USDA Agricultural Research Service
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United States Department of Agriculture

Agricultural Research Service

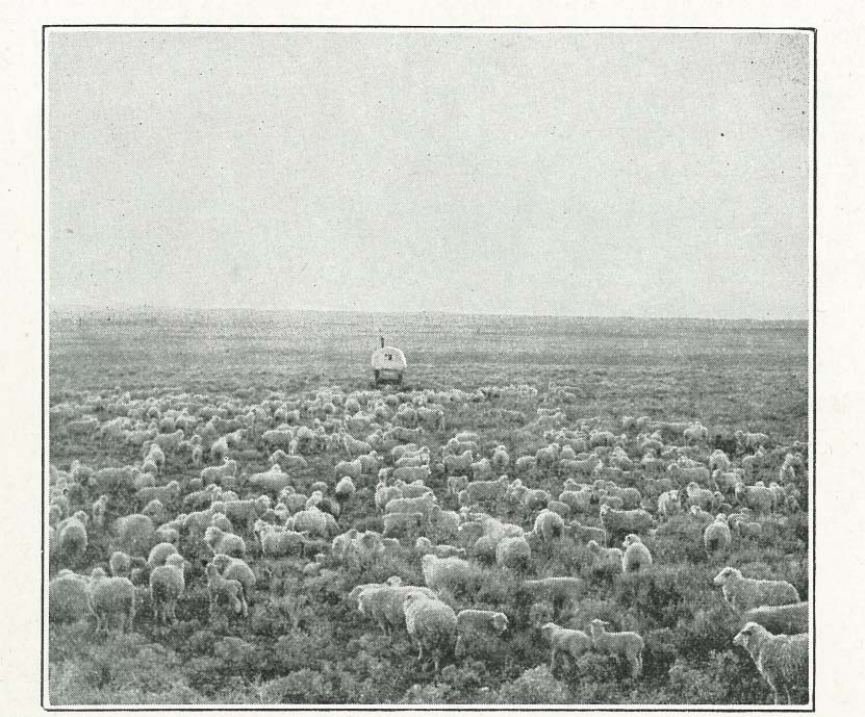
Pacific West Area

July 2011

Draft Environmental Impact Statement Appendices

U.S. Sheep Experiment Station Grazing and Associated Activities Project 2010

United States Sheep Experiment Station
Dubois, Clark County, Idaho



Sheep on the range, United States Sheep Experiment Station, in Idaho

Horlacher, Levi J. and Hammonds, Carsie , 1936. ***Sheep*** . published by The Commercial Printing Company, Lexington, KY. 305 pages. The photo appears on page 5.

For More Information Contact:

Sue Wingate
Environmental Coordinator
TEAMS Enterprise Unit
USDA Forest Service
559-920-5235

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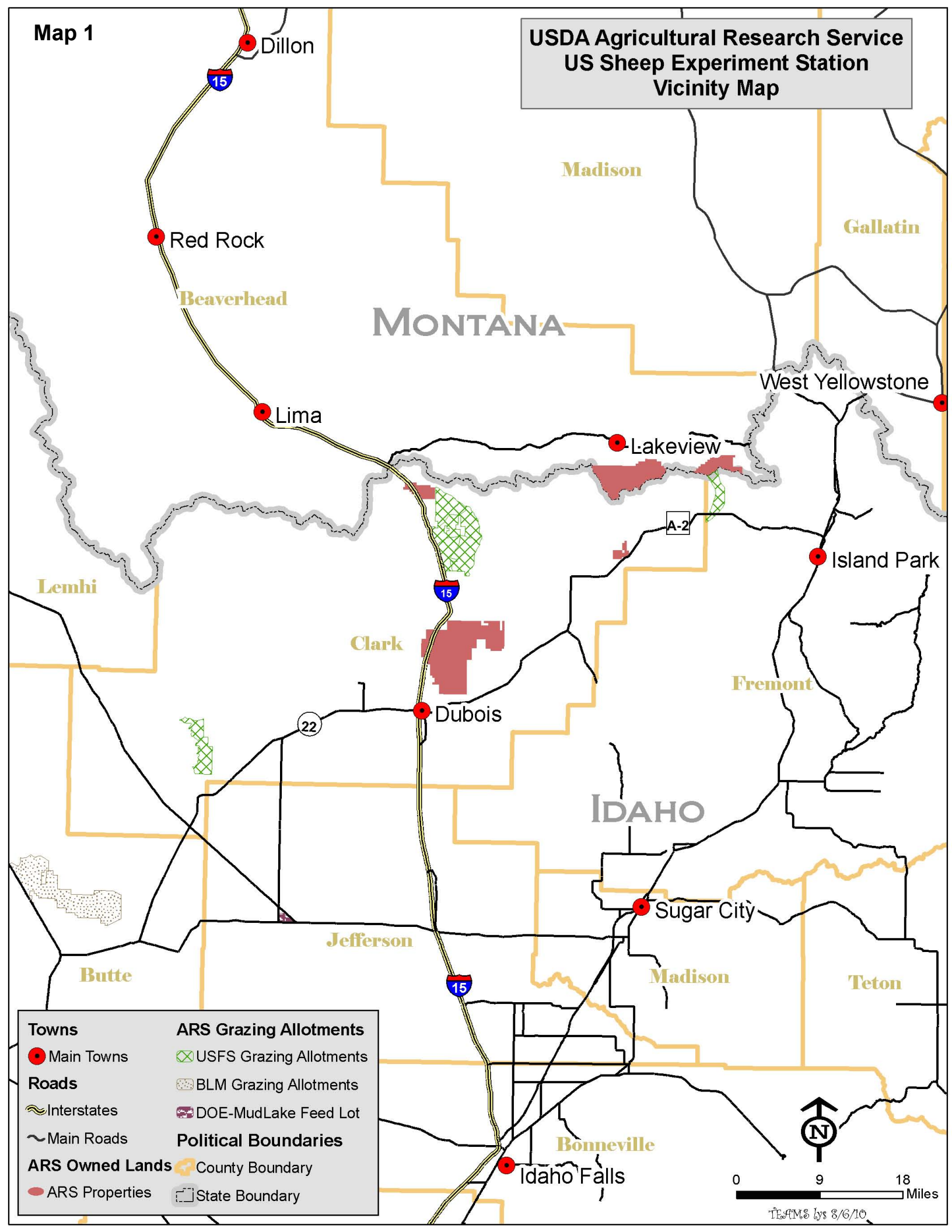
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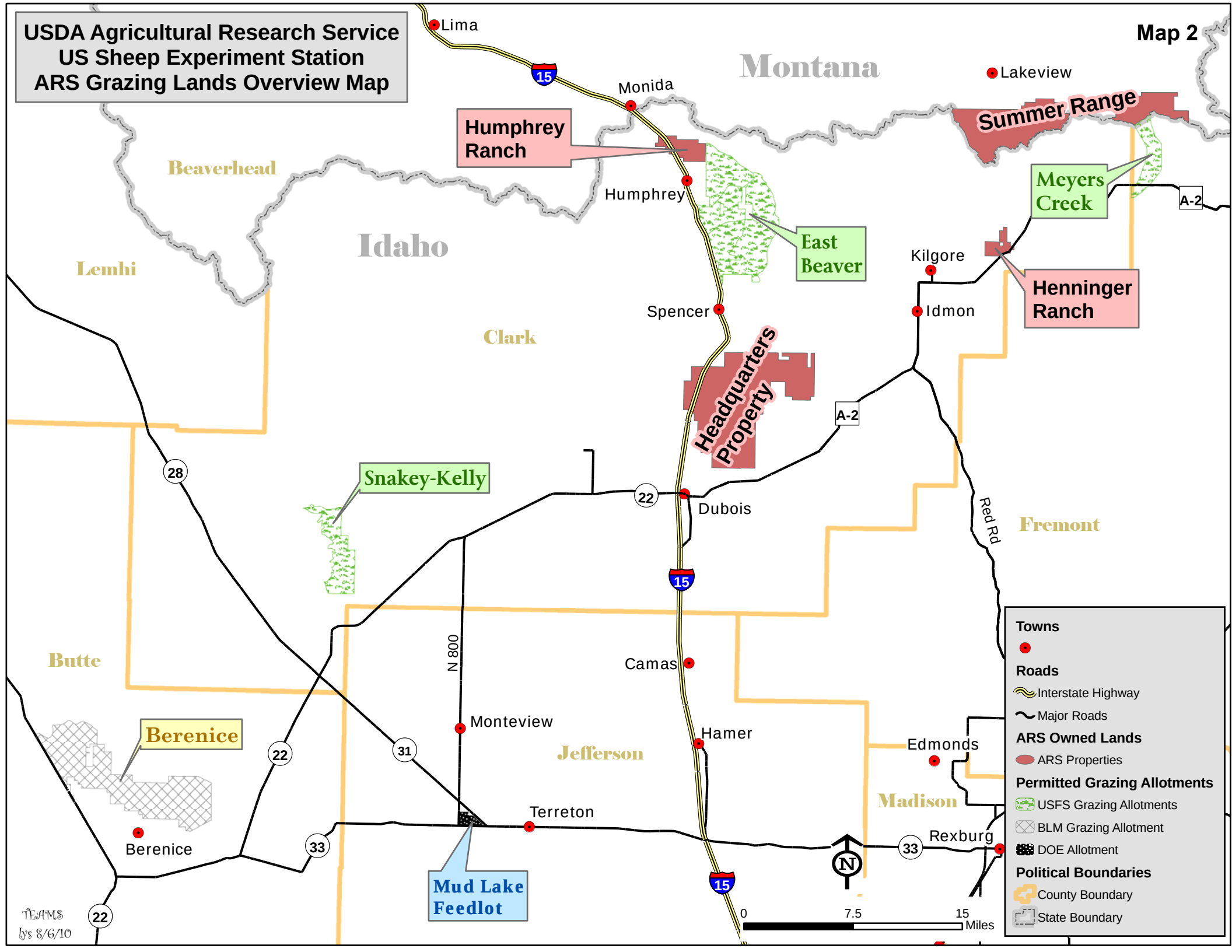
N
0
9
18
Miles
TEAMS lys 8/6/10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Camas
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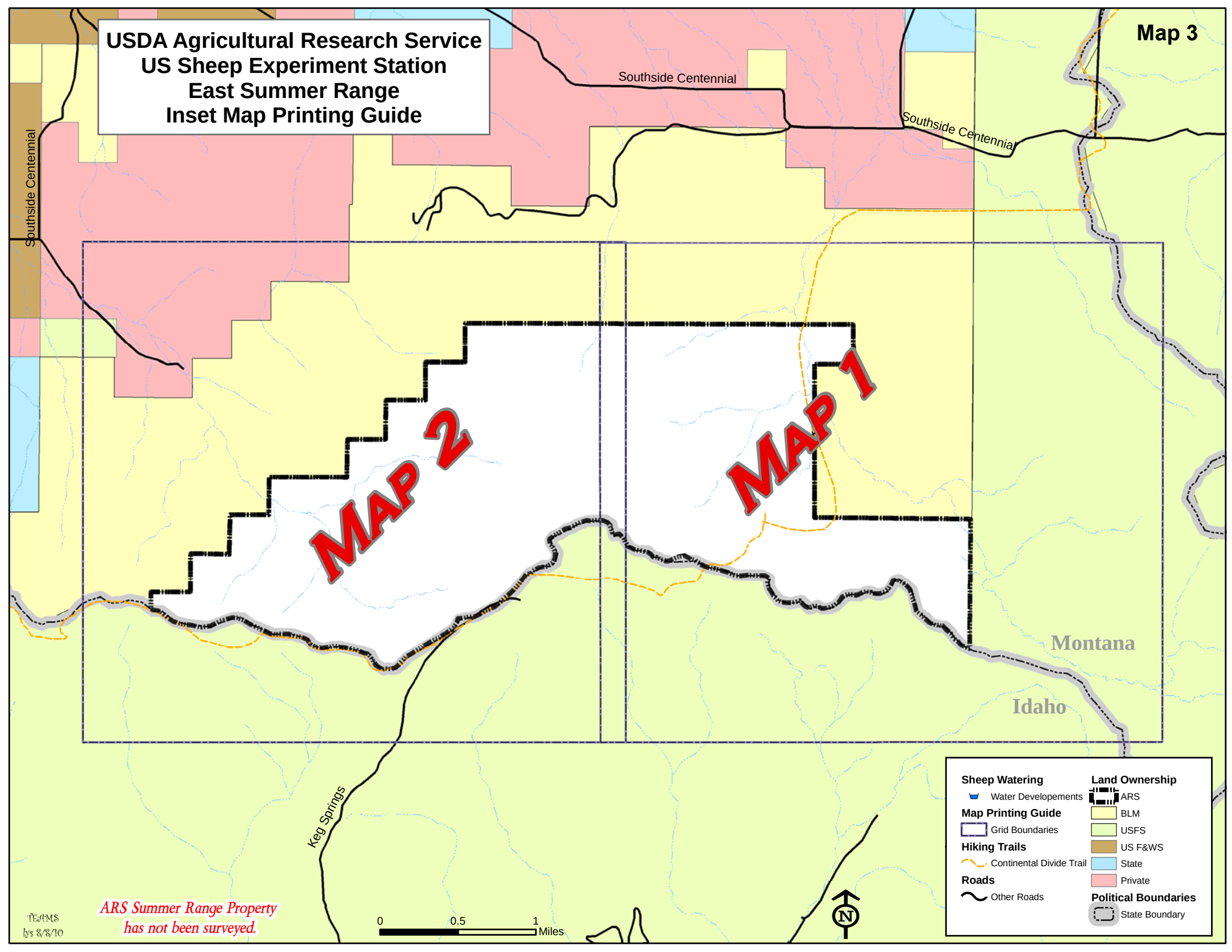
0
7.5
15
Miles
TE/AMS
lys 8/6/10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Southside Centennial
Southside Centennial
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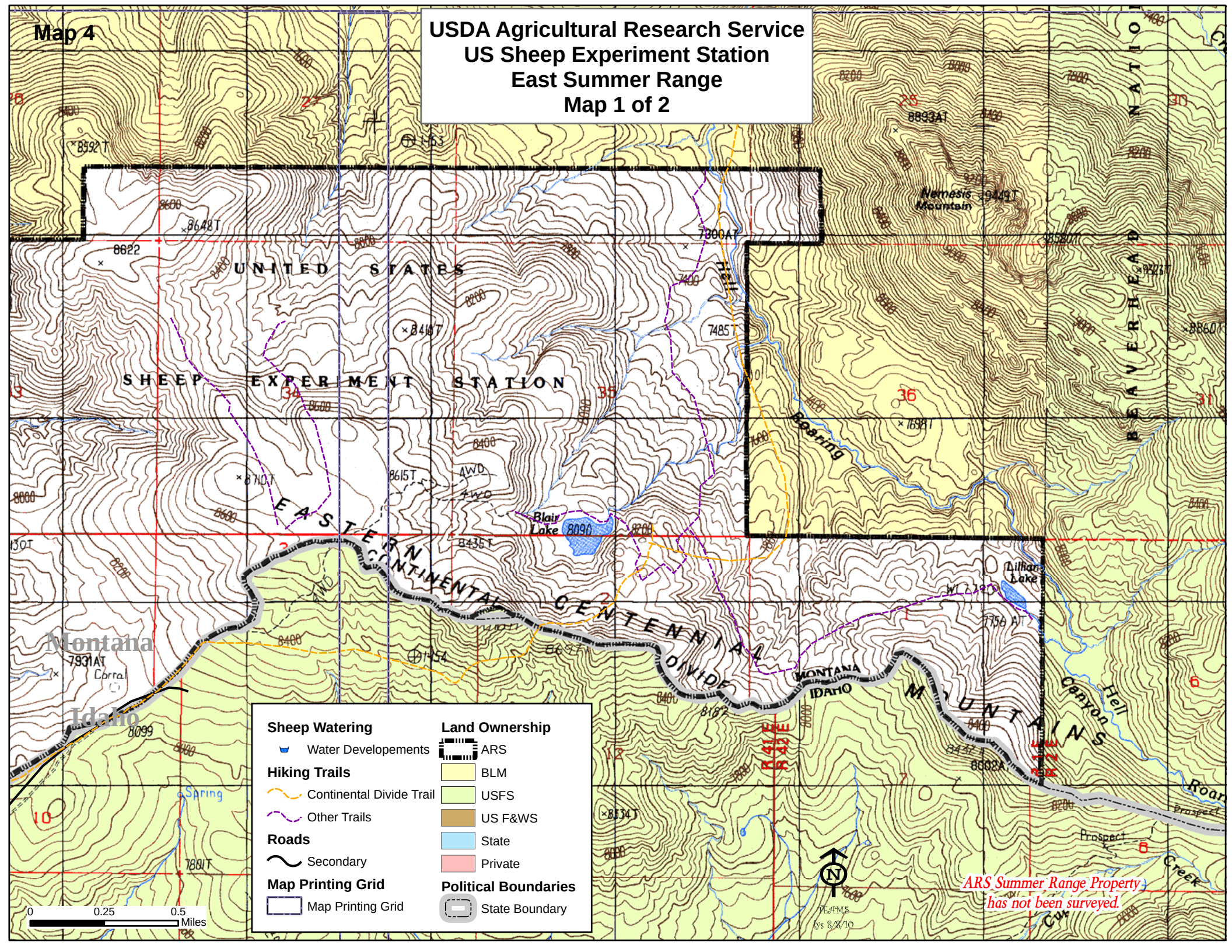
Roads
Other Roads
Land Ownership
ARS
BLM
USFS
US F&WS
State
Private
Political Boundaries
State Boundary
ARS Summer Range Property
has not been surveyed.
0
0.5
1
Miles
N


