

WHERE IN THE U.S. IS CAPTAIN PLANET NEEDED MOST?



i.e. What state needs its ass kicked the most for disrespecting the planet?

Jonathan Batchelor



Aside from
the obvious
current
location...



And the
current
individuals
needing an
ass kicking.

Purpose

- To identify the State in the United States that is in the most dire need of environmental action. Not the state that is the most degraded.
- To make this assessment using 10 criteria, trying to take into account many different factors and not just immediately obvious environmental crisis.

10 Criteria

- Air Quality
- CO₂ Emissions
- Water Quality
- Population Density
- Population Change
- Area Developed
- # of Endangered Species
- Per Capita Garbage Output
- Energy Use
- Cancer Rate

Excel Data Compilation

- Data was compiled and worked with largely in Excel to generate state rankings in each of the 10 criteria.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
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AIR QUALITY

Why?

- Toxins in the air have impacts on every thing from acid rain to asthma attacks.

What?

- Average number of days across monitoring stations in each state where AQI was deemed 'unhealthy to sensitive groups'
- CO NO₂ O₃ SO₂ PM2.5 PM10

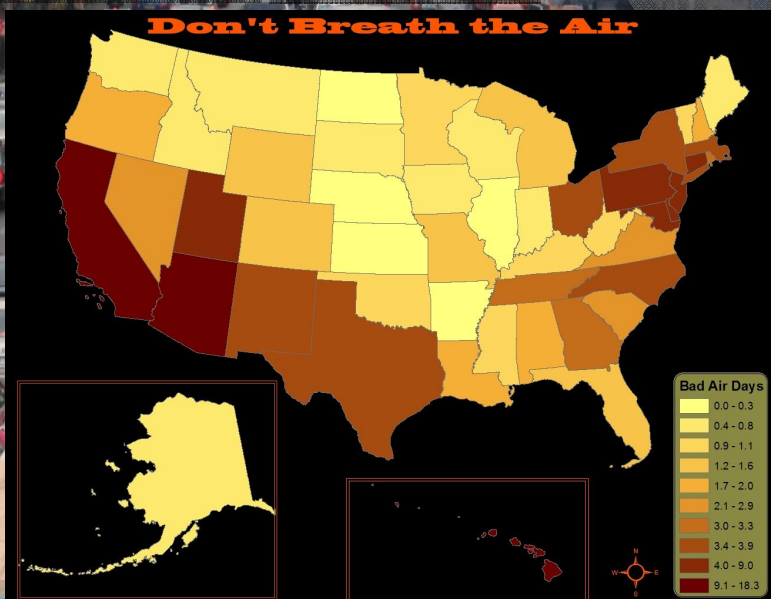
Source:

- US EPA - AirData Air Quality Index

AIR QUALITY

Best = North Dakota
Worst = California

Don't Breathe the Air



CO₂ EMISSIONS

Why?

- While linked to air quality and energy use, CO₂ is of special concern as the driving force behind global warming. Energy use is possible with little to no CO₂ emission so this category is necessary to reflect CO₂ significance.

What?

- Amount of CO₂ produced by electric companies divided by population in each state. (metric tons)

Source:

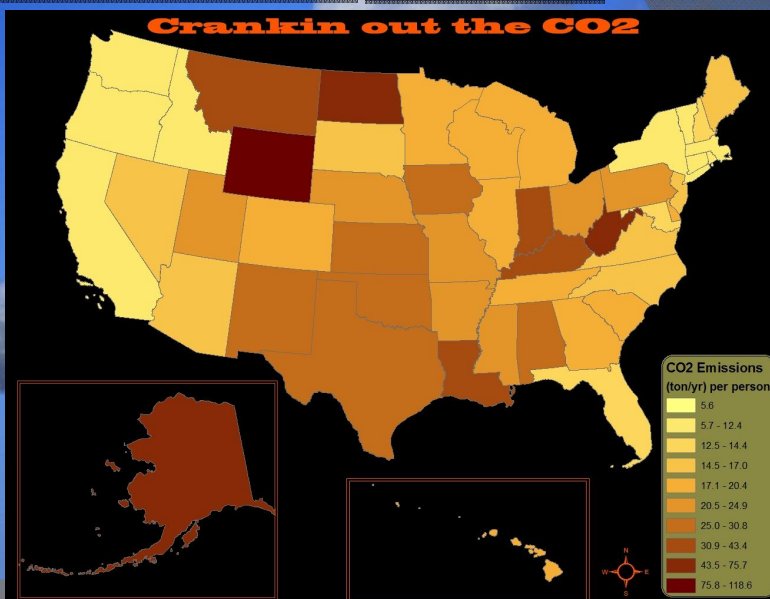
- US Energy Information Administration

CO₂ EMISSIONS

Best = DC

Worst = Wyoming

Crankin out the CO₂



WATER QUALITY

Why?

