 49°.16654 W 02°.06188	45332	63501			1 crow; 3 gulls; 10 unoccupied mooring buoys
25	28/11/11	12:52	N 49°.16711 W 02°.06571	45053	63564			surface water outlets in wall of properties; 2 unoccupied mooring buoys
26	28/11/11	13:04	N 49°.16270 W 02°.07052	44703	63073			unoccupied mooring buoy
27	28/11/11	13:08	N 49°.16321 W 02°.07323	44505	63130			Public toilets above shore; 2 dogs on beach; end of survey section
28	28/11/11	14:06	N 49°.19105 W 02°.13148	40257	66224	Figure 11	SCBW08	End of main Bellozane outfall; sample
29	28/11/11	14:46	N 49°.15260 W 02°.04002	46929	61952		SCBW09	Seawater sample
30	28/11/11	14:53	N 49°.15521 W 02°.04297	46713	62243		SCBS01	Pacific oyster sample
31	28/11/11	15:10	N 49°.16054 W 02°.05247	46019	62834		SCBW10	Seawater sample from shallow flow through trestles
32	28/11/11	15:12	N 49°.16017 W 02°.05329	45960	62793		SCBS02	Pacific oyster sample; mainly nursery bed; 2 egrets; 10 gulls; 1 crow; started to drizzle
33	28/11/11	15:29	N 49°.15743 W 02°.06390	45186	62488		SCBW11	Seawater sample
34	28/11/11	15:30	N 49°.15759 W 02°.06394	45183	62506	Figure 12	SCBS03	Pacific oyster sample; bed has mix of Pacific and native oysters; ormers to seaward

No.	Date	Time	Location (WGS84)	Easting	Northing	Associated photograph	Sample	Description
35	29/11/11	12:03	N 49°.19721 W 02°.02802	47797	66915	Figure 13	GBW01	Stream by Gorey slip; width 50cm, depth 6cm, flow 0.794m/s; water sample; approx 90 boats on moorings in harbour and 8 on harbour wall; approx 100 gulls, 30 small birds and 4 crows on shore
36	29/11/11	12:13	N 49°.19677 W 02°.02780	47813	66866		GBW02	Seawater sample; salinity at 0.5m: 36.0ppt, temp 12.8C
37	29/11/11	12:55	N 49°.18562 W 02°.03310	47428	65625	Figure 14	GBW03	Outfall with double flap valve; algae on concrete below; two flows; 1) width 24cm, depth 0.5cm, flow 0.047m/s; 2) width 25cm, depth 1cm, flow 0.325m/s; approx 214 Brent geese
38	29/11/11	13:05	N 49°.18460 W 02°.03283	47448	65512			Approx 30 Brent geese; 1 empty mooring buoy
39	29/11/11	13:09	N 49°.18305 W 02°.03264	47462	65340			44 Brent geese
40	29/11/11	13:14	N 49°.18112 W 02°.03251	47472	65125	Figure 15		Outfall with flap valve, no flow; some seepage next to outfall; 95 Brent geese, 4 crows, 3 gulls
41	29/11/11	13:20	N 49°.18007 W 02°.03208	47504	65008			90 Brent geese; 1 unoccupied mooring buoy
42	29/11/11	13:33	N 49°.17892 W 02°.03233	47486	64880	Figure 16	GBW04	Fauvic outlet, outfall with flap valve; Approx 200ml in 5 sec; 150 Brent geese; 2 gulls; 3 unoccupied mooring buoys
43	29/11/11	13:32	N 49°.17814 W 02°.03168	47533	64794			Approx 100 Brent geese; sparse bird droppings at top of beach
44	29/11/11	13:39	N 49°.17672 W 02°.03103	47581	64636			4 unoccupied mooring buoys; 1 crow and 2 dogs at top of beach
45	29/11/11	13:45	N 49°.17458 W 02°.03070	47605	64398	Figure 17		Flap valve in sea wall, no flow; lots of green algae below; open-ended pipe nearby
46	29/11/11	13:53	N 49°.17300 W 02°.02834	47777	64222			Depuration plant seawater intake; some bird droppings on shore; 10 unoccupied mooring buoys
47	29/11/11	13:57	N 49°.17203 W 02°.03012	47648	64114	Figure 18	GBW05	Outfall with flap valve, some flow; width 14cm, depth 2cm, flow 0.041m/s, water sample; 2 dogs on beach
48	29/11/11	14:03	N 49°.17173 W 02°.02994	47661	64081			Oyster racks and mussel poles offshore
49	29/11/11	14:05	N 49°.17120 W 02°.02993	47662	64022	Figure 19		Drain hole in wall, no flow; scum on shore below
50	29/11/11	14:08	N 49°.17016 W 02°.02933	47706	63906			2 unoccupied mooring buoys; 2 gulls
51	29/11/11	14:10	N 49°.16953 W 02°.02918	47717	63836	Figure 20		Flap valve in sea wall, no flow; Some algal staining; oyster racks offshore