Map 4
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UNITED STATES
SHEEP EXPERIMENT STATION
EASTERN CONTINENTAL CENTENNIAL DIVIDE
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IDAHO
Montana
Idaho
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Secondary
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Map Printing Grid
Land Ownership
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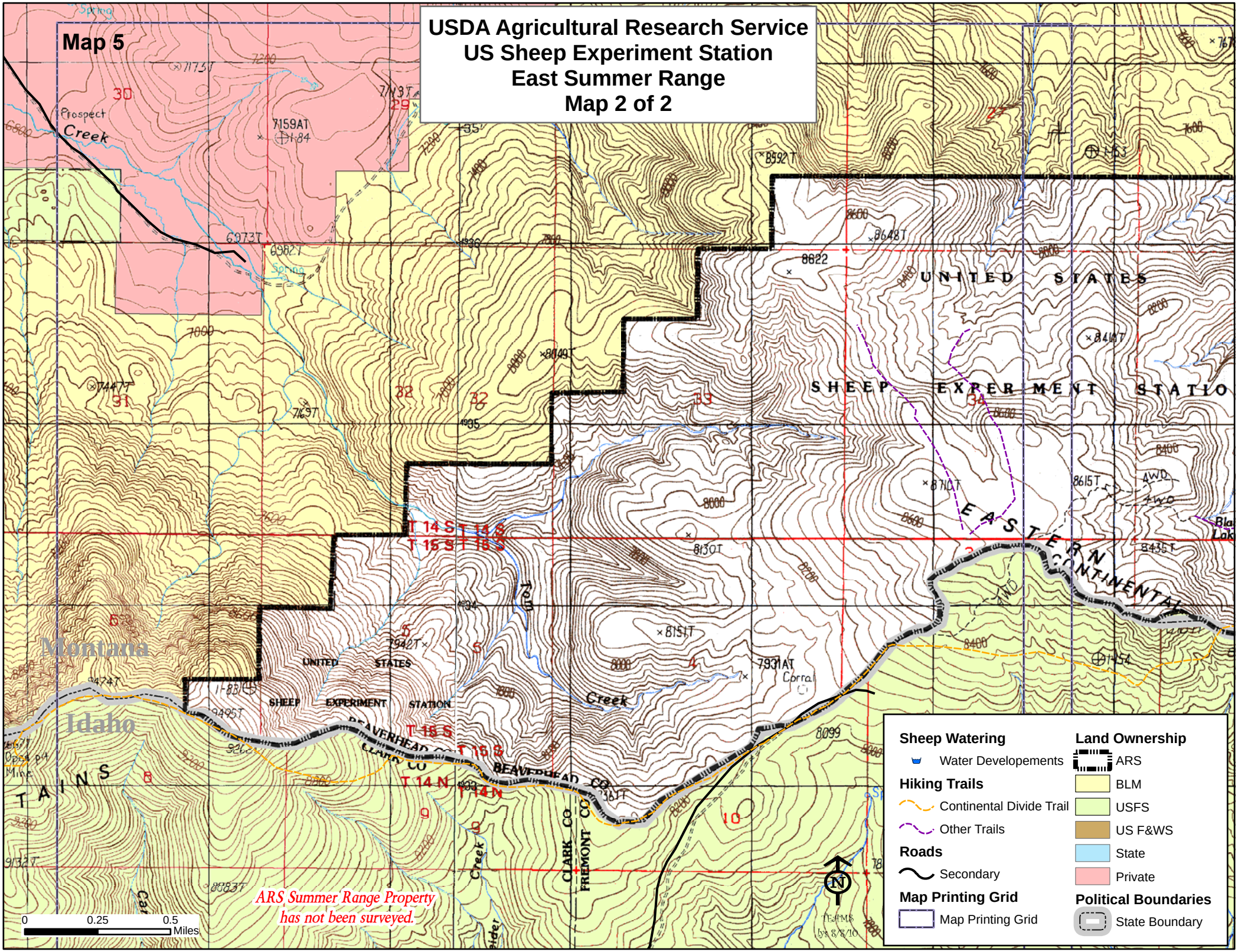
USFS
US F&WS
State
Private
Political Boundaries
State Boundary
0 0.25 0.5 Miles
ARS Summer Range Property has not been surveyed.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Idaho
Creek
T 14 S
T 15 S
T 14 N
T 15 S
BEAVERHEAD CO
CLARK CO
FREMONT CO
ARS Summer Range Property
has not been surveyed.
0 0.25 0.5 Miles
Sheep Watering
Water Developements
Hiking Trails
Continental Divide Trail
Other Trails
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Secondary
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Map Printing Grid
Land Ownership
ARS
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USFS
US F&WS
State
Private
Political Boundaries
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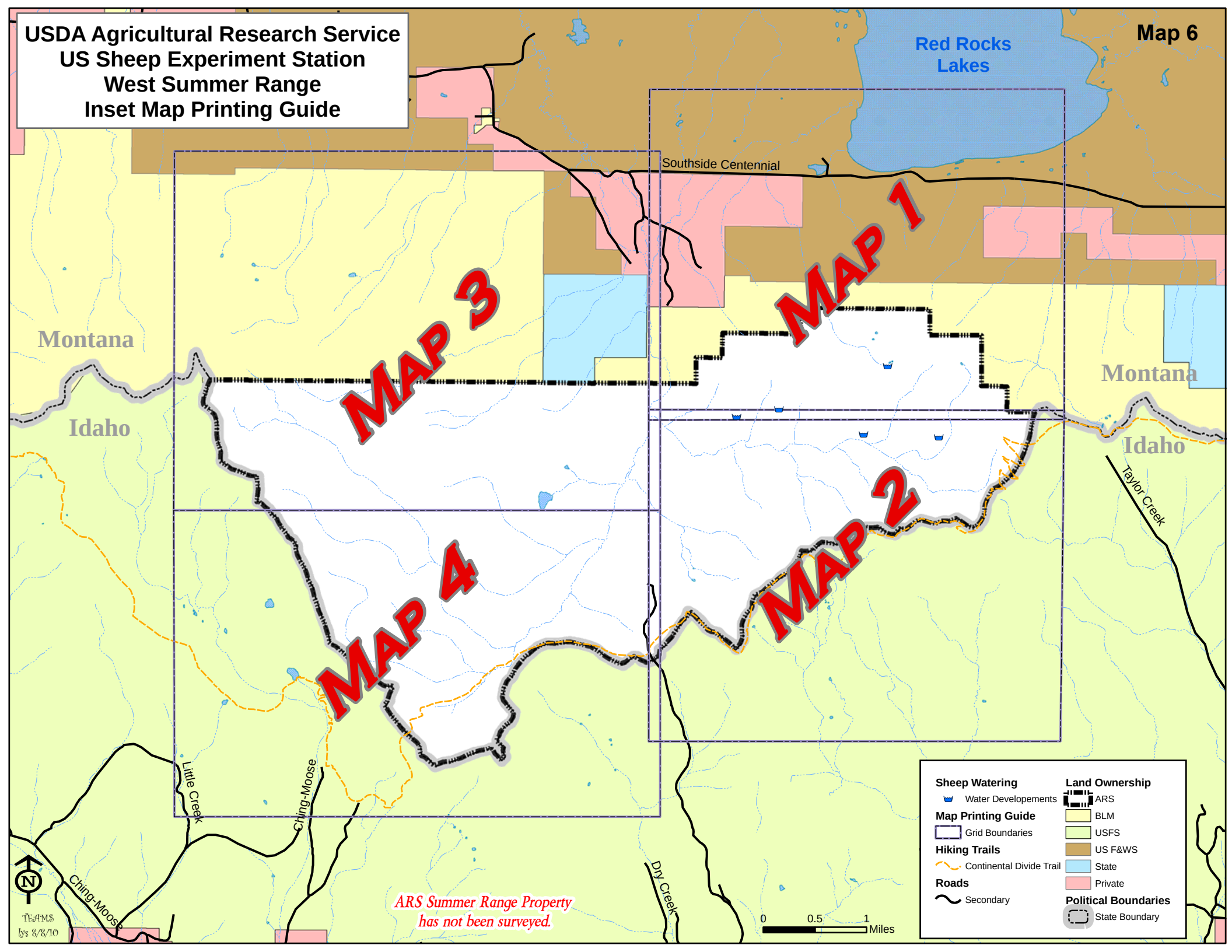
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Montana
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Ching-Moose
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ARS Summer Range Property has not been surveyed.
N
TEAMS lys 8/8/10
0 0.5 1 Miles
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Hiking Trails
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Roads
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BLM
USFS
US F&WS
State
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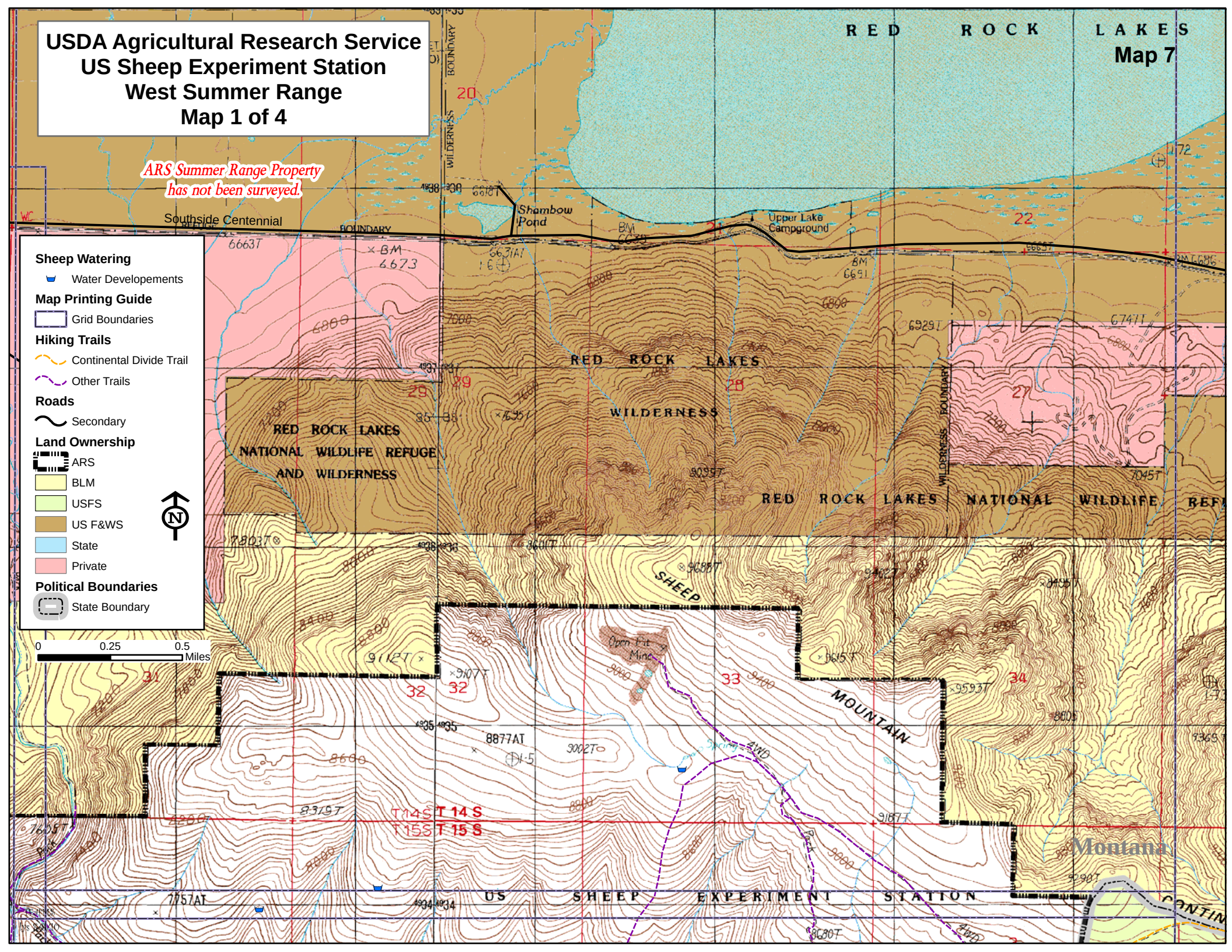
State Boundary


USDA Agricultural Research Service
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RED ROCK LAKES
ARS Summer Range Property has not been surveyed.
Southside Centennial
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Shambow Pond
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RED ROCK LAKES NATIONAL WILDLIFE REFUGE AND WILDERNESS
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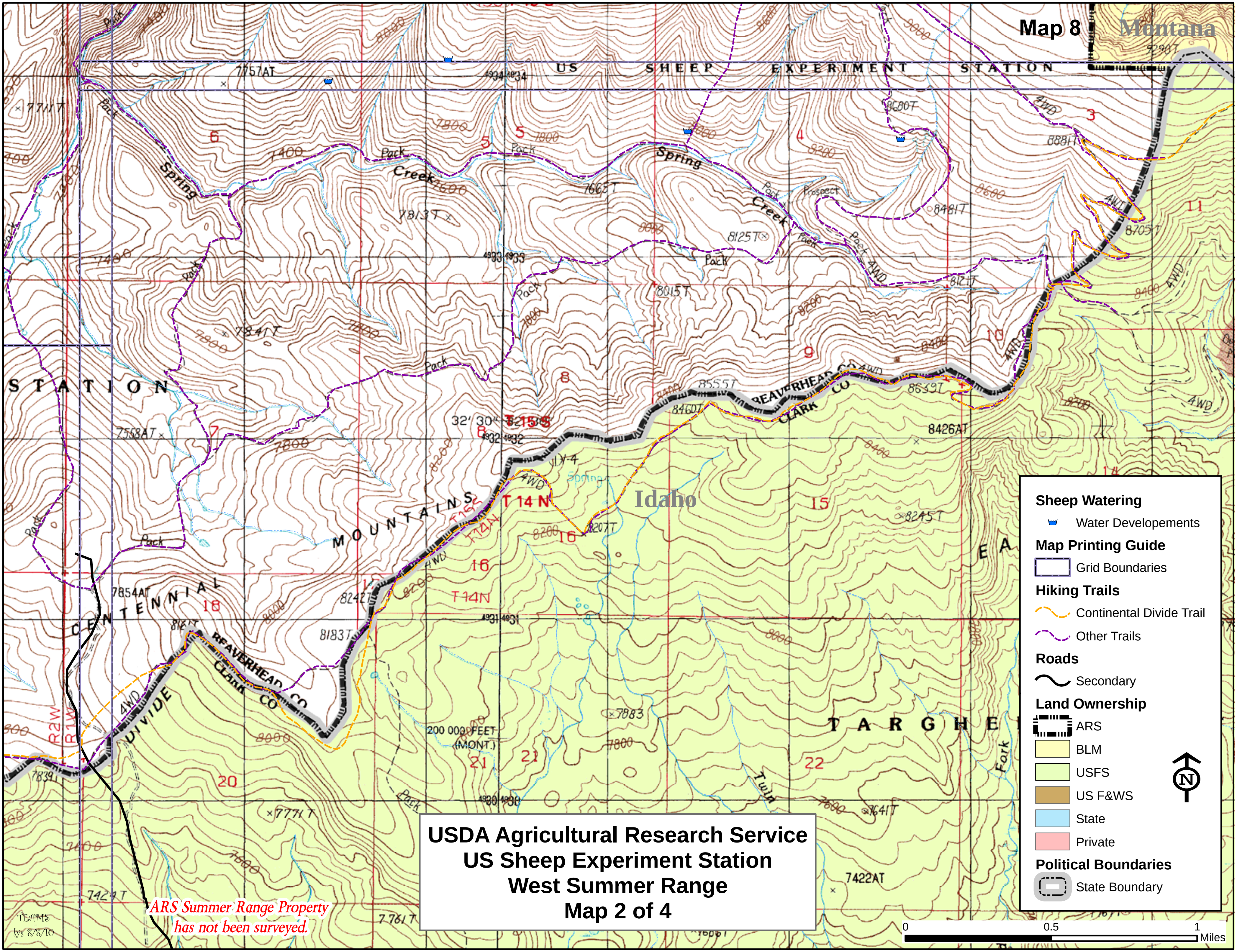
0 0.25 0.5 Miles
N
Montana


Map 8
Montana
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US SHEEP EXPERIMENT STATION
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0
0.5
1
Miles
ARS Summer Range Property has not been surveyed.
TEAMS bys 8/8/10
USDA Agricultural Research Service
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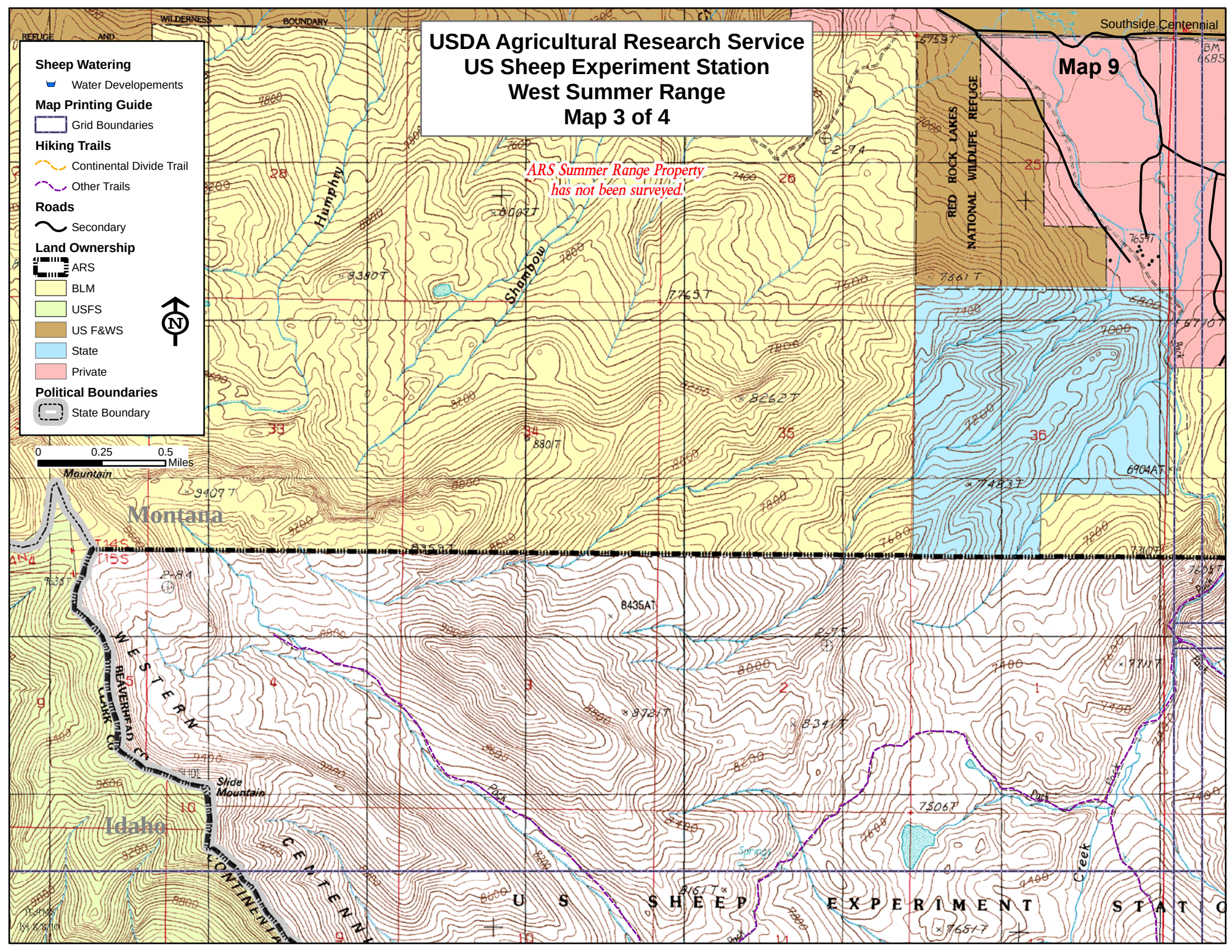
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USFS
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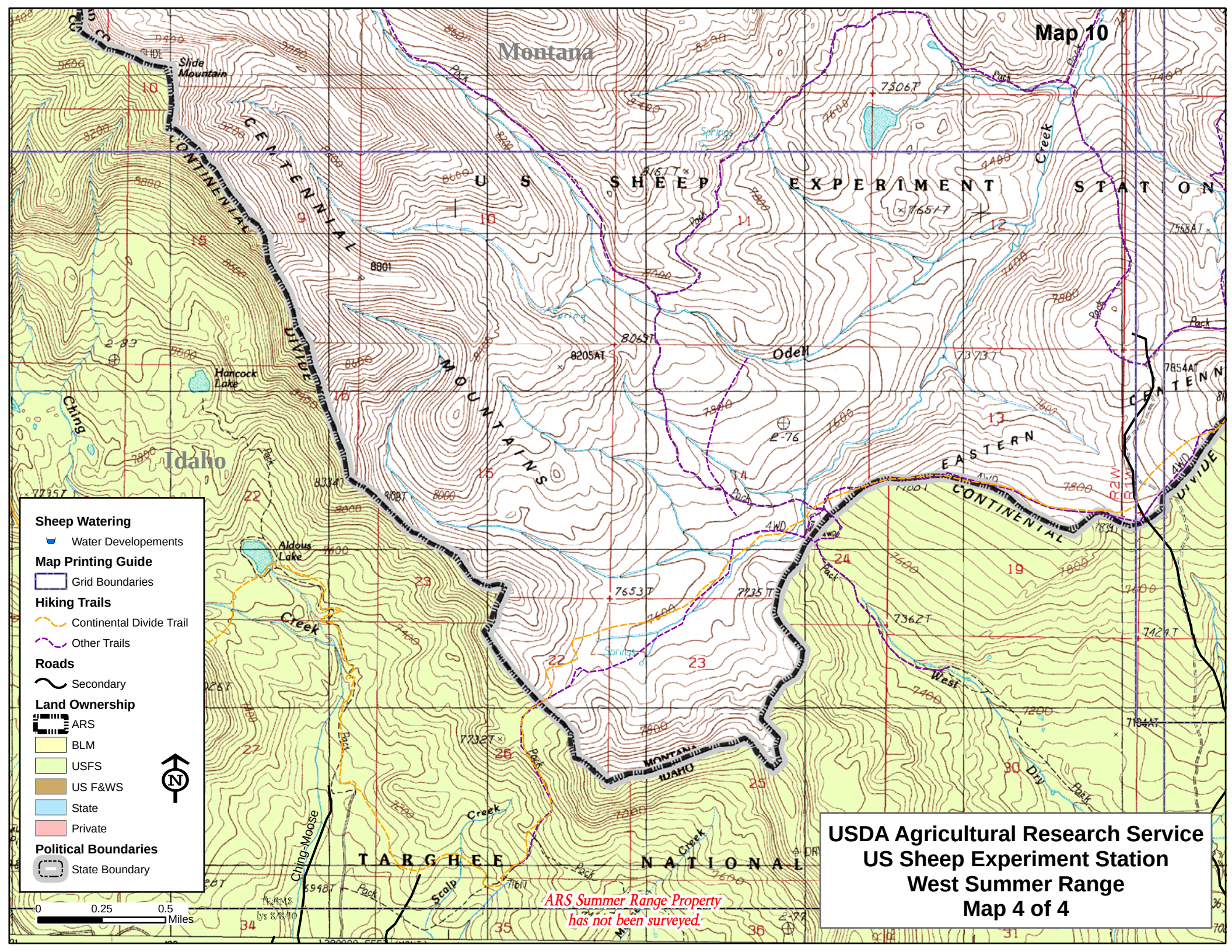
State Boundary
0 0.25 0.5 Miles
Montana
Idaho
Humphry
Shambow
Slide Mountain
Western Beaverhead Co Clark Co
Continental Divide
U S SHEEP EXPERIMENT STATION
RED ROCK LAKES NATIONAL WILDLIFE REFUGE
WILDERNESS BOUNDARY
REFUGE AND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Slide Mountain
Hancock Lake
Aldous Lake
Ching
Odell
West
Dry
Ching-Moose
Scalp
Creek
Pack
Spring
4WD
MONTANA
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0 0.25 0.5 Miles
ARS Summer Range Property has not been surveyed.
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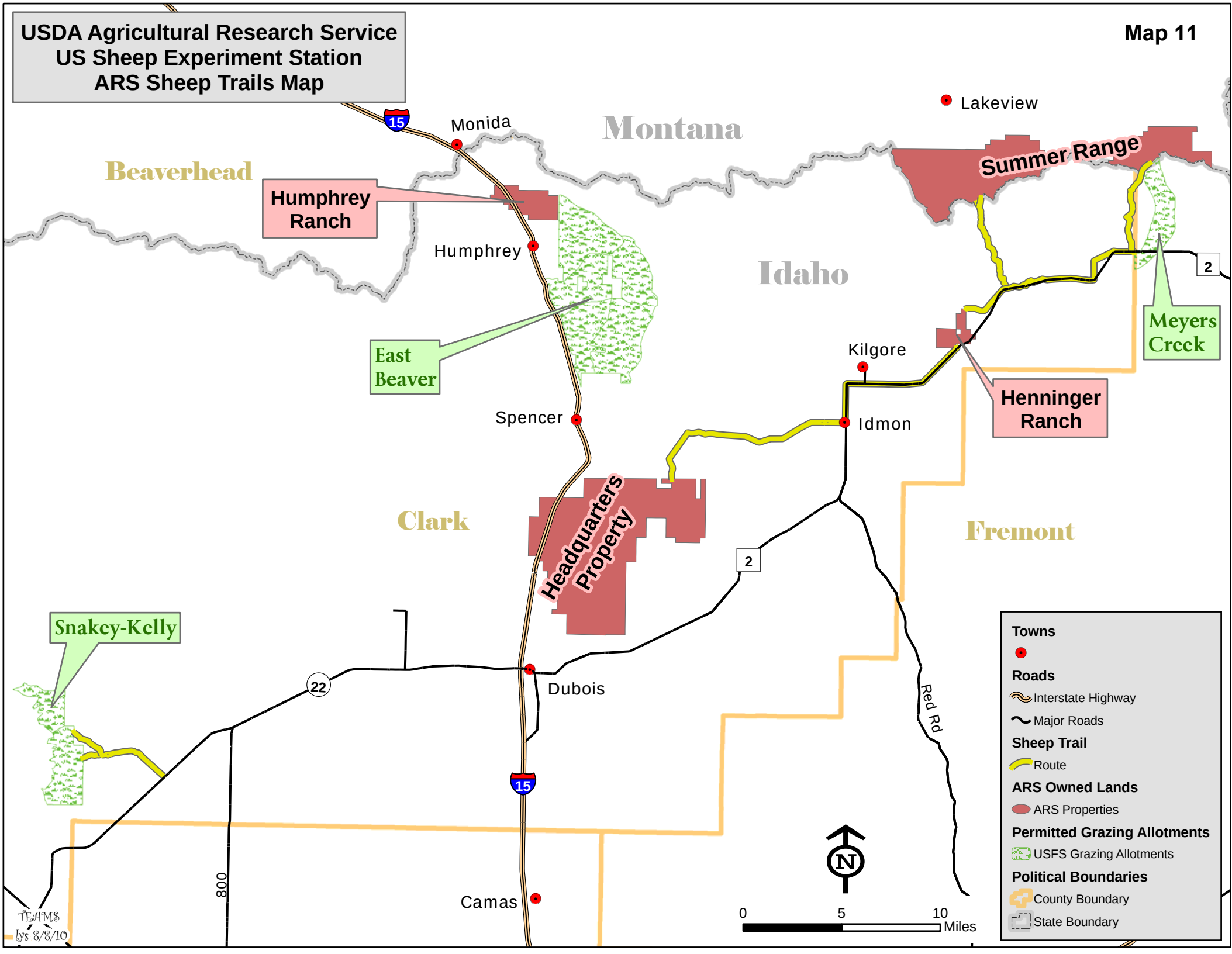

