

Pasture Range & Forage Insurance is a very good product because of the subsidies provided by USDA-Risk Management Agency. These subsidies should offset any of the complaints that I have heard about the problems with NOAA's rain gauges, i.e., your ranch did not get a rain but the grid index was above average.

However, the insurance is very complicated and it takes a great deal of effort to understand it and to use it as an effective financial and range management tool. There is not time today to discuss all of the intricacies or show how all of the numbers were derived. Rather than to understand this presentation in detail try to grasp general concepts and trends.

There is a handout with the highlights of this talk and it will be posted on the San Angelo website.

Pasture, Range & Forage Insurance Requires Many Decisions

$$450 \times 206 = 92,700$$

$$92,700 \times 300 > 27 \text{ mil.}$$

The screenshot shows a software interface for insurance decisions. Callouts indicate:

- 5 Coverage Levels** (pointing to a dropdown menu)
- 90 Protection Factors** (pointing to a dropdown menu)
- 450 Coverage x Protection Combinations** (pointing to a dropdown menu)

 A table on the right summarizes the intervals and combinations:

Index Interval	Insured Acres per Index Interval	Policy Protection per Unit	Premium Rate per \$100	Total Premium (\$/acre)	Premium Subsidy (\$/acre)	Producer Premium (\$/acre)	Actual Index Value	Indemnity (\$/acre)	Number of Intervals	Number of Combinations
Jan-Feb	-	-	-	-	-	-	-	-	-	-
Feb-Mar	-	-	-	-	-	-	-	-	-	-
Mar-Apr	-	-	-	-	-	-	-	-	-	-
Apr-May	-	-	-	-	-	-	-	-	6	1
May-Jun	-	-	-	-	-	-	-	-	5	6
Jun-Jul	-	-	-	-	-	-	-	-	4	70
Jul-Aug	-	-	-	-	-	-	-	-	3	84
Aug-Sep	-	-	-	-	-	-	-	-	2	45
Sep-Oct	-	-	-	-	-	-	-	-	-	-
Oct-Nov	-	-	-	-	-	-	-	-	-	-
Nov-Dec	-	-	-	-	-	-	-	-	-	-
Per Acre	N/A	N/A	N/A	-	-	-	-	-	-	-
Policy Total	-	-	-	N/A	-	-	-	-	Total	206

Your acreage can be distributed in multiple ways among the different intervals as long as each interval has a minimum of 10% and no more than 50% of the enrolled acreage. At 10 percentage unit increments that creates over 300 more choices, which multiplied by the 92,700 results in over 27 million choices.

If you make 4 mouse clicks every second, 24 hours a day between now (Sept. 6) and the November 15, 2012 deadline for signing up for PRF insurance in 2013 you just might get through all 27,000,000 calculations

My Bona Fides

- Taken out PRF insurance since 2008
- Initially calculated average return using historic indexes for each grid
- Determined the effect of El Niño conditions on returns
- Distributed acres across 5 intervals based on calculations
- Found out that the weather gods had not studied the historic indices

My Bona Fides

- Continued to adjust for El Niño conditions
 - Used all intervals
 - Adjustments were smaller
- Profit / (Loss)
\$1.33/ac/yr. avg. across 5 yrs. of participation



Do you have life insurance? Clearly, if you have life insurance, and if you are reading this, you don't mind paying a premium even though you have not received an indemnity. In fact you never will receive an indemnity for your life insurance.

Do you have homeowner's insurance? Did you make a claim against it last year? But you still pay the premiums.

One of the biggest mistakes that has recently been made with PRF insurance is that in 2010 people who took out PRF paid big premiums so they did not take it out in 2011.

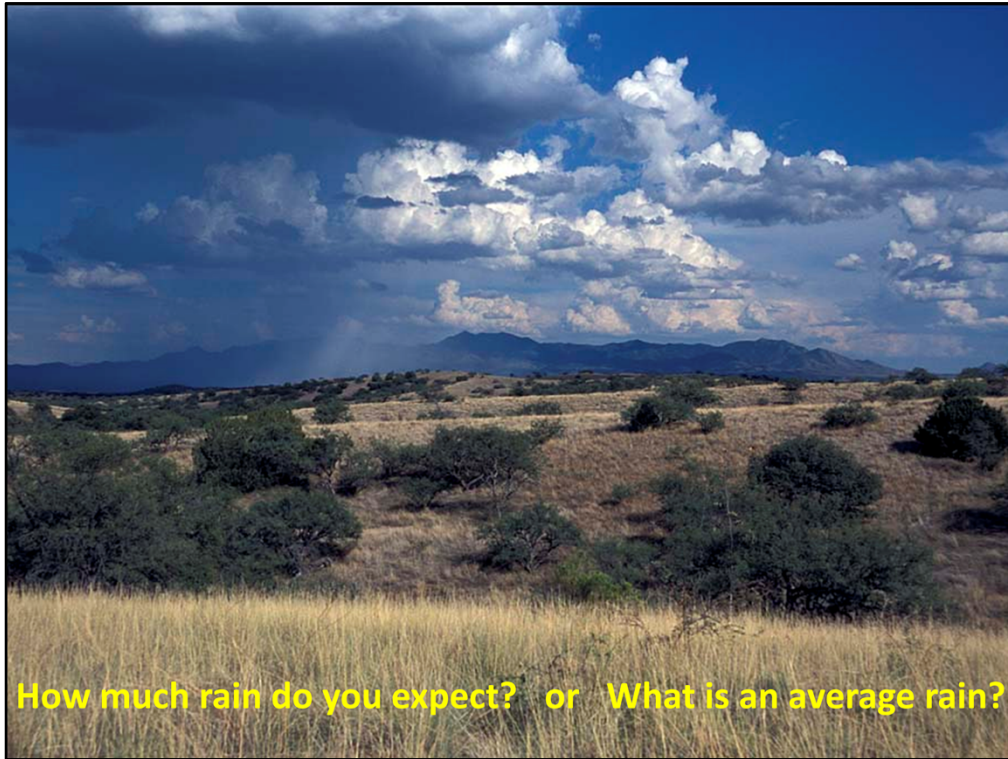
Do you plan to die or have your home destroyed in the next 5 years? Do you expect there will be a drought in the next 5 years? Do you expect there could be more than 1 drought in the next 5 years?