No.	Date	Time	Location (WGS84)	Easting	Northing	Associated photograph	Sample	Description
52	29/11/11	14:19	N 49°.16587 W 02°.02949	47695	63429			Surface water outlets in sea wall
53	29/11/11	14:21	N 49°.16573 W 02°.03011	47649	63414			2 pipes in sea wall, no flow
54	29/11/11	14:22	N 49°.16564 W 02°.03063	47612	63404			6 small open boats in harbour; at least 22 unoccupied mooring buoys; 17 small boats and 3 dinghies in car park
55	29/11/11	14:24	N 49°.16583 W 02°.03020	47643	63425			2 manholes in middle of road
56	29/11/11	14:30	N 49°.16711 W 02°.03289	47447	63567	Figures 21 & 22		Rue du Pont pumping station; conservation area nearby
57	29/11/11	14:51	N 49°.16801 W 02°.02365	48120	63668		GBS01	Pacific oyster sample Area 29
58	29/11/11	14:58	N 49°.17323 W 02°.02496	48024	64248		GBS02	Pacific oyster sample Area 27
59	29/11/11	15:07	N 49°.17891 W 02°.02187	48248	64880		GBS03	Pacific oyster sample Area 28; 16 Brent geese off racks
60	29/11/11	15:10	N 49°.17955 W 02°.02071	48333	64952		GBW06	Seawater sample; drizzle
61	29/11/11	15:21	N 49°.17515 W 02°.01826	48512	64463		GBS04	Mussel sample
62	29/11/11	15:35	N 49°.16747 W 02°.01241	48940	63609	Figure 23	GBW07	Seawater sample; dog on shore; heavy rain

Photos referenced in the table can be found attached as Figures 4-23.

### Sampling

Water and shellfish samples were collected at sites marked on the maps given in Figures 2 and 3. Bacteriology results are presented in Tables 3 and 4.

All samples were collected aseptically and transported in a dark, insulated carrier with cool packs before being placed in a coolbox for transport to the laboratory. Samples were sent by air and courier to the States Laboratory, Guernsey. All samples were received by the laboratory within 30 hours of collection and the temperature at the time of receipt ranged from 2.8 to 5.5°C.

Samples of seawater were tested for salinity on site at a depth of approximately 0.5 m using a calibrated salinity meter (YSI ProPlus with CT probe). These results are shown in Table 2, given as parts per thousand (ppt).