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USDA Agricultural Research Service US Sheep Experiment Station Headquarters Property Overview and Land Ownership Map

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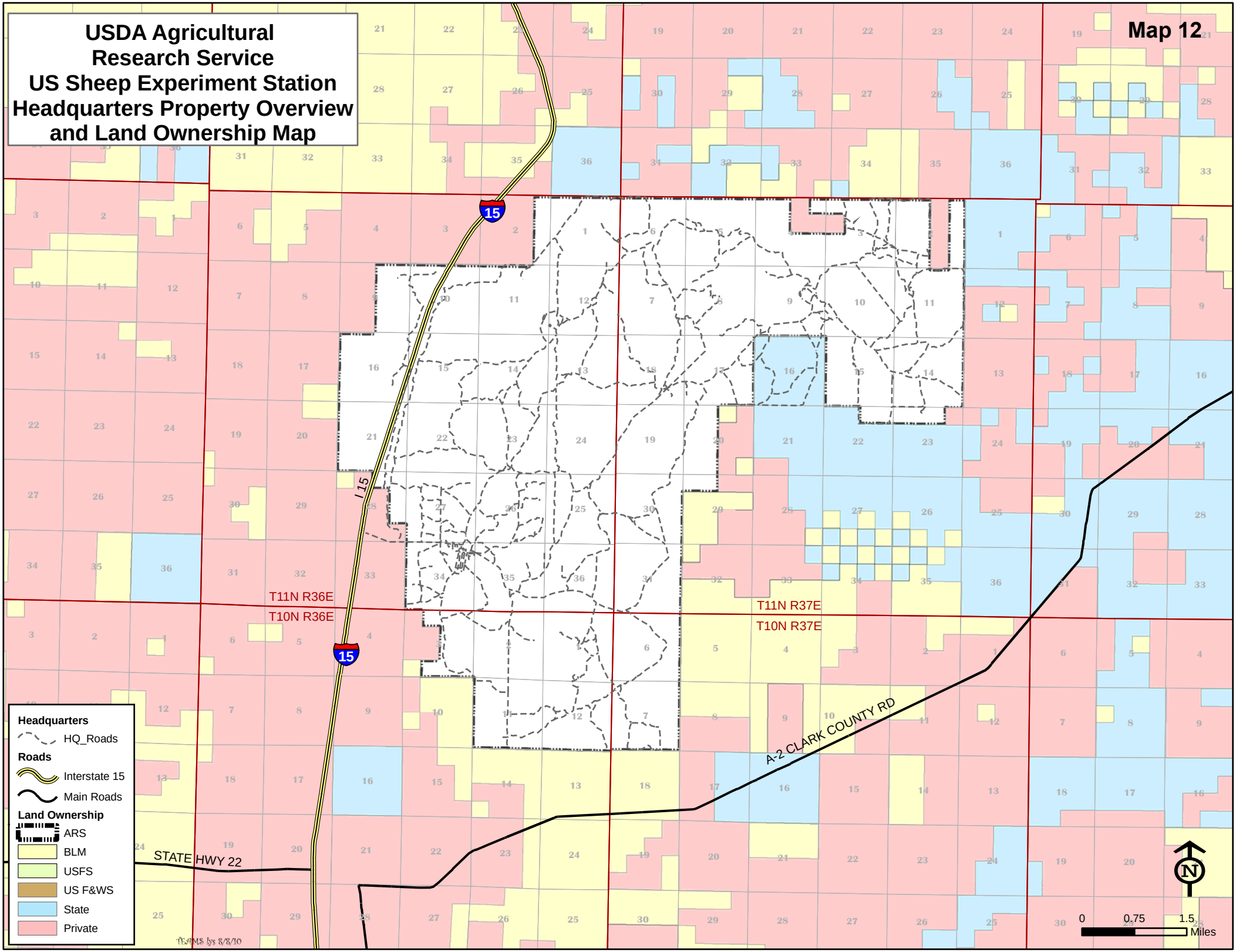

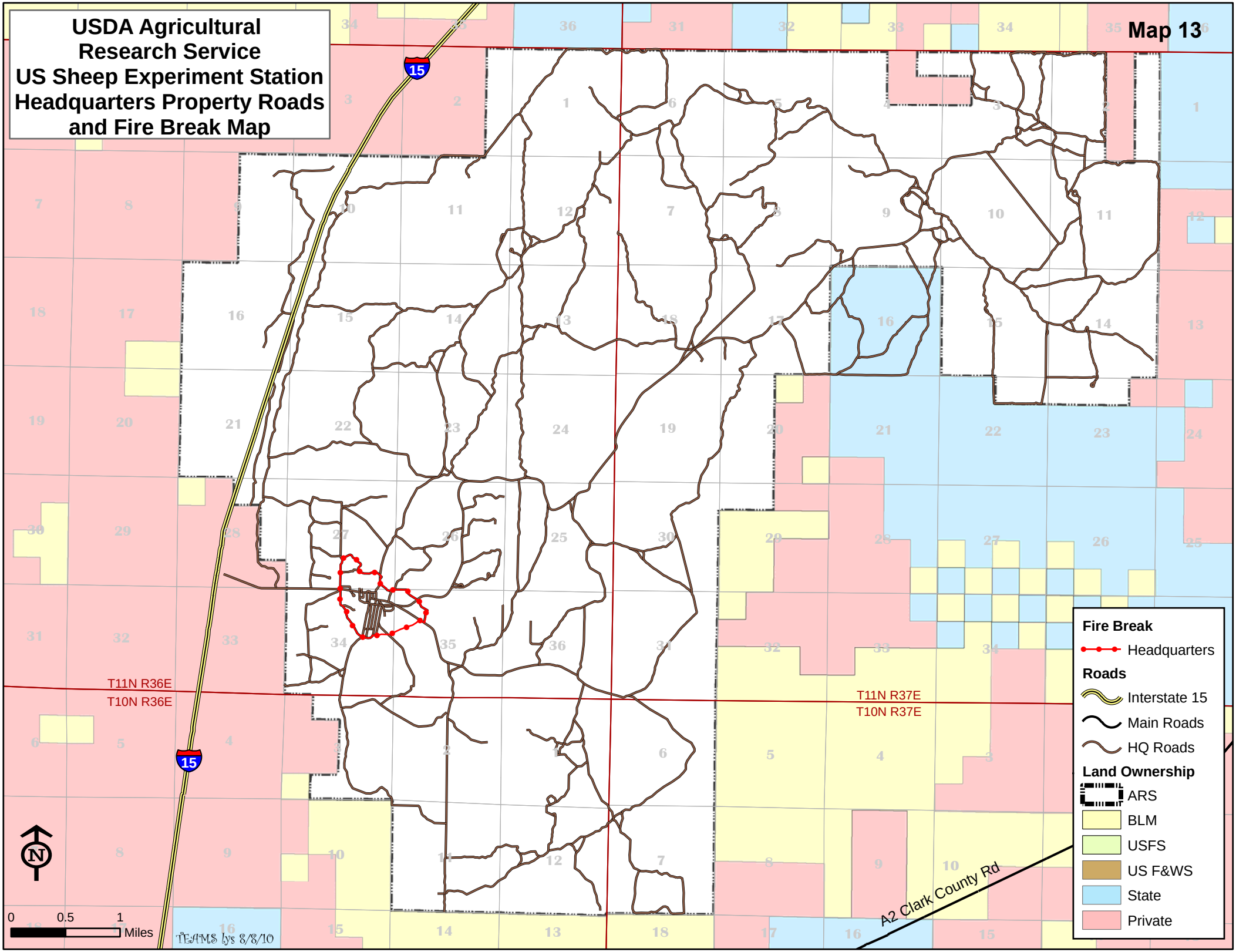
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15
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T10N R36E
T11N R37E
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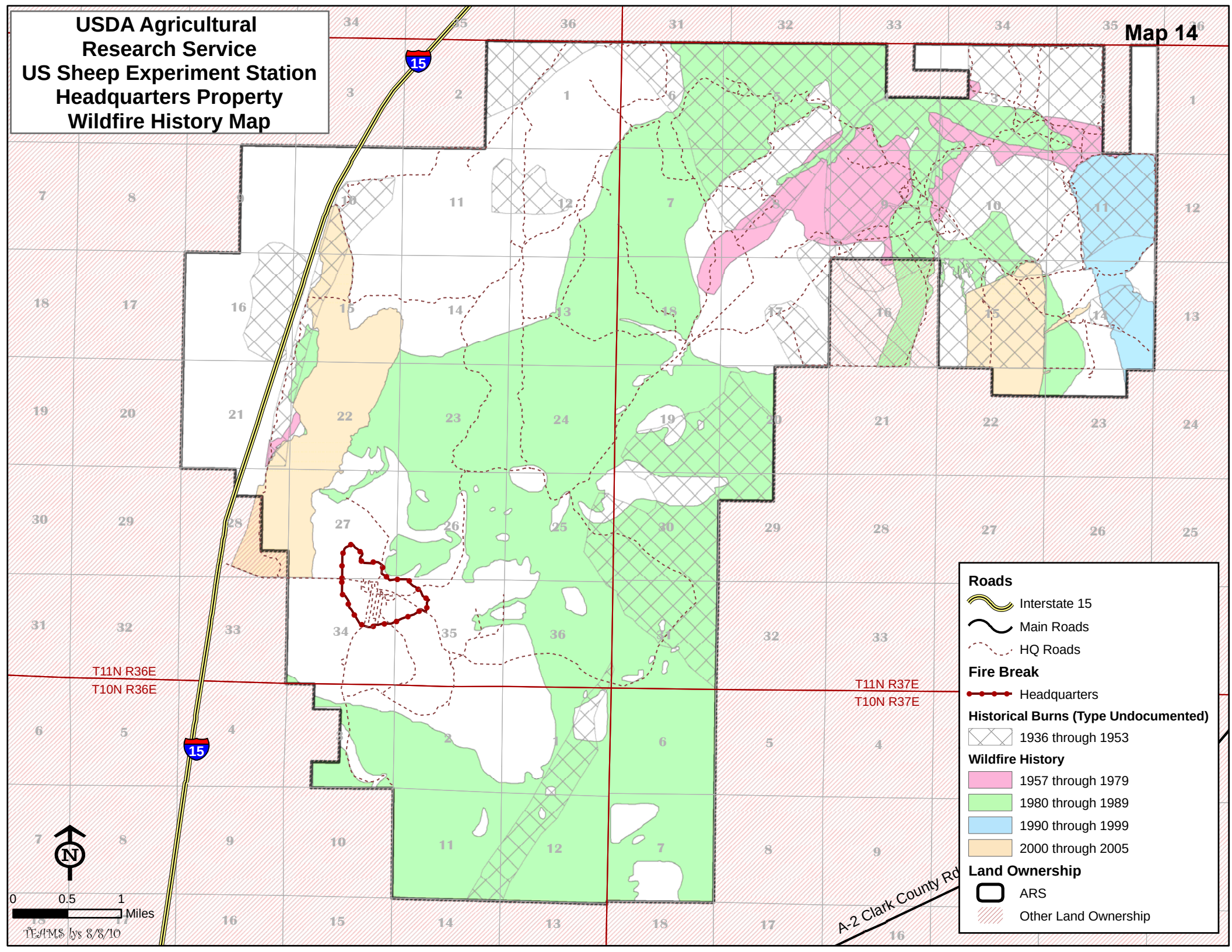
Roads
Interstate 15
Main Roads
HQ Roads
Land Ownership
ARS
BLM
USFS
US F&WS
State
Private
N
0
0.5
1
Miles
TE/MS lys 8/8/10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T10N R36E
T11N R37E
T10N R37E
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Main Roads
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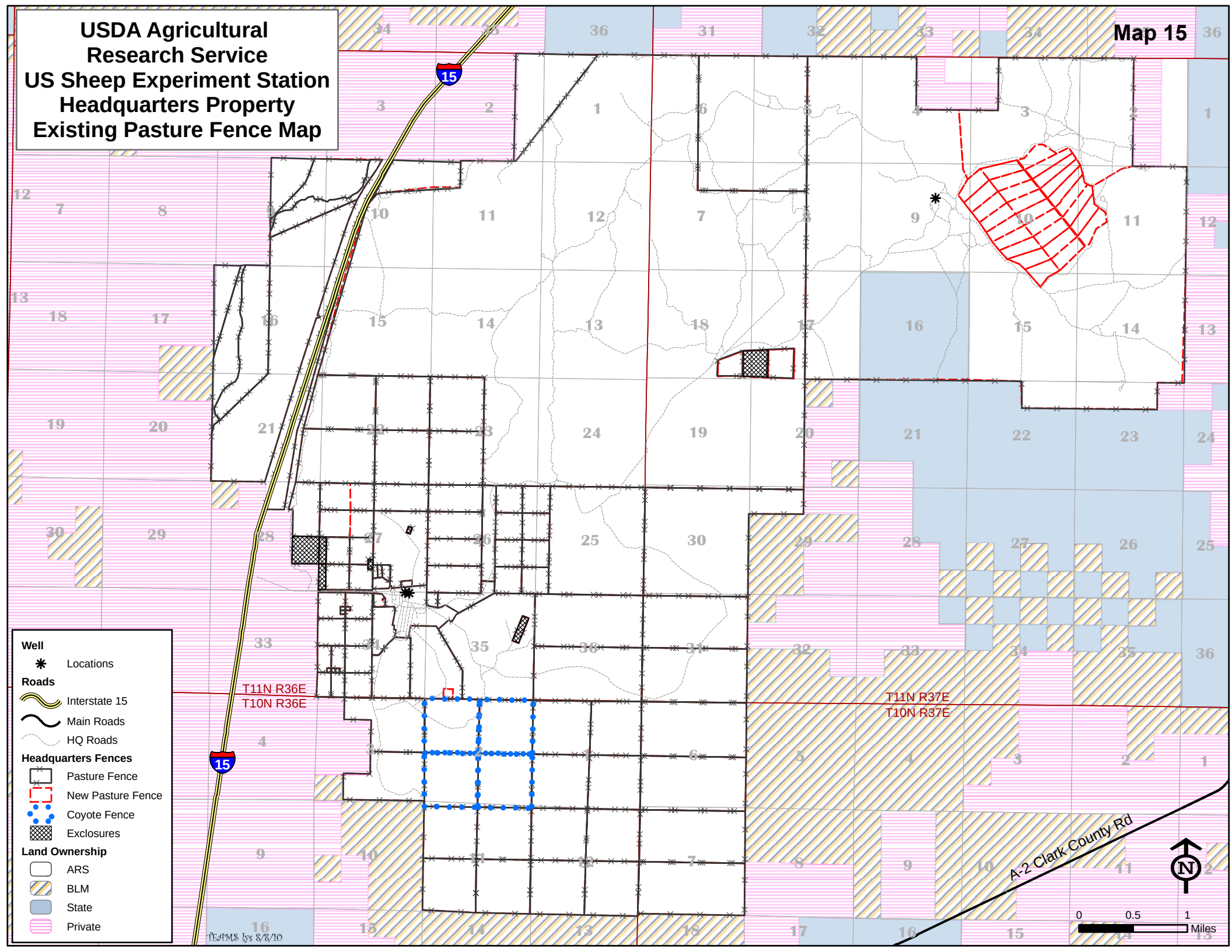
Fire Break
Headquarters
Historical Burns (Type Undocumented)
1936 through 1953
Wildfire History
1957 through 1979
1980 through 1989
1990 through 1999
2000 through 2005
Land Ownership
ARS
Other Land Ownership
N
0 0.5 1
Miles
TE/MS lys 8/8/10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Land Ownership
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BLM
State
Private
T11N R36E
T10N R36E
T11N R37E
T10N R37E
A-2 Clark County Rd
N
0
0.5
1
Miles
TEAMS lys 8/8/10

USDA Agricultural Research Service
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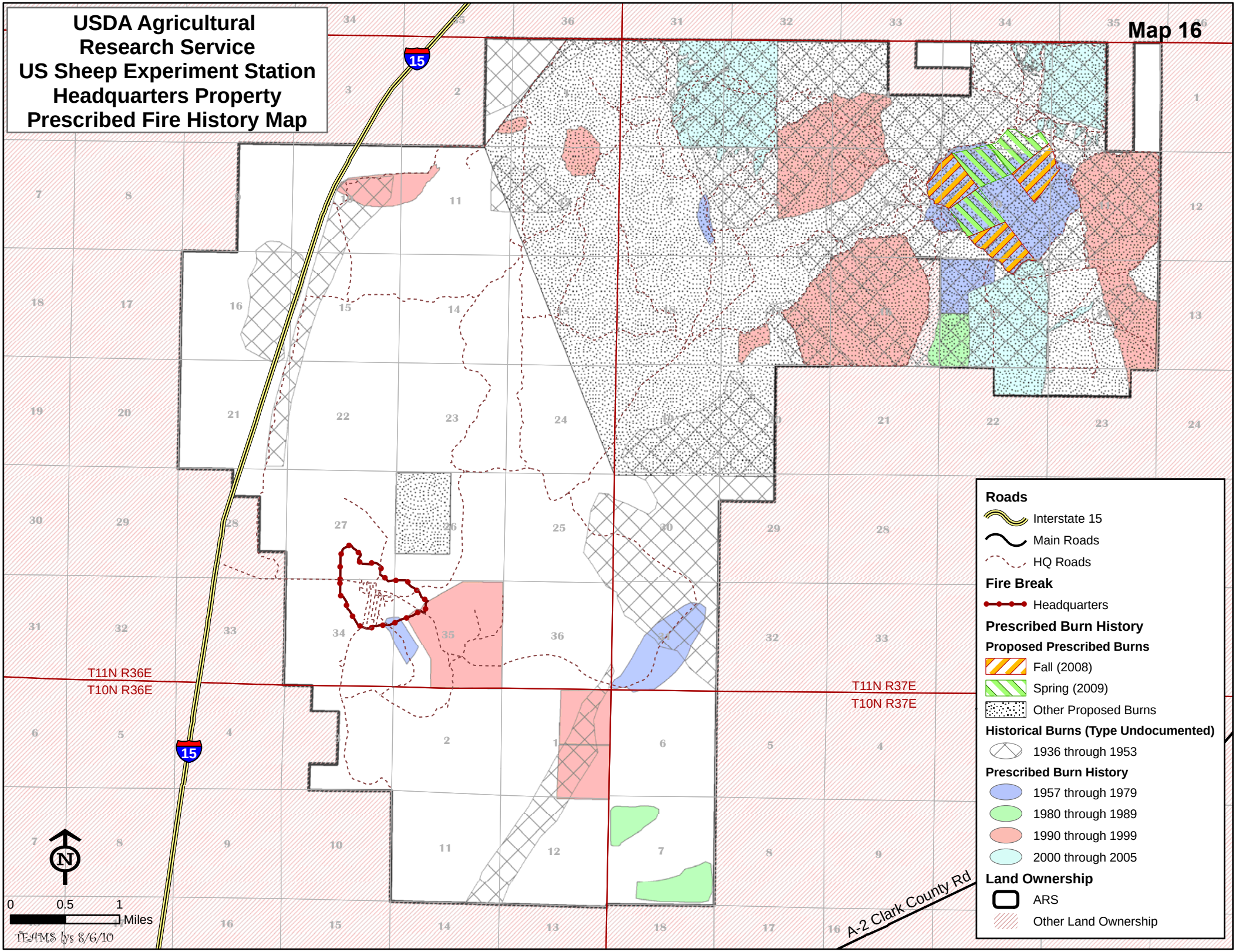

