

Integrating Social Science Methods into an Assessment of Conservation Program

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Utah State University

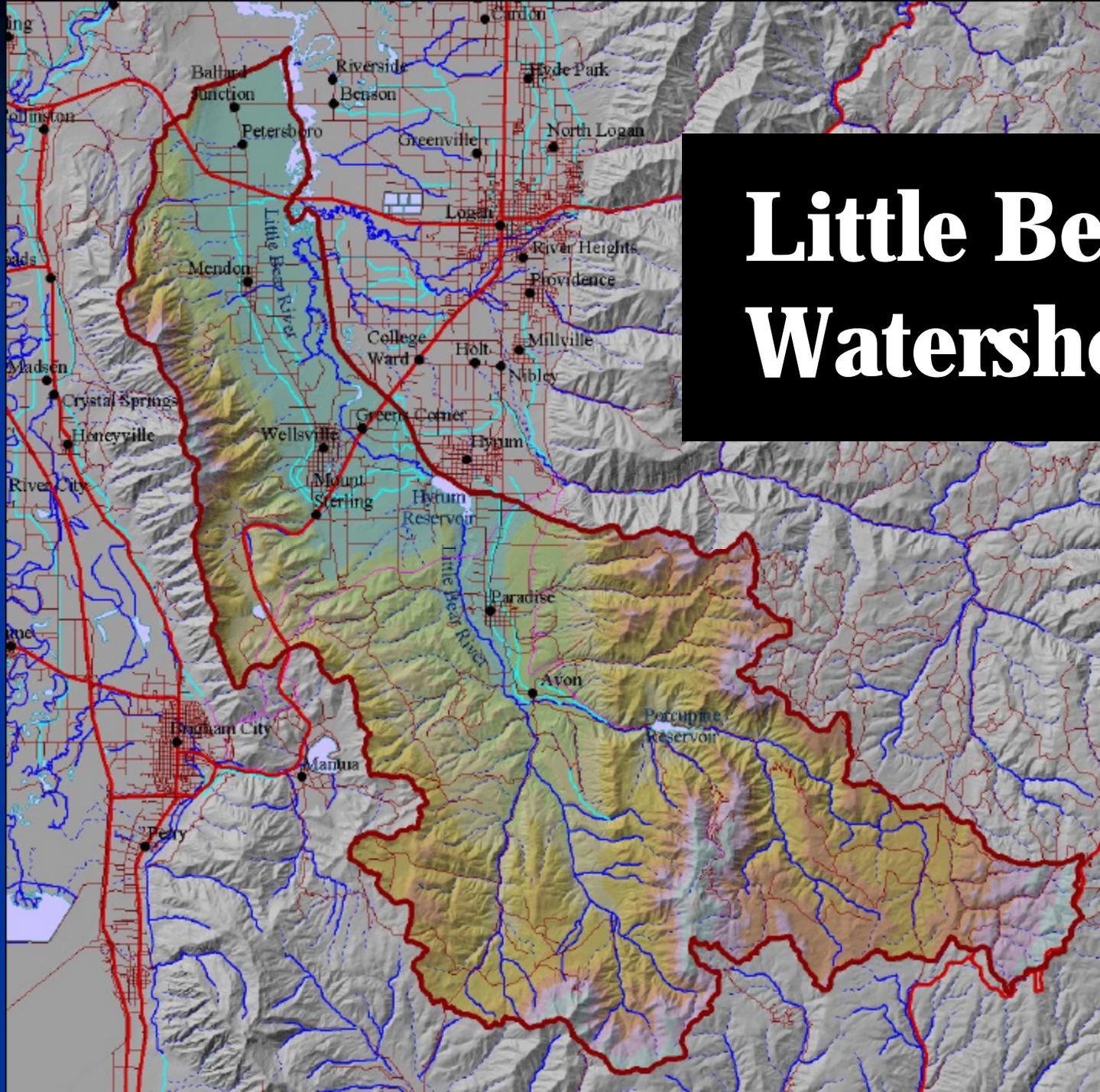
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Background

- Conservation Effects Assessment Program (CEAP)
 - USDA national assessments
 - USDA/ARS field sites
 - Competitive Grant program (initially 4 states)
- Utah State Proposal:
 - Little Bear River Watershed
 - Priority Watershed 1990-2003
 - Significant in-stream WQ monitoring data available