That is the big difference between PRF and other types of insurance that you are familiar with. With other types of insurance you don't expect to use them but with PRF you expect to have a drought and to collect an indemnity, which in part is why when you have to pay a premium it is high.

Definitions

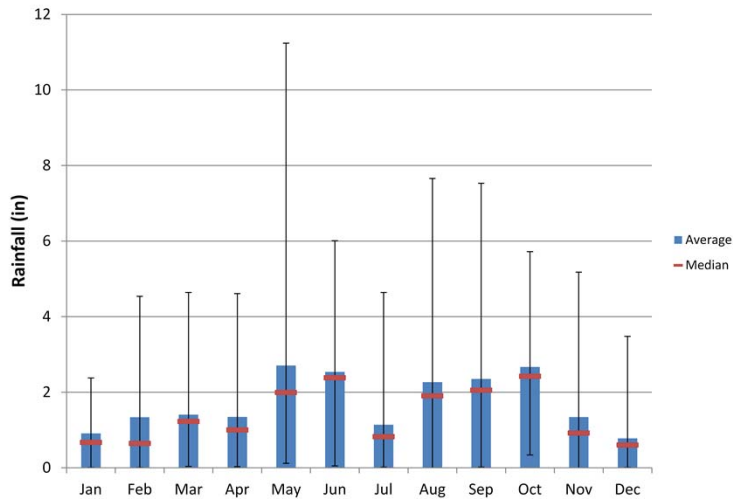
- PRF = Pasture, Range, Forage Insurance
 - A.K.A. Rainfall Insurance
- Indemnity – Money in your pocket when it doesn't rain.
- Premium – Money that you pay when it does rain.





If for a given month during a 10 year period it rained 1 inch every year except 1 year when it rained 11 inches how much would you expect it to rain? 2 inches which is the average for the 10 year period or 1 inch which is the most common amount of rainfall?

San Angelo Rainfall 1982 – 2011 Average = 20.4 Median = 16.6

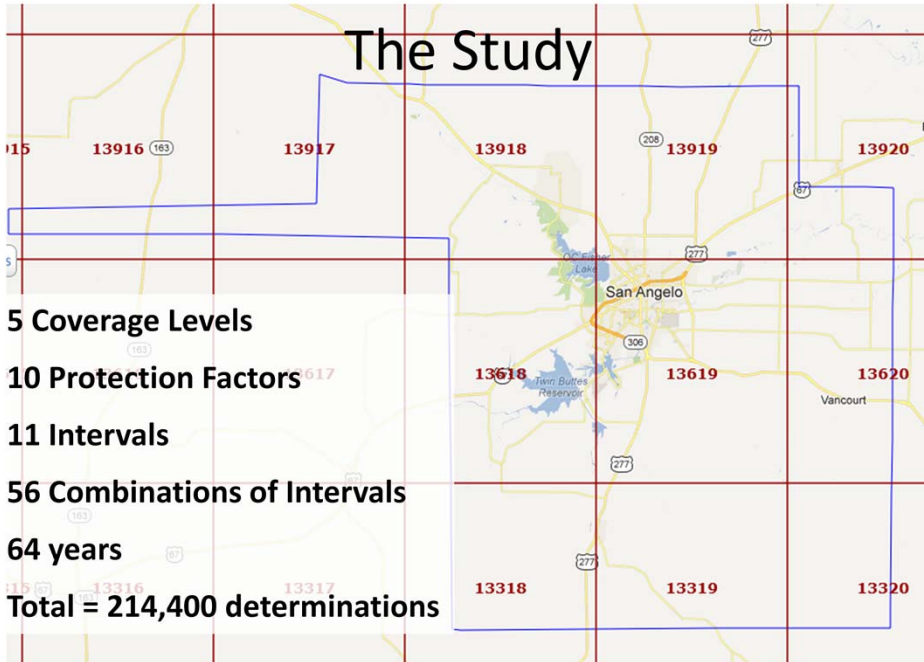


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May has had as much as over 11 inches of rain in the past 30 years and the average is about 2.7 inches but the median is 2 inches. The median for the year is 81% of the average a number that I will show the relevance to the PRF decisions latter.

The Study

- 5 Coverage Levels
- 10 Protection Factors
- 11 Intervals
- 56 Combinations of Intervals
- 64 years
- Total = 214,400 determinations



Some of the 214,400 Calculations Made for 1 Grid For This Presentation

The image displays a large, dense grid of data, representing 214,400 individual calculations. The grid is organized into many columns and rows, with each cell containing a small numerical value or a short text string. The data appears to be a result of a systematic calculation process, possibly related to a grid-based simulation or analysis. The values are too small to be legible, but they form a complex, repeating pattern across the entire grid.

<http://agforceusa.com/rma/ri/prf/dst>

Decision Support Tool
Pasture, Rangeland, Forage

This tool is for illustration purposes only. Your actual information may differ. For additional information, please [click here](#).

Rainfall Vegetation

Please Select a Location: State: County: Grid: [Grid Locator](#) [Print](#)

Protection Information

Intended Use:

Coverage Level (%):

Productivity Factor (%):

Insurable Interest (%):

Insured Acres:

Sample Year:

Graph

Type: Index Values Estimated Indemnities

Range: Start End

Intervals:

Jan-Feb Feb-Mar Mar-Apr
 Apr-May May-Jun Jun-Jul
 Jul-Aug Aug-Sep Sep-Oct
 Oct-Nov Nov-Dec

Index Interval	Percent of Value (%)	Policy Protection per Unit	Premium Rate per \$100	Total Premium	Premium Subsidy	Producer Premium	Actual Index Value	Indemnity
Jan-Feb								
Feb-Mar								
Mar-Apr								
Apr-May								
May-Jun								
Jun-Jul								
Jul-Aug								
Aug-Sep								
Sep-Oct								
Oct-Nov								
Nov-Dec								
Per Acre	N/A	N/A	N/A					N/A
Policy Total			N/A					N/A

County Base Value
Dollar Amount of Protection
Total Insured Acres
Total Policy Protection
Subsidy Level
Maximum Percent of Value per Index Interval

Calculate

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This is the website to access the Decision Support Tool to evaluate different PRF insurance options for your property.