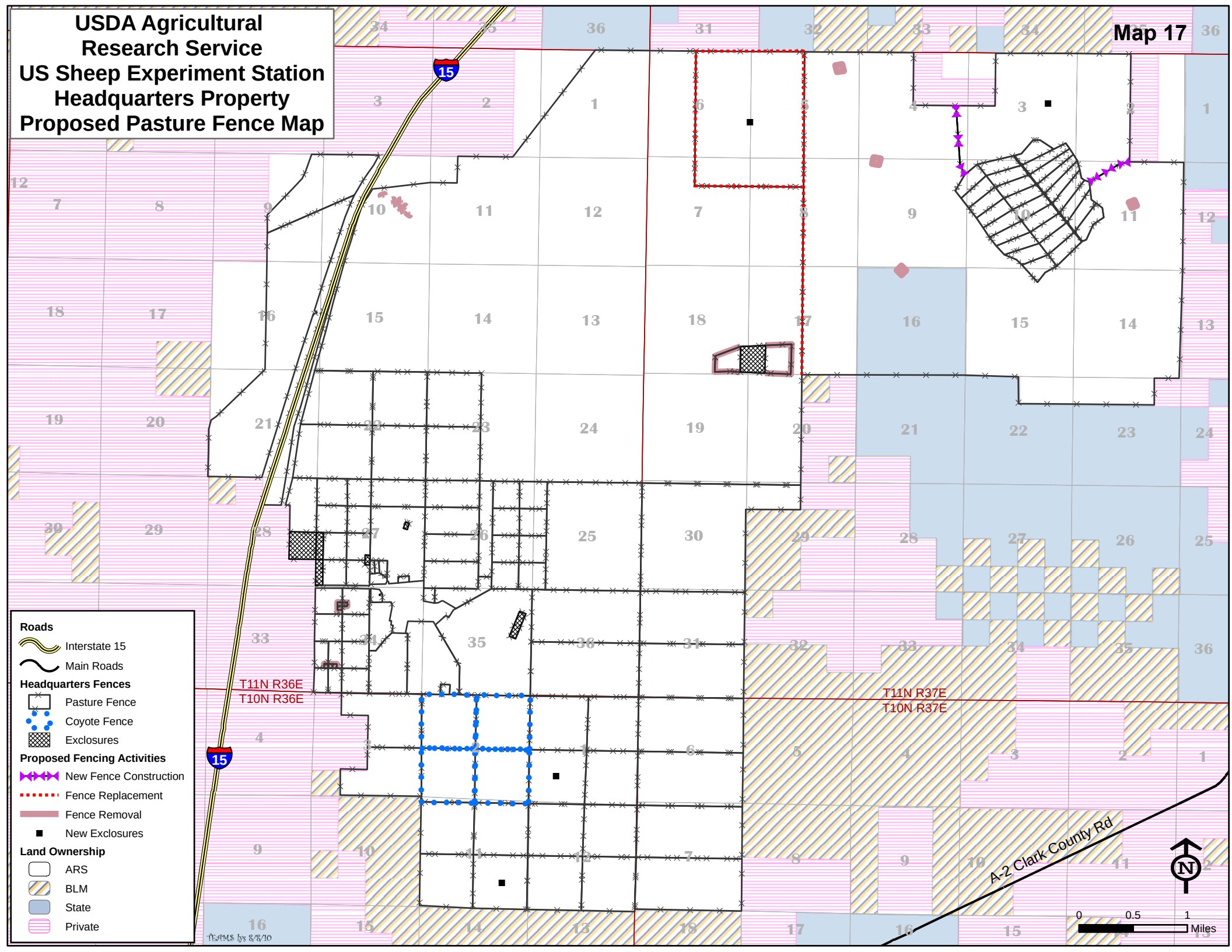
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Private
T11N R36E
T10N R36E
T11N R37E
T10N R37E
A-2 Clark County Rd
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0.5
1
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USDA Agricultural Research Service
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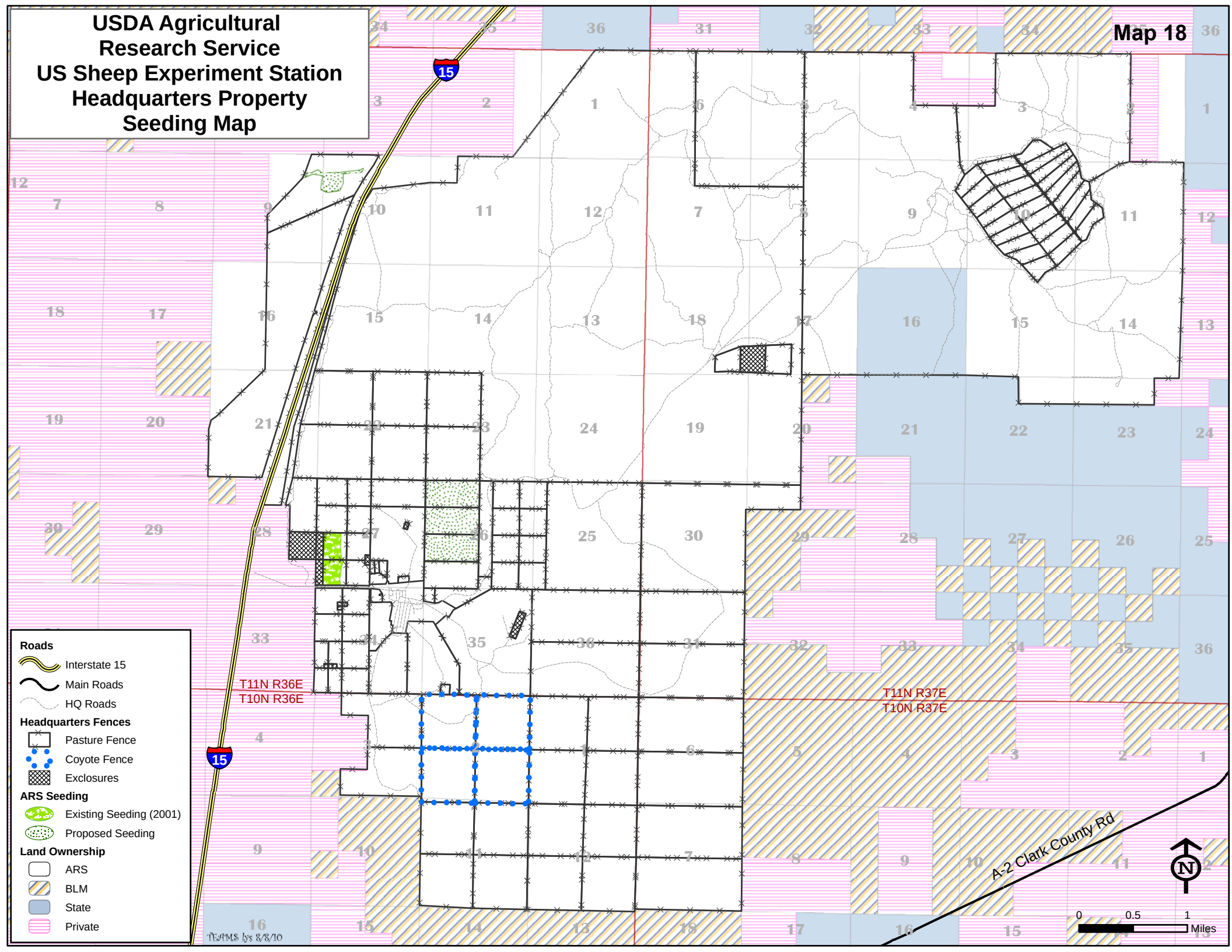

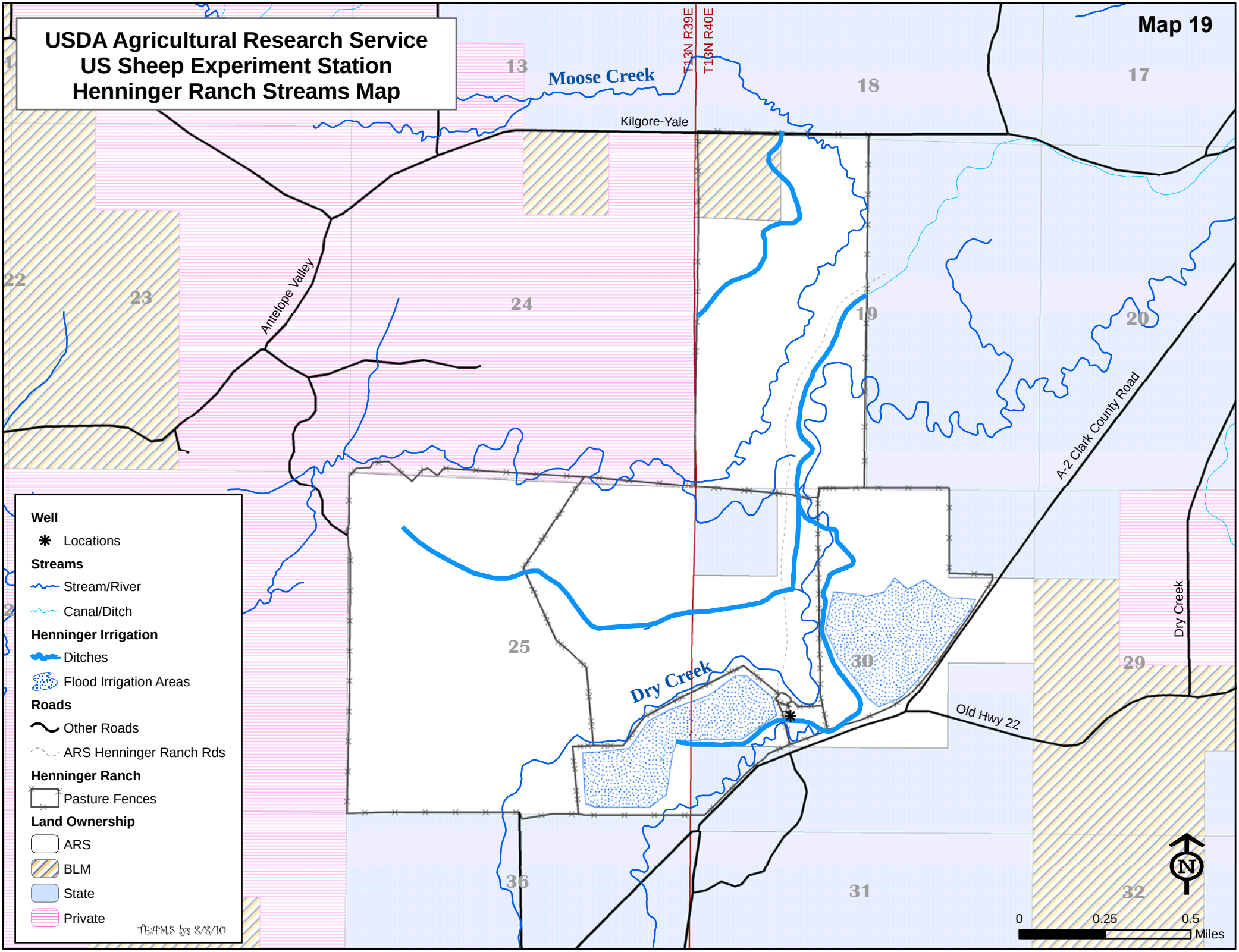
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T13N R40E
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Dry Creek
Old Hwy 22
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18
17
22
23
24
19
20
25
30
29
36
31
32
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Flood Irrigation Areas
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ARS Henninger Ranch Rds
Henninger Ranch
Pasture Fences
Land Ownership
ARS
BLM
State
Private
TEAMS by 8/8/10
N
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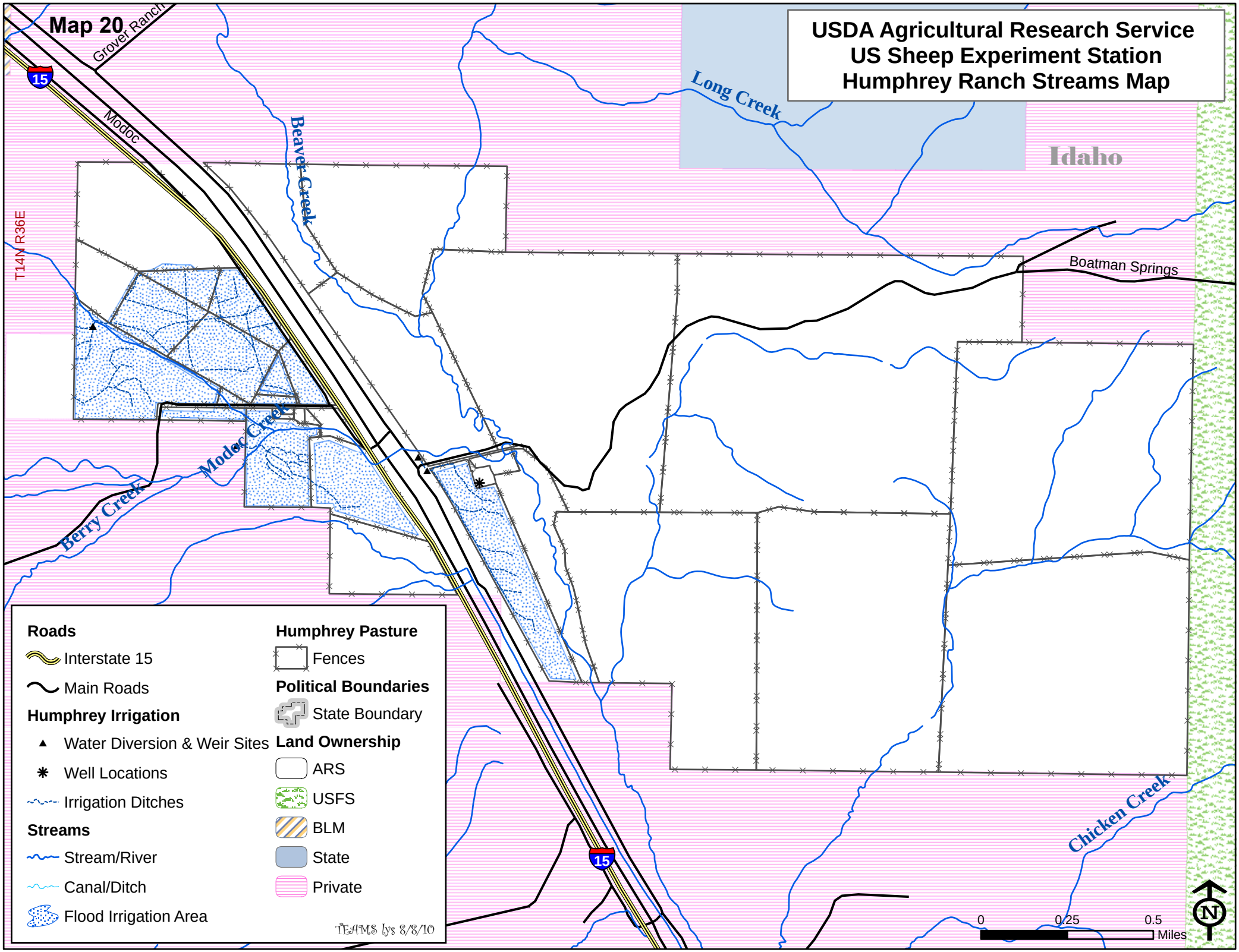
0.5
Miles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15
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Humphrey Pasture
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Political Boundaries
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Land Ownership
ARS
USFS
BLM
State
Private
TEAMS lys 8/8/10
0
0.25
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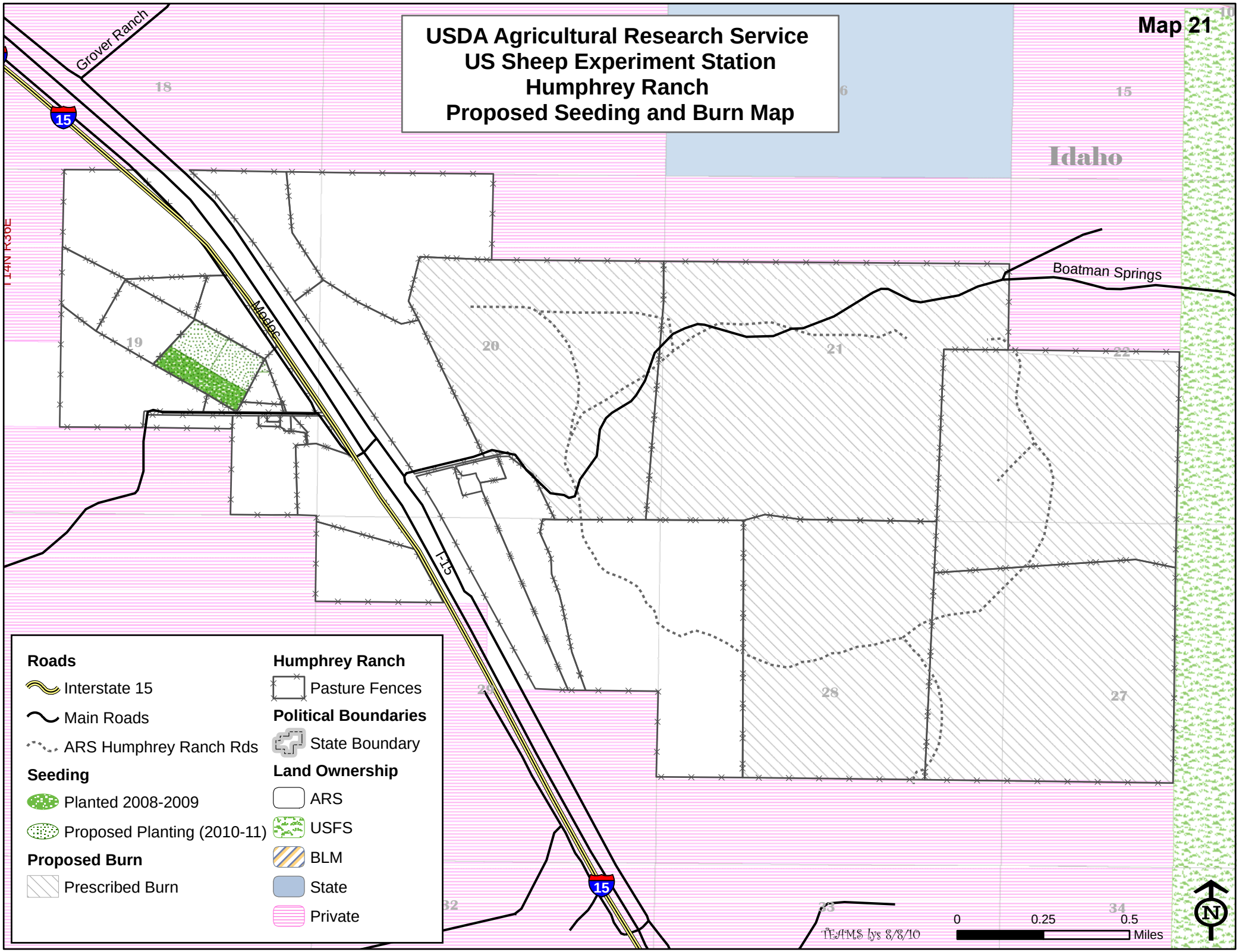
Miles
N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18
19
20
21
22
27
28
15
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Prescribed Burn
Humphrey Ranch
Pasture Fences
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State Boundary
Land Ownership
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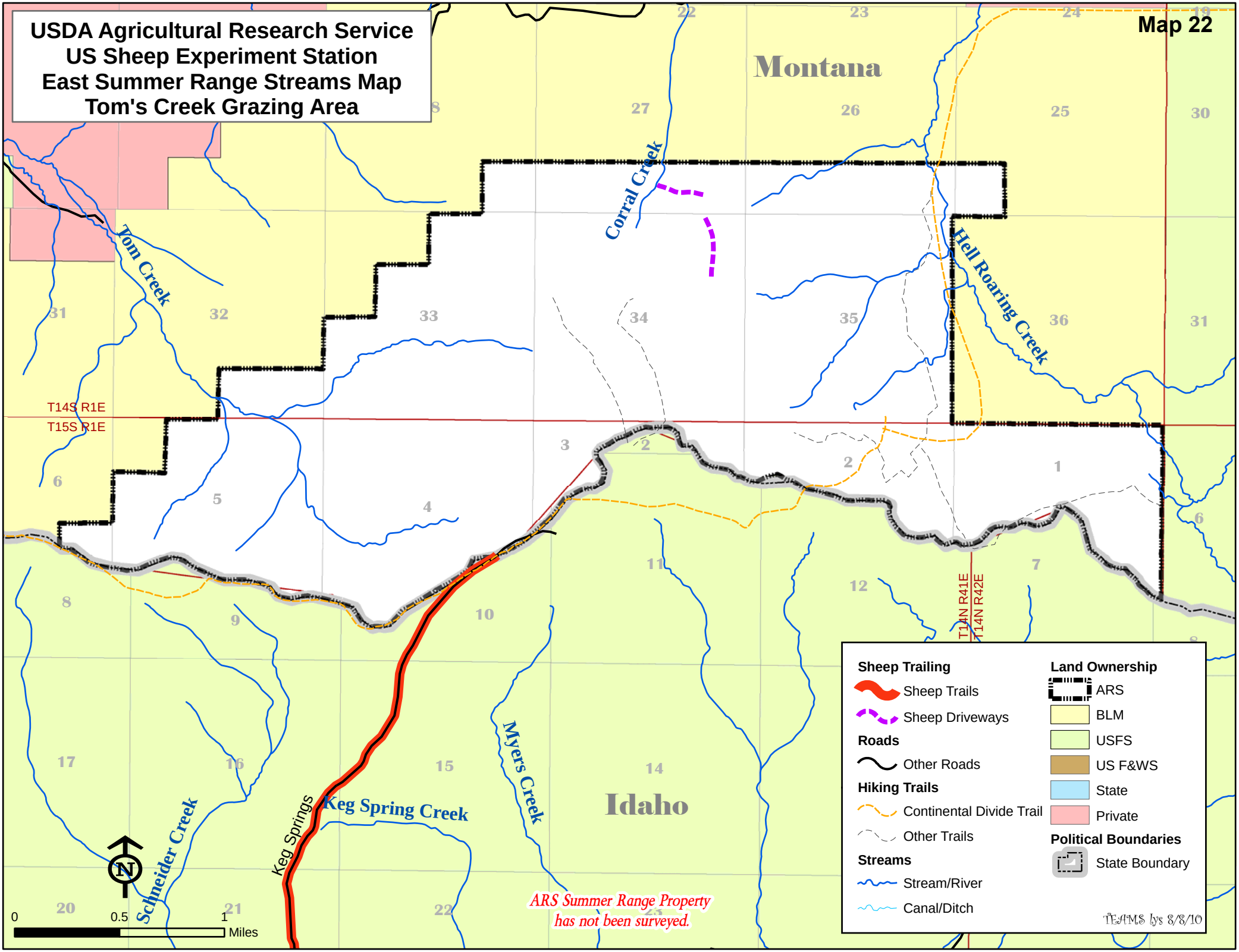
USFS
BLM
State
Private
TE/MS lys 8/8/10
0
0.25
0.5
Miles
N


USDA Agricultural Research Service
US Sheep Experiment Station
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Montana
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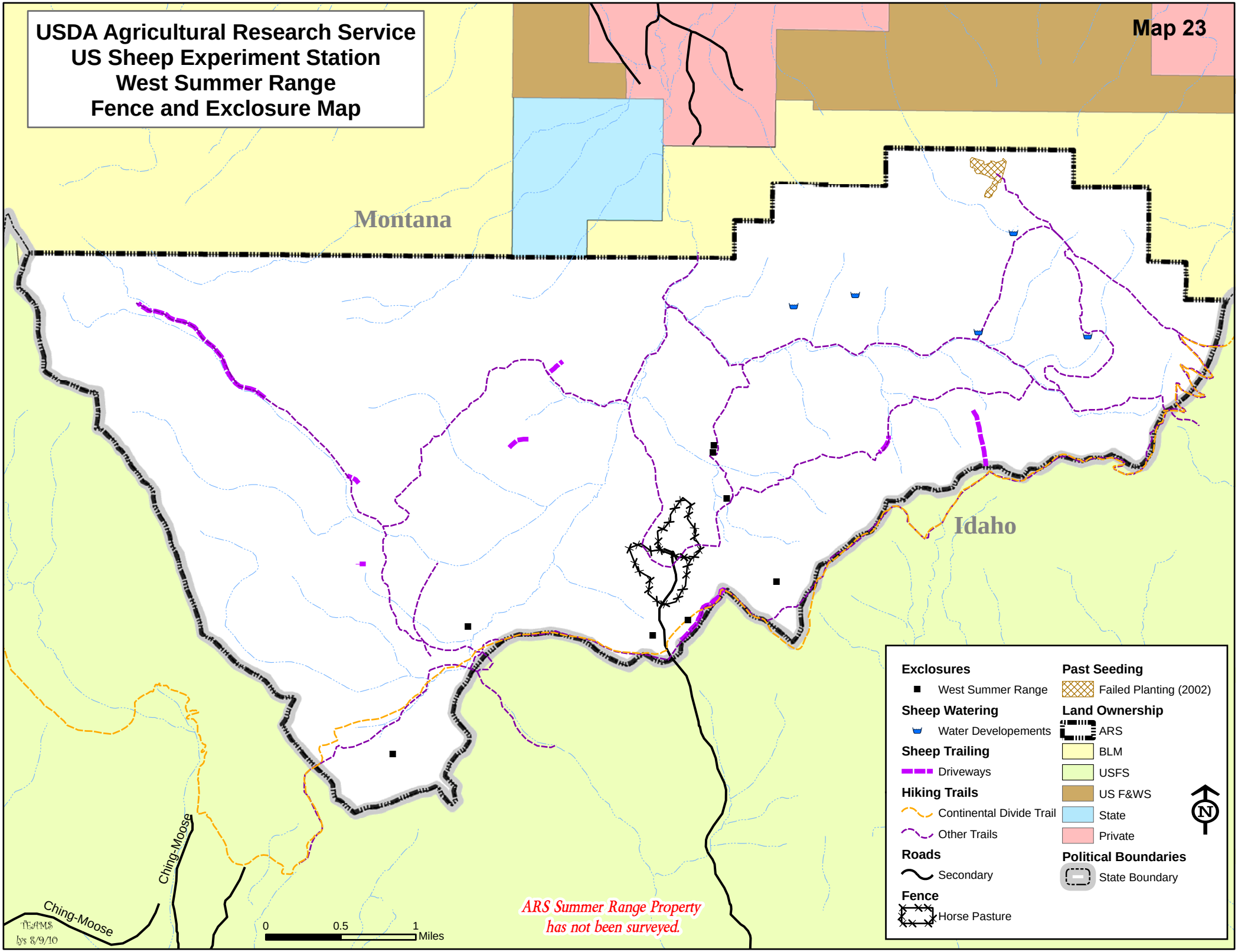
Corral Creek
Tom Creek
Hell Roaring Creek
Keg Spring Creek
Keg Springs
Myers Creek
Schneider Creek
T14S R1E
T15S R1E
T14N R41E
T14N R42E
ARS Summer Range Property
has not been surveyed.
Sheep Trailing
Sheep Trails
Sheep Driveways
Roads
Other Roads
Hiking Trails
Continental Divide Trail
Other Trails
Streams
Stream/River
Canal/Ditch
Land Ownership
ARS
BLM
USFS
US F&WS
State
Private
Political Boundaries
State Boundary
N
0
0.5
1
Miles
TEAMS lys 8/8/10

