In [58]:
```
import pandas as pd
import seaborn as sns
import matplotlib as mpl
import matplotlib.pyplot as plt
import numpy as np
%matplotlib inline
```

Using read_csv function to read CSV file and storing in riverkeeper object

In [59]:
```
riverkeeper = pd.read_csv('riverkeeper_data_2013.csv',parse_dates=['Date'])
```

Now printing five lines

In [60]:
```
riverkeeper[15:20]
```

Out[60]:

	Site	Date	EnteroCount	FourDayRainTotal	SampleCount
15	Hudson above Mohawk River	2011-07-14	11	0.3	35
16	Hudson above Mohawk River	2011-07-02	11	2.1	35
17	Hudson above Mohawk River	2011-05-19	91	1.6	35
18	Hudson above Mohawk River	2010-10-16	>2420	1.3	35
19	Hudson above Mohawk River	2010-09-14	15	0.0	35

Now we need to remove greater than and less than sign from EnteroCount column values

In [61]:
```
riverkeeper.EnteroCount = riverkeeper.EnteroCount.str.replace('>','')
riverkeeper.EnteroCount = riverkeeper.EnteroCount.str.replace('<','')
```

Printing same values to see if > sign removed

In [62]:
```
riverkeeper[15:20]
```

Out[62]:

	Site	Date	EnteroCount	FourDayRainTotal	SampleCount
15	Hudson above Mohawk River	2011-07-14	11	0.3	35
16	Hudson above Mohawk River	2011-07-02	11	2.1	35
17	Hudson above Mohawk River	2011-05-19	91	1.6	35
18	Hudson above Mohawk River	2010-10-16	2420	1.3	35
19	Hudson above Mohawk River	2010-09-14	15	0.0	35

In [63]:
```
riverkeeper.dtypes
```

Out[63]:
```
Site                        object
Date                datetime64[ns]
EnteroCount                 object
FourDayRainTotal           float64
SampleCount                  int64
dtype: object
```

Converting last two columns as int

In [64]:
```
riverkeeper.EnteroCount = riverkeeper.EnteroCount.apply(int)
riverkeeper.FourDayRainTotal = riverkeeper.FourDayRainTotal.apply(int)
riverkeeper.SampleCount = riverkeeper.SampleCount.apply(int)
riverkeeper.dtypes
```

Out[64]:
```
Site                        object
Date                datetime64[ns]
EnteroCount                  int64
FourDayRainTotal             int64
SampleCount                  int64
dtype: object
```

Create lists & graphs of the best and worst places to swim in the dataset.

Grouping by site name and getting average

In [65]:
```
siteData = riverkeeper.groupby(['Site'], as_index=False).mean()
siteData[1:5]
```

Out[65]:

	Site	EnteroCount	FourDayRainTotal	SampleCount
1	79th St. mid-channel	47.204082	0.612245	49.0
2	Albany Rowing Dock	280.944444	0.361111	36.0
3	Annesville Creek	83.421053	0.263158	38.0
4	Athens	201.314286	0.371429	35.0

Sorting by EnteroCount to get best ten places to swim

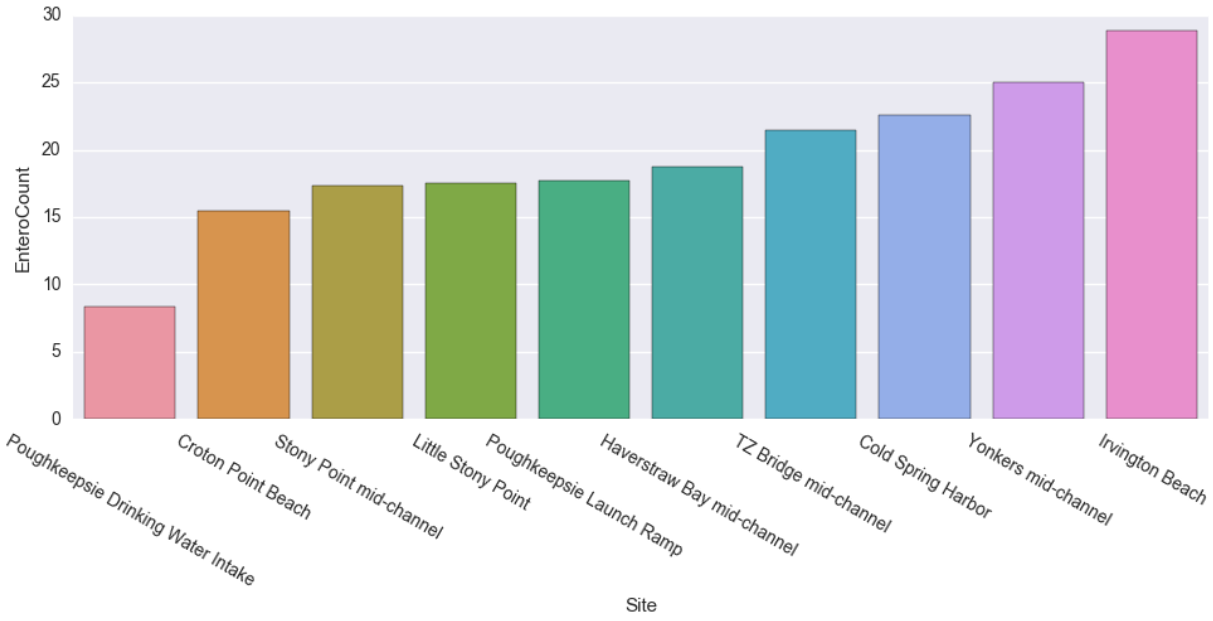
In [66]:
```
givenData = siteData.sort_values(by='EnteroCount')[0:10]
givenData
```