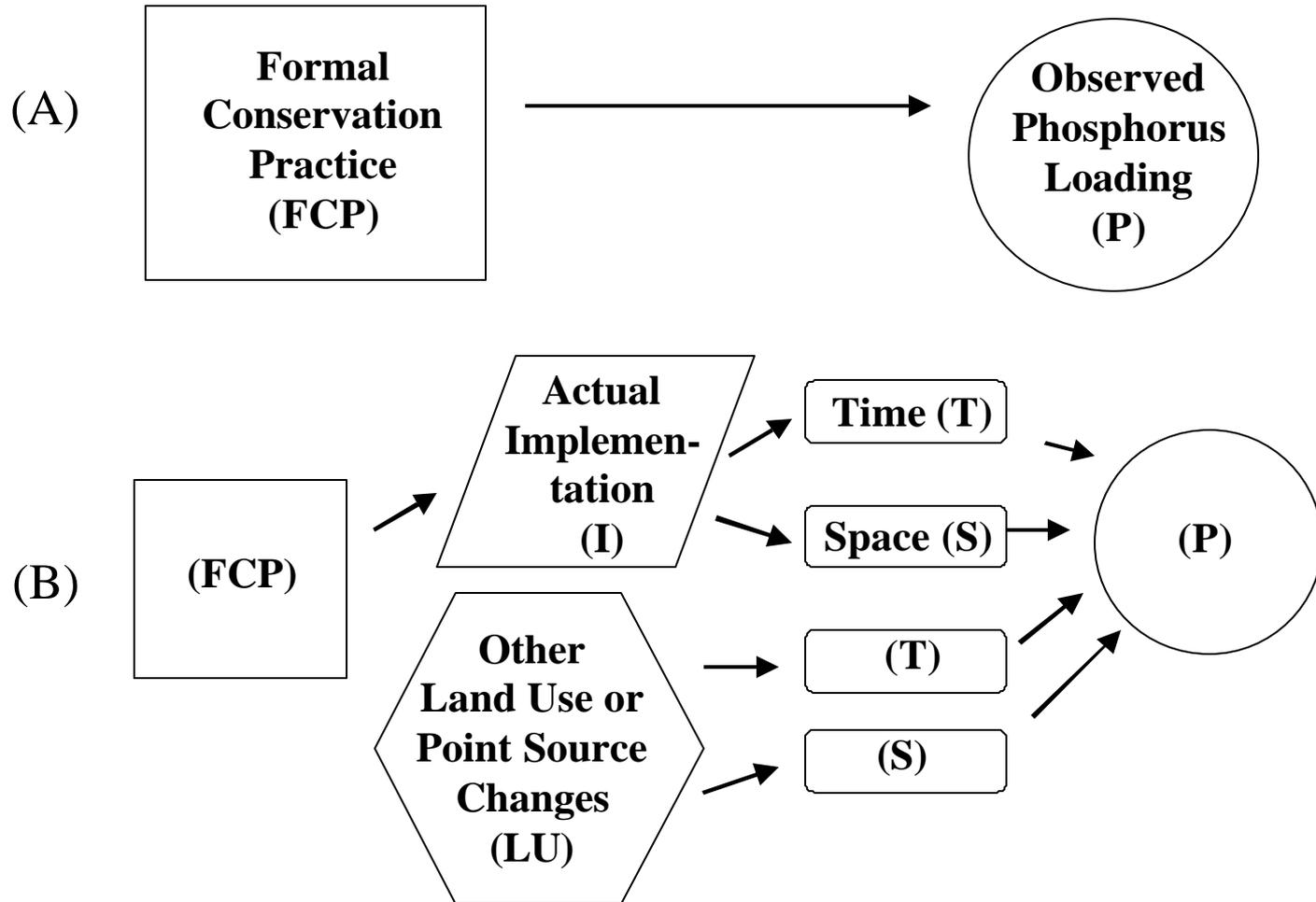
Little Bear Watershed

- Big problem = phosphorus runoff in river
- 74,000 ha of primarily agricultural lands
 - 70% is grazing land and forests
 - 19% is irrigated cropland
 - 7% is dry cropland
 - > 50 dairies & many beef/horses
- Experiencing rapid population growth
 - 32% increase between 1990 and 2000
 - Higher increase (46.7%) in unincorporated areas