USDA Agricultural Research Service
US Sheep Experiment Station
West Summer Range
Fence and Exclosure Map

Map 23



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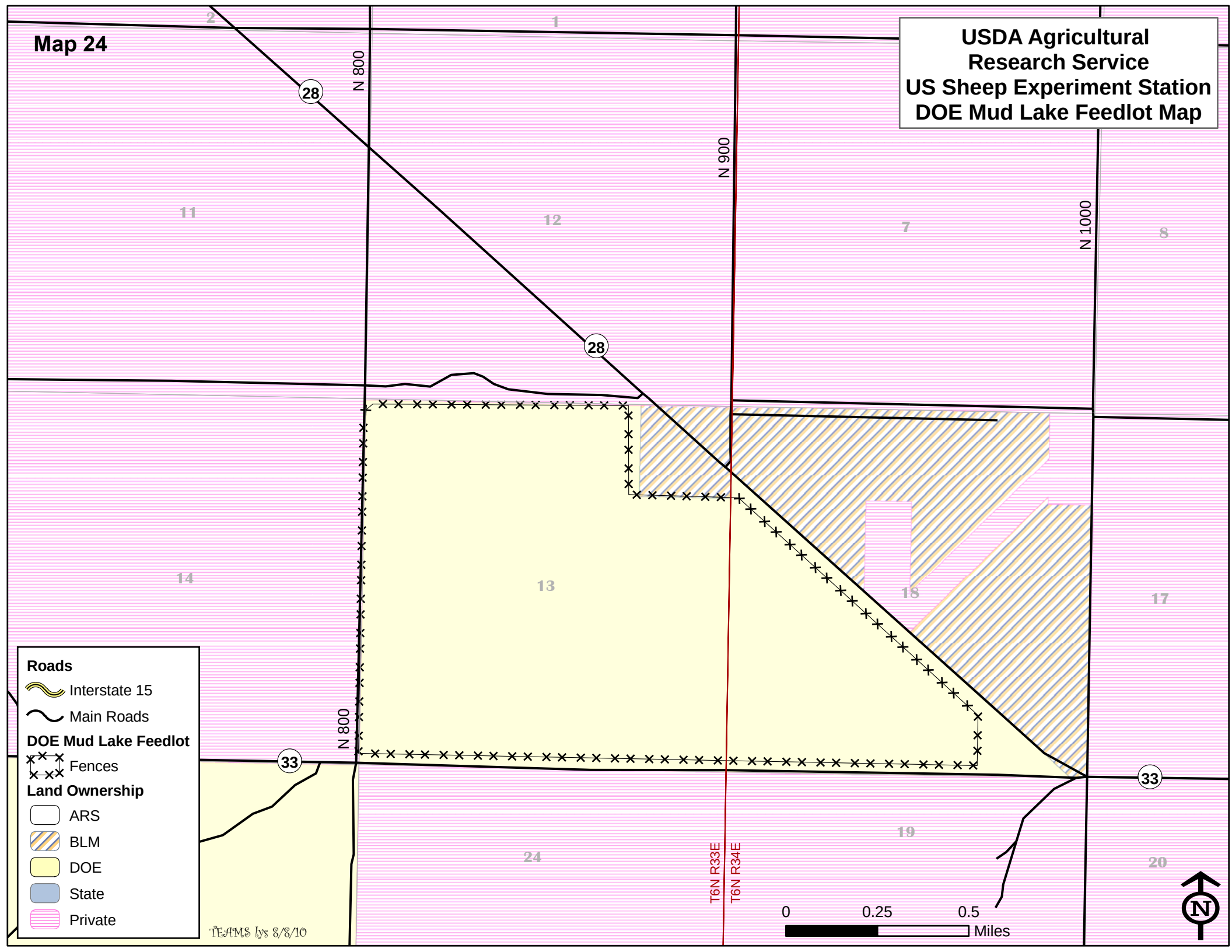
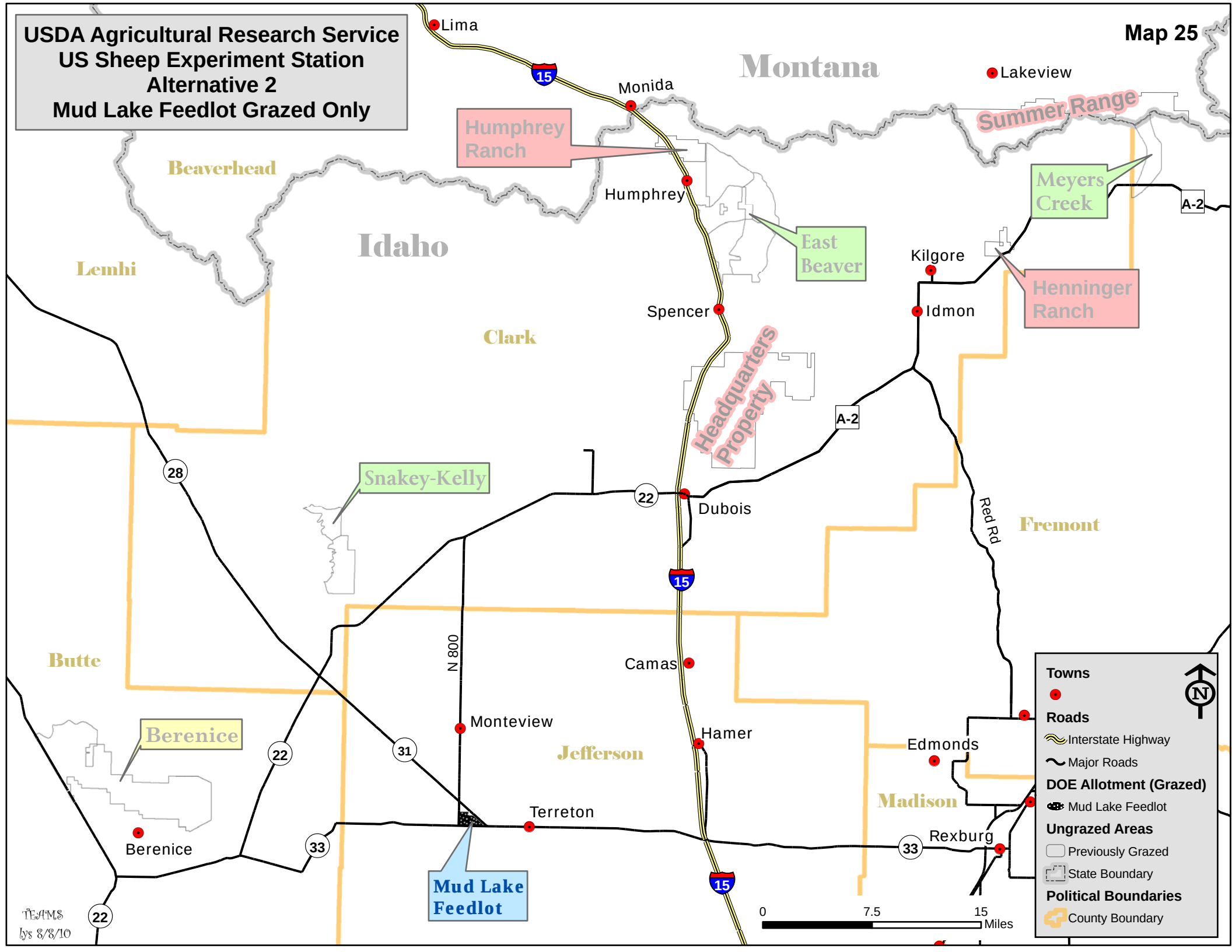
lys 8/9/10


Map 24
USDA Agricultural
Research Service
US Sheep Experiment Station
DOE Mud Lake Feedlot Map
N 800
N 900
N 1000
28
33
T6N R33E
T6N R34E
Roads
Interstate 15
Main Roads
DOE Mud Lake Feedlot
Fences
Land Ownership
ARS
BLM
DOE
State
Private
TE/AMS by 8/8/10
0
0.25
0.5
Miles
N


USDA Agricultural Research Service
US Sheep Experiment Station
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Summer Range
Humphrey Ranch
Humphrey
Beaverhead
Lemhi
Meyers Creek
A-2
East Beaver
Kilgore
Henninger Ranch
Idmon
Spencer
Clark
Headquarters Property
A-2
Snakey-Kelly
28
22
Dubois
Red Rd
Fremont
15
Butte
N 800
Camas
Monteview
Hamer
Jefferson
Edmonds
Madison
Berenice
22
31
Terreton
Rexburg
33
33
Berenice
Mud Lake Feedlot
15
22
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0
7.5
15
Miles
Towns
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Interstate Highway
Major Roads
DOE Allotment (Grazed)
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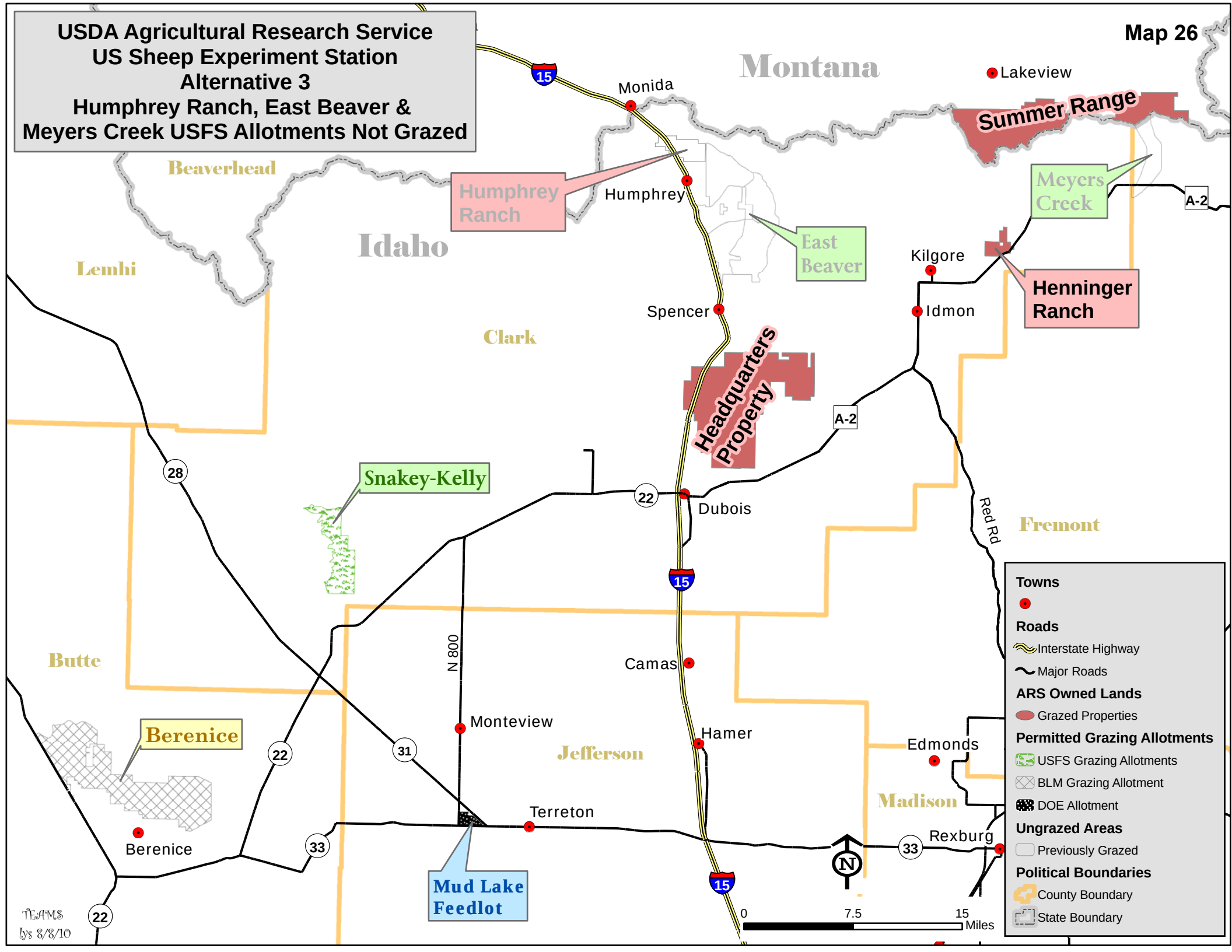
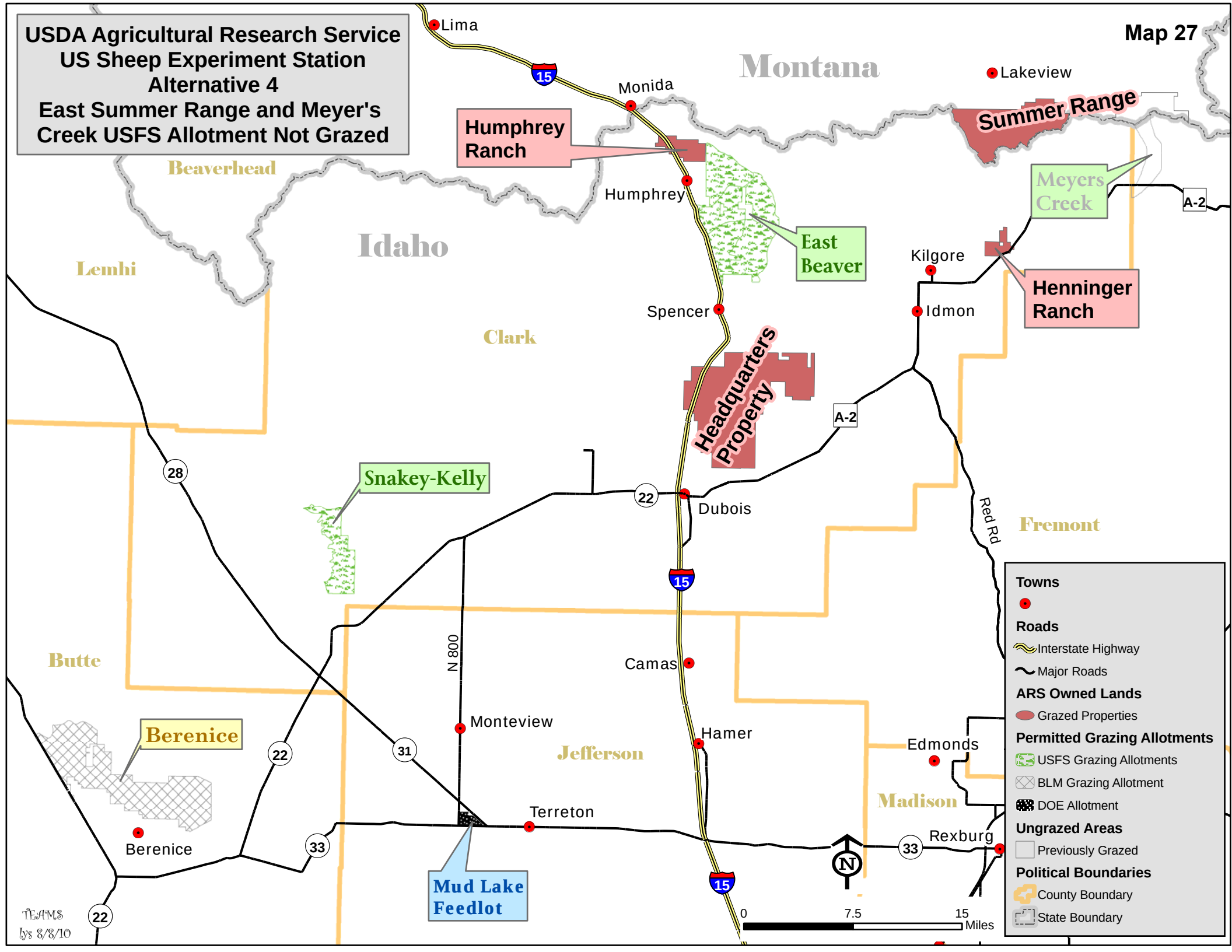
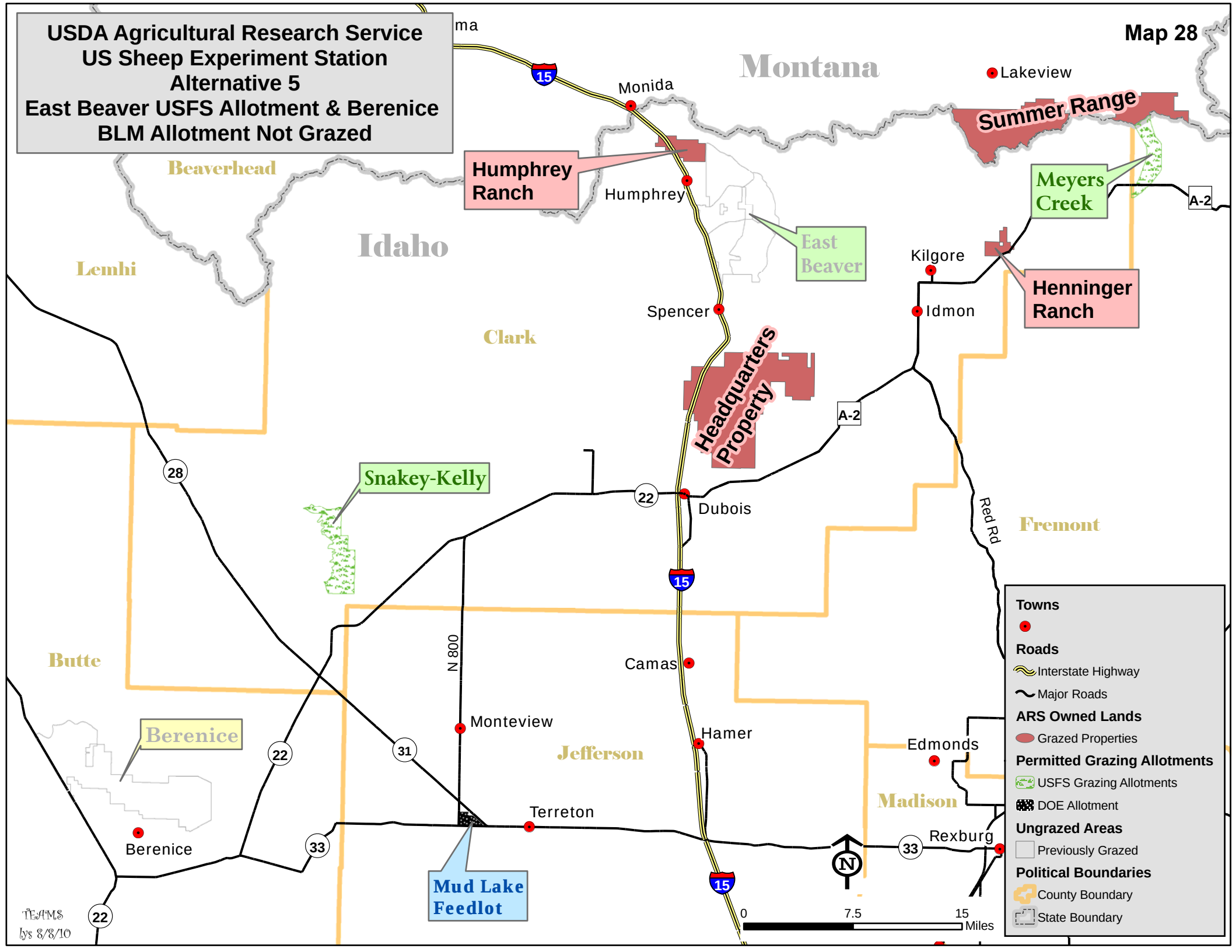
Previously Grazed
State Boundary
Political Boundaries
County Boundary
N


USDA Agricultural Research Service
US Sheep Experiment Station
Alternative 3
Humphrey Ranch, East Beaver &
Meyers Creek USFS Allotments Not Grazed
Map 26
Montana
Lakeview
Monida
Summer Range
Beaverhead
Humphrey Ranch
Humphrey
Meyers Creek
A-2
East Beaver
Idaho
Kilgore
Lemhi
Henninger Ranch
Idmon
Spencer
Clark
Headquarters Property
A-2
Snakey-Kelly
28
22
Dubois
Red Rd
Fremont
15
Butte
N 800
Camas
Monteview
Hamer
Jefferson
Edmonds
Berenice
22
31
Madison
Terreton
Rexburg
33
33
N
Berenice
Mud Lake Feedlot
15
22
0
7.5
15
Miles
TE/AMS
lys 8/8/10
Towns
Roads
Interstate Highway
Major Roads
ARS Owned Lands
Grazed Properties
Permitted Grazing Allotments
USFS Grazing Allotments
BLM Grazing Allotment
DOE Allotment
Ungrazed Areas
Previously Grazed
Political Boundaries
County Boundary
State Boundary


USDA Agricultural Research Service
US Sheep Experiment Station
Alternative 4
East Summer Range and Meyer's Creek USFS Allotment Not Grazed
Map 27
Montana
Idaho
Beaverhead
Lemhi
Clark
Butte
Jefferson
Madison
Fremont
Lima
Monida
Lakeview
Humphrey
Spencer
Kilgore
Idmon
Dubois
Camas
Hamer
Monteview
Terreton
Berenice
Edmonds
Rexburg
Red Rd
N 800
Humphrey Ranch
Summer Range
Meyers Creek
East Beaver
Henninger Ranch
Headquarters Property
Snakey-Kelly
Berenice
Mud Lake Feedlot
A-2
15
28
22
31
33
N
0
7.5
15
Miles
Towns
Roads
Interstate Highway
Major Roads
ARS Owned Lands
Grazed Properties
Permitted Grazing Allotments
USFS Grazing Allotments
BLM Grazing Allotment
DOE Allotment
Ungrazed Areas
Previously Grazed
Political Boundaries
County Boundary
State Boundary
TE/AMS
lys 8/8/10


USDA Agricultural Research Service
US Sheep Experiment Station
Alternative 5
East Beaver USFS Allotment & Berenice
BLM Allotment Not Grazed
Map 28
Montana
Idaho
Beaverhead
Lemhi
Clark
Jefferson
Madison
Fremont
Butte
Monida
Lakeview
Summer Range
Humphrey Ranch
Humphrey
East Beaver
Meyers Creek
A-2
Kilgore
Idmon
Henninger Ranch
Spencer
Headquarters Property
Snakey-Kelly
Dubois
Red Rd
Camas
N 800
Monteview
Hamer
Edmonds
Berenice
Terreton
Rexburg
Mud Lake Feedlot
28
22
31
33
15
N
0
7.5
15
Miles
Towns
Roads
Interstate Highway
Major Roads
ARS Owned Lands
Grazed Properties
Permitted Grazing Allotments
USFS Grazing Allotments
DOE Allotment
Ungrazed Areas
Previously Grazed
Political Boundaries
County Boundary
State Boundary
TE/AMS
lys 8/8/10

Appendix B – Average Annual Sheep Movement by Alternative

The following flow charts and tables display the movement of the USSES sheep between the various U.S. Sheep Experiment Station properties and allotments.

