

**Community Population Analysis Spreadsheet Tool:
for Evaluation and Determination of U.S. Census
Population Data and Population Forecasting**

Tab 1: **About** the Population Forecast Spreadsheet Tool & Tab Index

Tab 2: Data and Findings Summary Report Generation (**Printing**)

Tab 3: Population Forecasting Tools w/ **User Provided Input**

Tab 4: **County** Population Forecasting Tool w/ US Census Bureau Data

Tab 5: Historic **county** pop. data, compiled from the US Census Bureau

Note: This spreadsheet should be used in conjunction with the Department's Reasonably Anticipated Future Needs Municipal Water Rights Development Handbook. If you do not have this document please contact the Idaho Department of Water Resources, State Office.

DISCLAIMER: This spreadsheet tool was created for internal use by Department staff. However, the Department is not opposed to the use of this tool by the public. Public users should be aware that the use of this tool does not imply or guarantee review approval by the Department. Furthermore, this tool is provided with no warranty expressed or implied. The user has full responsibility to verify all assumptions, relationships, and calculations contained within.

Prepared By: Mathew Weaver, PE

Created: November 9, 2011

Please contact Mathew Weaver for questions on use, requests for added features, or required corrections to the spreadsheet.

[Read Me](#)

Population Analysis Summary

Select Data Source

- ☒ User Input Population Data
- ☐ US Census ID County Population Data

Summary of Planning Data

Planning Area: Gem City

Beginning of
Model Analysis (Year): 1930

Start of Planning Horizon (PH): 2010

Duration of PH: 30

Summary of Model Parameters

Model Type: Exponential

R^2 : 0.9297

Mean Error: 1.18

Mean Absolute Percent Error: 9.2%

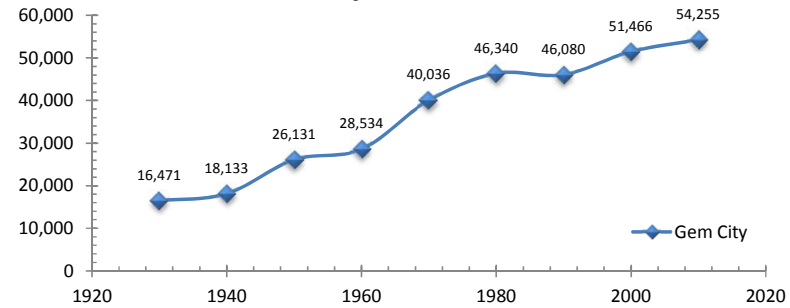
Population Data Source Citations

All population data supplied by user.

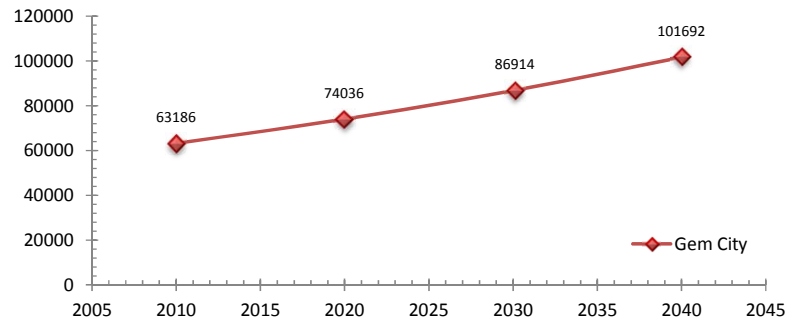
Applicant:

WR No.:

Historical Population Time Series



Forecast Population Time Series



Population Forecasting From User Input Data

Input Number of Data Points to be Used in Population Forecast

Note: a minimum of three data points must be used,
and a maximum of 10 data points can be used.

9 No. of Selected Data Points

Input Name of Community

Gem City

Enter Start of Planning Horizon

2010

About Planning Horizons

Enter Period of Planning Horizon

30

Select Population Forecast Model Type

Exponential

About Model Selection

Statistical Summary of Model Adequacy

$R^2 = 0.9297$

About Coefficient of Determination

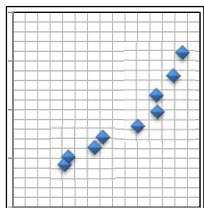
ME = 1.2

About Mean Error

MAPE = 9.16%

About Mean Absolute Percent Error

Plot of Predicted (y-axis)
vs. Actual (x-axis) Data



About Plot of Predicted vs. Actual Pop.