Decision Support Tool
Pasture, Rangeland, Forage

This tool is for illustration purposes only. Your actual information may differ. For additional information, please [click here](#).

Rainfall Vegetation

Please Select a Location: State: Texas County: Tom Green Grid: 13918 Grid Locator Print

Protection Information

Insured Crop Type: Grazingland
 Coverage Level (%): 90
 Protection Factor (%): 100
 Share (%): 100
 Insurable Acres: 60
 Sample Year: 2011

Graph

Type: Index Values Estimated Indemnities
 Range: Start 1948 End 2012
 Intervals:
 Jan-Feb Feb-Mar Mar-Apr
 Apr-May May-Jun Jun-Jul
 Jul-Aug Aug-Sep Sep-Oct
 Oct-Nov Nov-Dec

Index Interval	Insured Acres per Index Interval	Policy Protection per Unit	Premium Rate per \$100	Total Premium (\$/acre)	Premium Subsidy (\$/acre)	Producer Premium (\$/acre)	Actual Index Value	Indemnity (\$/acre)
Jan-Feb	10	\$74	32.80	\$2.43	\$1.24	\$1.19	32.4	\$4.74
Feb-Mar	N/A ?	\$0	28.72	\$0.00	\$0.00	\$0.00	18.3	\$0.00
Mar-Apr	10	\$74	23.57	\$1.74	\$0.89	\$0.85	3.7	\$7.10
Apr-May	N/A ?	\$0	17.46	\$0.00	\$0.00	\$0.00	16.8	\$0.00
May-Jun	10	\$74	16.71	\$1.24	\$0.63	\$0.61	27.8	\$5.11
Jun-Jul	N/A ?	\$0	23.42	\$0.00	\$0.00	\$0.00	22.3	\$0.00
Jul-Aug	10	\$74	20.10	\$1.49	\$0.76	\$0.73	90.4	\$0.00
Aug-Sep	N/A ?	\$0	23.28	\$0.00	\$0.00	\$0.00	68.6	\$0.00
Sep-Oct	10	\$74	21.48	\$1.59	\$0.81	\$0.78	54.1	\$2.95
Oct-Nov	N/A ?	\$0	27.10	\$0.00	\$0.00	\$0.00	89.7	\$0.00
Nov-Dec	10	\$74	33.97	\$2.51	\$1.28	\$1.23	79.2	\$0.89
Per Acre	N/A	N/A	N/A	\$1.83	\$0.93	\$0.90	N/A	\$3.46
Policy Total	60	\$444	N/A	\$110	\$56	\$54	N/A	\$208

County Base Value per Acre: \$8.25
 Dollar Amount of Protection per Acre: \$7.43
 Total Insured Acres: 60
 Total Policy Protection: \$446
 Subsidy Level: 51%
 Maximum % of Insured Acres per Index Interval: 50.0%

Calculate

Value per Acre \$8.25

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Current Extension budgets for this area assume a lease rate of 13.50/Animal Unit Month. The county based average of \$8.25/acres is the equivalent of a stocking rate of 20 ac/ AU.

If you think the rental price for pasturing a cow should be different than \$13.50 per month you can calculate the effect of that rental price on the equivalent stocking rate of the county base value using the following formula:

Equivalent Stocking Rate (ac/cow) = monthly rate x 12 ÷ count base value
 $13.50 \times 12 \div 8.25 = 19.6 \text{ ac/cow}$
 $10 \times 12 \div 8.25 = 14.5 \text{ ac/cow}$

If you believe that your carrying capacity is different from stocking rate based on the county base value it can be adjusted using the Protection Factor. For instance, if you think the actual carrying capacity for your ranch is 30 ac/cow the Protection Factor adjustment would be $20 \div 30 \times 100 = 66\%$.

Decision Support System: Protection per Acre

Pasture, Rangeland, and Vegetation

Please Select a Location: **Ranges from \$3.47 to \$11.14**

Protection Information

Insured Crop Type: Grazingland
 Coverage Level (%): 90
 Protection Factor (%): 100
 Share (%): 100
 Insurable Acres: 60
 Sample Year: 2011

Graph

Type: Index Values
 Range: Start 1948, End 2012
 Intervals: Jan-Feb, Apr-May, Jul-Aug, Oct-Nov

Index Interval	Insured Acres per Index Interval	Policy Protection per Unit	Premium Rate per \$100	Total Premium (\$/acre)	Premium Subsidy (\$/acre)	Producer Premium (\$/acre)	Actual Index Value	Indemnity (\$/acre)
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Policy Total	60	\$444	N/A	\$110	\$56	\$54	N/A	\$208

County Base Value per Acre: \$8.25
 Dollar Amount of Protection per Acre: \$7.43
 Total Insured Acres: 60
 Policy Total: \$446
 Premium Rate: 51%
 Indemnity: 50.0%

Calculate

\$8.25 x Coverage x Protection
\$8.25 x 90% x 100% = \$7.43

Value per Acre \$8.25

- Coverage Level is like the deductible on a home owners insurance – how much of the loss will you cover?
- When deciding what coverage level you want recall that for San Angelo the Median Rainfall of 16.6 inches is 81% of the Average Rainfall
- Protection Factor is like the valuation of the home.

Decision Support Tool

Pasture, Rangeland, Forage

This tool is for illustration purposes only. Your actual information may differ. For additional information, please [click here](#).