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Alternative 1 - Proposed Action

Alternative 1. 3300 sheep (7920 AUM); current grazing plan

Table 1-B. Proposed action general sheep movement schedule (Grazing dates are approximate depending on range readiness; A sheep is considered a lamb that is weaned, a yearling ram or ewe, a mature ram or ewe, or a pregnant or lactating ewe with a lamb(s).)

Dates	Location: Activity/Animal numbers	ARS Lands
Early Jan	**BLM Bernice allotment:** Ewes continue grazing. 2100 sheep	Yes/No
	Mud Lake feedlot and USSES HQ feedlot: Sheep continue being maintained in feedlots and are fed harvested feeds. 1200 sheep	
Mid Jan to Early Feb	**BLM Bernice allotment:** Ewes continue grazing until being trucked to Mud Lake feedlot depending on the weather. 0 to 2100 sheep	Yes/No
	Mud Lake feedlot and USSES HQ feedlot: Sheep continue being maintained in feedlots and are fed harvested feeds. Sheep numbers are increasing as sheep are trucked from Bernice. 1200 to 3300 sheep	
Early Feb to Late Apr	**Mud Lake feedlot and HQ feedlot:** Sheep continue being maintained in feedlots and are fed harvested feeds. Lambing begins during this period. 3300 sheep	Yes/No
Late Apr to Mid May	**Mud Lake feedlot and HQ feedlot:** Sheep continue being maintained in feedlots and are fed harvested feeds. Sheep are moved to range as range becomes ready and the lambs are old enough to forage. Lambing ends during this period. 0 to 3300 sheep	Yes/No
	USSES HQ range: Sheep are going on to range and are grazing. 0 to 3300 sheep	
Mid May to End of May	**USSES HQ range:** Sheep continue grazing. 3300 sheep	Yes
Beginning of June to Late June	**USSES HQ range:** Rams and misc. ewes are trucked to Humphrey Ranch. Ewes continue grazing until ewes with lambs are trailed to Henninger Ranch. 2650 sheep	Yes
	Humphrey Ranch: Rams and misc. ewes are trucked to ranch and are grazing. 650 sheep	
Late June to Early July	**USSES HQ range:** Non-lactating ewes are grazing and being trucked to the Forest Service East Beaver allotment. 0 to 650 sheep	Yes/No
	Humphrey Ranch: Rams and misc. ewes continue grazing. 650 sheep	
	Henninger Ranch: Ewes with lambs are trailed from USSES HQ to the ranch and are grazing until moving on to Summer Ranges at the end of the period. 2000 sheep	
	Forest Service East Beaver allotment: Non-lactating ewes are trucked from USSES HQ range and are grazing. 0 to 650 sheep	

Dates	Location: Activity/Animal numbers	ARS Lands
Early July to Mid July	**Humphrey Ranch:** Rams and misc. ewes continue grazing. 650 sheep	Yes/No
	USSES West Summer range: Ewes with lambs are trailed to the property and are grazing each grazing area in a rest rotation (2 years grazed 1 year rest). 1400 sheep average (1100 sheep 1st yr O'Dell, 1100 sheep 2nd yr Big Mountain, and 2000 sheep 3rd year with half on O'Dell and half on Big Mountain)	
	Forest Service Meyers Creek allotment: Ewes with lambs are trailed to the allotment and are grazing in a rest rotation (2 years grazed 1 year rest) until moving to USSES East Summer Range. 600 sheep average (900 sheep 1st year, 900 sheep 2nd year, and 0 sheep in 3rd year)	
	Forest Service East Beaver allotment: Non-lactating ewes continue grazing. 650 sheep	
Late July to End of Aug	**Humphrey Ranch:** Rams and misc. ewes continue grazing. 650 sheep	Yes/No
	USSES West Summer range: Ewes with lambs continue grazing each grazing areas in 2 of 3 years. 1400 sheep average (1100 sheep 1st yr on O'Dell, 1100 sheep 2nd yr on Big Mountain, and 2000 sheep 3rd yr—half on O'Dell and half on Big Mountain)	
	USSES East Summer range: Ewes with lambs are moved from the adjacent Forest Service allotment to the property and graze in 2 of 3 years. 600 sheep average (900 sheep 1st yr, 900 sheep 2nd yr, and 0 sheep in 3rd yr)	
	Forest Service East Beaver allotment: Non-lactating ewes continue grazing. 650 sheep	
1st week Aug	**Humphrey Ranch:** Rams and misc. ewes continue grazing. 650 sheep	Yes/No
	Henninger Ranch: Ewes with lambs are trailed to the ranch from summer ranges and are grazing. 2000 sheep	
	Forest Service East Beaver allotment: Non-lactating ewes continue grazing. 650 sheep	
2nd week Aug	**USSES HQ range:** All non-lactating ewes from Forest Service East Beaver allotment and some sheep from the Henninger Ranch are trucked to the property. Sheep are grazing. 900 sheep	Yes
	Humphrey Ranch: Some rams and misc. ewes continue grazing. 400 sheep	
	Henninger Ranch: Ewes with lambs continue grazing. 2000 sheep	
Late August to Early Oct	**USSES HQ range:** All sheep have been trucked from Henninger Ranch to the property. Cull ewes, rams, and market lambs are sold and replacement ewe and lamb lambs are incorporated into respective breading flocks. Sheep continue grazing. 2900 sheep	Yes
	Humphrey Ranch: Some rams and misc. ewes continue grazing. 400 sheep	

Dates	Location: Activity/Animal numbers	ARS Lands
2nd week of Oct	**USSES HQ range:** Some sheep from Humphrey Ranch are trucked to the property. Sheep continue grazing. 3100 sheep	Yes
	Humphrey Ranch: Some rams continue grazing. 200 sheep	
Mid Oct to Late Oct	**Mud Lake feedlot and USSES HQ feedlot:** Ewes and rams are moved to the feedlots for breeding and are maintained on harvested feeds. 1870 sheep	Yes/No
	USSES HQ range: Remaining ewes and rams continue grazing. 1230 to 1430 sheep	
	Humphrey Ranch: Some rams continue grazing as weather permits. By period end all remaining rams are trucked to USSES Headquarters range. 0 to 200 sheep	
1st week of Nov	**Mud Lake feedlot and USSES HQ feedlot:** All ewes and required rams are in feedlots for breeding and are maintained on harvested feeds. 3100 sheep	Yes/No
	USSES HQ range: Remaining rams continue grazing. 200 sheep	
Mid Nov	**Mud Lake feedlot and USSES HQ feedlot:** All ewes and required rams are in feedlots for breeding and are maintained on harvested feeds. 2000 to 2200 sheep	Yes/No
	USSES HQ range: Remaining rams continue grazing until weather conditions require that the rams are moved to the feedlots. 0 to 200 sheep	
	Forest Service Snakey Canyon allotment: Ewes are trucked to the allotment. Sheep are grazing. 1100 sheep	
Late Nov	**Mud Lake feedlot and USSES HQ feedlot:** All ewes and required rams are in feedlots for breeding and are maintained on harvested feeds. 1200 sheep	Yes/No
	Forest Service Snakey Canyon allotment: Ewes continue grazing. 1100 sheep	
	Forest Service Kelly Canyon allotment: Ewes are trucked to the allotment. Sheep are grazing. 1000 sheep	
Early Dec to Late Dec	**Mud Lake feedlot and USSES HQ feedlot:** Remaining sheep are maintained on harvested feeds. 1200 sheep	Yes/No
	Forest Service Snakey Canyon allotment: Ewes continue grazing while weather permits until period end. 0 to 1100 sheep	
	Forest Service Kelly Canyon allotment: Ewes continue grazing while weather permits until period end. 0 to 1000 sheep	
	BLM Bernice allotment: If weather conditions at Forest Service Sankey/Kelly allotments require moving, ewes are trucked to Bernice allotment and sheep are grazing. 0 to 2100 sheep	

Dates	Location: Activity/Animal numbers	ARS Lands
Last week of Dec	**Mud Lake feedlot and USSES HQ feedlot:** Sheep continue being maintained in feedlots and are fed harvested feeds. 1200 sheep	Yes/No
	BLM Bernice allotment: Sheep continue grazing. 2100 sheep	

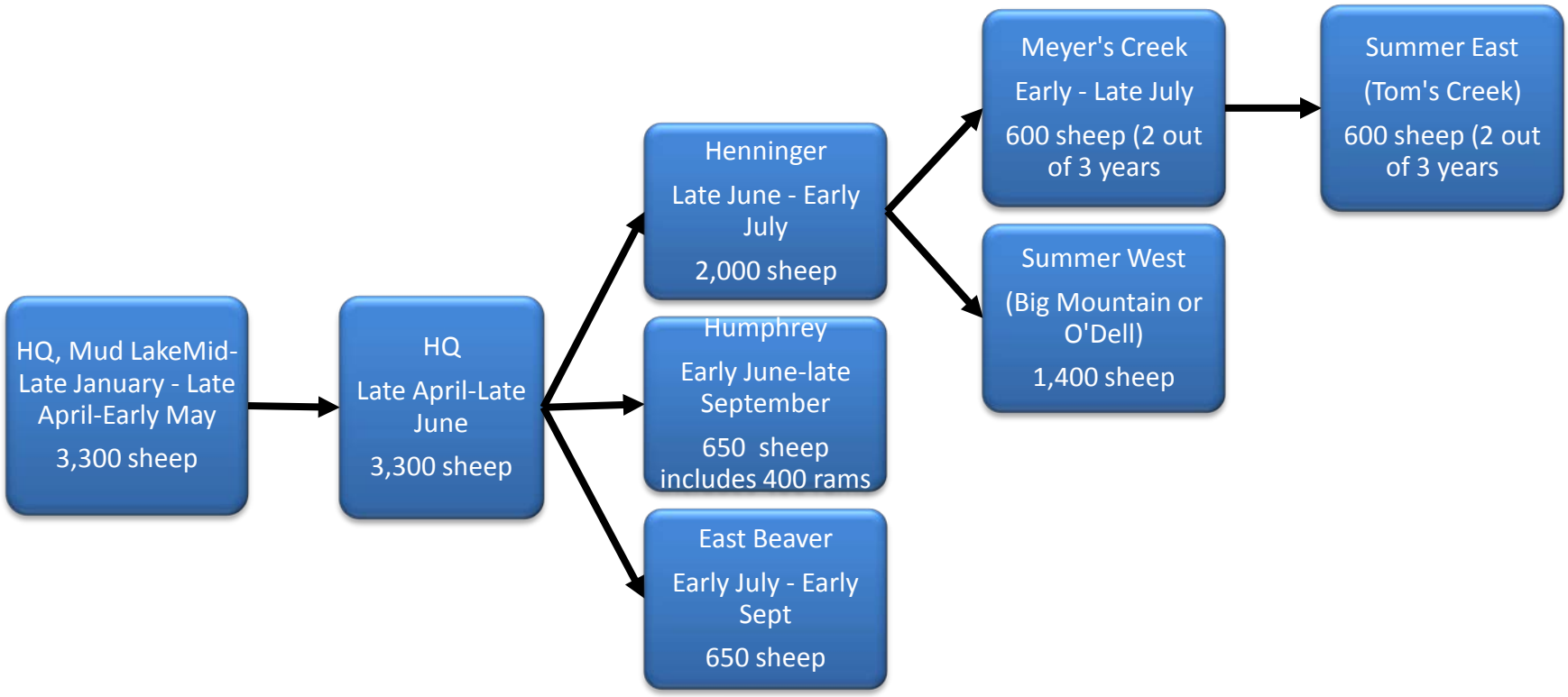


Figure 1 -B. Proposed Action sheep movement out to summer range

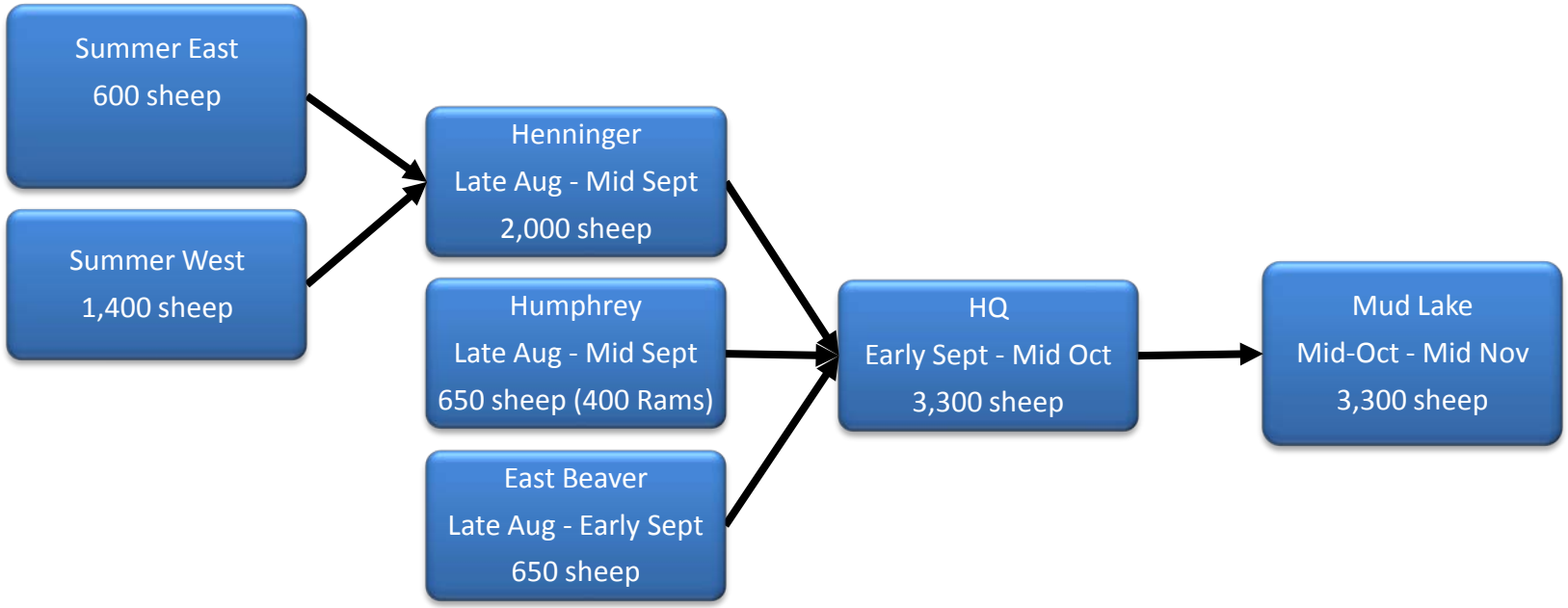


Figure 2-B. Proposed Action sheep movement off summer ranges

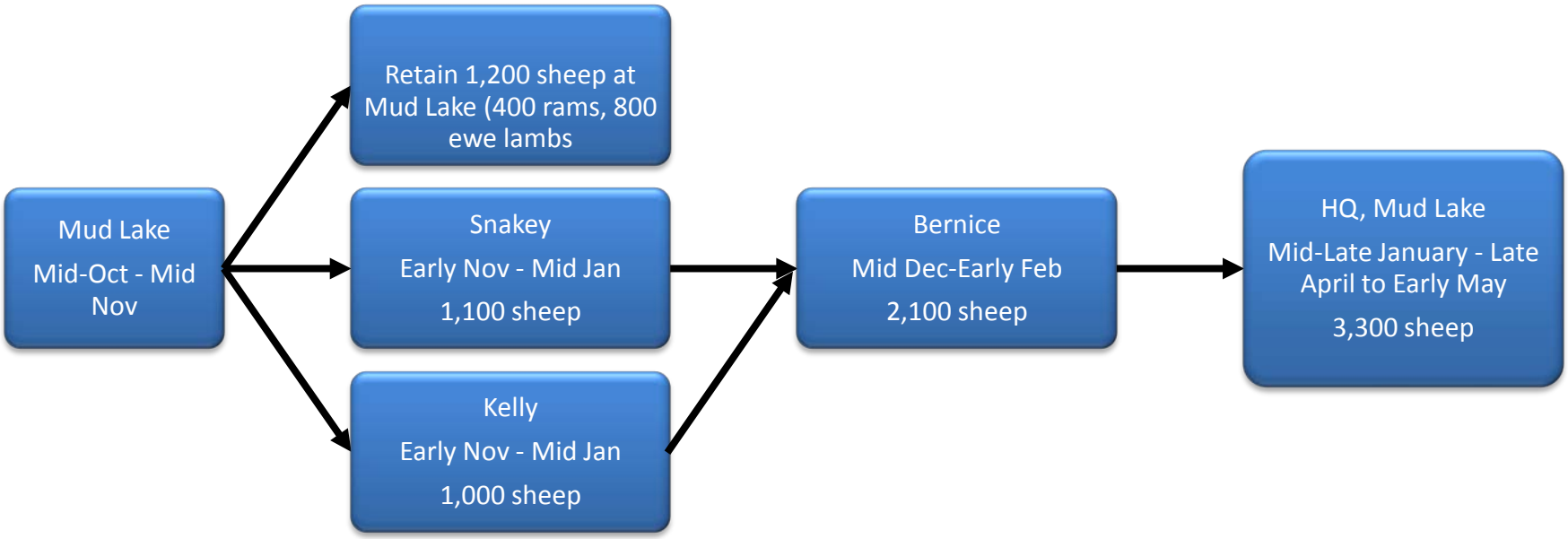


Figure 3-B. Proposed Action sheep movement to winter range

Alternative 2

Alternative 2: 1,166 sheep (2,798 AUM), 65% reduction from alternative 1, sheep are retained at Mud Lake with only occasional grazing. Only 158 AUMs are grazed at Mud Lake in the spring, summer, or autumn. Sheep are maintained in feed lots and the remaining 2,640 AUM equivalents will be provided with harvested feeds.

Alternative 3

Alternative 3: 2640 sheep (6,336 AUM), 20% reduction from alternative 1, No sheep grazing at Humphrey, East or West Summer ranges, East Beaver, or Meyers Creek allotment.

Table 2-B. Alternative 2 - general sheep movement schedule (Grazing dates are approximate depending on range readiness; A sheep is considered a lamb that is weaned, a yearling ram or ewe, a mature ram or ewe, or a pregnant or lactating ewe with a lamb(s).)