Table 3. Water Sample Results

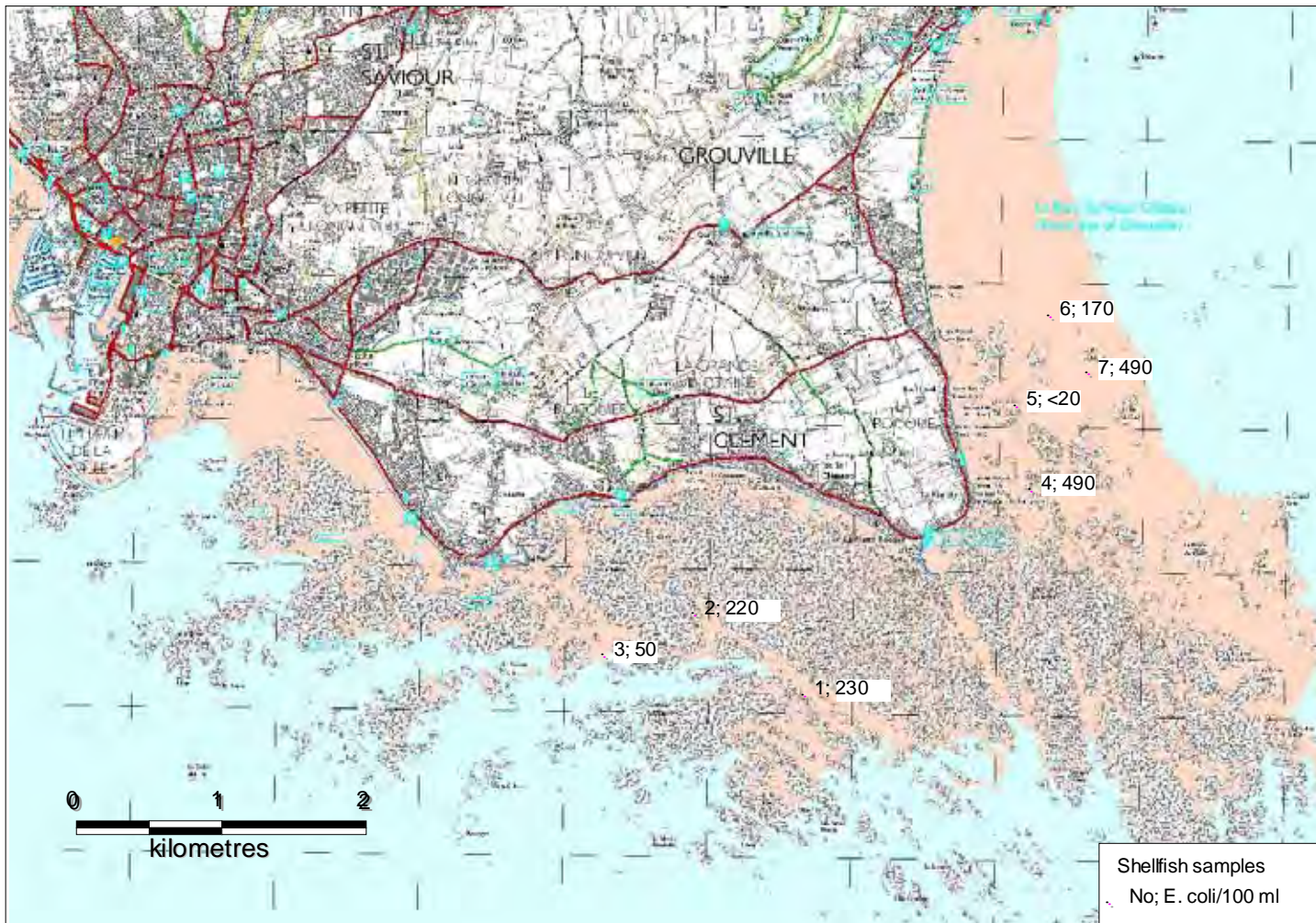
No.	Date	Sample	Latitude/Longitude (WGS84)	Type	E. coli (cfu/100 ml)	Salinity (ppt)
1	28/11/11	SCBW1	N 49°.16270 W 02°.07518	Sea	11	36.3
2	28/11/11	SCBW2	N 49°.16684 W 02°.06125	Fresh	624	
3	28/11/11	SCBW3	N 49°.16399 W 02°.03396	Fresh	<10	
4	28/11/11	SCBW4	N 49°.16425 W 02°.03489	Fresh	31	
5	28/11/11	SCBW5	N 49°.16888 W 2°.05048	Fresh	111	
6	28/11/11	SCBW6	N 49°.16924 W 02°.05536	Fresh	87	
7	28/11/11	SCBW7	N 49°.16922 W 02°.05580	Fresh	254	
8	28/11/11	SCBW8	N 49°.19105 W 02°.13148	Fresh	6590	
9	28/11/11	SCBW9	N 49°.15260 W 02°.04002	Sea	1	
10	28/11/11	SCBW10	N 49.16054 W 02°.05247	Sea	20	
11	28/11/11	SCBW11	N 49°.15743 W 02°.06390	Sea	2	
12	29/11/11	GBW01	N 49°.19721 W 02°.02802	Fresh	2710	
13	29/11/11	GBW02	N 49°.19677 W 02°.02780	Sea	270	36.0
14	29/11/11	GBW03	N 49°.18562 W 02°.03310	Fresh	1500	
15	29/11/11	GBW04	N 49°.17892 W 02°.03233	Fresh	16520	
16	29/11/11	GBW05	N 49°.17203 W 02°.03012	Fresh	<10	
17	29/11/11	GBW06	N 49°.17955 W 02°.02071	Sea	16	
18	29/11/11	GBW07	N 49°.16747 W 02°.01241	Sea	1	