Out[66]:

	Site	EnteroCount	FourDayRainTotal	SampleCount
59	Poughkeepsie Drinking Water Intake	8.342105	0.157895	38.0
17	Croton Point Beach	15.458333	0.270833	48.0
64	Stony Point mid-channel	17.340909	0.250000	44.0
42	Little Stony Point	17.526316	0.157895	38.0
60	Poughkeepsie Launch Ramp	17.675676	0.135135	37.0
32	Haverstraw Bay mid-channel	18.708333	0.250000	48.0
65	TZ Bridge mid-channel	21.438596	0.508772	57.0
14	Cold Spring Harbor	22.542857	0.114286	35.0
74	Yonkers mid-channel	25.019231	0.519231	52.0
37	Irvington Beach	28.805556	0.250000	36.0

In [67]:
```
plot('Site', 'EnteroCount', data=givenData, aspect = 2.5, kind='bar', order=givenD
```

Out[67]: <seaborn.axisgrid.FacetGrid at 0x1040adb0>



Sorting by EnteroCount by descending order to get most count number first

In [68]:
```
worstPlacesToSwim = siteData.sort_values(by='EnteroCount', ascending=False).reset
worstPlacesToSwim[0:10]
```

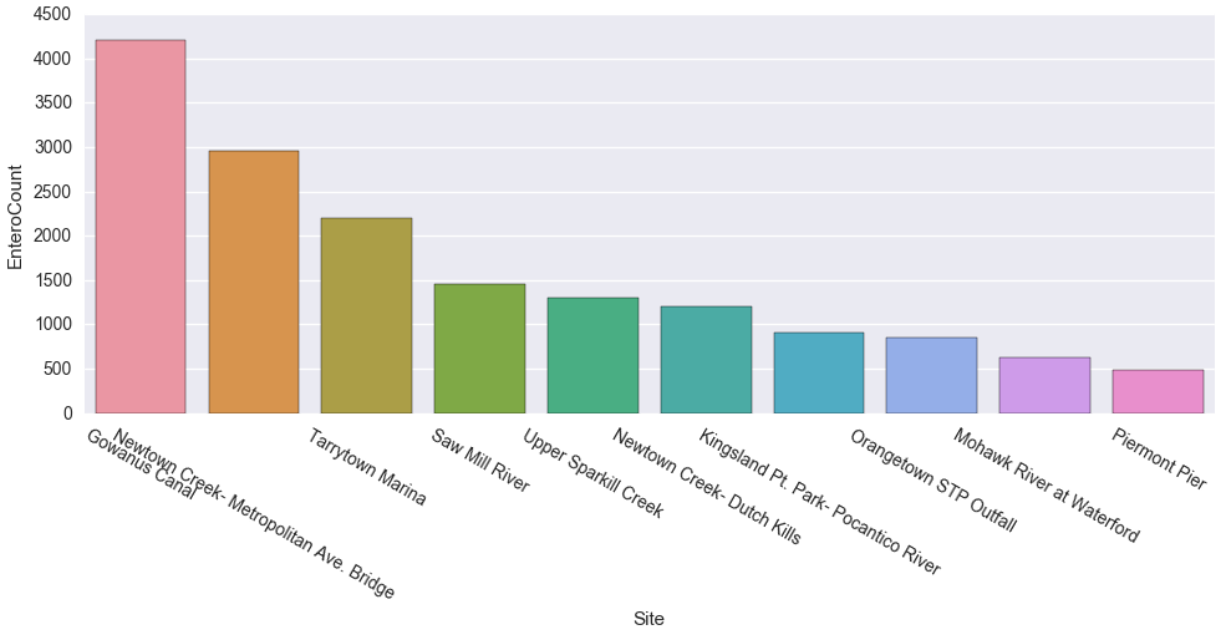
Out[68]:

	index	Site	EnteroCount	FourDayRainTotal	SampleCount
0	29	Gowanus Canal	4206.837838	0.648649	37.0
1	48	Newtown Creek- Metropolitan Ave. Bridge	2953.684211	0.614035	57.0
2	66	Tarrytown Marina	2205.666667	0.592593	27.0
3	63	Saw Mill River	1455.760000	0.520000	50.0
4	70	Upper Sparkill Creek	1296.072727	0.327273	165.0
5	47	Newtown Creek- Dutch Kills	1205.087719	0.614035	57.0
6	39	Kingsland Pt. Park- Pocantico River	907.857143	0.404762	42.0
7	53	Orangetown STP Outfall	854.192982	0.456140	57.0
8	45	Mohawk River at Waterford	621.057143	0.371429	35.0
9	57	Piermont Pier	482.165775	0.336898	187.0

In [69]:
```
worstPlacesToSwim[0:10]

plot('Site', 'EnteroCount', data=givenData, aspect = 2.5, kind='bar', order=givenD
```

Out[69]: <seaborn.axisgrid.FacetGrid at 0xce5c950>



The testing of water quality can be sporadic. Which sites have been tested most regularly? Which ones have long gaps between tests? Pick out 5-10 sites and visually compare how regularly their water quality is tested.

In [70]:
```
import datetime

sitelist = ['East River mid-channel at Roosevelt Is.', 'Esopus Creek West', 'Norr
            'North River STP at 145th', 'Nyack Launch Ramp', 'The Battery mid-cha

Question2Data = riverkeeper[riverkeeper['Site'].isin(sitelist)]
givenData.loc[:,'MonthYear'] = pd.to_datetime(Question2Data.loc[:,'Date'])
```

In [72]:
```
sns.set_palette("deep", desat=.6)

givenData = Question2Data

#new Column addd
givenData.loc[:,'MonthYear'] = givenData.loc[:,'Date'].apply(lambda x : datetime.
givenData[1:5]
```

Out[72]:

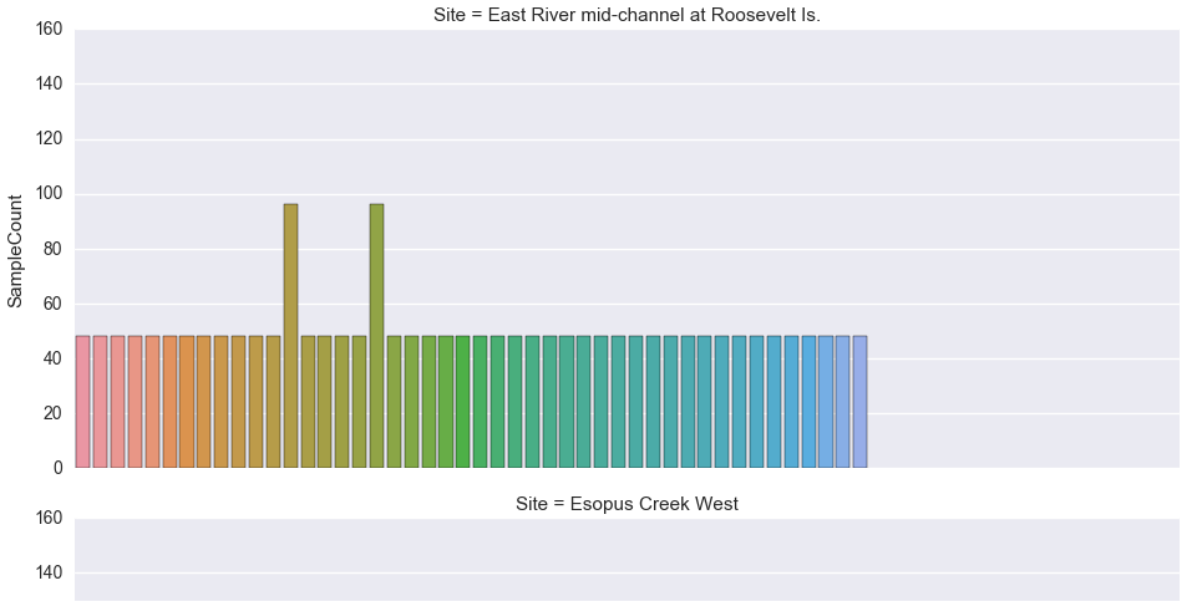
	Site	Date	EnteroCount	FourDayRainTotal	SampleCount	MonthYear
694	Esopus Creek West	2012-06-15	2	0	42	2012-06-01
695	Esopus Creek West	2013-10-20	8	0	42	2013-10-01
696	Esopus Creek West	2013-09-21	13	0	42	2013-09-01
697	Esopus Creek West	2013-08-18	17	0	42	2013-08-01

In [74]:
```
#making sum
givenData = givenData.groupby(by=['Site','MonthYear'], as_index=False).sum()
```

Plotting site data showing gaps in reading

In [75]:
```
sns.factorplot(x='MonthYear', y='SampleCount', data=givenData, row='Site', aspect
```

Out[75]: <seaborn.axisgrid.FacetGrid at 0x110d2730>



Is there a relationship between the amount of rain and water quality? Show this relationship graphically. If you can, estimate the effect of rain on quality at different sites and create a visualization to compare them.