Little Bear Watershed

General USU Model



Socioeconomic Efforts

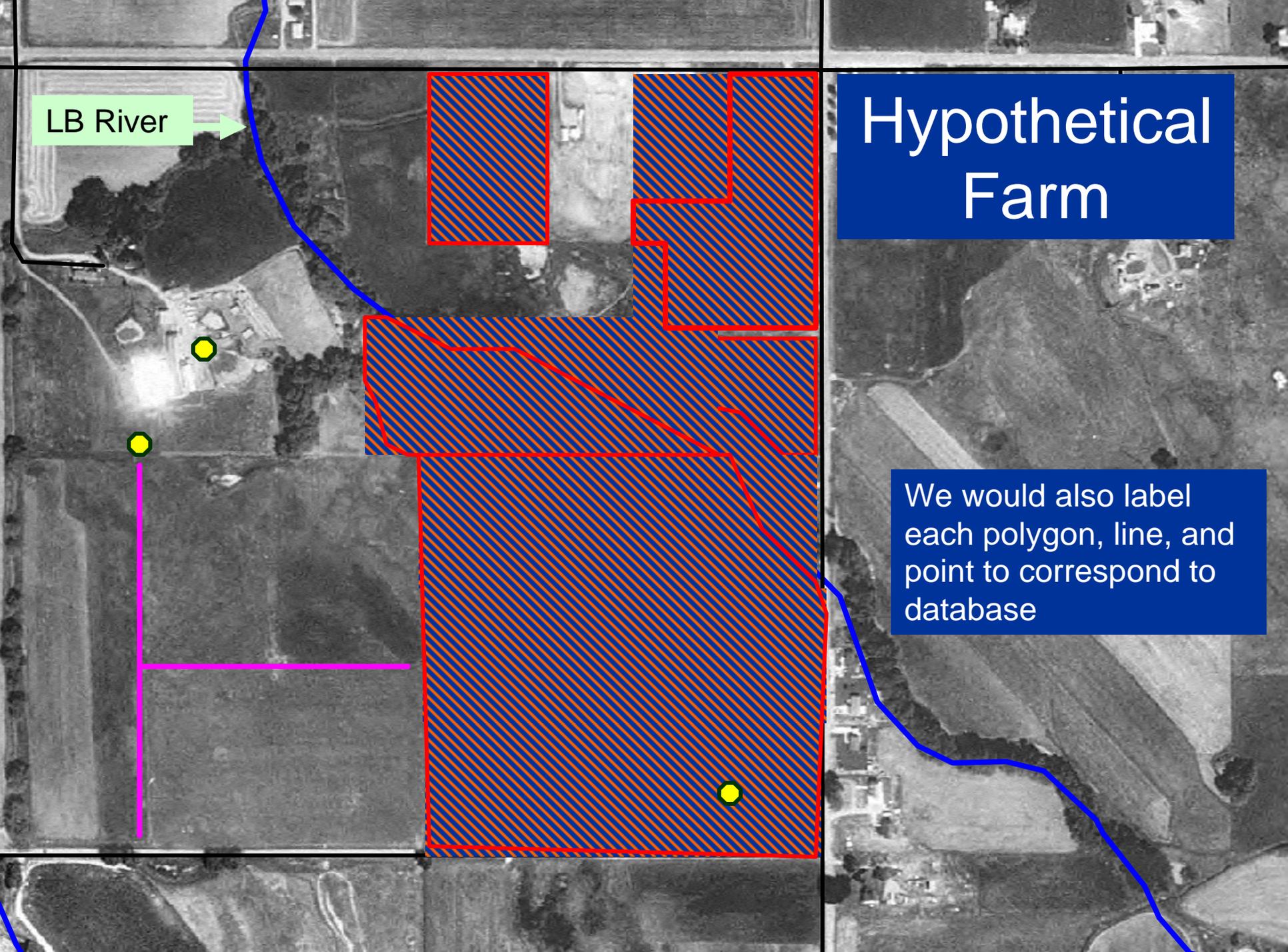
- **Gather formal practice info** from NRCS files
 - Locate in time & space
 - Code attributes
- **Conduct field interviews** with participants
 - Validate file information
 - Learn about experience
 - Before, during & after participation in LBR projects

NRCS File Information

- Worked in county USDA/NRCS office (~ 9 months)
- Went through every file associated with Little Bear River Watershed project – **90 landowners**
- Observations
 - Challenge to create master list of practices (**871 total**)
 - Variability in quality & content of files
 - Ambiguities often clarified by NRCS staff
- Copied key maps for interviews
- Summarized information on spreadsheet
 - There were 65 practice types

Database of File Information

Prop ID	GIS Ref. #	GIS type	Practice Code	Applied Units	Practice Units	Intended End Date	Structure or Event Certified Complete	Mgmt start date (spring of this year)	Mgmt end date (fall of this year)	Notes
1	1-A1	polygon	312	1	plan	Oct-96	10/21/96	NA	NA	a plan to put in the facilities and store when spreading is not feasible
1	1-B1	point	313	1	structures	Oct-95	10/16/95	NA	NA	solid and liquid storage facilities
1	1-B1	point	313	1	structure		10/16/95	NA	NA	
1	1-C1	point	313	1	structure	Oct-95	12/05/95	NA	NA	animal holding areas/stalls as a manure containment method
1	1-A2	polygon	382	1750	feet of fence	Dec-95	12/4/1995	NA	NA	all the way around a pasture but it protects Hyrum Slough to the East
1	1-D1	line	382	350	feet of fence	Dec-95	12/4/1995	NA	NA	along Hyrum Slough to prevent cattle in stream and erosion. Jay thinks this may not have happened and actually they convinced him to abandon this area
1	1-E1	polygon	645	62.3	acres	NA	NA	Jan-95	09/26/95	wildlife habitat
1	1-F1	polygons	645	116.3	acres	NA	NA	Jan-96	11/08/96	wildlife habitat
2	NONE	NONE	312	1	Management System	09/01/00	09/20/00	NA	NA	Waste storage facility was constructed properly.
2	2-A2	point	313	1	Waste Storage Facility	09/01/00	09/20/00	NA	NA	see comment
2	2-B1	polygon	449	36	acres	NA	NA	Jun-96	09/29/97	Irrigation water management- irrigate to meet peak demand of the crop. Specifics were given: Alfalfa- 9 days, Small grain- 12 days, Corn- 16 days.
2	2-C1	polygon	449	479	acres	NA	NA	Jun-95	09/29/97	Irrigation water management- irrigate to meet peak demand of the crop. Specifics were given: Alfalfa- 9 days, Small grain- 12 days, Corn- 16 days.
2	2-B2	polygon	510	36	acres	NA	NA	May-96	09/29/97	Pasture and Hayland Mgmt.
2	2-C2	polygon	510	479	acres	NA	NA	May-95	09/29/97	Pasture and Hayland Mgmt.
2	2-B3	polygon	633	36	acres	NA	NA	Jan-96	09/29/97	Waste utilization
2	2-C3	polygon	633	479	acres	NA	NA	Jan-95	09/29/97	Waste utilization
2	2-A1	point	634	1	Liquid Transfer System	09/01/00	09/20/00	NA	NA	Liquid waste pump
2	2-D1	polygon	645	94	acres	NA	NA	Jan-95	09/27/95	Upland Wildlife Mgmt- Wildlife secondary concern. Maintained vegetation along roadways and fences for wildlife cover and feed.
2	2-E1	polygon	645	96	acres	NA	NA	Jan-95	09/29/97	Upland Wildlife Mgmt- Wildlife secondary concern. Maintained vegetation along roadways and fences for wildlife cover and feed.
2	NONE	NONE	991	479	acres	NA	NA	Jan-95	09/29/97	Record Keeping- Attended a training course to learn how to keep records properly.
3	3-B3	line	322	0.2	acres	9/1/2001	04/07/02	NA	NA	at intersection of 3 fields
3	3-A1	line	382	1453	feet of fence	9/1/2001	05/15/01	NA	NA	cross fencing
3	3-B1	line	382	4500	feet of fence	9/1/2000	04/07/02	NA	NA	drainpipe from water control structures
3	3-F1	line	430	40	feet of pipe	9/1/2000	08/16/00	NA	NA	structure for water control
3	3-H2	polygon	449	9.8	acres	NA	NA	Jun-96	10/22/96	channel vegetation
3	3-H1	polygon	464	9.8	acres	9/1/1996	10/22/96	NA	NA	riparian fencing