Table 4. Shellfish Sample Results

No.	Date	Sample	Latitude/Longitude (WGS84)	Species	E. coli (MPN/100g)
1	28/11/11	SCBS01	N 49°.15521 W 02°.04297	Pacific oysters	230
2	28/11/11	SCBS02	N 49°.16017 W 02°.05329	Pacific oysters	220
3	28/11/11	SCBS03	N 49°.15759 W 02°.06394	Pacific oysters	50
4	29/11/11	GBS01	N 49°.16801 W 02°.02365	Pacific oysters	490
5	29/11/11	GBS02	N 49°.17323 W 02°.02496	Pacific oysters	<20
6	29/11/11	GBS03	N 49°.17891 W 02°.02187	Pacific oysters	170
7	29/11/11	GBS04	N 49°.17515 W 02°.01826	Mussels	490



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 Figure 2. Water sample results map



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Figure 3. Shellfish sample results map

Photographs



Figure 4. Pumping Station and associated discharge pipe at Le Hocq



Figure 5. Outfall at Le Bourg





Figure 6. Outfall at La Commune de Pontac



Figure 7. Culverted flow through sea wall near Pontac slip



Figure 8. Flap valve at Pontac slip



Figure 9. Pontac Pumping Station



Figure 10. Flap valve in sea wall at Le Hocq



Figure 11. Main Bellozane outfall



Figure 12. Trestles at Area 12



Figure 13. Stream outlet at Gorey slip



Figure 14. Outfall with double flap valve near Fort Henry



Figure 15. Outfall with flap valve north of Round Tower No. 5



Figure 16. Fauvic outfall

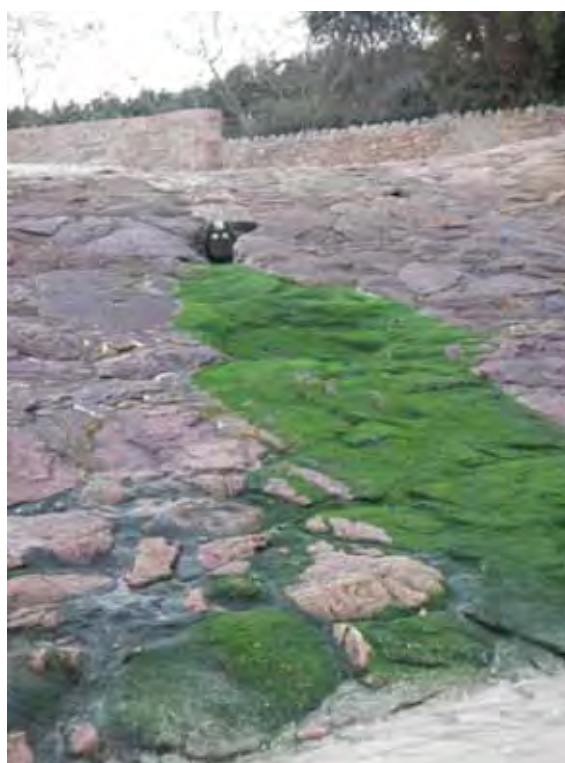


Figure 17. Flap valve at Le Hurel with green algae below outlet



Figure 18. Flap valve in sea wall north of Round Tower No. 2



Figure 19. Drain outlet in sea wall south of Round Tower No. 2



Figure 20. Flap valve in sea wall north of La Nez de la Rocque



Figure 21. Rue du Pont Pumping Station





Figure 22. Conservation area at Rue du Pont



Figure 23. Trestles at Area 21