



National Agricultural Statistics Service

Presentation for ISU Students

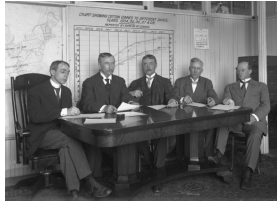
Greg Thessen
Director, Iowa Field Office
USDA-NASS





The History of NASS

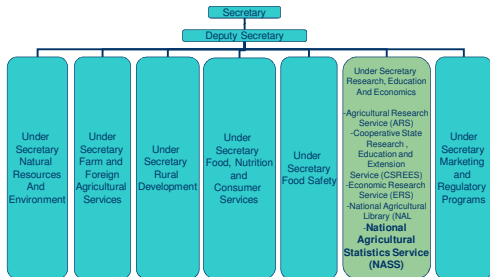
- The USDA was founded by Lincoln in 1862.
- NASS, formerly known as the Division of Statistics and then the Bureau of Statistics, was founded in 1863.

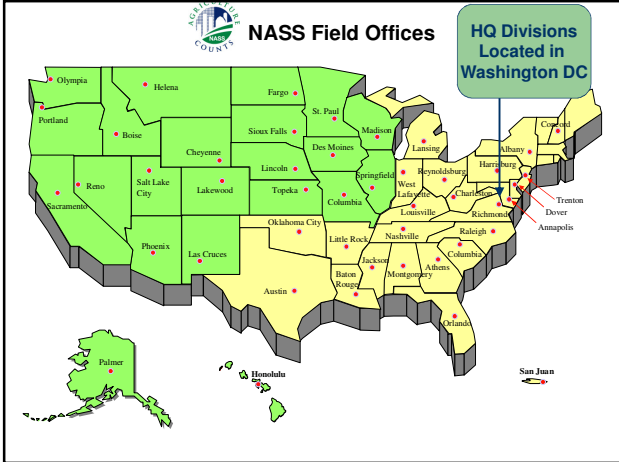


Bureau of Statistics employees working on crop estimates, circa 1910.



USDA Organizational Chart





The NASS Mission

- To provide timely, accurate, and useful statistics in service to U.S. agriculture

NASS issues about 500 statistical reports each year and about 9,000 reports and news releases from its 46 field offices.

Weekly Weather and Crop Bulletin
Crop Production
Cattle

2012 CENSUS OF AGRICULTURE
www.agcensus.usda.gov

YOUR VOICE.
YOUR FUTURE.
YOUR RESPONSIBILITY.

The Census of Agriculture

- A complete count, taken once every 5 years, of America's farms and the people who operate them

Number of Farms, Iowa

Year	Number of Farms
1978	125,000
1982	115,000
1987	105,000
1992	95,000
1997	85,000
2002	75,000
2007	65,000

Average Age of Principal Operator, Iowa

Year	Average Age
1978	46
1982	47
1987	48
1992	49
1997	50
2002	51
2007	52



The Census of Agriculture

- Provides uniform data for every county in Iowa that
 - Helps farm organizations promote agriculture
 - Helps lending institution ensure operational loan funding is adequate
 - Helps determine if USDA service centers are staffed appropriately
 - Helps NRCS allocate funding to counties for their programs
 - Helps USDA Rural Development allocate loans to counties
 - Helps companies deliver products and services to counties more efficiently





NASS Principles

- Safeguard Confidentiality of individual's data
 - Protected by law from any court or legislative action (U.S. Code, Title 7, Chapter 55, Section 2276)
- Independent and Impartial Analysis
 - No political influence in estimates and forecasts
- Timeliness
- Security
 - Release reports to all users at same time



Program Areas

- Commodities
 - Crops, Livestock, Poultry, Cold Storage
- Economics
 - Agricultural Prices, Ag Labor, Farm Production Expenditures
- Environmental
 - Pesticide usage
- Census of Agriculture
 - Uniform & comprehensive data for every county
- Reimbursable Surveys



Where do the official statistics come from?