LB River →

Hypothetical Farm

We would also label each polygon, line, and point to correspond to database

Interview Methods

- Advance letter sent
- Phone contact made to set up interview
- USDA/USU Confidentiality Agreement requires Informed Consent Form to be signed
- Face to face interviews conducted in field
- Status of Interviews
 - 60 sent letters as of Jan 2007
 - 35 interviews completed (1 new farm)
 - 1 refused, 3 deceased, 3 no good current address

Interview Content

- Review maps & list of file practices
- For each major cluster of practices
 - What exactly was done?
 - Why select this practice?
 - What was it supposed to accomplish?
 - How easy or difficult was it to implement?
 - Did it work like expected?
 - Did it require major changes in the rest of operation?
 - Costs and benefits associated with the practice?
 - Were you able to continue using this practice (after the original contract ran out)?
 - Any changes made to the practice?
 - Is practice still being maintained? Is it still there?

More Interview Content

- Explore how respondent got involved in the Little Bear Watershed project in the first place
- List of other things done on land that might impact water quality in the Little Bear River
- Information about farm operation
- Personal characteristics & plans for future
- Interviews generally took ~90 minutes

Created Revised Practice Database

- Incorporated information from interviews
- Several key modifications
 - Implementation information
 - Some practices not implemented fully
 - Some actual practices differed from 'file view'
 - New practices (not NRCS work) likely to affect WQ
 - Current Status
 - Dates for start
 - Still there? Still Used?
 - Estimated water quality impacts (if any)

Findings - Implementation

- Farm-Level (of 34 farms interviewed)
 - **22 (65%) had at least 1 practice that was not fully implemented**
 - 12 (35%) had fully implemented all of their practices
 - Put differently:
 - About 52% of farms implemented over 75% of practices
 - About 33% of farms implemented 50-75%
 - About 15% of farms implemented $< \frac{1}{2}$ of practices

Implementation – Practice View

- 372 distinct practices identified in files
- **Were they implemented as per contract?**
 - **80% fully implemented** as described in file (n=292)
 - **16% not fully implemented** (n=60)
 - About half ‘rang no bells’ with respondent
 - Rest = remembered, but didn’t change any behavior
 - Another 3% listed mistakenly (internal NRCS code)
 - Remaining 1% not determined

Types of Practices with Low Implementation Rates (< 50%)

- Mostly Management Practices
 - Pest management
 - Nutrient management plan
 - Brush management
 - Deferred grazing
 - Irrigation water management
 - Waste utilization
 - Upland wildlife management
 - Pasture and hayland management
 - Record keeping

Interpreting Low Implementation

- Caution required
 - Recall errors? – up to 14 years ago
 - Not necessarily mean nothing done
 - NRCS Staff might tell different story
 - Not evidence of malfeasance or illegality
 - Frequent explanation = already doing practice