- Clean fresh water sources are rapidly disappearing. Water is one of the most basic needs of all life and a frightening percentage of water is unsafe to drink.

What?

- Number of water ways on the 303d list of impaired water bodies divided by state area.

Source:

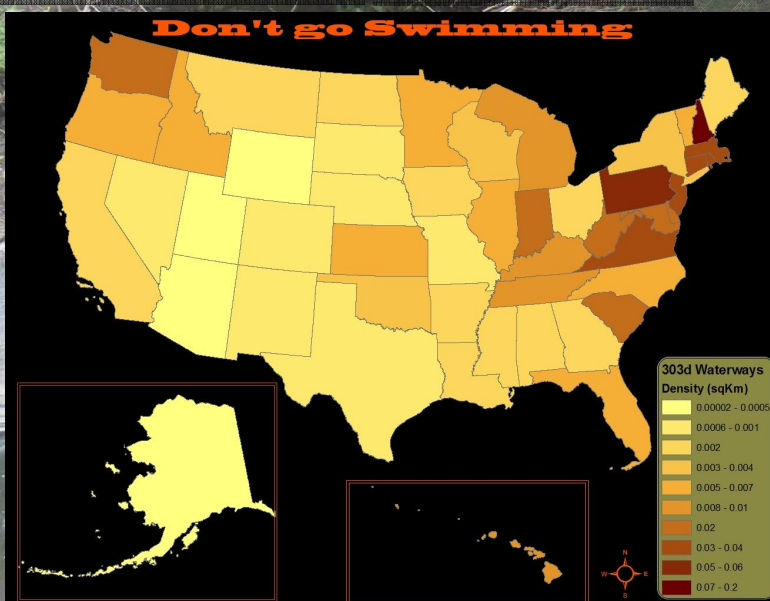
- US EPA – Clean Water Report

WATER QUALITY

Best = Alaska

Worst = New Hampshire

Don't go Swimming



POPULATION DENSITY

Why?

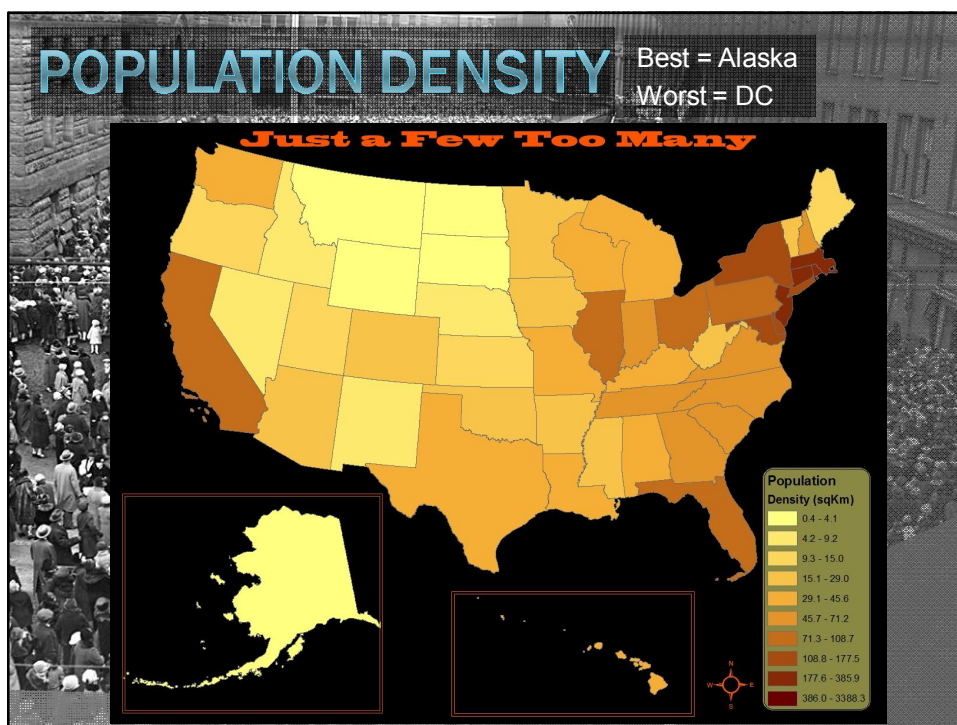
- Humans are essentially the source and cause of all environmental degradations. The more people in an area the more land and resources required to support them.

What?

- Estimated 2009 population divided by state area.

Source:

- US Census Bureau



POPULATION CHANGE %

Why?

- Similar to population density, an area with a high rate of human population increase faces potentially dire consequences if the population increase is not checked.

What?

- Estimated 2009 population increase from 2008 divided by total population.