Rainfall

Vegetation

Please Select a Location: State: Texas County: Tom Green Grid: 13918 [Grid Locator](#) [Print](#)

Protection Information

Insured Crop Type: Grazingland

Coverage Level (%): 90

Protection Factor (%): 100

Share (%): 100

Insurable Acres: 60

Sample Year: 2011

Table Graph

Index Interval	Insured Acres per Index Interval	Policy Protection per Unit	Premium Rate per \$100	Total Premium (\$/acre)	Premium Subsidy (\$/acre)	Producer Premium (\$/acre)	Actual Index Value	Indemnity (\$/acre)
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Policy Total	60	\$444	N/A	\$110	\$56	\$54	N/A	\$208

The Coverage Level affects:

1. Premium Rate
2. Subsidy Level

Start 1948 End 2012

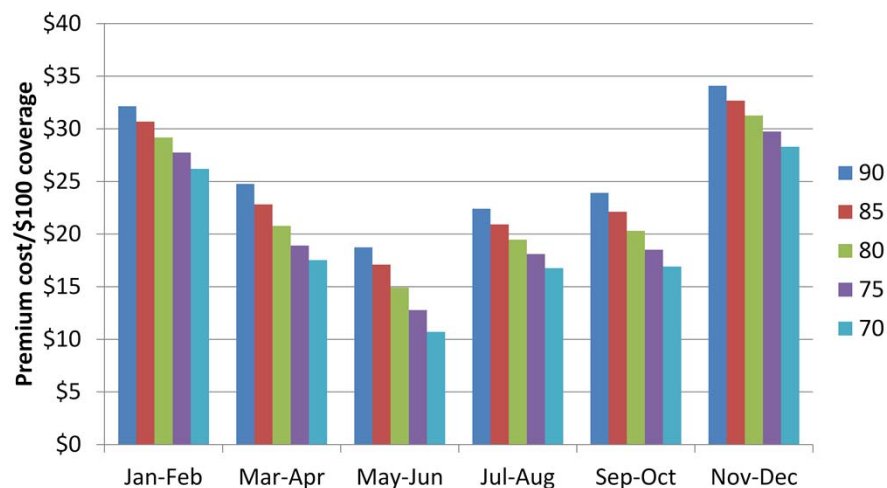
Intervals:

- Jan-Feb Feb-Mar Mar-Apr
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 Oct-Nov Nov-Dec

County Base Value per Acre	\$8.25
Dollar Amount of Protection per Acre	\$7.43
Total Insured Acres	60
Total Policy Protection	\$444
Subsidy Level	51%
Maximum % of Insured Acres per Index Interval	50.0%

Calculate

Premiums vary with level of coverage and with season.



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There are several things to note on this chart

1. Premiums decrease as the amount of coverage declines, which is the equivalent of lowering your premiums by increasing your deductible.
2. The cost of coverage is quite high. Homeowner's insurance for this area is generally less than \$1/\$100 of coverage. PRF insurance averaged across all intervals and Coverage Levels is \$22 / \$100, i.e., 22 times as high, which reflects the fact that we expect to be in a drought.
3. The cost of coverage varies for the different periods.

Producer Premium

Total Premium – Premium Subsidy

Please Select a Location: State: County: Grid:

Protection Information

Insured Crop Type:

Coverage Level (%):

Protection Factor (%):

Share (%):

Insurable Acres:

Sample Year:

Table

Index Interval	Insured Acres per Index Interval	Policy Protection per Unit	Premium Rate per \$100	Total Premium (\$/acre)	Premium Subsidy (\$/acre)	Producer Premium (\$/acre)	Actual Index Value	Indemnity (\$/acre)
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Nov-Dec	10	\$74	33.97	\$2.51	\$1.28	\$1.23	79.2	\$0.89
Per Acre	NIA	NIA	NIA	\$1.83	\$0.93	\$0.90	NIA	\$3.46
Policy Total	60	\$444	N/A	\$110	\$56	\$54	N/A	\$208

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 Subsidy Level: 51%
 Maximum % of Insured Acres per Index Interval: 50.0%

Graph

Type: Index Values Estimated Indemnities

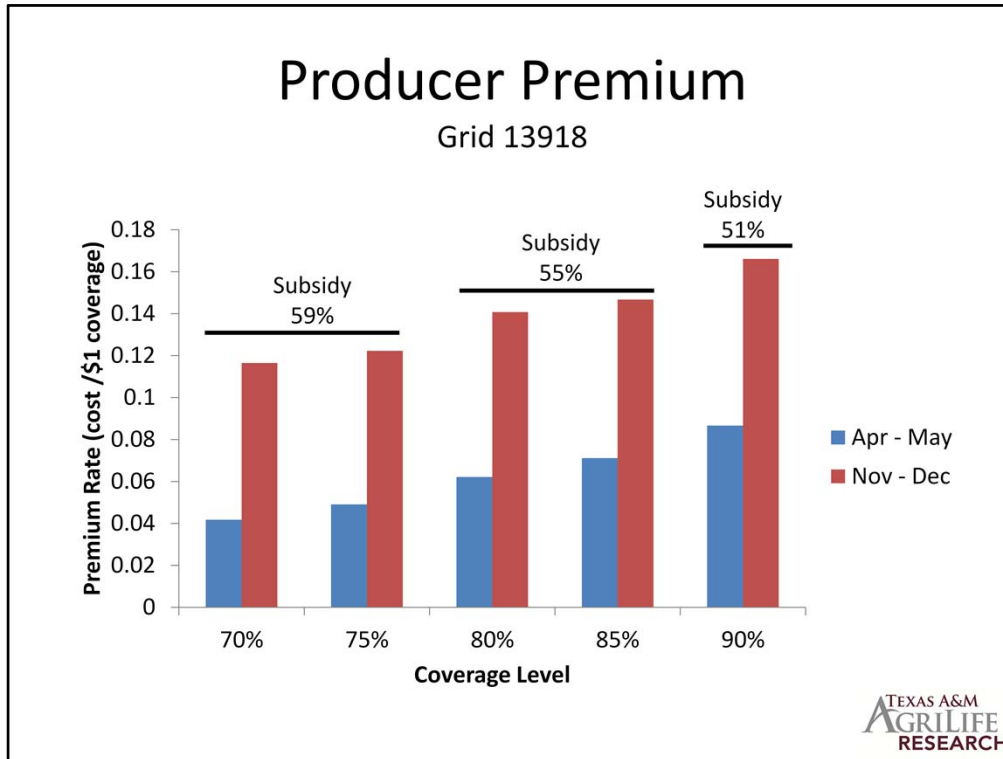
Range: Start: End:

Intervals:

Jan-Feb Feb-Mar Mar-Apr
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 Jul-Aug Aug-Sep Sep-Oct
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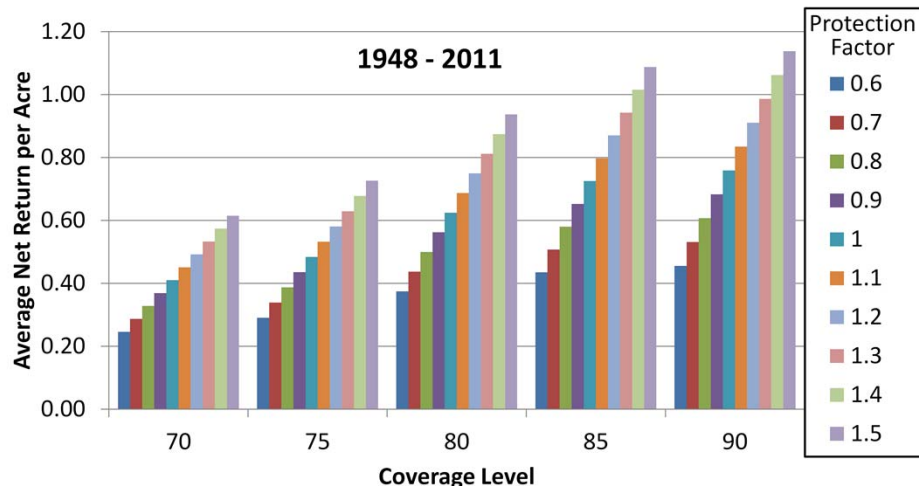
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The Protection Factor affects both the Premium Rate per \$100 and the subsidy level. The higher the Protection Factor the higher the Premium Rate, because you will be indemnified more often.



- The subsidy for Producer Premium does not change between 70 & 75% or 80 & 85% Coverage Levels.
- Producer Premiums for the highest cost interval is nearly twice as great as for the lowest cost interval.
- Because the median rainfall which is really the most reasonable amount of rain to expect is 81% of the average rainfall and because the subsidy is the same for the 80 or 85% coverage level this is a very reasonable coverage level to consider.

Average Net Return is Greatest at the Higher Coverage & Protection Factors



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Net returns presented in this chart is the average net return averaged across 64 years and all 11 intervals within a year.

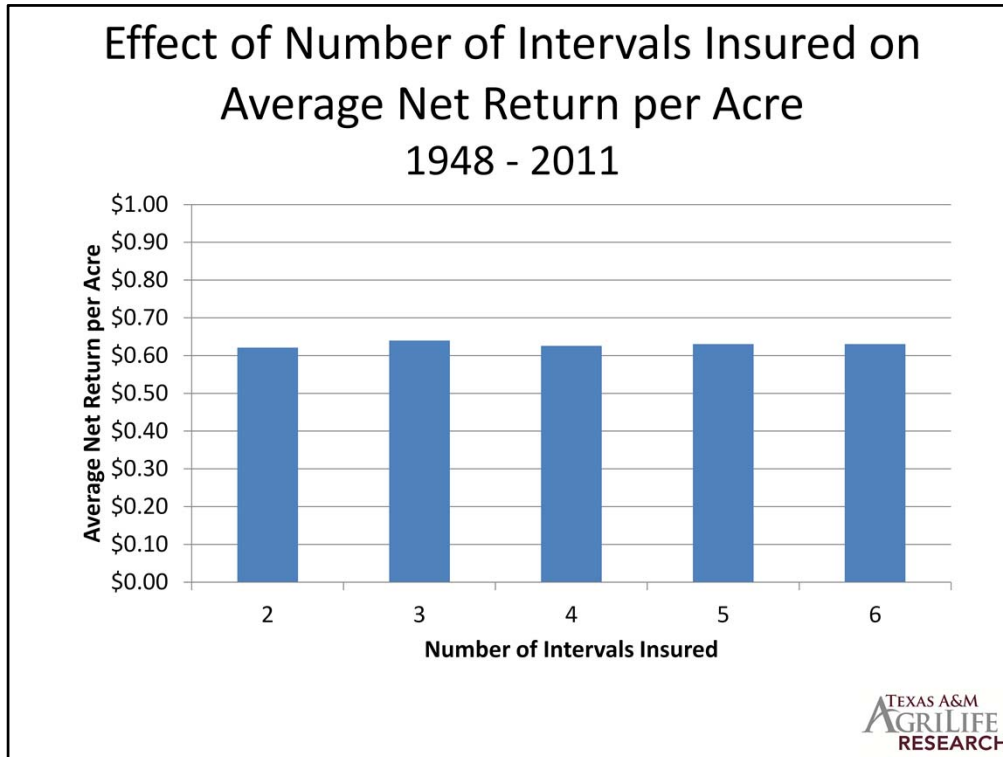
Net returns are highest at the higher coverage levels and higher Protection Factors because you are using more of RMA's funds on an actual dollar basis.

At the 70% Coverage Level and 60% Protection Factor the total premium is \$3.47/ac and RMA contributes \$2.04.

At the 90% Coverage Level and 150% Protection Factor the total premium is \$11.14/ac and RMA contributes \$5.68.

Even though at the 90% Coverage Level the percentage subsidy is lower (51% compared to 59% for 70% Coverage Level) the amount of dollars leveraged is greater resulting in a higher net return.

BUT! In a wet year the premiums will also be much higher \$5.46/ac compared to 1.43/ac. You must be certain that you can afford the premiums.