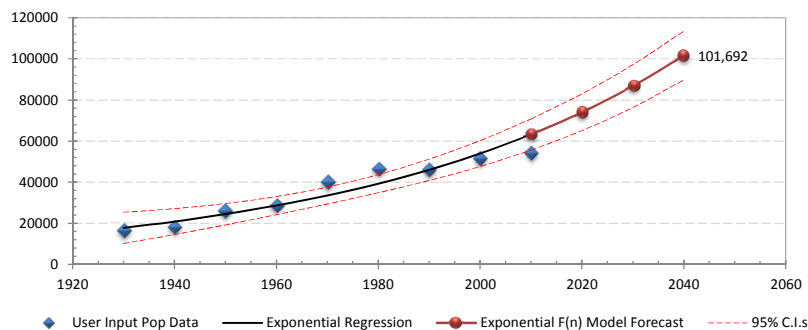
READ ME

Input User Population Data Here

User Must Input Population Data in All Yellow Hi-Lighted Cells, e.g. Date: 2005, Pop. 10,000

Index	1	2	3	4	5	6	7	8	9
Date	1930	1940	1950	1960	1970	1980	1990	2000	2010
Pop.	16,471	18,133	26,131	28,534	40,036	46,340	46,080	51,466	54,255

Graph of User Input Population Data w/ Exponential Regression Model
for the Gem City Community



$$y = 8.99372883233005E-10 (m)^{1.0159}$$

$$R^2 = 0.9297$$

Note, Annual Compound Growth Rate: 2.19%

About the Selected Regression Model Function

Exponential Extrapolation Function: $y = B(m)^x$

A widely used extrapolation curve that describes the compound growth of a phenomena measured in time intervals.

Growth rate is constant and the growth increment increases in time from one year to the next. This curve is ideal for growth that is not limited by resource constraints such as land available for development.

Pocatello

1930 16,471

1940 18,133

1950 26,131

1960 28,534

1970 40,036

1980 46,340

1990 46,080

2000 51,466

2010 54,255

Comparative Statistical Summary of all Models

Parameter	Linear	Logarithmic	Power	Exponential	Mod. Expon.	Parabolic	Gompertz
R^2	0.9636	0.9646	0.9321	0.9297	0.9653	0.9710	0.9969
ME	0.00	0.00	-0.34	1.18	0.00	0.00	121.00
MAPE	6.2%	6.2%	9.0%	9.2%	8.0%	6.8%	6.3%

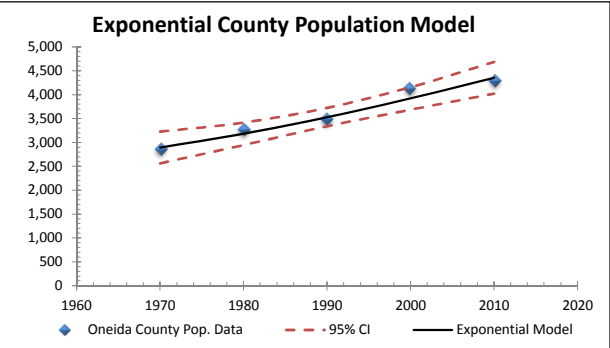
Population Forecasting From U.S. Census County Data

Select County for Analog Comparison

Oneida County

Select Beginning Decade for Analog Comparison

1970 Beginning Decade



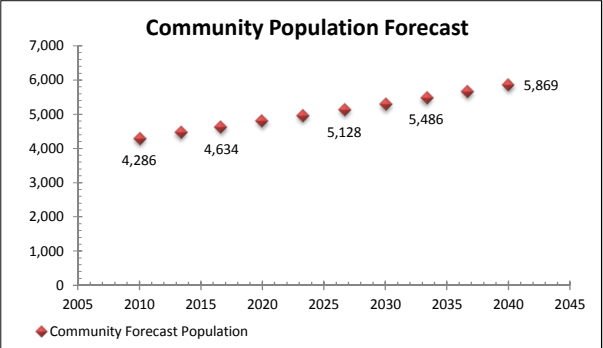
Exponential Growth Calculator

Exponential Growth Eqn.: $P_t = P_i * (e^{rt})$

About Planning Horizons

PH _i =	2010	Enter Start of Planning Horizon
t =	30	Enter Period of Planning Horizon
P _i =	4,286	Population in 2010
r =	1.05%	exponential growth rate
P _t =	5,869	Forecast Population in 2040

Read Me



Spreadsheet Control - don't overwrite cells

1900	1	1970
1910	2	
1920	3	8
1930	4	
1940	5	
1950	6	
1960	7	
1970	8	
1980	9	
1990	10	
2000	11	
2010	12	
2020	13	