- Sample Surveys – Voluntary Reporting [Confidentiality Pledge]
- Agriculture Census – Mandatory Reporting
- Administrative Data

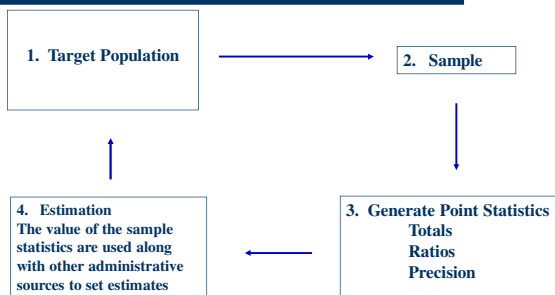


How are the data collected?

- Mail
- Telephone
 - Individual State Offices
 - Data Collection Centers
- Personal Interview
- Internet



Sample Survey Process





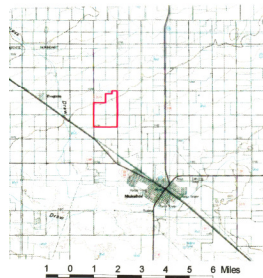
Methodology

- Sampling Frames (target population)
 - Area Frame
 - List Frame
- Estimators (indications)
- Advantages - Disadvantages



Methodology – Area Frame

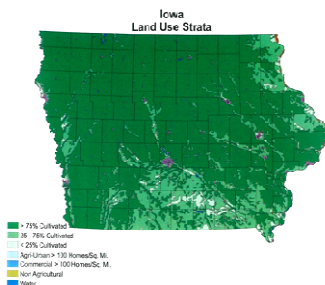
- All land area in Iowa
- Sample blocks of land called segments
- Collect agricultural data from the block of land

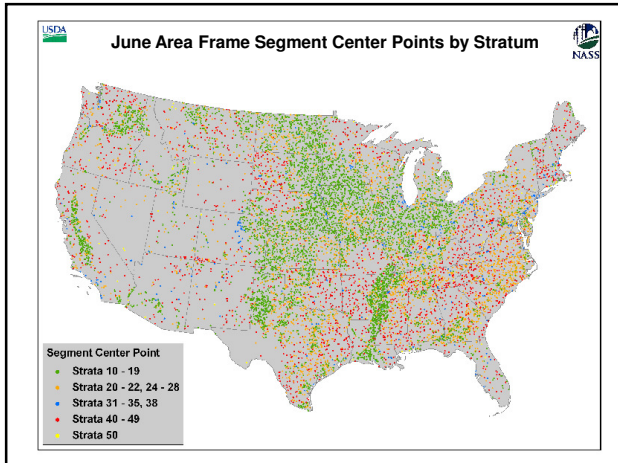


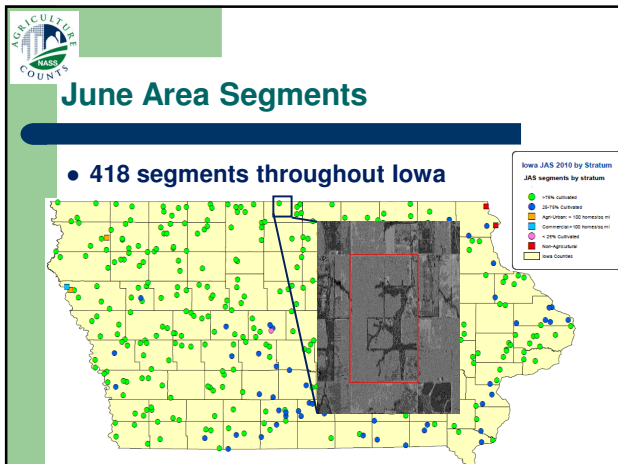


Methodology – Area Frame

- State is stratified based on percent of the land cultivated
- Strata are divided into "segments" (about 1 sq. mile)







Methodology – Area Frame

- Data collection by personal interview
- Account for all land within the segment boundaries



Methodology – List Frame

- Stratified based on size/type of farm
- Sample size varies by stratum
- Larger operations sampled at a higher rate