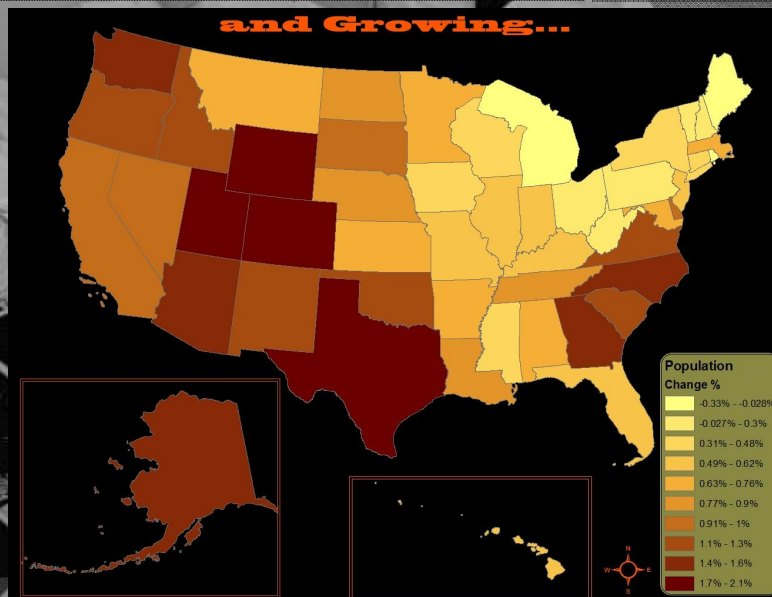
Source:

- US Census Bureau

POPULATION CHANGE %

Best = Michigan
Worst = Wyoming

and Growing...



AREA DEVELOPED

Why?

- The more area taken over by humans, the less area that nature has to do its thing. Already approximately 70% of all arable land is converted to human use.

What?

- Percentage of land converted to human use. Included in this is all urban, industrial, and agricultural land

Source:

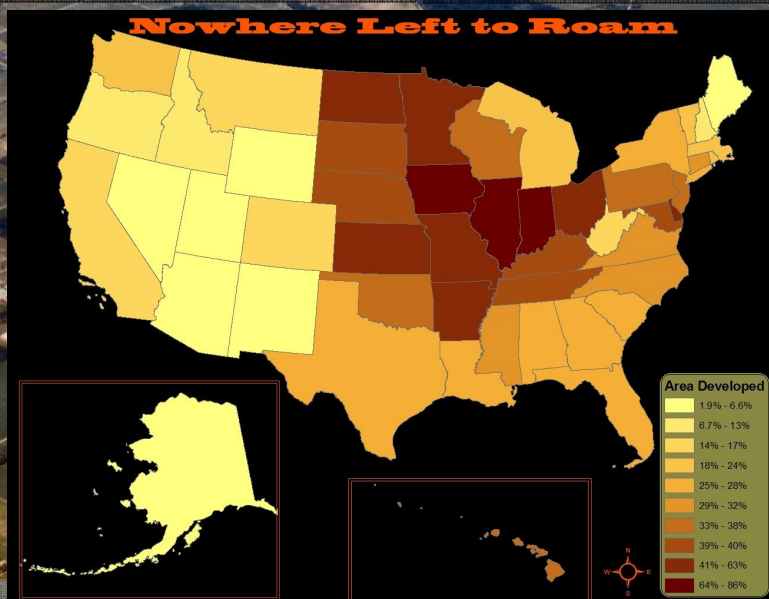
- USGS EROS Center

AREA DEVELOPED

Best = Alaska

Worst = Iowa (Damn Corn Fields)

Nowhere Left to Roam



ENDANGERED SPECIES

Why?

- ◉ The disappearance of a seemingly insignificant species can have massive and unforeseen effects. While more species listed is not indicative of a worse environment the presence of endangered species compels action to preserve habitat and thus deserves consideration.

What?

- ◉ Number of endangered species by state.

Source:

- ◉ US Fish and Wildlife Service

ENDANGERED SPECIES

Least = DC
Most = Hawaii

No One Left to Roam



PER CAPITA GARBAGE

Why?