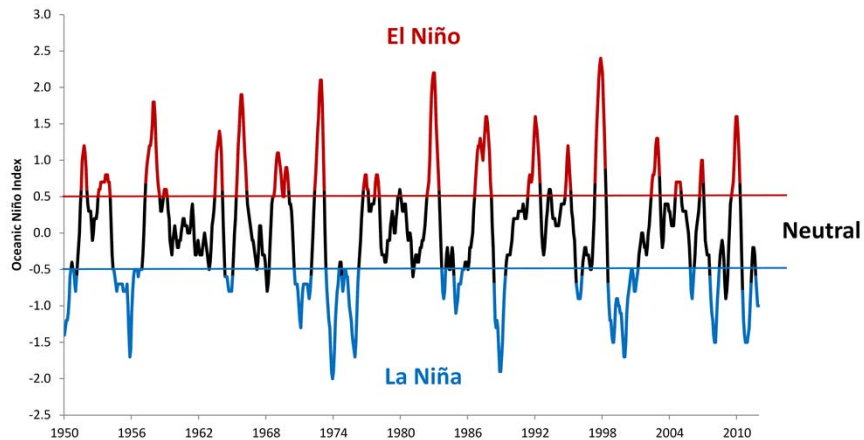
On average and over the long haul the number of intervals insured does not affect average net return per acre.

However, next year is not a long-term average it is a single year and by taking only 2 intervals you could pay a high premium because of a large rainfall event in one of the intervals that you selected even though you are in the middle of a drought, but by continuing the program every year this will not happen.

Review

- Averaged across the 64 years of available rainfall indices PRF always has a positive return.
 - Returns vary 4 fold across these years depending upon the Coverage Level and Production Factor selected.
- On average higher coverage rates and higher protection factors have a higher net return.
- Number of intervals insured does not appear to make a difference.

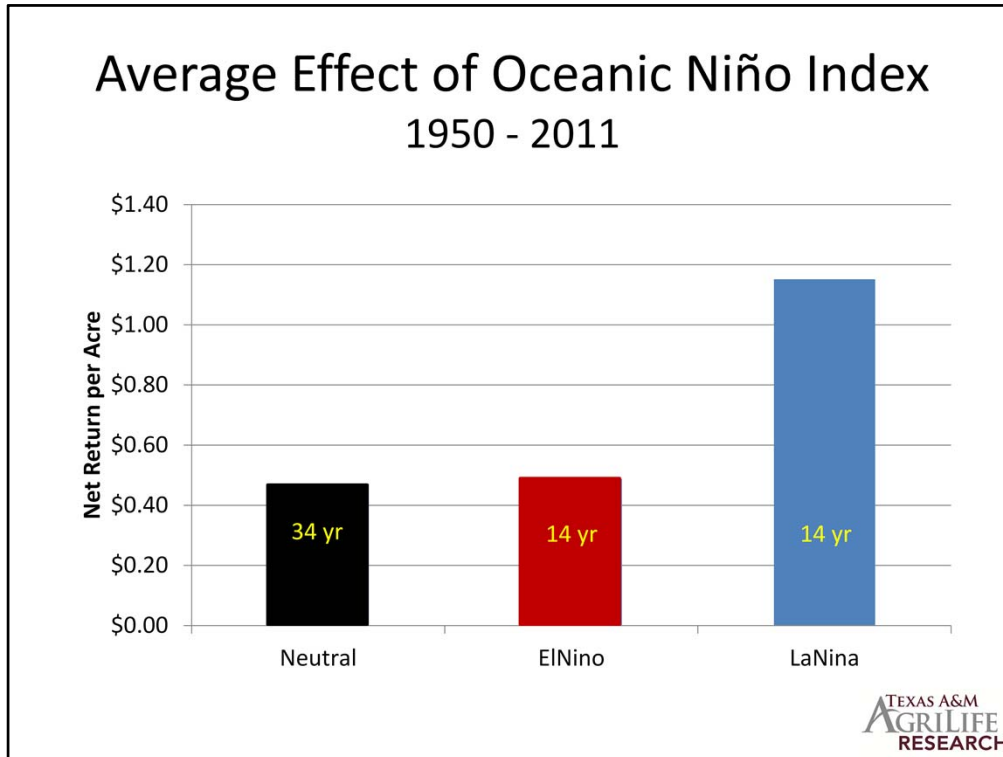
Oceanic Niño Index 3.4



Source: NOAA

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml

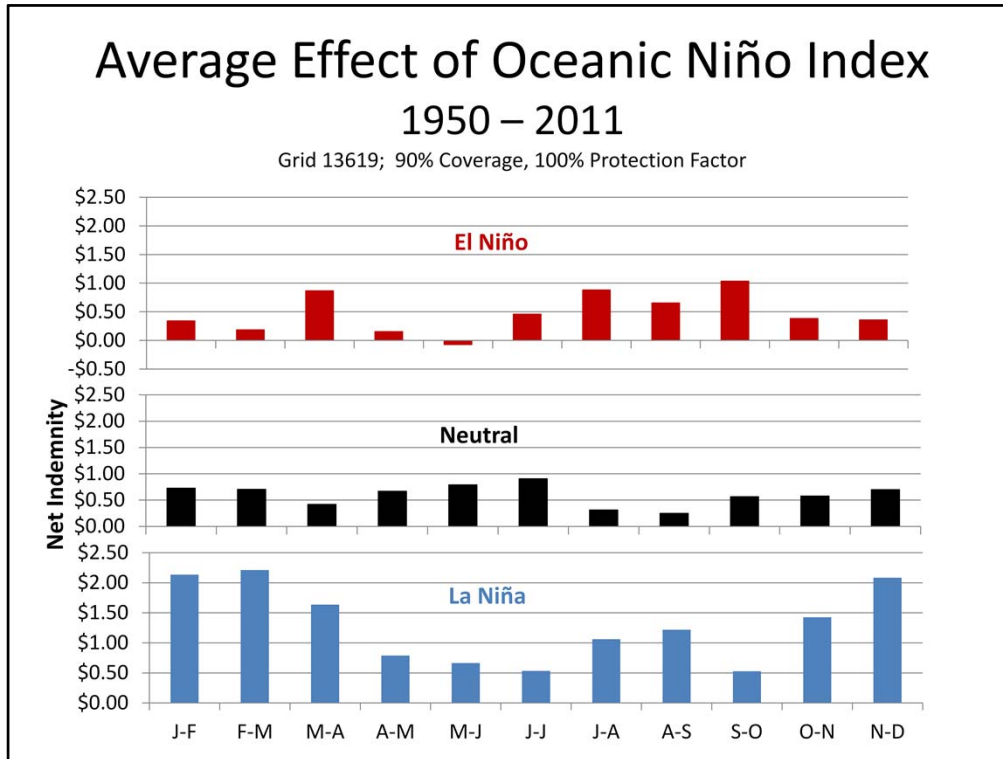
El Niño AKA El Niño Southern Oscillation (ENSO) or Oceanic Niño Index (ONI) affects rainfall. In years when a La Niña occurs, there tends to be warmer and drier conditions in many areas, including Texas. State climatologist John Nielsen-Gammon says. “In general terms, a La Niña period means drier weather patterns for Texas. There are numerous studies on how El Niño and La Niña affect weather patterns, specifically hurricanes and their intensity. Some research indicates that the type of hurricanes that affect Texas are more common during La Niña periods than during a neutral or El Niño year.”