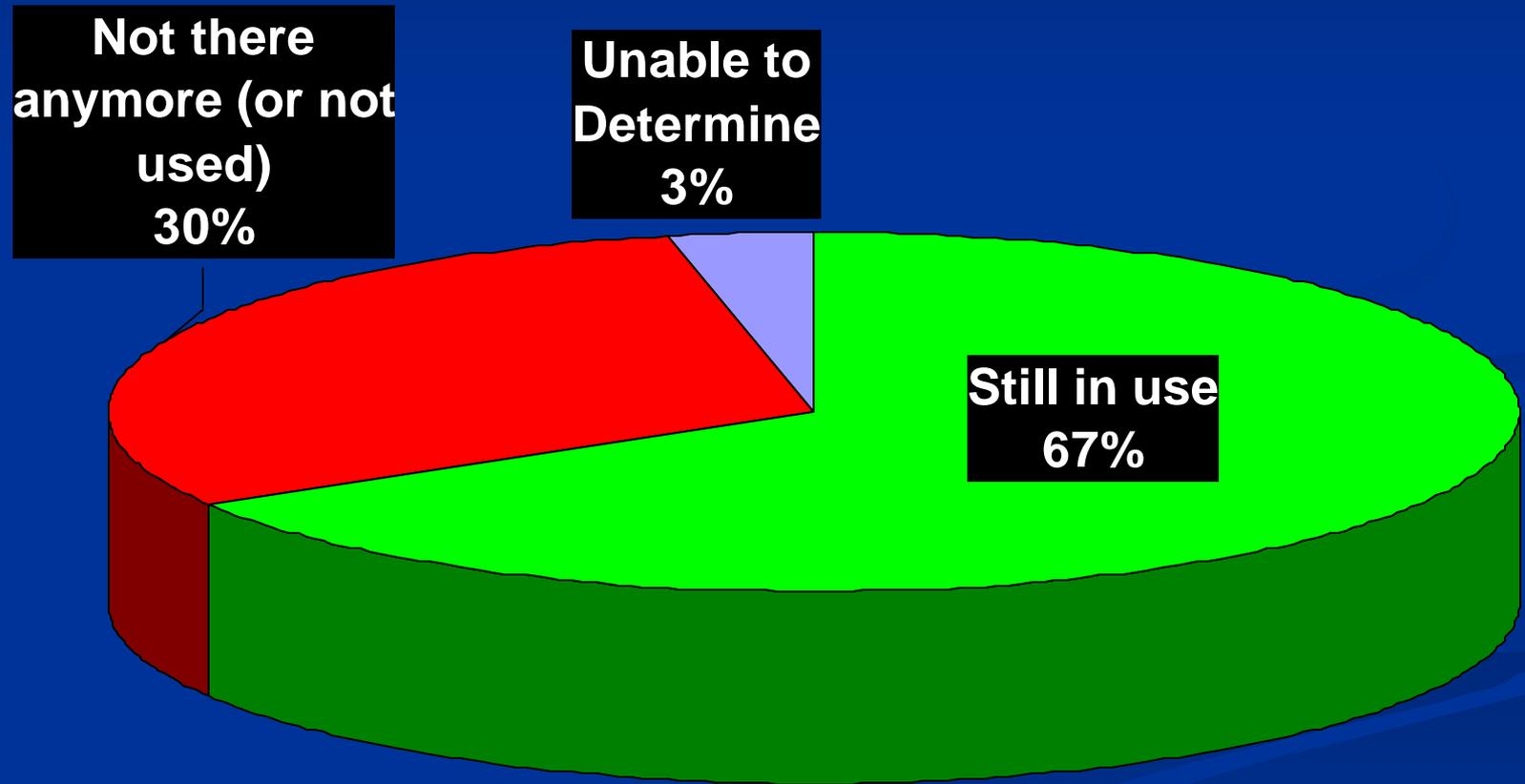
Results: Maintenance

- Practices had explicit or implied time periods
 - Structures – date construction completed
 - Management practices – years covered by contract
- Obviously, NRCS goal = permanent changes
- Interviews allowed us to track fate of each practice
 - Still there?
 - If not, why not?