Warning Control

1900	0
1910	0
Sum	0

County Name Control

Oneida County
Oneida County Pop. Data
Expon. Model (Oneida County)

Plot County Data (do not edit cell content within box)

Index	0	1	2	3	4	5	6	7	8	9	10	11
Date	1970	1980	1990	2000	2010	0	0	0	0	0	0	0
Pop.	2,864	3,258	3,492	4,125	4,286	0	0	0	0	0	0	0

Community Plot Data

Index	1	2	3	4	5	6	7	8	9	10
Year	1	4	7	11	14	17	20	24	27	30
Calendar Year	2010	2013	2017	2020	2023	2027	2030	2033	2037	2040
Population	4,286	4,480	4,634	4,793	4,957	5,128	5,304	5,486	5,674	5,869

Summary Table of Confidence Interval for Regression Plot

Year	X _i	Y _i	SS _{tot}	Y _i	SS _{resid}	CI Int. (CI _i)	Lower CI	Upper CI
1	1970	2,864	5.E+05	2,894	910	333	2,562	3,227
10	1980	3,258	1.E+07	3,180	6,032	235	2,945	3,415
20	1990	3,492	1.E+07	3,532	1,569	192	3,340	3,724
30	2000	4,125	2.E+07	3,922	41,338	235	3,687	4,157
40	2010	4,286	2.E+07	4,355	4,739	333	4,022	4,687
--	--	--	--	--	--	--	0	0
--	--	--	--	--	--	--	0	0
--	--	--	--	--	--	--	0	0
--	--	--	--	--	--	--	0	0
--	--	--	--	--	--	--	0	0
--	--	--	--	--	--	--	0	0
--	--	--	--	--	--	--	0	0
Avg.:	1990	3,605	6.E+07	ΣS _r _{resid}	54,588			
DevSq.:	1000			n =	5			
				k =	2			
				C.I. =	0.95			
				d.f., =	3			
				t value =	3.18245			
				S.E. _{regres} =	134.89			
				R^2 =	0.9991			