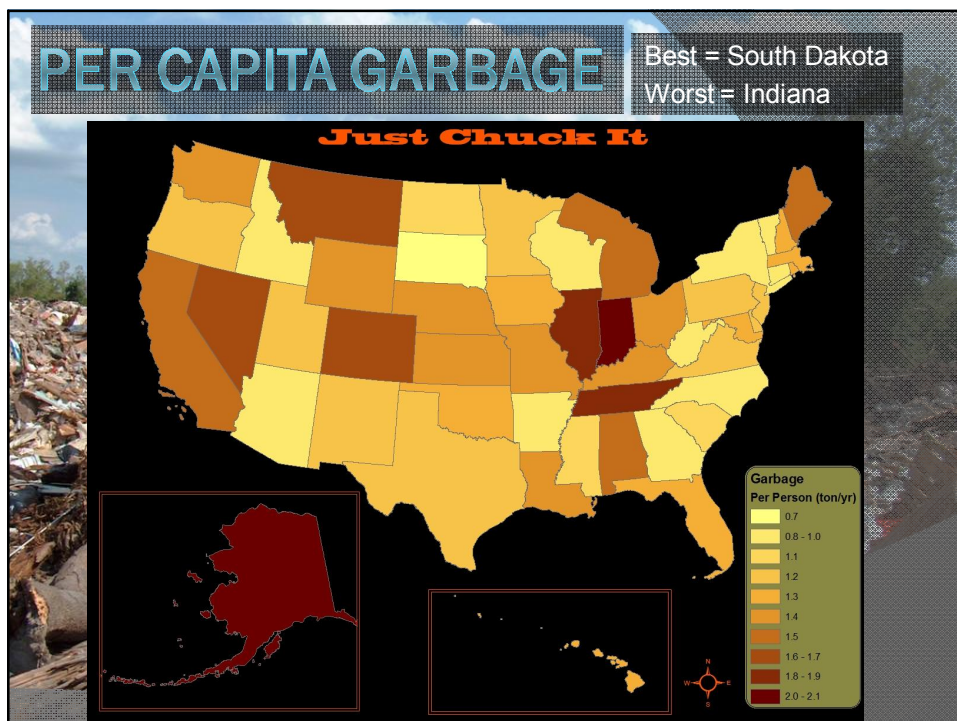
- Not only tied to land fill use and the dumping of toxics, this can also be viewed as an indicator of consumption rates. Consumption of resources is the heart of all environmental degradation.

What?

- Estimated Municipal Solid Waste (MSW) generated by state. (tons/yr)

Source:

- BioCycle. 2006.47(4): 26



ENERGY USE

Why?

- More energy used, the more power plants needed. While coal, nuclear, or hydro electric are perhaps the worst, there is no such thing as a totally 'green' source of energy.

What?

- Amount of Energy used per capita in each state. (million Btu)

Source:

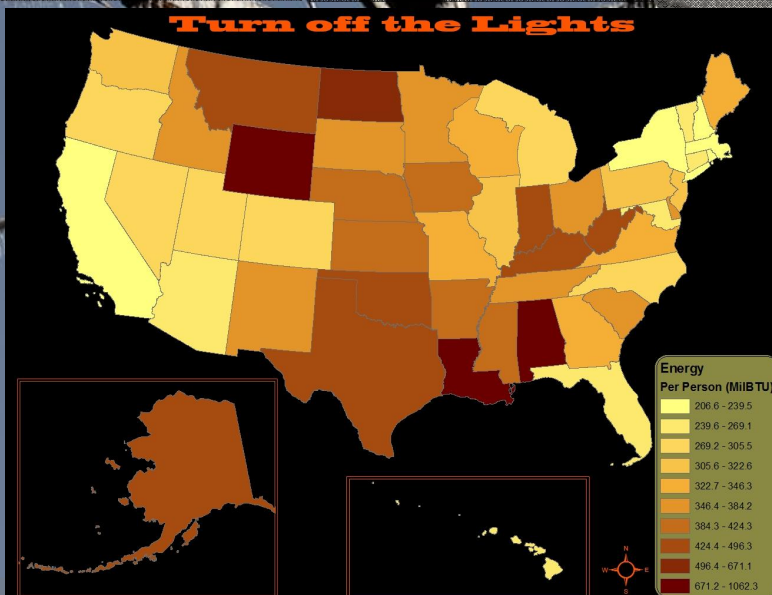
- US Energy Information Administration

ENERGY USE

Best = Rhode Island

Worst = Alabama

Turn off the Lights



CANCER RATE

Why?

- Humans as 'guinea pigs'. Most cancers are caused by environmental factors. It is an easy assumption to make that there is something environmentally going on in areas with higher cancer rates.

What?

- Cancer death rate by state.

Source:

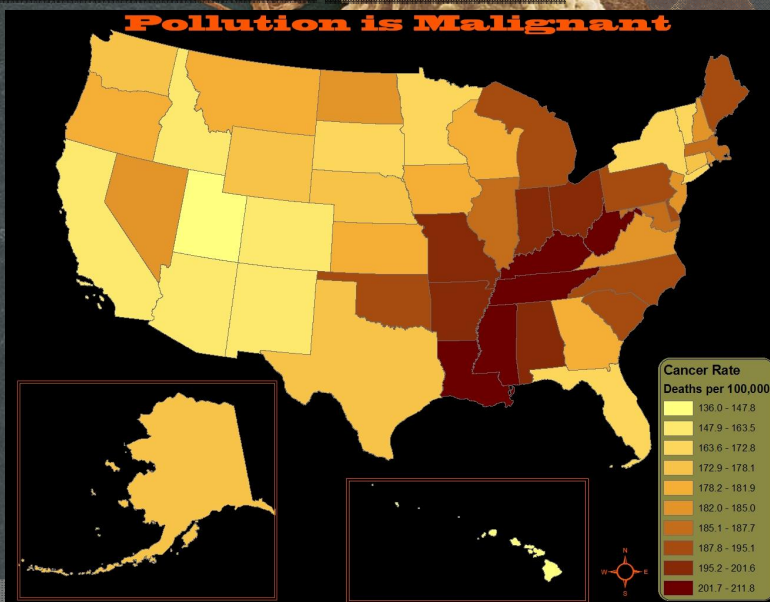
- National Cancer Institute: State cancer profiles