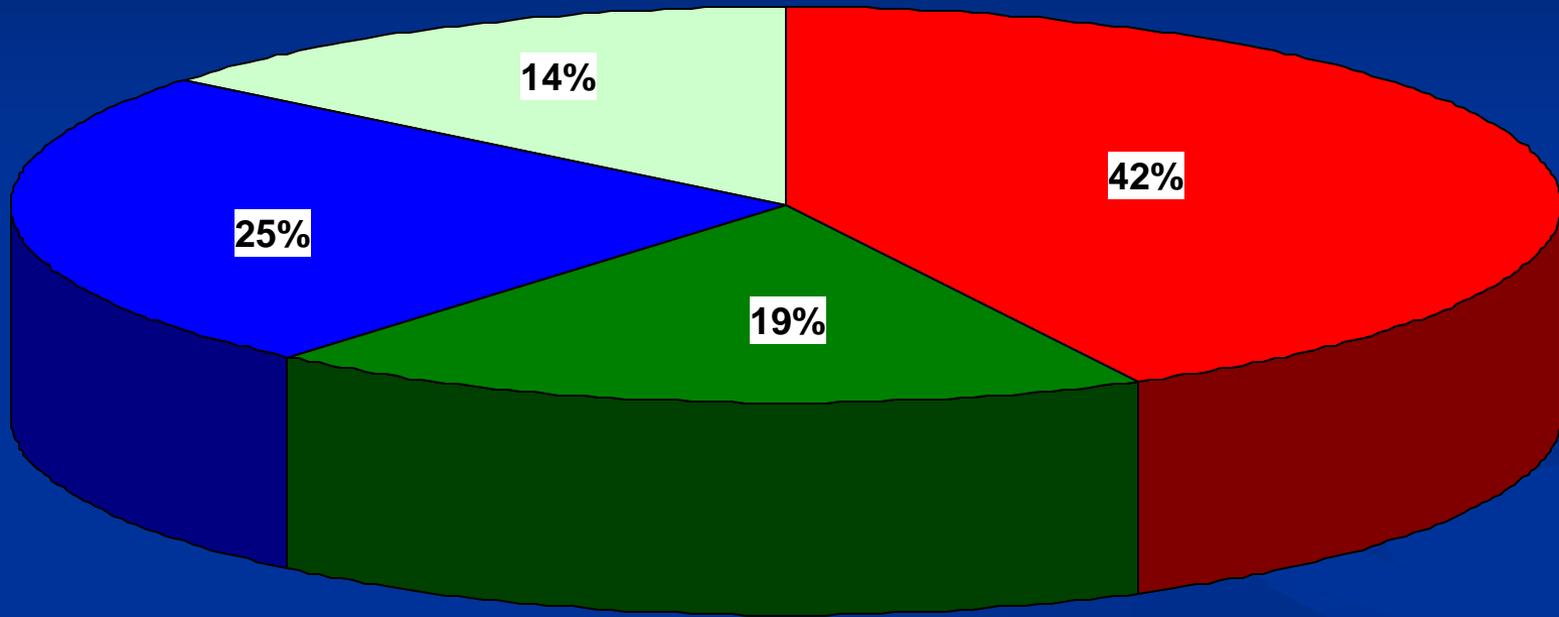
Still There?

- Of 34 farms
 - 45% had > 80% of practices still in use
 - 25% had 50-80% still there
 - 30% had <50% still there
- Put differently...
 - 82% had at least 1 practice no longer there

Still There? (Aggregated Practices)



Reasons Not Still There



- Never done originally
- Still farming, but no longer done
- Operator no longer farming this parcel
- Temporary practice, not meant to be continued

Impact of Farm & Nonfarm Changes

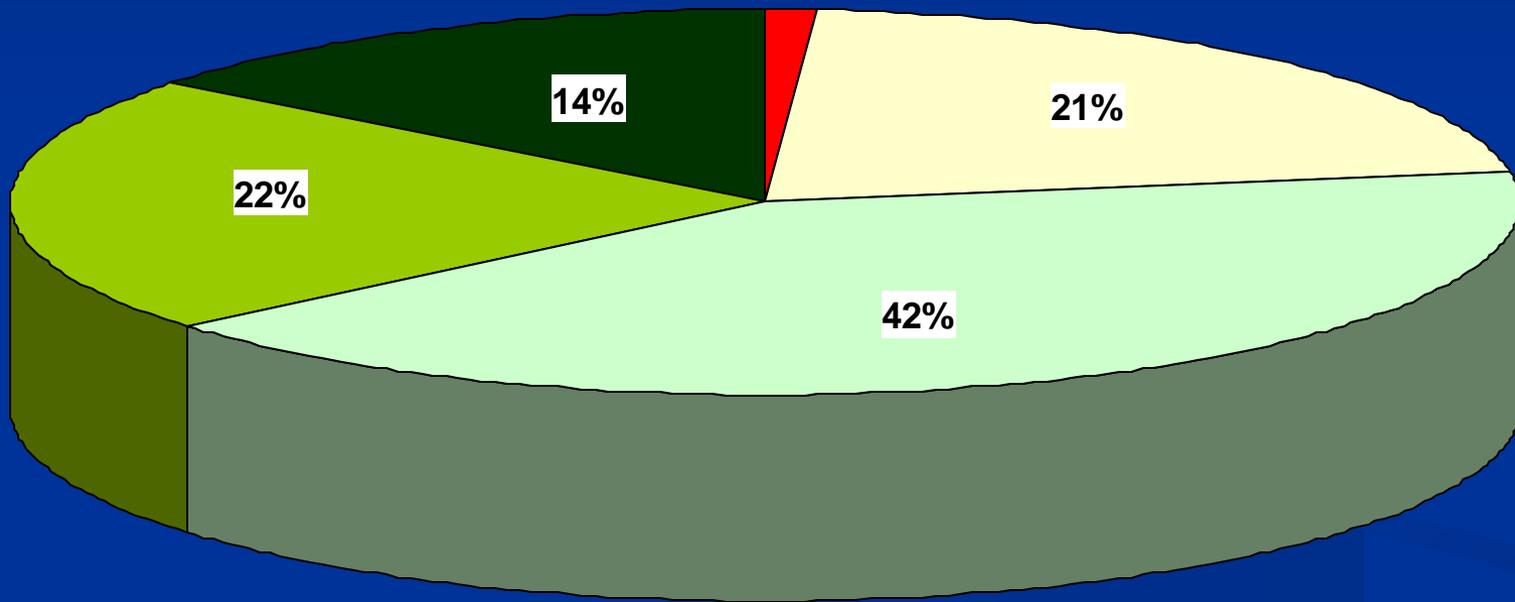
- **UNDONE BY FARM CHANGES**
 - 9% of practices, 25% farms
 - Mostly due to **DOWNSIZING**
 - Sold off animals
 - Sold off some land
 - Ceased renting some land
- **UNDONE BY DEVELOPMENT**
 - 5% of practices, 10% farms
 - Generally land now in housing