Dates	Location: Activity/ Animal numbers	ARS Lands
Early Jan	**BLM Bernice allotment:** Ewes continue grazing. 1680 sheep[b]	Yes/No
	Mud Lake feedlot and USSES HQ feedlot: Sheep continue being maintained in feedlots and are fed harvested feeds. 960 sheep	
Mid Jan to Early Feb	**Bernice:** Ewes continue grazing until being trucked to Mud Lake feedlot depending on the weather. 0 to 1680 sheep	Yes/No
	Mud Lake feedlot and USSES HQ feedlot: Sheep continue being maintained in feedlots and are fed harvested feeds. Sheep numbers are increasing as sheep are trucked from Bernice. 960 to 2640 sheep	
Early Feb to Late Apr	**Mud Lake feedlot and HQ feedlot:** Sheep continue being maintained in feedlots and are fed harvested feeds. Lambing begins during this period. 2640 sheep	Yes/No
Late Apr to Mid May	**Mud Lake feedlot and HQ feedlot:** Sheep continue being maintained in feedlots and are fed harvested feeds. Sheep are moved to range as range becomes ready and the lambs are old enough to forage. Lambing ends during this period. 0 to 2640 sheep	Yes/No
	USSES HQ range: Sheep are going on to range and are grazing. 0 to 2640 sheep	
Mid May to End of May	**USSES HQ range:** Sheep continue grazing. 2640 sheep	Yes

Dates	Location: Activity/ Animal numbers	ARS Lands
Beginning of June to Early Oct	**USSES HQ range:** Rams and misc. ewes are trucked to Henninger Ranch. Ewes continue grazing until ewes with lambs are trailed to Henninger Ranch. 2300 sheep	Yes
	Henninger Ranch: Rams are trucked to ranch and are grazing. 340 sheep	
2nd week of Oct	**USSES HQ range:** Some sheep from Henninger Ranch are trucked to the property. Sheep continue grazing. 2500 sheep	Yes
	Henninger Ranch: Some rams continue grazing. 140 sheep	
Mid Oct to Late Oct	**Mud Lake feedlot and USSES HQ feedlot:** Ewes and rams are moved to the feedlots for breeding and are maintained on harvested feeds. 1500 sheep	Yes/No
	USSES HQ range: Remaining ewes and rams continue grazing. 1000 to 1140 sheep	
	Henninger Ranch: Some rams continue grazing as weather permits. By period end all remaining rams are trucked to USSES Headquarters range. 0 to 140 sheep	
1st week of Nov	**Mud Lake feedlot and USSES HQ feedlot:** All ewes and required rams are in feedlots for breeding and are maintained on harvested feeds. 2500 sheep	Yes/No
	USSES HQ range: Remaining rams continue grazing. 140 sheep	
Mid Nov	**Mud Lake feedlot and USSES HQ feedlot:** All ewes and required rams are in feedlots for breeding and are maintained on harvested feeds. 1620 to 1760 sheep	Yes/No
	USSES HQ range: Remaining rams continue grazing until weather conditions require that the rams are moved to the feedlots. 0 to 140 sheep	
	Forest Service Snakey Canyon allotment: Ewes are trucked to the allotment. Sheep are grazing. 880 sheep	

Dates	Location: Activity/ Animal numbers	ARS Lands
Late Nov	**Mud Lake feedlot and USSES HQ feedlot:** All ewes and required rams are in feedlots for breeding and are maintained on harvested feeds. 960 sheep	Yes/No
	Forest Service Snakey Canyon allotment: Ewes continue grazing. 880 sheep	
	Forest Service Kelly Canyon allotment: Ewes are trucked to the allotment. Sheep are grazing. 800 sheep	
Early Dec to Late Dec	**Mud Lake feedlot and USSES HQ feedlot:** Remaining sheep are maintained on harvested feeds. 960 sheep	Yes/No
	Forest Service Snakey Canyon allotment: Ewes continue grazing while weather permits until period end. 0 to 880 sheep	
	Forest Service Kelly Canyon allotment: Ewes continue grazing while weather permits until period end. 0 to 800 sheep	
	BLM Bernice allotment: If weather conditions at Forest Service Sankey/Kelly allotments require moving, ewes are trucked to Bernice allotment and sheep are grazing. 0 to 1680 sheep	
Last week of Dec	**Mud Lake feedlot and USSES HQ feedlot:** Sheep continue being maintained in feedlots and are fed harvested feeds. 960 sheep	Yes/No
	BLM Bernice allotment: Sheep continue grazing. 1680 sheep	

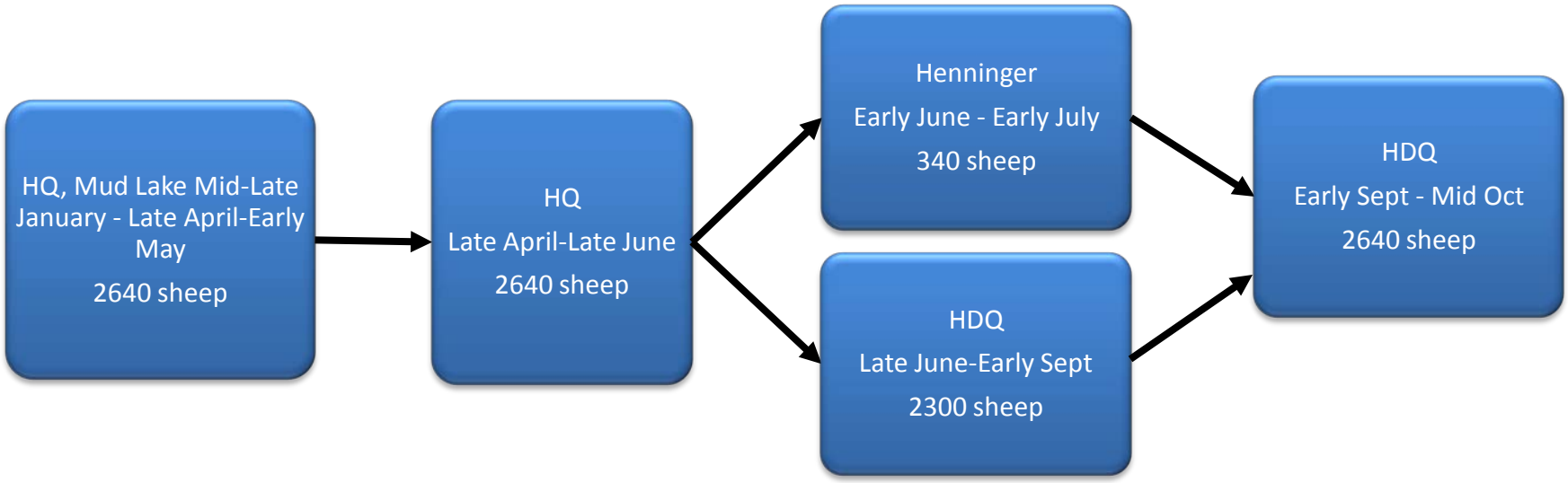


Figure 4-B. Alternative 3 sheep movement out to summer range

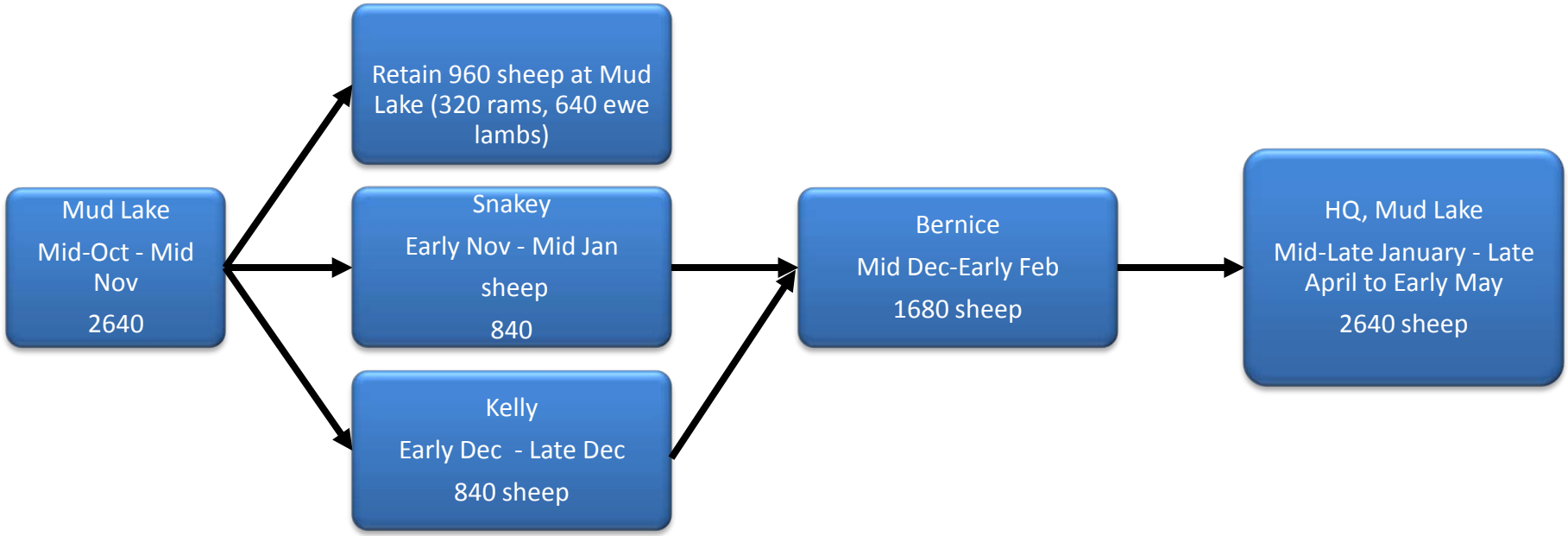


Figure 5-B. Alternative 3 sheep movement to winter range

Alternative 4

Alternative 4: 3,300 sheep (7920 AUM), no reduction from alternative 1, no grazing on East Summer range or Meyers Creek which means that rest rotation on West Summer range ceases.

Table 3-B. Alternative 4 - general sheep movement schedule (Grazing dates are approximate depending on range readiness; A sheep is considered a lamb that is weaned, a yearling ram or ewe, a mature ram or ewe, or a pregnant or lactating ewe with a lamb(s).)

Dates[a]	Location: Activity/ Animal numbers	ARS Lands
Early Jan	**BLM Bernice allotment:** Ewes continue grazing. 2100 sheep	Yes/No
	Mud Lake feedlot and USSES HQ feedlot: Sheep continue being maintained in feedlots and are fed harvested feeds. 1200 sheep	
Mid Jan to Early Feb	**Bernice:** Ewes continue grazing until being trucked to Mud Lake feedlot depending on the weather. 0 to 2100 sheep	Yes/No
	Mud Lake feedlot and USSES HQ feedlot: Sheep continue being maintained in feedlots and are fed harvested feeds. Sheep numbers are increasing as sheep are trucked from Bernice. 1200 to 3300 sheep	
Early Feb to Late Apr	**Mud Lake feedlot and HQ feedlot:** Sheep continue being maintained in feedlots and are fed harvested feeds. Lambing begins during this period. 3300 sheep	Yes/No
Late Apr to Mid May	**Mud Lake feedlot and HQ feedlot:** Sheep continue being maintained in feedlots and are fed harvested feeds. Sheep are moved to range as range becomes ready and the lambs are old enough to forage. Lambing ends during this period. 0 to 3300 sheep	Yes/No
	USSES HQ range: Sheep are going on to range and are grazing. 0 to 3300 sheep	
Mid May to End of May	**USSES HQ range:** Sheep continue grazing. 3300 sheep	Yes
Beginning of June to Late June	**USSES HQ range:** Rams and misc. ewes are trucked to Humphrey Ranch. Ewes continue grazing until ewes with lambs are trailed to Henninger Ranch. 2650 sheep	Yes
	Humphrey Ranch: Rams and misc. ewes are trucked to ranch and are grazing. 650 sheep	

Dates[a]	Location: Activity/ Animal numbers	ARS Lands
Late June to Early July	**USSES HQ range:** Non-lactating ewes are grazing and being trucked to the Forest Service East Beaver allotment. 0 to 650 sheep	Yes/No
	Humphrey Ranch: Rams and misc. ewes continue grazing. 650 sheep	
	Henninger Ranch: Ewes with lambs are trailed from USSES HQ to the ranch and are grazing until moving on to Summer Ranges at the end of the period. 2000 sheep	
	Forest Service East Beaver allotment: Non-lactating ewes are trucked from USSES HQ range and are grazing. 0 to 650 sheep	
Early July to End of Aug	**Humphrey Ranch:** Rams and misc. ewes continue grazing. 650 sheep	Yes/No
	USSES West Summer range: Ewes with lambs are trailed to the property and are grazing. 2000 sheep	
	Forest Service East Beaver allotment: Non-lactating ewes continue grazing. 650 sheep	
1st week Aug	**Humphrey Ranch:** Rams and misc. ewes continue grazing. 650 sheep	Yes/No
	Henninger Ranch: Ewes with lambs are trailed to the ranch from summer ranges and are grazing. 2000 sheep	
	Forest Service East Beaver allotment: Non-lactating ewes continue grazing. 650 sheep	
2nd week Aug	**USSES HQ range:** All non-lactating ewes from Forest Service East Beaver allotment and some sheep from the Henninger Ranch are trucked to the property. Sheep are grazing. 900 sheep	Yes
	Humphrey Ranch: Some rams and misc. ewes continue grazing. 400 sheep	
	Henninger Ranch: Ewes with lambs continue grazing. 2000 sheep	
Late August to Early Oct	**USSES HQ range:** All sheep have been trucked from Henninger Ranch to the property. Cull ewes, rams, and market lambs are sold and replacement ewe and lamb lambs are incorporated into respective breading flocks. Sheep continue grazing. 2900 sheep	Yes
	Humphrey Ranch: Some rams and misc. ewes continue grazing. 400 sheep	

Dates[a]	Location: Activity/ Animal numbers	ARS Lands
2nd week of Oct	**USSES HQ range:** Some sheep from Humphrey Ranch are trucked to the property. Sheep continue grazing. 3100 sheep	Yes
	Humphrey Ranch: Some rams continue grazing. 200 sheep	
Mid Oct to Late Oct	**Mud Lake feedlot and USSES HQ feedlot:** Ewes and rams are moved to the feedlots for breeding and are maintained on harvested feeds. 1870 sheep	Yes/No
	USSES HQ range: Remaining ewes and rams continue grazing. 1230 to 1430 sheep	
	Humphrey Ranch: Some rams continue grazing as weather permits. By period end all remaining rams are trucked to USSES Headquarters range. 0 to 200 sheep	
1st week of Nov	**Mud Lake feedlot and USSES HQ feedlot:** All ewes and required rams are in feedlots for breeding and are maintained on harvested feeds. 3100 sheep	Yes/No
	USSES HQ range: Remaining rams continue grazing. 200 sheep	
Mid Nov	**Mud Lake feedlot and USSES HQ feedlot:** All ewes and required rams are in feedlots for breeding and are maintained on harvested feeds. 2000 to 2200 sheep	Yes/No
	USSES HQ range: Remaining rams continue grazing until weather conditions require that the rams are moved to the feedlots. 0 to 200 sheep	
	Forest Service Snakey Canyon allotment: Ewes are trucked to the allotment. Sheep are grazing. 1100 sheep	
Late Nov	**Mud Lake feedlot and USSES HQ feedlot:** All ewes and required rams are in feedlots for breeding and are maintained on harvested feeds. 1200 sheep	Yes/No
	Forest Service Snakey Canyon allotment: Ewes continue grazing. 1100 sheep	
	Forest Service Kelly Canyon allotment: Ewes are trucked to the allotment. Sheep are grazing. 1000 sheep	

Dates[a]	Location: Activity/ Animal numbers	ARS Lands
Early Dec to Late Dec	**Mud Lake feedlot and USSES HQ feedlot:** Remaining sheep are maintained on harvested feeds. 1200 sheep	Yes/No
	Forest Service Snakey Canyon allotment: Ewes continue grazing while weather permits until period end. 0 to 1100 sheep	
	Forest Service Kelly Canyon allotment: Ewes continue grazing while weather permits until period end. 0 to 1000 sheep	
	BLM Bernice allotment: If weather conditions at Forest Service Sankey/Kelly allotments require moving, ewes are trucked to Bernice allotment and sheep are grazing. 0 to 2100 sheep	
Last week of Dec	**Mud Lake feedlot and USSES HQ feedlot:** Sheep continue being maintained in feedlots and are fed harvested feeds. 1200 sheep	Yes/No
	BLM Bernice allotment: Sheep continue grazing. 2100 sheep	

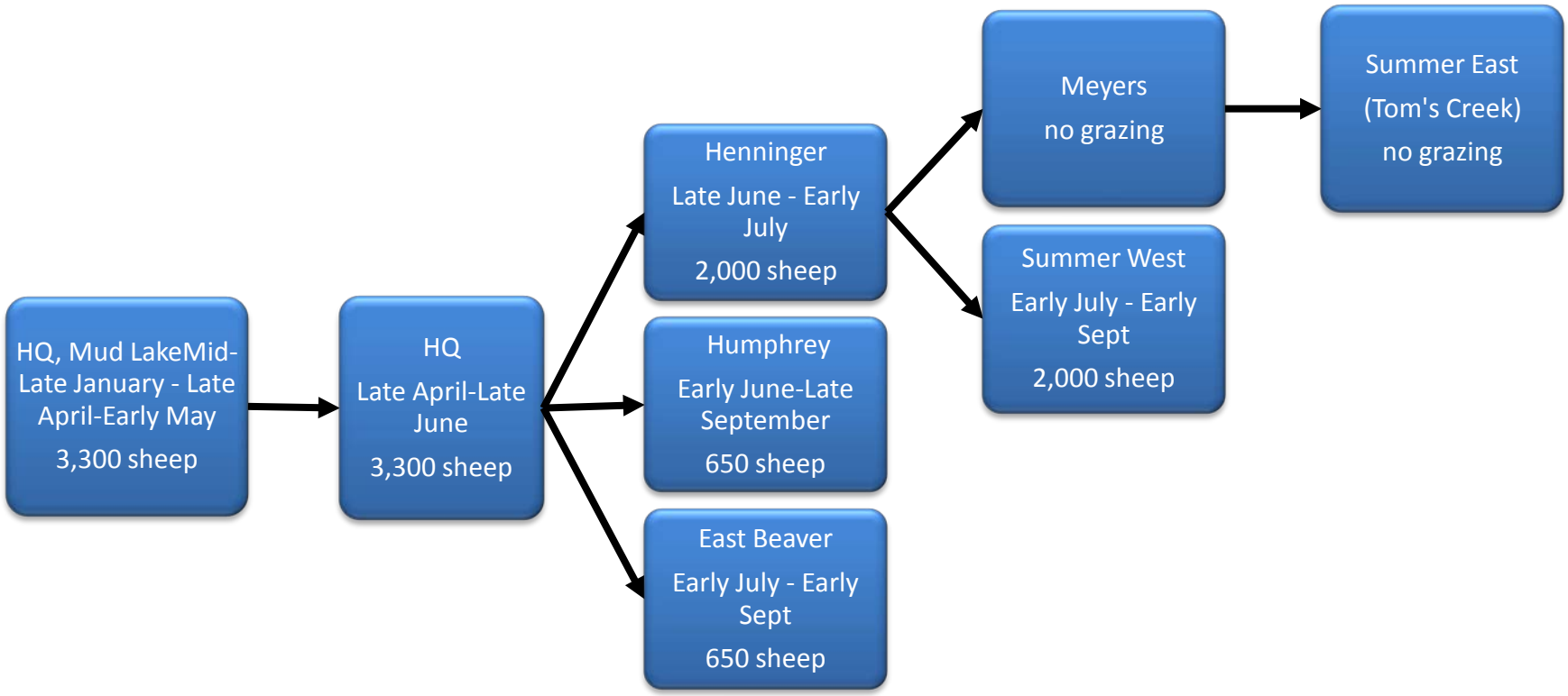


Figure 6-B. Alternative 4 sheep movement out to summer range

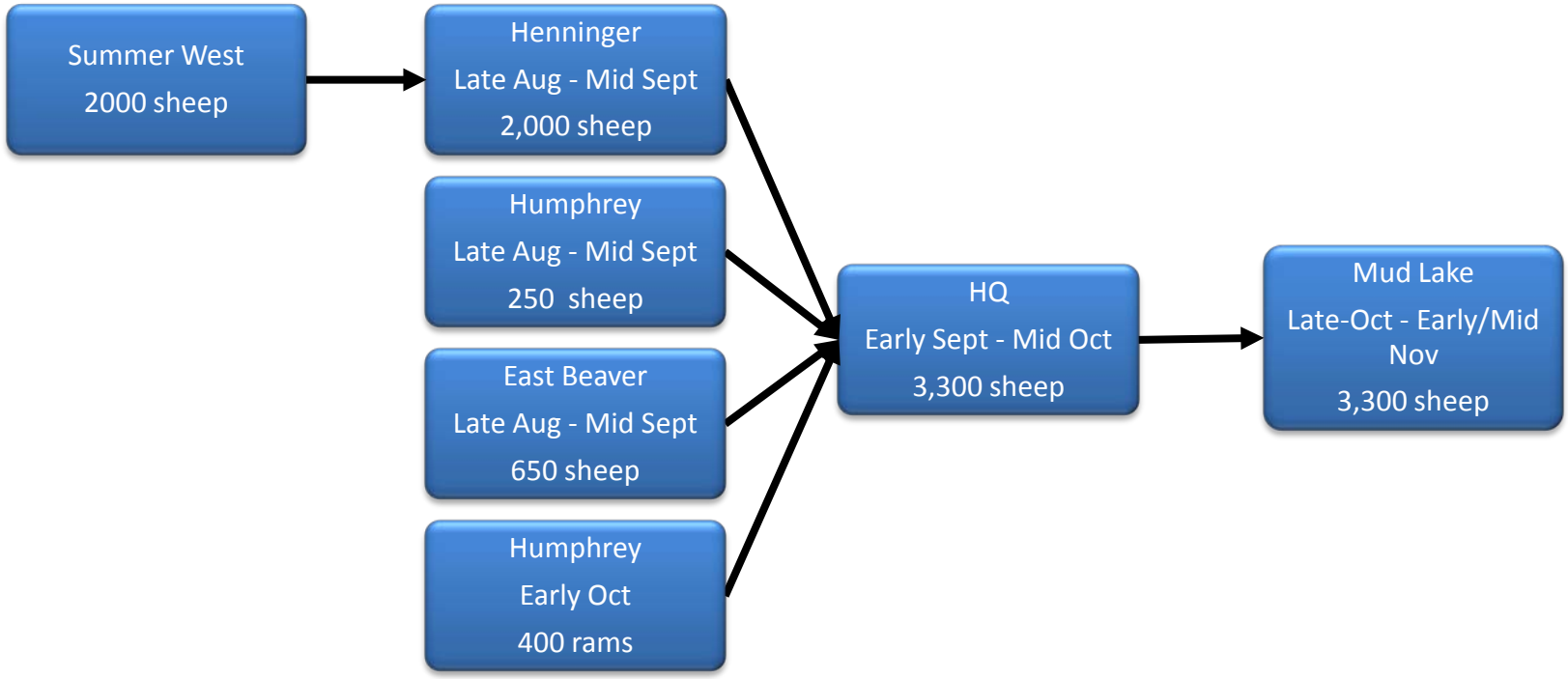


Figure 7-B. Alternative 4 sheep movement off summer range

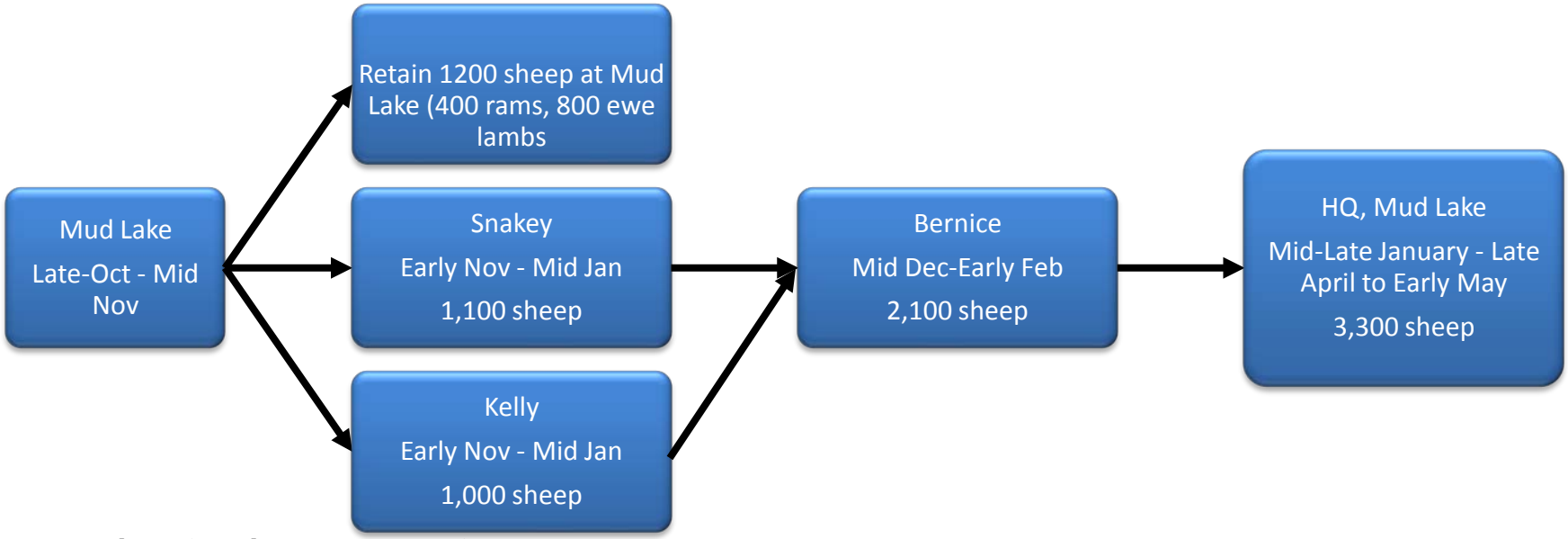


Figure 8-B. Alternative 4 sheep movement to winter range

Alternative 5

Alternative 5: 2330 sheep (5,544 AUM), 30% reduction from alternative 1, No grazing on Snakey-Kelly allotments or Bernice.