Printing 10 rows

In [77]:
```
siteData[0:10]
```

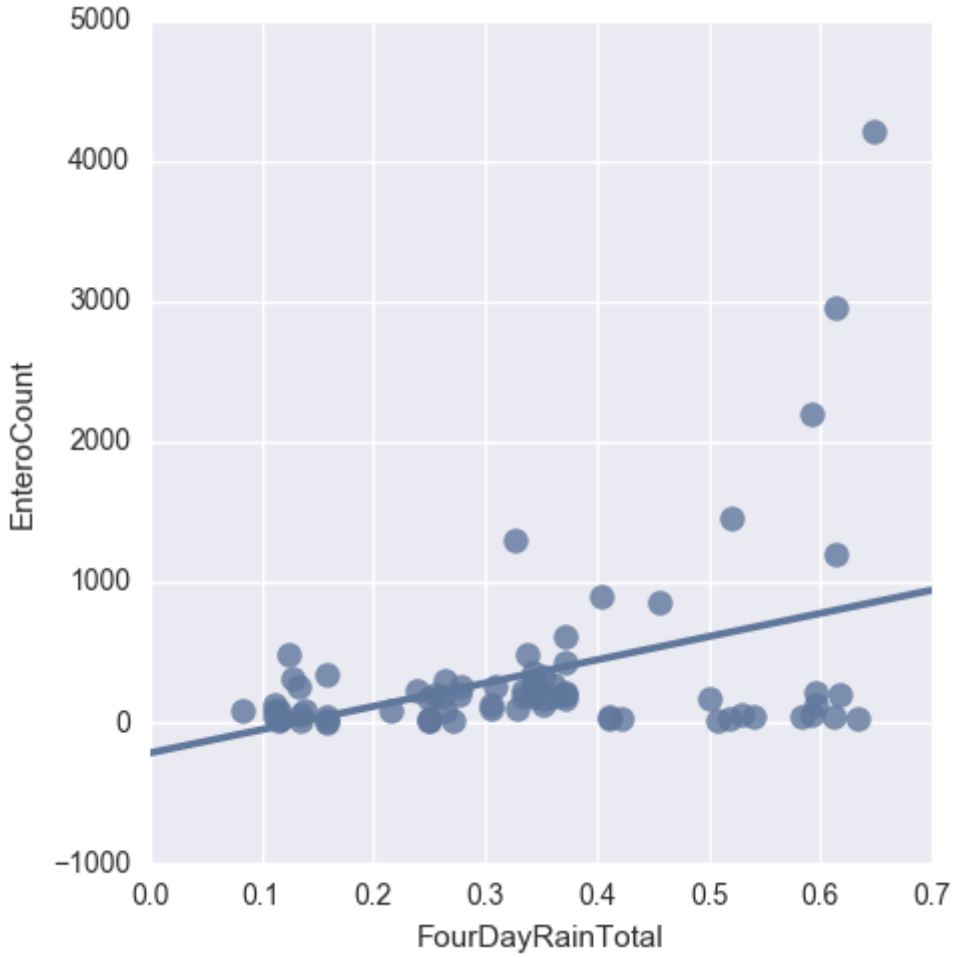
Out[77]:

	Site	EnteroCount	FourDayRainTotal	SampleCount
0	125th St. Pier	179.696970	0.500000	66.0
1	79th St. mid-channel	47.204082	0.612245	49.0
2	Albany Rowing Dock	280.944444	0.361111	36.0
3	Annesville Creek	83.421053	0.263158	38.0
4	Athens	201.314286	0.371429	35.0
5	Beacon Harbor	52.657895	0.157895	38.0
6	Bethlehem Launch Ramp	231.694444	0.333333	36.0
7	Castle Point, NJ	37.076923	0.410256	39.0
8	Castleton	186.000000	0.342857	35.0
9	Catskill Creek- East End	261.238095	0.309524	42.0

By looking at above 10 rows; it is not clear if there is any relationship betweeen rain and EnteroCount

In [79]:
```
sns.lmplot(data=siteData, x='FourDayRainTotal', y='EnteroCount',ci=None, scatter_
```

Out[79]:
```
<seaborn.axisgrid.FacetGrid at 0x9ea8670>
```



I expected with more rain, water quality to be better (means less EnteroCount) but that is not case here