Estimated Water Quality Impacts

- Rated each practice based on
 - Maps & field observations
 - Evaluate possibility that changes could affect surface runoff into Little Bear River during time frame
 - Producer input
 - What did they think was water quality impact
 - Did they see any changes?
- Scale Scores ranged from -5 to +5
 - Negative to Positive impacts (0 = neutral)

WQ Impacts of Practices

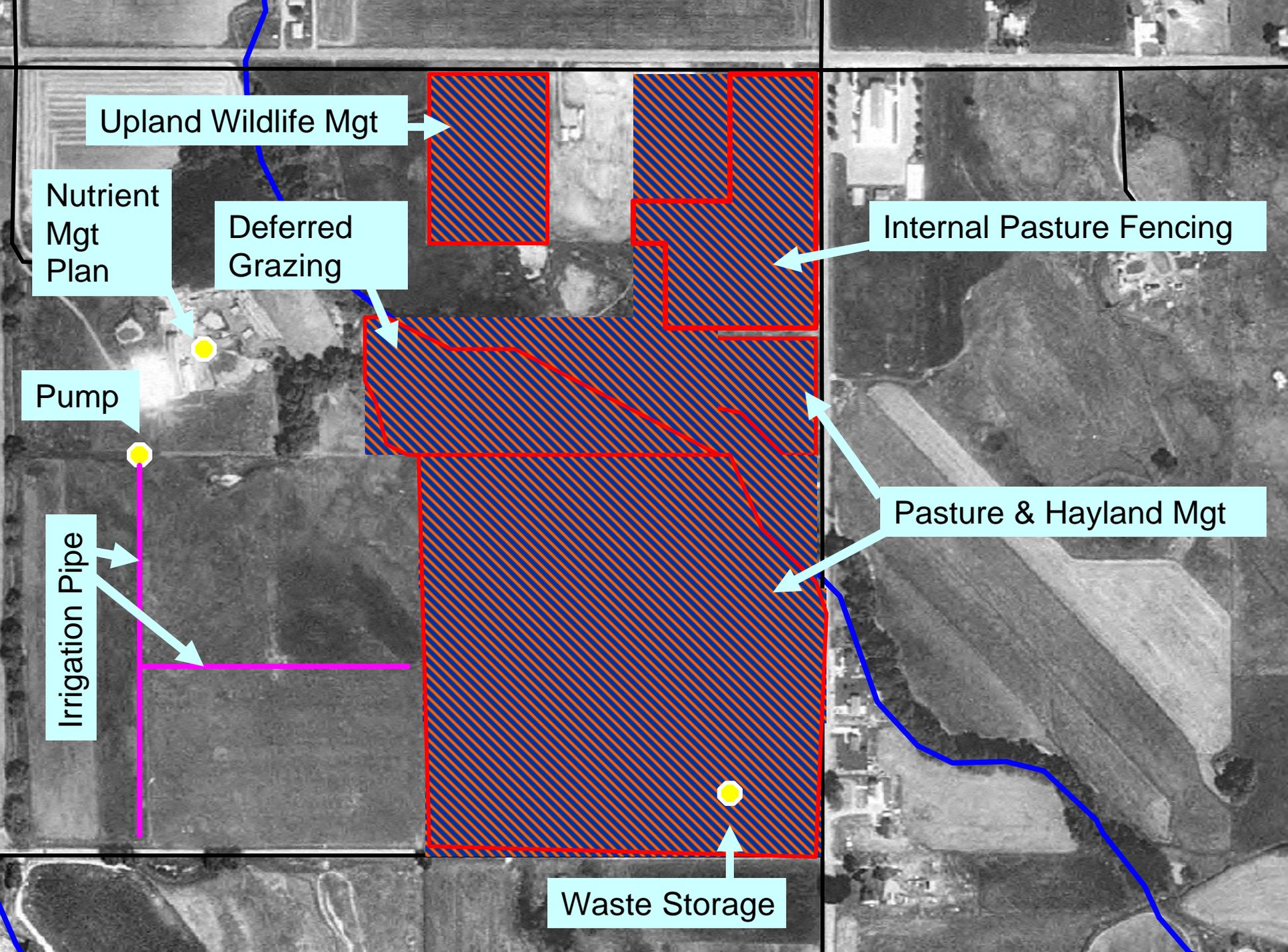
(among those implemented)