Quarterly Crop/Stocks Survey			
Stratum	Boundaries	Population	Sample
62	Cropland 200 - 599	5,184	152
65	Capacity 1 – 14,999	17,628	585
66	Cropland 600 - 1,599	2,068	129
72	Capacity 15,000 - 49,999	17,931	751
73	Capacity 50,000 - 299,999	8,318	450
78	Cropland 1,600 - 4,999	2,137	212
79	Capacity 300,000 – 999,999	229	26
95	Cropland 5,000+	66	66
97	Capacity 1,00,000+	11	11
Total		53,572	2,382



Advantages & Disadvantages

- | | |
|---|---|
| <ul style="list-style-type: none"> • List Frame <ul style="list-style-type: none"> - Inexpensive data collection - Can target commodities - Reduced sampling variability - Cost efficient | <ul style="list-style-type: none"> • List Frame <ul style="list-style-type: none"> - Not complete - Increased non-sampling errors - Goes out of date quickly - High maintenance |
|---|---|



Methodology – Multiple Frame

- Combines the Strength of Each Sampling Frame
 - List
 - Less Costly Data Collection
 - Rare & Specialty Commodities
 - Area
 - Complete Coverage by using portion not on the list (NOL)





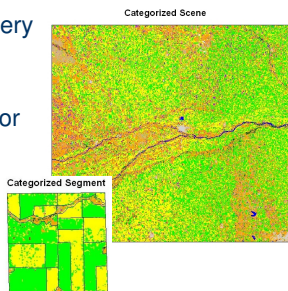
Methodology – Administrative Data

- FSA certified planted acreage data for crops
 - Have access to county totals
 - Aggregate to State level
 - Considered a minimum (not all farmers certify)
 - Not complete and available until October
- Import & Export data
- Slaughter data for livestock



Methodology – Remote Sensing, Cropland Data Layer

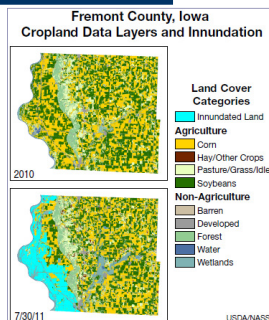
- Uses Satellite Imagery
- NASS Area Frame and Farm Service Agency data used for ground truth
- Regression-based acreage estimator