CANCER RATE

Best = Utah

Worst = Kentucky

Pollution is Malignant



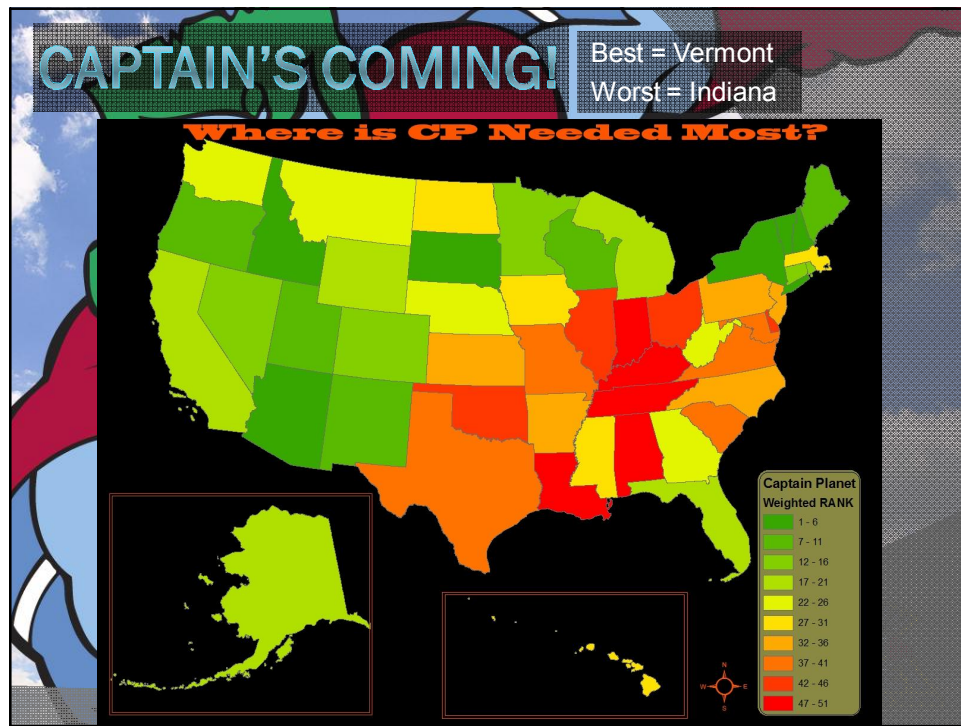
WEIGHTING THE VARIABLES

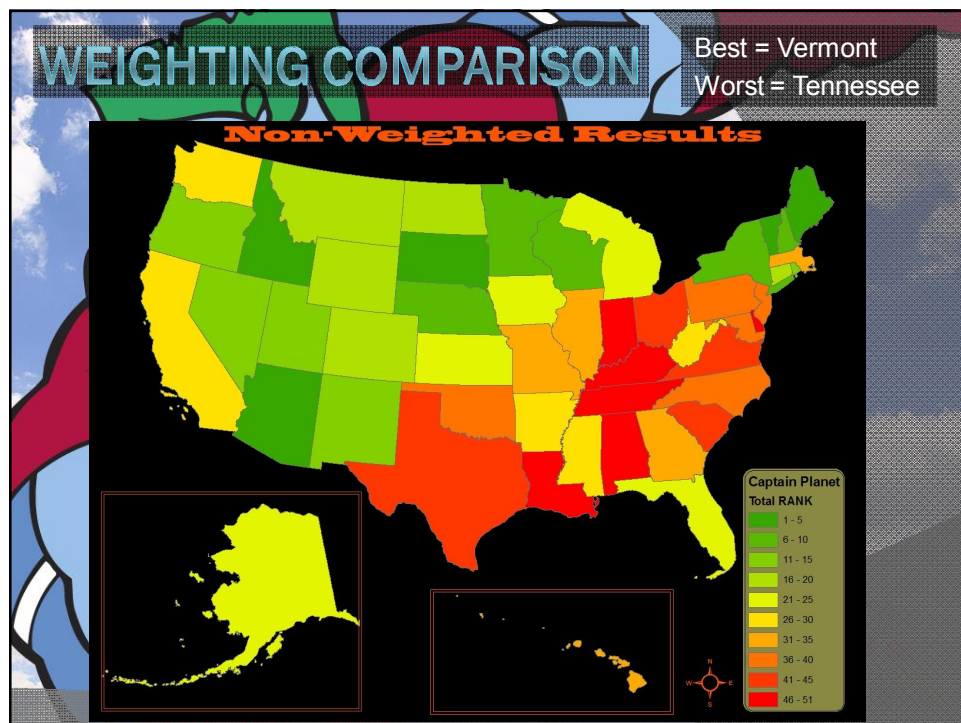
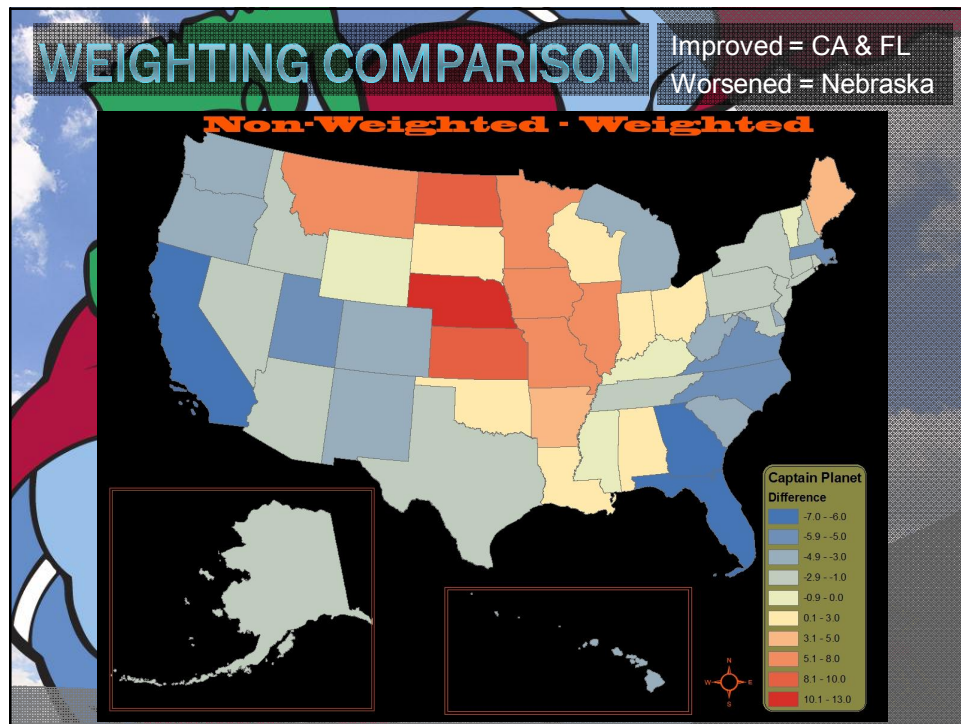
1) Energy Use.....	15%
2) Area Developed.....	15%
3) Per Capita Garbage Output.....	14%
4) Population Density.....	11%
5) Cancer Rate.....	10%
6) Air Quality.....	8%
7) CO ₂ Emissions.....	8%
8) Population Change.....	7%
9) Water Quality.....	6%
10)# of Endangered Species.....	6%