- Possible negative impact (-1 or -2)
- No apparent WQ impact (0)
- Possible small positive impact (+1)
- Likely positive impact (+2)
- Strong positive impact (+3 or more)

Impacts of Fieldwork

- Accuracy critical for successful CEAP modeling
- Interviews clarified
 - **Implementation**
 - Allows us to focus on practices that were associated with actual changes in behaviors
 - **Spatial Location:**
 - Frequently changed GIS maps
 - Polygons → lines or points; Subset of polygons
 - **Temporal Information**
 - Actual start, end dates
 - Possible 'weights' for WQ impact assessment



Upland Wildlife Mgt

Nutrient
Mgt
Plan

Deferred
Grazing

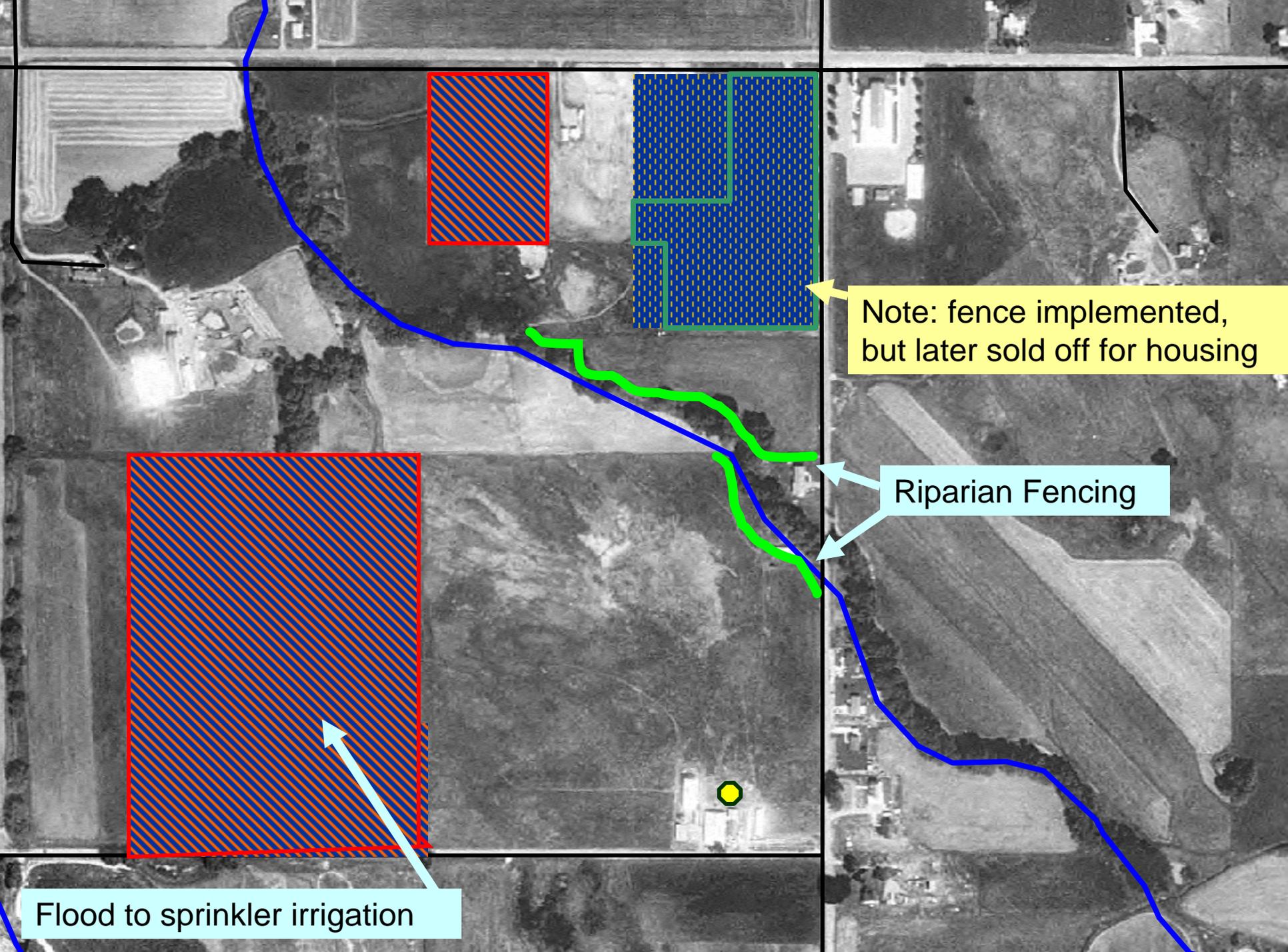
Internal Pasture Fencing

Pump

Irrigation Pipe

Pasture & Hayland Mgt

Waste Storage



Note: fence implemented, but later sold off for housing

Riparian Fencing

Flood to sprinkler irrigation

Conclusions

- Formal USDA Program files are imperfect guide to actual BMP implementation & maintenance
- Fieldwork can generate important insights into water-quality relevant behaviors
 - More accurate behavioral component of models
 - Understanding barriers to implementation & maintenance
- Face to Face Contact = particularly useful
 - Takes time & money

Questions?

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