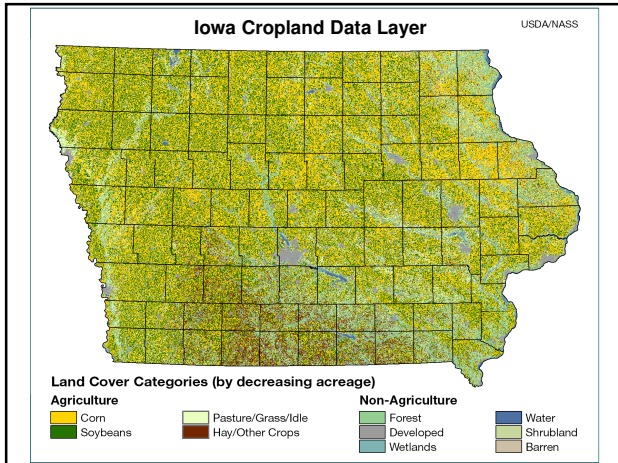


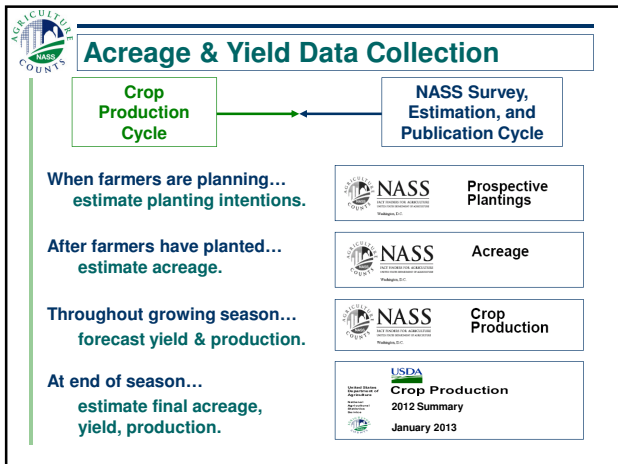


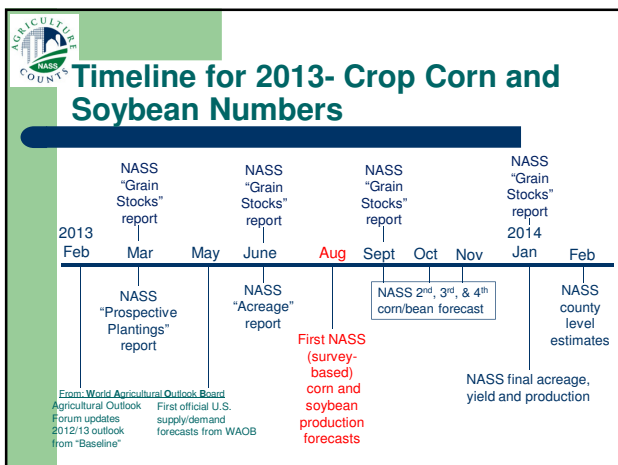
Methodology – Remote Sensing, Cropland Data Layer

- Satellite imagery available after crop canopies
 - Helps determine mid-season and year-end acreage estimates
 - Helps assess the impact of weather disasters











March Intentions Data Collection

March Crops/Stocks Survey

Data Collection	Feb. 26 – March 15
Sample Size	Approx 86,000 farms ~3,100 in Iowa
Collection Methods	phone, mail, internet, personal interview
Data Items	Acres planted and <u>to be planted</u> to specific crops, quantities of grains and oilseed stored on-farm



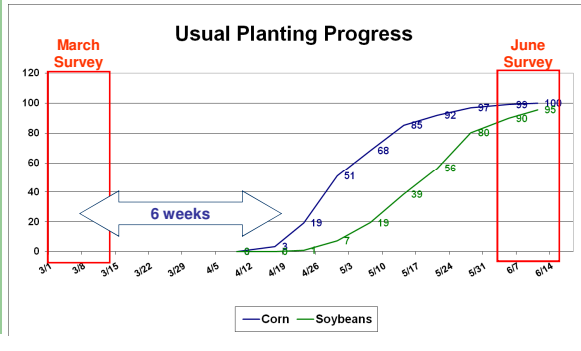
June Data Collection

June C/S Survey June Area Survey

Data Collection	May 29 – June 15	May 29 – June 15
Sample Size	Approx 73,500 farms ~3,000 in Iowa	Approx 11,000 segments 418 in Iowa
Collection Methods	phone, mail, internet, personal interview	Personal interview
Data Items	Acres planted to specific crops, acres expected to be harvested, quantities of grains and oilseed stored on-farm	Information on land use within segment, quantities of grains and oilseed stored on entire farm, & livestock inv.



Why do March Intentions Usually Differ from June Acreage?





Determining Production

Production =

<i>Harvested acres</i>	X	<i>Yield</i>
June Crops/Stocks Survey and Area Survey – updated as needed to reflect current growing conditions based on survey, satellite, and FSA acreage data	FORECAST	Agricultural Yield Surveys Objective Yield Surveys
December Crops/Stocks Satellite Imagery FSA Acreage Data	FINAL	December Crops/Stocks Survey Obj. Yield Survey



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Crop Yield Surveys

- NASS conducts two surveys for yield
 - Agriculture Yield Survey
 - List frame survey conducted in all States (May – November)
 - Objective Yield Survey (Corn & Soybeans)
 - Area frame survey conducted in major States (Aug. – Dec.)



Crop Yield Surveys

- **Agricultural Yield**
- **Objective Yield**

Sample Selected From:

List Frame - June
Crop/Stocks Survey

- crops of interest
- rotated out reps
- exclude extreme ops
- exclude NOL

Fields recorded on the
June Area Survey

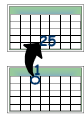
- crops of interest
- Each acre has equal chance of selection
- More than 1 sample may fall in same field



Agricultural Yield Survey

- Acres Harvested (or to be harvested)
- Expected Yield (based on farmers assessment of yield prospects until harvest)
- Reference date – 1st of the month
- Mail, phone, internet

Yields to reflect conditions as of 1st of month



Data collection starts 25th of previous month



Agricultural Yield Survey

Agricultural Yield Survey Sample Size (approximate)