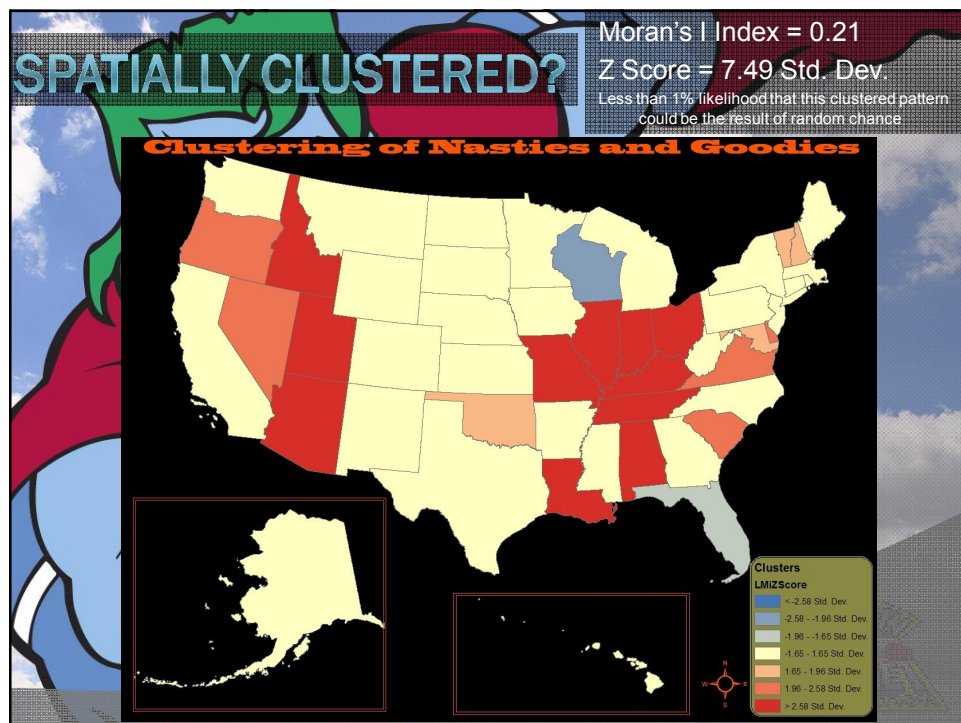
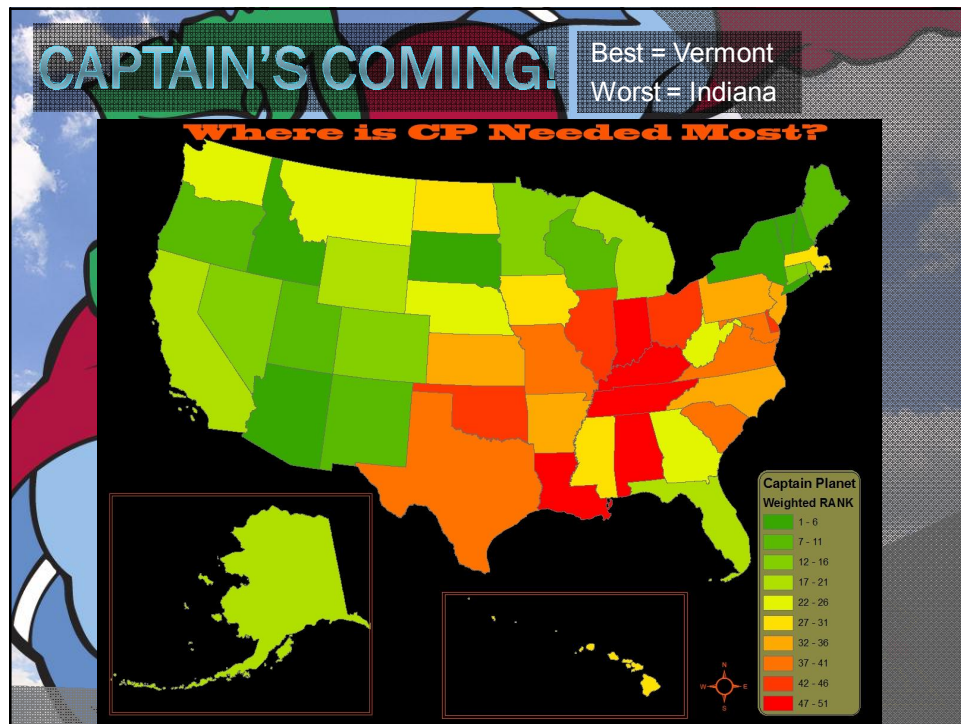
*Weight determined after consulting with Dr. T at Humboldt State University

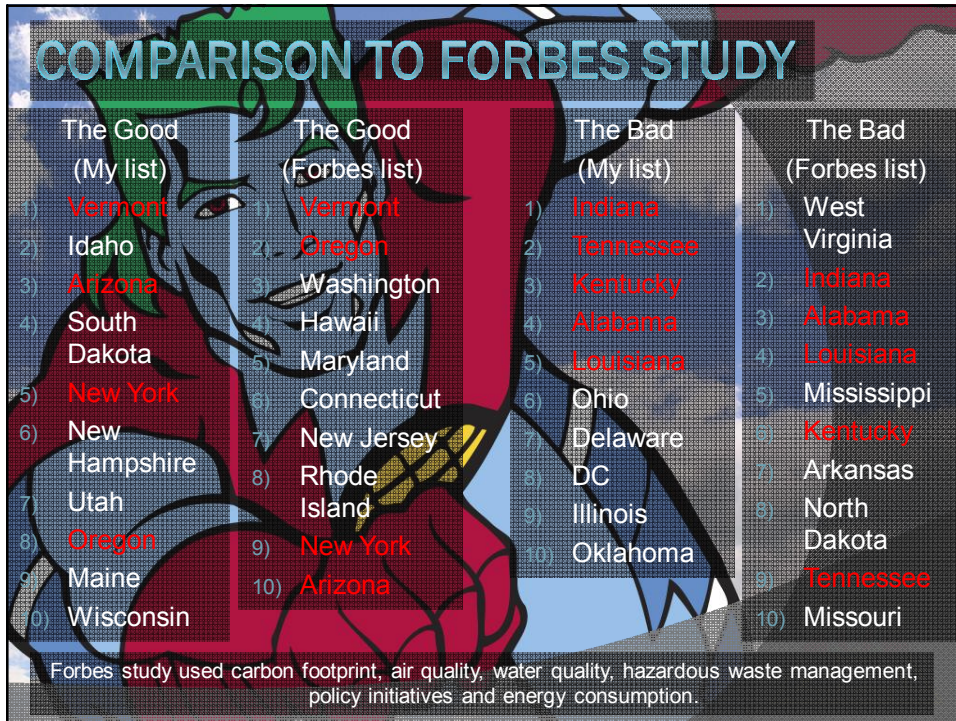
METHODS

- 1) Standardized all the data and ranked the states 1-51 (DC is the 51st)
- 2) Applied the weight scale to the data and then re-ranked the states 1-51
- 3) Determined if results are spatially clustered (Anselin Local Moran's I)