The Net Returns in this chart are the average net return across all years for a given ONI condition and all 11 intervals.

I defined El Niño years as having an average surface temperature +0.5 above normal and to be above +0.5 during at least a 6 months during the year. La Niña years were just the opposite. By this criteria during the past 64 years there have been 14 El Niño years, 14 La Niña years and 34 neutral years. As discussed in the previous slide, La Niña tends to produce drought conditions. Witness 2011, thus the La Niña years had net returns nearly 3 times as great as El Niño or Neutral years. And surprisingly, even though El Niño is supposed to result in above average rainfall there was no difference between El Niño and Neutral years.

Finally over the long-term all ONI conditions produced a positive result, this reflects the subsidy on producer premiums.



This chart shows how net returns were distributed across the 11 intervals for grid 19619. It is different for each of the ONI conditions and you should consider distributing your insurance according to the historic variation in returns.

Comparison of Actual and October
Predictions of ONI

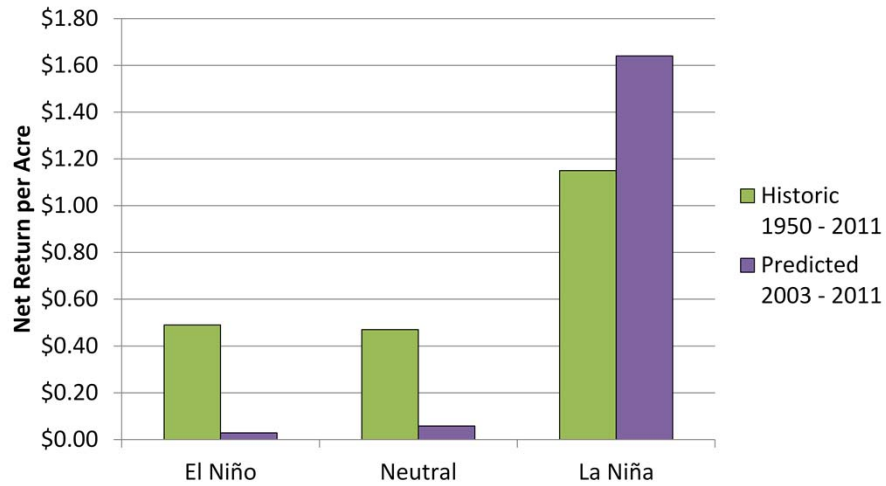
Accuracy = 66%

	Actual	October Prediction
2003	Neutral	El Niño
2004	Neutral	Neutral
2005	Neutral	El Niño
2006	Neutral	Neutral
2007	Neutral	Neutral
2008	La Niña	La Niña
2009	Neutral	Neutral
2010	Neutral	El Niño
2011	La Niña	La Niña

<http://iri.columbia.edu/climate/ENSO/currentinfo/archive/200411/QuickLook.html>

PRF would be the perfect insurance product if you could decide what intervals to insure at the end of the year instead of 2 months before the beginning of the year. Knowing that the ONI affects amounts and patterns of rainfall you have to use predictions of the ONI that come out in the middle of each month.

Comparison of Oceanic Niño Index Between Long-term Average and 9 yr. Average



This slide is important because it shows that short-term trend may not track long-term trends. In this case averaged across all intervals PRF insurance under performed during the last 9 years for El Niño and Neutral conditions but did better for the La Niña condition.

Suggested Acreage Distributions for Different ONI Conditions

	J-F	F-M	M-A	A-M	M-J	J-J	J-A	A-S	S-O	O-N	N-D
El Niño			40%			30%					30%
Neutral	40%				40%						20%
La Niña	35%		30%		10%						25%

These recommendations are rather intuitive, but are based on:

1. The fact that number of intervals insured did not appear to affect net return.
2. Adjustments for intervals that will result in above average returns should not exceed about 10 percentage units of an equal distribution of all acres.

Insurance Strategies



Grazing Manager



Profit Maximizer



Tin shone brains! the livestock business, it took five years 'till I went broke this time!