Month	U.S.	Iowa
August	28,000	800
September	13,000	400
October	15,000	400
November	11,000	400



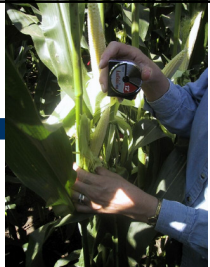
Objective Yield Surveys

- Randomly selected fields
 - Initial interview to update/verify acreage, ask permission
- 2 Randomly located plots per field
- Objective measurements made in the fields
 - Measure Row Width
 - Count Plants (or stalks)
 - Count Fruit (pods, ears, or proxy early in season)
 - Weigh Fruit (pods, ears, or proxy early in season)
 - Gleanings (harvest loss)



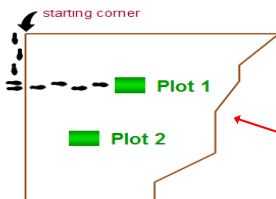
Objective Yield Survey

- Data collected from about 25th of previous month through the 3rd of the survey month
- Return to the same plots for several months until crop is mature or harvested
- Personal interviews and field visits





Objective Yield Surveys



Samples consist of 2 plots randomly located within each selected field and scientifically placed within the field with predetermined locations.





Objective Yield Components and Forecast Variables

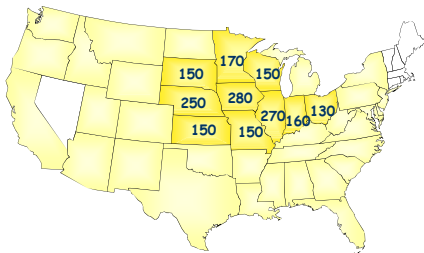
Crop	Component	Forecast Variable
Corn	Ears	- stalks - ears & ear shoots - ears with kernels
	ear weight	- historic average - length over husk - kernel row length - ear diameter
Soybeans	Plants pods per plant	- plants - main stem nodes - lateral branches - blooms, dried flowers & pods - pods with beans
	pod weight	- historical average - pods with beans

Variables used to measure the number of fruit and weight vary each month based on the stage of maturity



Objective Yield Survey

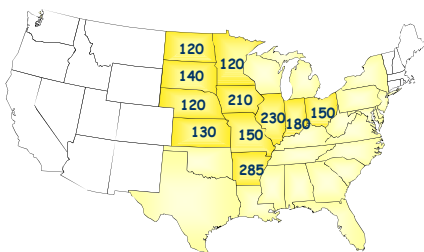
- CORN n=1860 (only half completed in August)
- 10 states average ~85% of U.S. corn production





Objective Yield Survey

- SOYBEANS n=1835 (only half completed in August)
- 11 states average ~85% of U.S. soybean production





FINAL Acreage, Yield, & Production

Production =

<i>Harvested acres</i>	<i>X</i>	<i>Yield</i>
June Crops/Stocks and Area Surveys – updated as needed to reflect current growing conditions based on survey, satellite, and FSA acreage data	F O R E C A S T	Agricultural Yield Surveys Objective Yield Surveys
December Crops/Stocks Satellite Imagery FSA Acreage Data	F I N A L	December Crops/ Stocks Survey Obj. Yield Survey



County Estimates

- Combines December Crop/Stocks survey & a supplemental county survey
- Set Planted, Harvest, Production, & Yield by county
- Iowa – Corn, Soybeans, Oats, Alfalfa Hay, Other Hay, Cattle, Cash Rents(separate data collection)



Quarterly Grain Stocks

- Estimates provided for stocks as of March 1, June 1, September 1, and December 1
- Total Stocks in all positions is comprised of 2 parts based on location of the grain:





Grain Stocks Data Collection

	<u>On Farm Stocks</u>	<u>Off Farm Stocks</u>
Data Collection	Survey of Farmers (Mar, Jun, Sep, Dec)	Census of Facilities (Mar, Jun, Sep, Dec)
Sample Size	66,000-84,000 farms 2,400-3,000 in Iowa	8,900 facilities 900 in Iowa
Collection Methods	phone, mail, internet, personal interview	mail, phone, internet
Data Items	Whole grains and oilseeds stored on the farm regardless of ownership or intended use	Whole grains and oilseeds stored in commercial storage facility