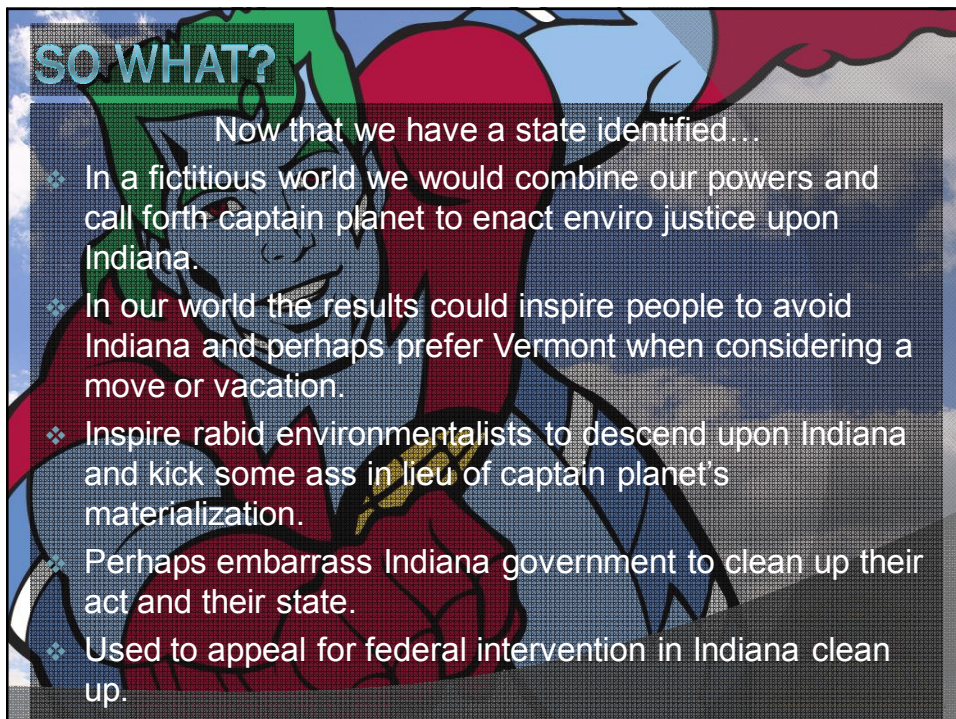




COMPARISON TO FORBES STUDY

The Good (My list)	The Good (Forbes list)	The Bad (My list)	The Bad (Forbes list)
1) Vermont	1) Vermont	1) Indiana	1) West Virginia
2) Idaho	2) Oregon	2) Tennessee	2) Indiana
3) Arizona	3) Washington	3) Kentucky	3) Alabama
4) South Dakota	4) Hawaii	4) Alabama	4) Louisiana
5) New York	5) Maryland	5) Louisiana	5) Mississippi
6) New Hampshire	6) Connecticut	6) Ohio	6) Kentucky
7) Utah	7) New Jersey	7) Delaware	7) Arkansas
8) Oregon	8) Rhode Island	8) DC	8) North Dakota
9) Maine	9) New York	9) Illinois	9) Tennessee
10) Wisconsin	10) Arizona	10) Oklahoma	10) Missouri

Forbes study used carbon footprint, air quality, water quality, hazardous waste management, policy initiatives and energy consumption.



SO WHAT?

Now that we have a state identified...

- ❖ In a fictitious world we would combine our powers and call forth captain planet to enact enviro justice upon Indiana.
- ❖ In our world the results could inspire people to avoid Indiana and perhaps prefer Vermont when considering a move or vacation.
- ❖ Inspire rabid environmentalists to descend upon Indiana and kick some ass in lieu of captain planet's materialization.
- ❖ Perhaps embarrass Indiana government to clean up their act and their state.
- ❖ Used to appeal for federal intervention in Indiana clean up.

Limits of Data

- ◉ Data's reliability is unknown
- ◉ State level analysis is all that was possible with available data
- ◉ Some states had more complete data than others (air quality is one example)
- ◉ Weighting factors are completely subjective even if they are arrived at by an informed 'expert'.
- ◉ Ignored pollution types that don't impact all states (i.e. water issues in coastal states or radiation leakage in states with nuclear containment facilities) in order to develop a ranking that could be applied to all states.

Error of Scale

- ◉ Generalizing on a state level could be misleading as a state could have one bad county that throws off the whole state's rank
- ◉ Assume that a state's government is responsible for the conditions state wide and this concern can be somewhat addressed