About CIs

US Census Decadal Population Data for Idaho and Idaho Counties

FIPS	Counties	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010
16000	All (Idaho)	161,772	325,594	431,866	445,032	524,873	588,637	667,191	712,567	943,935	1,006,749	1,293,953	1,567,582
16001	Ada County	11,559	29,088	35,213	37,925	50,401	70,649	93,460	112,230	173,036	205,775	300,904	392,365
16003	Adams County	---	---	2,966	2,867	3,407	3,347	2,978	2,877	3,347	3,254	3,476	3,976
16005	Bannock County	11,702	19,242	27,532	31,266	34,759	41,745	49,342	52,200	65,421	66,026	75,565	82,839
16007	Bear Lake County	7,051	7,729	8,783	7,872	7,911	6,834	7,148	5,801	6,931	6,084	6,411	5,986
16009	Benewah County	---	---	6,997	6,371	7,332	6,173	6,036	6,230	8,292	7,937	9,171	9,285
16011	Bingham County	10,447	23,306	18,310	18,561	21,044	23,271	28,218	29,167	36,489	37,583	41,735	45,607
16013	Blaine County	4,900	8,387	4,473	3,768	5,295	5,384	4,598	5,749	9,841	13,552	18,991	21,376
16015	Boise County	4,174	5,250	1,822	1,847	2,333	1,776	1,646	1,763	2,999	3,509	6,670	7,028
16017	Bonner County	---	13,588	12,957	13,152	15,667	14,853	15,587	15,560	24,163	26,622	36,835	40,877
16019	Bonneville County	---	---	17,501	19,664	25,697	30,210	46,906	51,250	65,980	72,207	82,522	104,234
16021	Boundary County	---	---	4,474	4,555	5,987	5,908	5,809	6,371	7,289	8,332	9,871	10,972
16023	Butte County	---	---	2,940	1,934	1,877	2,722	3,498	2,925	3,342	2,918	2,899	2,891
16025	Camas County	---	---	1,730	1,411	1,360	1,079	917	728	818	727	991	1,117
16027	Canyon County	7,497	25,323	26,932	30,930	40,987	53,597	57,662	61,288	83,756	90,076	131,441	188,923
16029	Caribou County	---	---	2,191	2,121	2,284	5,576	5,976	6,534	8,695	6,963	7,304	6,963
16031	Cassia County	3,951	7,197	15,659	13,116	14,430	14,629	16,121	17,017	19,427	19,532	21,416	22,952
16033	Clark County	---	---	1,886	1,122	1,005	918	741	798	762	1,022	982	982
16035	Clearwater County	---	---	4,993	6,599	8,243	8,217	8,548	10,871	10,390	8,505	8,930	8,761
16037	Custer County	2,049	3,001	3,550	3,162	3,549	3,318	2,996	2,967	3,385	4,133	4,342	4,368
16039	Elmore County	2,286	4,785	5,087	4,491	5,518	6,687	16,719	17,479	21,565	21,205	29,130	27,038
16041	Franklin County	---	---	8,650	9,379	10,229	9,867	8,457	7,373	8,895	9,232	11,329	12,786
16043	Fremont County	12,821	24,606	10,380	9,924	10,304	9,351	8,679	8,710	10,813	10,937	11,819	13,242
16045	Gem County	---	---	6,427	7,419	9,544	8,730	9,127	9,387	11,972	11,844	15,181	16,719
16047	Gooding County	---	---	7,548	7,580	9,257	11,101	9,544	8,645	11,874	11,633	14,155	15,464
16049	Idaho County	9,121	12,384	11,749	10,107	12,691	11,423	13,542	12,891	14,769	13,783	15,511	16,267
16051	Jefferson County	---	---	9,441	9,171	10,762	10,495	11,672	11,619	15,304	16,543	19,155	26,140
16053	Jerome County	---	---	5,729	8,358	9,900	12,080	11,712	10,253	14,840	15,138	18,342	22,374
16055	Kootenai County	10,216	22,747	17,878	19,469	22,283	24,947	29,556	35,332	59,770	69,795	108,685	138,494
16057	Latah County	13,451	18,818	18,092	17,798	18,804	20,971	21,170	24,891	28,749	30,617	34,935	37,244
16059	Lemhi County	3,446	4,786	5,164	4,643	6,521	6,278	5,816	5,566	7,460	6,899	7,806	7,936
16061	Lewis County	---	---	5,851	5,238	4,666	4,208	4,423	3,867	4,118	3,516	3,747	3,821
16063	Lincoln County	1,784	12,676	3,446	3,242	4,230	4,256	3,686	3,057	3,436	3,308	4,044	5,280
16065	Madison County	---	---	9,167	8,316	9,186	9,156	9,417	13,452	19,480	23,674	27,467	37,536
16067	Minidoka County	---	---	9,035	8,403	9,870	9,785	14,394	15,731	19,718	19,361	20,174	20,069
16069	Nez Perce County	13,748	24,860	15,253	17,591	18,873	22,658	27,066	30,376	33,220	33,754	37,410	39,265
16071	Oneida County	8,933	15,170	6,723	5,870	5,417	4,387	3,603	2,864	3,258	3,492	4,125	4,286
16073	Owyhee County	3,804	4,044	4,694	4,103	5,652	6,307	6,375	6,422	8,272	8,392	10,644	11,526
16075	Payette County	---	---	7,021	7,318	9,511	11,921	12,363	12,401	15,722	16,434	20,578	22,623
16077	Power County	---	---	5,105	4,457	3,965	3,988	4,111	4,864	6,844	7,086	7,538	7,817
16079	Shoshone County	11,950	13,963	14,250	19,060	21,230	22,806	20,876	19,718	19,226	13,931	13,771	12,765
16081	Teton County	---	---	3,921	3,573	3,601	3,204	2,639	2,351	2,897	3,439	5,999	10,170
16083	Twin Falls County	---	13,543	28,398	29,828	36,403	40,979	41,842	41,807	52,927	53,580	64,284	77,230
16085	Valley County	---	---	2,524	3,488	4,035	4,270	3,663	3,609	5,604	6,109	7,651	9,862
16087	Washington County	6,882	11,101	9,424	7,962	8,853	8,576	8,378	7,633	8,803	8,550	9,977	10,198

Citation (1900-1990): U.S. Census Bureau. (1995, March 27). *Population of County by Decennial Census: 1900 to 1990*. Retrieved August 17, 2011, from <http://www.census.gov/population/cencounts/id190090.txt>

Citation (2000): U.S. Census Bureau. (n. d.) *Census 2000 Redistricting Data (Public Law 94-171) Summary File, Matrices PL1 and PL2*. Retrieved August 17, 2011, from http://factfinder.census.gov/servlet/GCTTable?_bm=n&_lang=en&mt_name=DEC_2000_PL_U_GCTPL_ST2&format=ST-2&_box_head_nbr=GCT-PL&ds_name=DEC_2000_PL_U&geo_id=04000US16000

Citation (2010): U.S. Census Bureau. (2011, June 3). *State & County QuickFacts: Idaho and Idaho Counties*. Retrieved on August 17, 2011, from <http://quickfacts.census.gov/qfd/states/16000.html>