Crop Balance Sheet

Beginning Stocks	NASS
Supply	
+ Production	NASS
+ Imports	U.S. Census Bureau
Disappearance	
- Exports	U.S. Census Bureau
- Food & Industrial Use	Millers, Crushers, WAOB
Ethanol & by products	Calculated by WAOB
- Seed	NASS, ERS
-(+)Residual (feed, in-transit, shrinkage, imbalance, error, etc.)	
Stocks on Hand	
On-Farm Grain Stocks	NASS
Off-Farm Grain Stocks	NASS



What about Livestock Estimates?

- Frequency of reports mainly determined by production cycle
 - Quarterly Hog report (Mar, Jun, Sep, Dec)
 - Semi Annual Cattle report (Jan, Jul)
 - Monthly Cattle on Feed report
- Other livestock reports also available



Hog & Pig Survey

- Target population= all hog owners
- Conducted quarterly
- Multiple frame survey design
 - Gives everyone who owns hogs a chance to be selected for the survey
- Sample is stratified by size of operation
 - Larger operations sampled at a higher rate
 - Nationally, depending on the quarter, 8,800 or 11,600 hog owners are contacted
 - Over 1,400 in Iowa

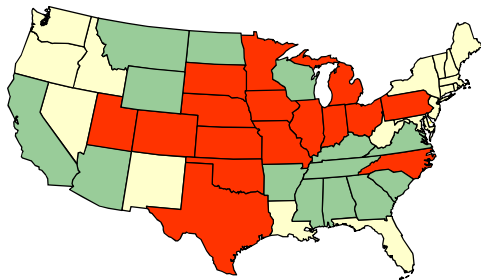


Estimates from the Quarterly Hog & Pig Survey

- All Hogs & Pigs
- Breeding Herd Inventory
- Market Hog Inventory
 - By weight group
- Sows Farrowing, Litter Rate, Pig Crop
 - Litter rate by size of operation for U.S.
- Farrowing Intentions
 - Next 3 months
 - 3 to 6 months



Hog & Pig Estimating Program



- Quarterly Estimates Published
- Quarterly Survey/Annual Estimates Published
- Annual Survey/Annual Estimates Published



Cattle Survey

- Target population= all operations w/ cattle
- Conducted in January and July
 - State estimates only published in January report
- Multiple frame survey design
 - Gives every cattle operation a chance to be selected for the survey
- Sample is stratified by size and type
 - Larger operations sampled at a higher rate
 - Nationally, about 40,000 producers contacted
 - Over 2,100 in Iowa



Estimates from the Cattle Survey

- All Cattle & Calves
- All Cows that have calved
 - Beef cows and Milk cows that have calved
- Heifers 500 pounds and over
 - Beef and Milk cow replacements
 - All other heifers
- Steers 500 pounds and over
- Bulls 500 pounds and over
- Calves under 500 pounds
- Calf Crop
- Total Cattle and Calves on Feed (all size lots)



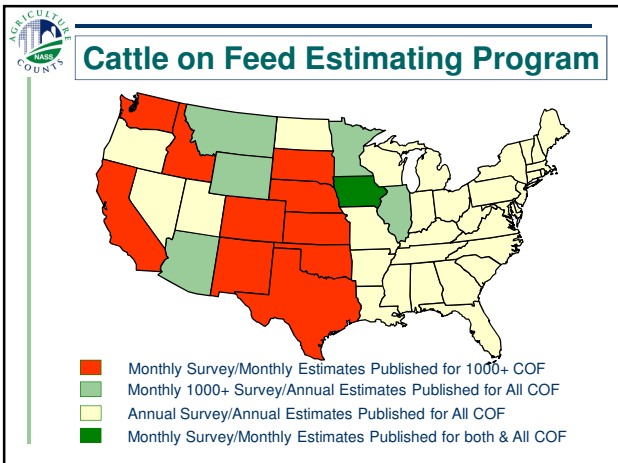
Cattle on Feed Surveys

1000+ COF Survey

- Federally Funded
- Conducted monthly
- List Frame census of all lots with 1000+ hd capacity
 - Add any new lots
- Data collected mostly by personal interview