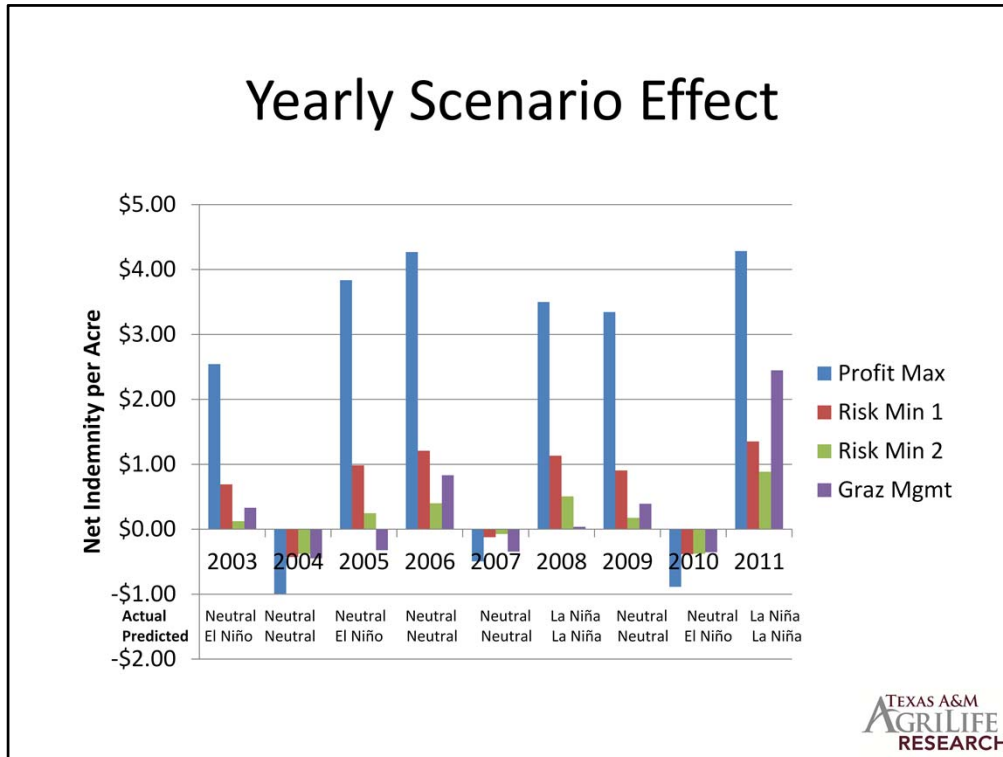
Risk Minimizer

PRF Insurance Scenarios

	Coverage	Protection Factor	Interval Distribution
Profit Maximizer	90%	150%	ONI Indicated
Risk Minimizer 1	75%	60%	ONI indicated
Risk Minimizer 2	75%	60%	6 Intervals even distribution
Grazing Manager	85%	80%	Jan-Feb 10% Mar-Apr 30% May-Jun 30% Aug-Sep 20% Oct-Nov 10%

Effect of Different Scenarios 2003 – 2011 Predictions





The 9 year average means very little if in say 2004 you could not pay the premium and when bankrupt. A couple of things to notice on this slide.

1. The only difference between the profit maximizer and the risk minimizer scenario 1 is the size of the indemnities received and premiums paid. The profit maximizer all ways received larger indemnities and paid larger premiums because he used more of RMA's money. But the pattern between the 2 is the same because they both distributed their acreage the same for the different scenarios.
2. Spreading his risk across all intervals never paid off for the risk minimizer in scenario 2.
3. By distributing their acreage according to the suggested distribution for a predicted El Niño condition the net return in the years when indemnities were received was nearly as high in the non-La Niña years and in the La Niña years

Using PRF Insurance for Better Range Management

- Light stocking rate
- During the “good” years there are 2 options
 - Use the additional forage as fuel for prescribed fire to reduce brush so rain is more effective.
 - Offset the cost of premiums
 - Take on livestock for pasturage
 - Retain weanlings
 - Purchase stockers

2010 Example Leasing Excess Forage

Grid 1319; CL=90% PF=150%

	Average - Poor	Good
Stocking Rate (ac/AU)	25	20
Carrying Capacity on 1000 ac	40	50
Value of additional 10 hd @ pasturage fee of \$13.50 / AUM		\$1,620
Average return per acre		\$1.62
Producer Premium \$/ac		\$0.89
Net Return		\$0.73



PRF Insurance Decisions

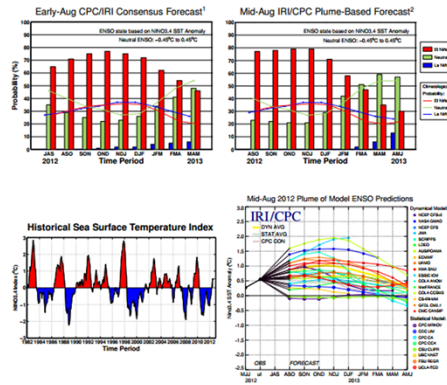


- Stock light and buy insurance.
- Distribute acreage according to expected seasonal rainfall for El Niño or La Niña.
- Coverage Level 70 – 90%
 - Adjust to the level of risk you want to assume.
- Protection Factor 60 – 150%
 - High value = higher average return.
 - High value = higher premium payment in wet years.

Most Recent ONI Forecast Predicts: **El Niño** or Neutral

ENSO QUICK LOOK August 16, 2012 A monthly summary of the status of El Niño, La Niña and the Southern Oscillation, or "ENSO", based on Niño3.4 index (120°-170W, 5S-5N).

More than 75% of the ENSO prediction models predict El Niño conditions during the August-October season, continuing through the rest of 2012. Meanwhile, about 20% of the models still indicate persistence of ENSO-neutral conditions. No models indicate a re-emergence of La Niña conditions.



Historically Speaking

- El Niño and La Niña events tend to develop during the period Apr-Jun and they:*
- Tend to reach their maximum strength during Dec-Feb
 - Typically persist for 9-12 months, though occasionally persisting for up to 2 years
 - Typically recur every 2 to 7 years

¹Based on a consensus of CPC and IRI forecasters, in association with the official CPC/IRI ENSO Diagnostic Discussion.
²Plainly objective, based on regression, using equally weighted model predictions from the plume.

There will be other predictions in mid-September and mid-October before the November 15 deadline.

Suggested Acreage Distributions for El Niño and Neutral ONI

	J-F	F-M	M-A	A-M	M-J	J-J	J-A	A-S	S-O	O-N	N-D
El Niño			40%			30%					30%
Neutral	40%				40%						40%

These recommendations are rather intuitive, but are based on:

1. The fact that number of intervals insured did not appear to affect net return.
2. Adjustments for intervals that will result in above average returns should not exceed about 10 percentage units of an equal distribution of all acres.

The worst thing about PRF Insurance is:

- 1. You may pay a premium.**
- 2. You don't enjoy a good rain as much!**