LT 1000 COF Survey

- State Funded
- Conducted monthly
- List Frame survey of lots w/ LT 1000 hd capacity
 - Not complete coverage
- Data collected by mail and phone



LT 1,000 Hd Capacity COF Survey

- February - Mail to all operations with LT 1000 head capacity - about 13,000 lots
- For Subsequent Months - Select a sample of February survey respondents
 - Stratified Replicated Sample
 - About 1,100 sampled each month
 - Sample is stratified by February reported capacity
 - Replication scheme limits operators to 6 contacts per year but allows 40% carryover of the sample from month to month
 - Have about 600 good reports each month

Estimates from the COF Survey

- Monthly 1000+, LT 1000, & total cattle on feed in all lots
 - Quarterly steers, heifers, & cows/bulls on feed for 1000+ lots
- Number placed during the month
- Number marketed during the month
- Other disappearance during the month

All Cattle on Feed, Iowa

Item	Lots 1,000+ Head (1,000 Head)	Lots Less than 1,000 Head (1,000 Head)	All Lots (1,000 Head)
Cattle on Feed, December 1, 2012	610	660	1,270
December Placements	82	80	162
December Marketings	68	76	144
December Other Disappearance	4	4	8
Cattle on Feed, January 1, 2013	620	660	1,280



Interpreting the Survey Indications

- Indications include direct measures and ratios
 - Normally have more than one indication to set estimate/forecast
- Guiding principles for setting yield forecasts
 - Reference period = 1st of the month
 - Do not extrapolate beyond data collection period
 - Assume normal conditions the remainder of the season

Two Questions:

- Historically, how well have the indications performed?
- Is there a consistent bias in the indications?
 - Tools – difference tables, charts, supporting analysis balance sheet



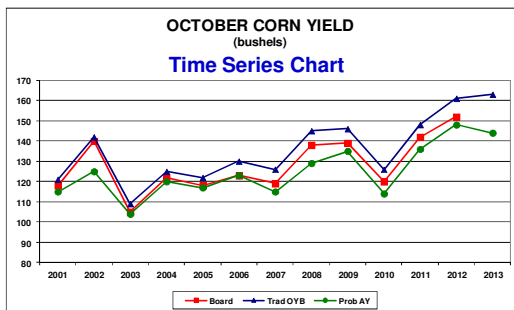
Interpreting the Survey Indications

Difference Table: Corn, Yield, Objective Yield Survey by month

Year	Board	Aug	Diff	Sept	Diff	Oct	Diff	Nov	Diff
2006	126.0	144.0	-18.0	141.7	-15.7	142.2	-16.2	140.2	-14.2
2007	136.0	144.1	-8.1	147.0	-11.0	145.8	-9.8	142.6	-6.6
2008	137.0	149.8	-12.8	147.7	-10.7	144.9	-7.9	143.8	-6.8
2009	122.0	145.5	-23.5	136.5	-14.5	134.4	-12.4	131.0	-9.0
2010	148.0	163.3	-15.3	164.5	-16.5	160.9	-12.9	152.8	-4.8
2012	162.0	172.6	-10.6	178.3	-16.3	170.2	-8.2	164.4	-2.4
2013		162.3		169.5		168.2		164.8	
Diff 10-yr			-16.1		-15.4		-10.3		-6.1
Diff 5-yr			-14.0		-13.8		-10.2		-5.9
std err		14.7		12.9		7.4		4.1	

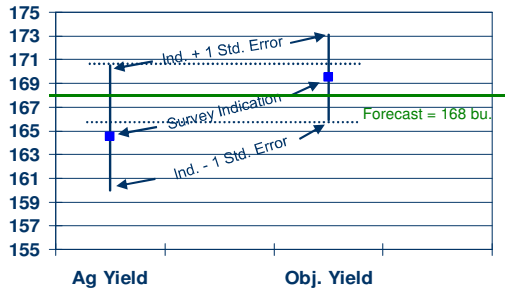


Interpreting the Survey Indications



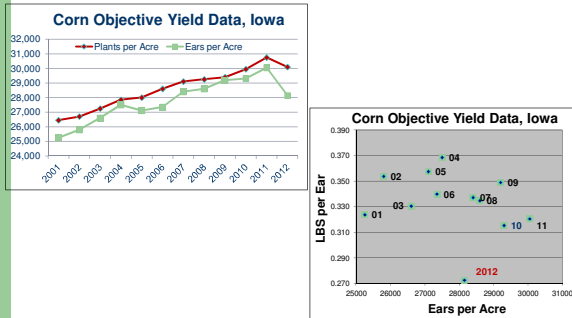


Interpreting the Survey Indications





Other Analysis - Objective Yield Survey Components





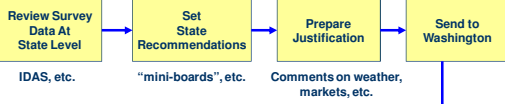
Balance Sheet Review

- Supply: Beginning Inventory +
Pig or Calf Crop +
Imports +
- Disposition: Commercial Slaughter -
Farm Slaughter -
Death -
Exports -
- Indicated Inventory =
- Estimated Inventory
- Residual

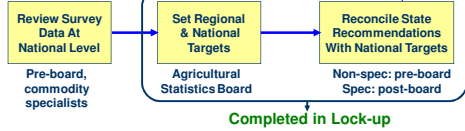


Estimate / Forecasts - Work Flow

Field Offices



Headquarters





Agricultural Statistics Board





Agricultural Statistics Board (ASB) - Security

- Since 1905, the ASB has secured its data to prevent leaks from influencing speculative trading markets
- Armed guards stand watch outside of the lock-up area to prevent disclosures

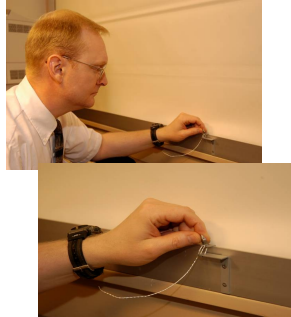


Secretary Johanns and an aide sign-in with security to attend the Crop Report briefing.



Agricultural Statistics Board (ASB) - Security

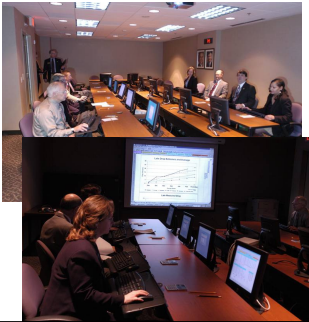
- Window shades are secured and phones are disconnected
- The computer system is disconnected from computers outside of lock-up





Agricultural Statistics Board

- The ASB is comprised of commodity experts who set regional and national yield and production or livestock estimates





Agricultural Statistics Board

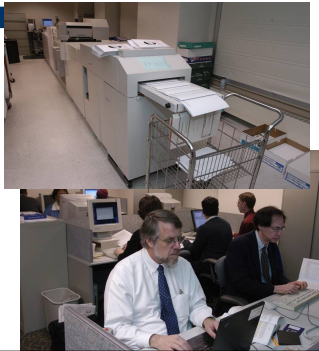
- The Secretary of Agriculture or his designee attends the briefing and signs the report





Agricultural Statistics Board

- Reports are printed inside the lock-up area
- Reporters are allowed inside lock-up to prepare their news articles for release





Agricultural Statistics Board

- The Crop Reports are released at 12:00 pm ET on specified dates.
- Hogs and Pigs, Cattle, and COF reports are released at 3:00 pm ET.





How Reliable are the NASS numbers?

- NASS reports include reliability information
- Also include information on
 - Survey and estimation procedures
 - Revision policy

Reliability of January 1 Cattle Estimates

(Based on data for the past ten years)

Item	Root mean square error (percent)	90 percent confidence level (percent)	Difference between first and latest estimate				
			Average (1,000 head)	Smallest (1,000 head)	Largest (1,000 head)	Years	
						Above latest (number)	Below latest (number)
All cattle	0.5	0.9	338	6	830	7	3
All cows	0.6	1.1	167	0	505	6	3
CalF crop	1.0	1.8	272	10	674	5	5