Table 4-B. Alternative 5 - general sheep movement schedule (Grazing dates are approximate depending on range readiness; A sheep is considered a lamb that is weaned, a yearling ram or ewe, a mature ram or ewe, or a pregnant or lactating ewe with a lamb(s).)

Dates[a]	Location: Activity/ Animal numbers	ARS Lands
Jan 1 to Late Apr	**Mud Lake feedlot and USSES HQ feedlot:** Sheep continue being maintained in feedlots and are fed harvested feeds. Lambing begins during this period. 2330 sheep	Yes/No
Late Apr to Mid May	**Mud Lake feedlot and HQ feedlot:** Sheep continue being maintained in feedlots and are fed harvested feeds. Sheep are moved to range as range becomes ready and the lambs are old enough to forage. Lambing ends during this period. 0 to 2310 sheep	Yes/No
	USSES HQ range: Sheep are going on to range and are grazing. 0 to 2330 sheep	
Mid May to End of May	**USSES HQ range:** Sheep continue grazing. 2330 sheep	Yes
Beginning of June to Late June	**USSES HQ range:** Rams and misc. ewes are trucked to Humphrey Ranch. Ewes continue grazing until ewes with lambs are trailed to Henninger Ranch. 1855 sheep	Yes
	Humphrey Ranch: Rams and misc. ewes are trucked to ranch and are grazing. 455 sheep	
Late June to Early July	**USSES HQ range:** Non-lactating ewes are grazing and being trucked to the Forest Service East Beaver allotment. 0 to 455 sheep	Yes/No
	Humphrey Ranch: Rams and misc. ewes continue grazing. 455 sheep	
	Henninger Ranch: Ewes with lambs are trailed from USSES HQ to the ranch and are grazing until moving on to Summer Ranges at the end of the period. 1400 sheep	
	Forest Service East Beaver allotment: Non-lactating ewes are trucked from USSES HQ range and are grazing. 0 to 455 sheep	

Dates[a]	Location: Activity/ Animal numbers	ARS Lands
Early July to Mid July	**Humphrey Ranch:** Rams and misc. ewes continue grazing. 455 sheep	Yes/No
	USSES West Summer range: Ewes with lambs are trailed to the property and are grazing each of grazing area in 2 of 3 years. 980 sheep average (770 sheep year 1 on O'Dell, 770 sheep year 2 on Big Mountain, and 1400 sheep year 3 with half on O'Dell and half on Big Mountain)	
	Forest Service Meyers Creek allotment: Ewes with lambs are trail to the allotment and are grazing in 2 of 3 years until moving to USSES East Summer Range. 420 sheep average (630 sheep year 1, 630 sheep year 2, and 0 sheep in year 3)	
	Forest Service East Beaver allotment: Non-lactating ewes continue grazing. 455 sheep	
Late July to End of Aug	**Humphrey Ranch:** Rams and misc. ewes continue grazing. 455 sheep	Yes/No
	USSES West Summer range: Ewes with lambs continue grazing each grazing areas in 2 of 3 years. 980 sheep average (770 sheep 1st yr on O'Dell, 770 sheep 2nd yr on Big Mountain, and 1400 sheep 3rd yr—half on O'Dell and half on Big Mountain)	
	USSES East Summer range: Ewes with lambs are moved from the adjacent Forest Service allotment to the property and graze in 2 of 3 years. 420 sheep average (630 sheep 1st yr, 630 sheep 2nd yr, and 0 sheep in 3rd yr)	
	Forest Service East Beaver allotment: Non-lactating ewes continue grazing. 455 sheep	
1st week Aug	**Humphrey Ranch:** Rams and misc. ewes continue grazing. 455 sheep	Yes/No
	Henninger Ranch: Ewes with lambs are trailed to the ranch from summer ranges and are grazing. 1400 sheep	
	Forest Service East Beaver allotment: Non-lactating ewes continue grazing. 455 sheep	

Dates[a]	Location: Activity/ Animal numbers	ARS Lands
2nd week Aug	**USSES HQ range:** All non-lactating ewes from Forest Service East Beaver allotment and some sheep from the Henninger Ranch are trucked to the property. Sheep are grazing. 630 sheep	Yes
	Humphrey Ranch: Some rams and misc. ewes continue grazing. 280 sheep	
	Henninger Ranch: Ewes with lambs continue grazing. 1400 sheep	
Late August to Early Oct	**USSES HQ range:** All sheep have been trucked from Henninger Ranch to the property. Cull ewes, rams, and market lambs are sold and replacement ewe and lamb lambs are incorporated into respective breading flocks. Sheep continue grazing. 2030 sheep	Yes
	Humphrey Ranch: Some rams and misc. ewes continue grazing. 280 sheep	
2nd week of Oct	**USSES HQ range:** Some sheep from Humphrey Ranch are trucked to the property. Sheep continue grazing. 2190 sheep	Yes
	Humphrey Ranch: Some rams continue grazing. 140 sheep	
Mid Oct to Late Oct	**Mud Lake feedlot and USSES HQ feedlot:** Ewes and rams are moved to the feedlots for breeding and are maintained on harvested feeds. 1330 sheep	Yes/No
	USSES HQ range: Remaining ewes and rams continue grazing. 860 to 1000 sheep	
	Humphrey Ranch: Some rams continue grazing as weather permits. By period end all remaining rams are trucked to USSES Headquarters range. 0 to 140 sheep	
1st week of Nov	**Mud Lake feedlot and USSES HQ feedlot:** All ewes and required rams are in feedlots for breeding and are maintained on harvested feeds. 2190 sheep	Yes/No
	USSES HQ range: Remaining rams continue grazing. 140 sheep	

Dates[a]	Location: Activity/ Animal numbers	ARS Lands
Mid Nov	**Mud Lake feedlot and USSES HQ feedlot:** All ewes and required rams are in feedlots for breeding and are maintained on harvested feeds. 2170 to 2330 sheep	Yes/No
	USSES HQ range: Remaining rams continue grazing until weather conditions require that the rams are moved to the feedlots. 0 to 140 sheep	
Late Nov to Year End	**Mud Lake feedlot and USSES HQ feedlot:** All ewes and required rams are in feedlots for breeding and are maintained on harvested feeds. 2330 sheep	Yes/No

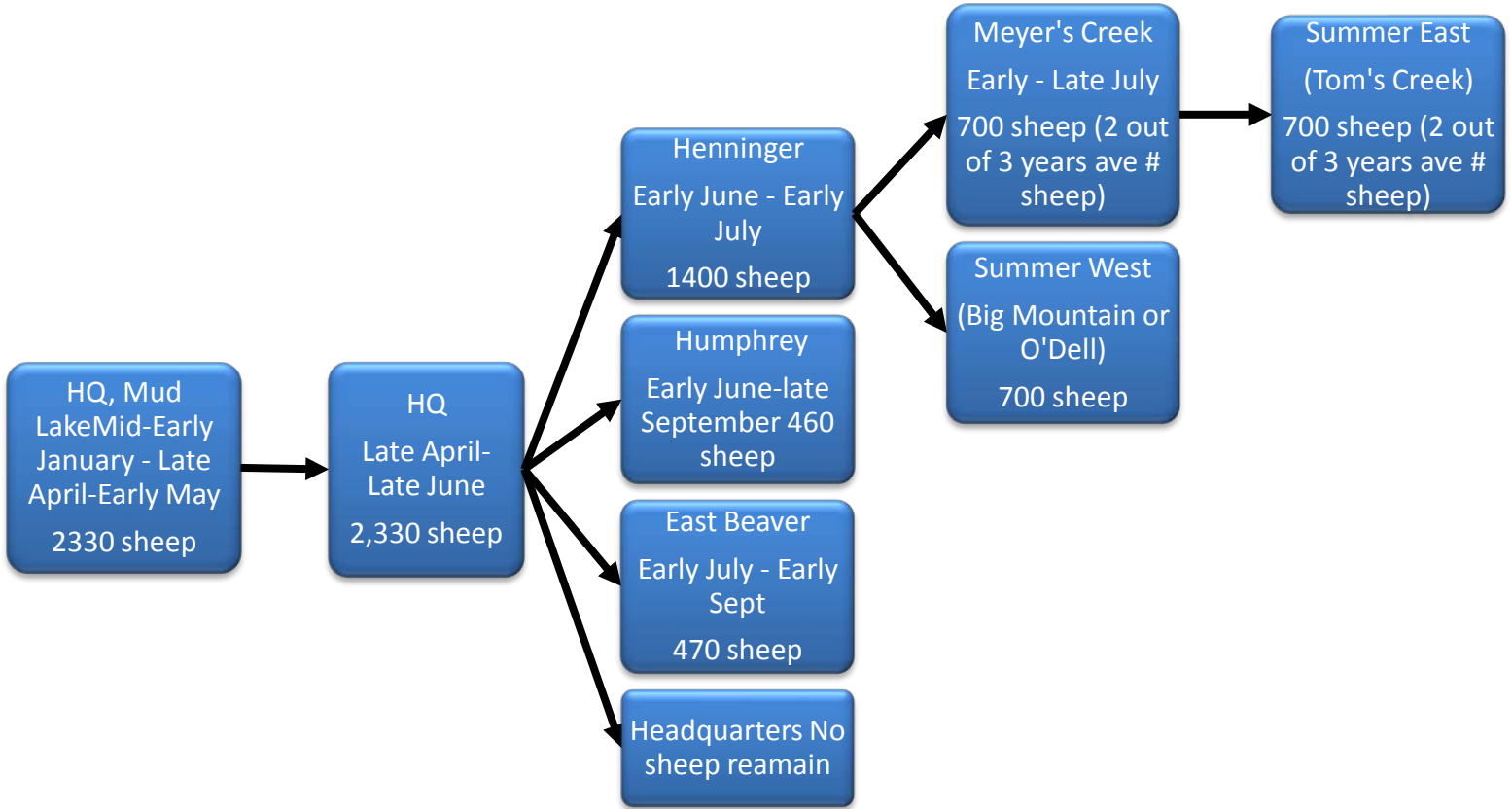


Figure 9-B. Alternative 5 sheep movement out to summer range

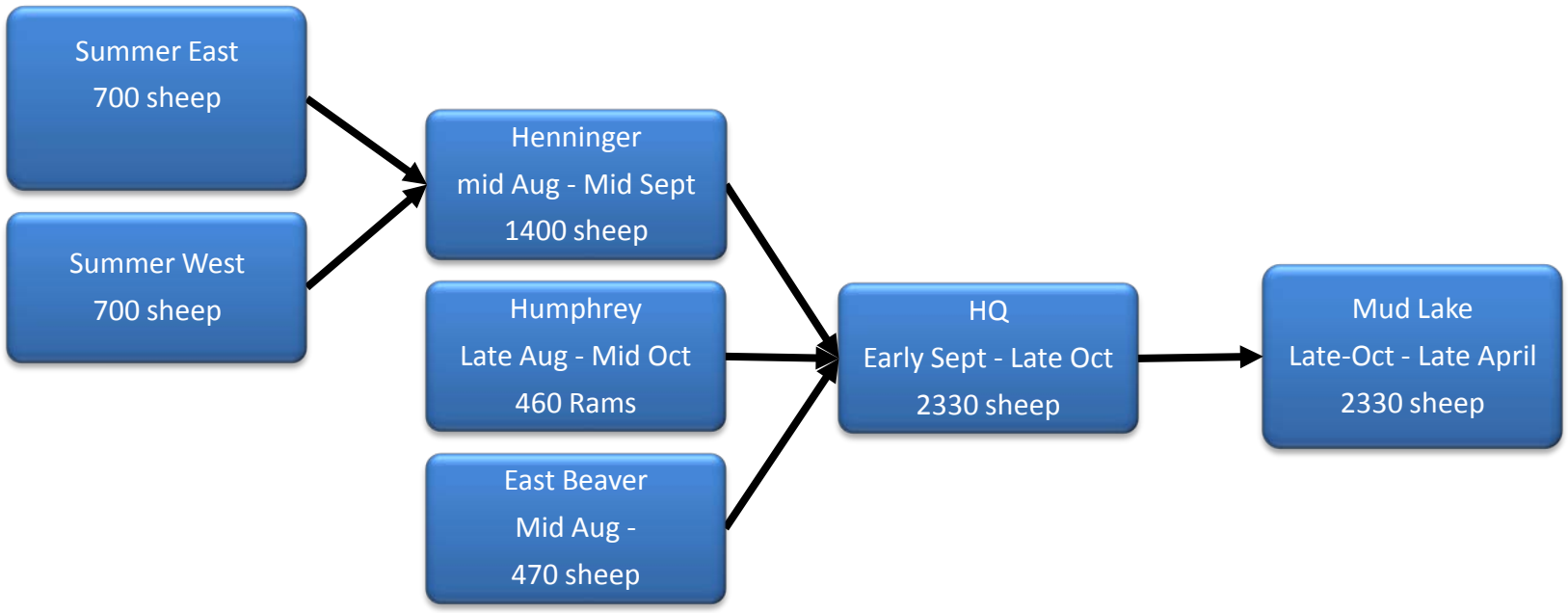


Figure 10-B. Alternative 5 sheep movement to winter range

Appendix C – ARS Sheep Station Integrated Invasive Plant and Weed Control

There are few weed problems on USSES pasture lands. The minimal weed infestations that are present are located in sheep pens and along roads where there is no grazing. Some weed species are present on adjacent lands where cattle graze, and, over time, the adjacent weeds invade USSES lands. Invasive plant species infestations on USSES lands are GPS (Global Positioning System) mapped. Area or patch infestations are mapped as polygons and included in the USSES records. Roadside noxious weed locations are identified on hard copy maps and recorded for treatment, as they are found.

USSES uses an adaptive management/integrated pest management approach for control and eradication of exotic, invasive weeds. This integrated approach is coupled with research on ecosystem functions and native plant communities and with research on weed seed production and spread with sheep grazing. As primary weed control, this integrated approach includes the use of strategic sheep grazing as a biocontrol method to reduce the production of weed seed and the spread of weeds. Other biocontrol methods, such as specific species of beetles, alone or in combination with other biocontrol methods, are also used.

Precautions are taken by USSES to minimize weed spread from sheep. To accomplish this, weed areas are grazed in spring when there is little or no risk of spreading weed seeds. USSES also quarantines animals for six days before moving sheep from weed infested areas or from feed with potential weed seeds to other grazing units. USSES does not graze areas when weed seeds are developed and there is risk of spreading seeds to another area.

For range weed infestations: USSES personnel report potential exotic weed infestations to the operation supervisor. Range and(or) animal scientists inspect the site, and if the presence of exotic weeds are confirmed, the scientist documents the location (GPS), weed species, and size/density of infestation; prescribes appropriate grazing strategies to mitigate the weed presence; and schedules seasonal and annual monitoring measures (on-ground sample and/or aerial imagery).

Table C-1. Target species for grazing control of exotic weeds

Target Species Scientific/Common Name	General Location	Season to Graze
Euphorbia esula **(leafy spurge)**	along I 15 and scattered plants in the 2005 Hitchin-post burn area	Grazing in weed areas is done in spring or early summer when there is no or little risk of spreading weed seeds.
Centaurea stoebe **(spotted knapweed)**		

For roadside, working facility, dry-lot and corral, and small pasture weed infestations: Herbicides have been used to control weeds along roadsides, in feedlots and corrals, small pastures (< 10 ha), and near building structures for ~30 years. USSES personnel report potential exotic weed infestations to the operation supervisor. The technician assigned to noxious weed management investigates the site. If presence of exotic weeds is confirmed, the technician documents the location (traditional name and/or GPS), weed species, and size/density of infestation, and treats the weed(s) with appropriate herbicide(s). The technician records this information in the "Pesticide Records: Noxious Weed Control" log.

Herbicide Use Protocols

The following table provides the types of plant species targeted for exotic weed infestations and the herbicide control methods used.

Table C-2. Target species for herbicide control of exotic weeds

Herbicide	Active ingredients	Area	Frequency	Acres
Curtail	2,4 D (39%) and Clorpyralid (5%)	Headquarters roadsides (+/- 5 m) and fencelines (+/- 2 m)	Annual	35
Curtail	2,4 D (39%) and Clorpyralid (5%)	Humphrey roadsides (+/- 5 m) and fencelines (+/- 2 m)	Annual	10
Krovar	40% Bromacil and 40% Diuron	Headquarters feedlots	Annual	2
Roundup	Glyphosphate (48%)	Humphrey pasture reseeding	One time	12
Arsenal	Imazapyr (29%)	NA	Past use	-
TordonK	Picloram (24%)	NA	Past use	-

- USSES personnel report potential exotic weed infestations to the operation supervisor.
- If presence of exotic weeds is confirmed, the technician documents the location (traditional name and/or GPS), weed species, and size/density of infestation, and treats the weed(s) with appropriate herbicide(s). The technician records this information in the "Pesticide Records: Noxious Weed Control" log.
- Only herbicide formulations (active and inert ingredients) and additives registered by EPA and approved by the Forest Service are applied.
- Herbicides and application methods are chosen to minimize risk to human and wildlife health and the environment
- Herbicides are applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human (NRC 1983) and wildlife health (EPA 1986a). Application rate and work time must not exceed typical levels (Appendix A, tables 4-4 to 4-6) unless a supplementary risk assessment shows that proposed rates do not increase risk to human or wildlife health or the environment beyond standards
- Method and timing of application are chosen to achieve project objectives while minimizing effects on non-target vegetation and other environmental elements.
- Weather is monitored and the project is suspended if temperature, humidity, or winds become unfavorable.
- A certified pesticide applicator supervises application.
- Workers who handle herbicides must wear a long sleeved shirt and long pants made of tightly woven cloth that must be cleaned daily. They must wear a hard hat with plastic liner, waterproofed boots and gloves, and other safety clothing and equipment required by labeling. They must bring a change of clothes to the field in case their clothes become contaminated.
- Employees applying herbicides must take soap, wash water separate from drinking water, eyewash bottles, and first aid equipment to the field.
- During transport, herbicides, additives, and application equipment are secured to prevent tipping or excess jarring and are carried in a part of the vehicle totally isolated from people, food, clothing, and livestock feed.
- Only the amount of herbicide needed for the day's use is brought to the site. At day's end, all leftover herbicide is returned to storage.
- Herbicide mixing, loading, or cleaning areas in the field are not located within 200 feet of private land, open water or wells, or other sensitive areas.
- During use, equipment to store, transport, mix, or apply herbicides is inspected daily for leaks.
- Containers are reused only for their designated purpose. Empty herbicide containers are disposed of according to 40 Code of Federal Regulations (CFR) 165.9 Group I & II Containers.

- Accident preplanning is done in each site-specific analysis. Emergency spill plans are prepared. In the unlikely event of a spill, the spill is quickly contained and cleaned up, and appropriate agencies and persons are promptly notified.

Herbicide Hazard Quotients and Effects to Human Health

An inventory of herbicides is maintained. Herbicides are stored according to the manufacture label, which is displayed in the storage room. All human health and environmental related issues are managed according to the most current MSDS, which is displayed in the storage room.

Chemical Hygiene Plan

Requirements for use of Caustics, Corrosive, Flammable, Pesticide Materials

Introduction

The intent of the Dubois, Idaho, Research Unit Chemical Hygiene Plan (CHP) is to:

1. Protect laboratory employees from health hazards associated with the use of various chemicals found in the laboratory.
2. Aid in assuring that our laboratory employees are not exposed to substances in excess of the permissible exposure limits as defined by OSHA in 29 CFR 1910 subpart Z.

This plan is part of the Dubois, Idaho ARS Safety Manual which is readily available to all employees and it is their responsibility to be aware of its contents.

The location research leaders are to immediately notify their chemical hygiene officer if there are any changes in procedures or chemicals used within their employees workplace. It is then the responsibility of the chemical hygiene officers and the location safety committee to make corrections to the CHP.

The name of the Chemical Hygiene Officer for each research unit can be found in the appropriate Appendix in this manual.

Standard operating procedures (SOPs) address the safety concerns of the research leader in charge of that work area. A compilation of workplace SOPs can be found in appropriate appendix of this manual. Work specific SOP may be found at the respective worksite.

The following information covers the general chemical hygiene policy for ARS Dubois, Idaho.

Training sessions on laboratory safety are held at designated intervals. Annual safety and occupational health training is also provided by the ARS Northern Cluster Environmental Protection Specialist.

All employees will be required to read and become familiar with safety guidelines and procedures established in this manual (each employee is required to sign a document stating that they have read and understand those requirements specified within the safety manual). This document is kept on file in the Main ARS Office.

Reading of MSDS

As there is no standard procedure for writing material data sheets the employee may find several different formats available. It is imperative that all employees familiarize themselves with the MSDSs used in their

laboratory. For additional training and information contact the Chemical Hygiene Officer, or consult with the NCEPS.

Labeling/Secondary Labels

All chemical shipments will be inspected by the person who submitted the requisition for the chemical purchase to determine that all containers in the shipment are properly labeled. Any container that is not properly labeled as required will be refused and returned to the supplier by the Administrative Officer.

All containers received in chemical shipments that are properly labeled will not have the label removed or defaced.

Existing containers of hazardous chemicals, excluding containers present for use in laboratory work areas or stored for use in laboratory operations, that are not properly labeled will have an in-house label prepared and affixed to the container by the Chemist.

Secondary labeling must contain:

- The name of the product
- The hazard of the product, such as, irritant, respiratory toxicant
- A source to contact for further information about the product
- Secondary labeling is required on all containers holding products which will not be completely used by the end of the work day

Location

Action must begin immediately following an accident. Therefore, it is important that everyone at the location be familiar with hazards that may accompany their work and with the emergency plan developed as a safeguard in case of an accident. Supervisors are responsible for notifying employees accordingly.

Additional personnel should be designated in each research unit to accompany medics and/or paramedic and patient (s) being transported to the first aid station/emergency room.

Laboratory

Each laboratory at this location will develop a contingency plan that will cover emergencies that may arise from use of hazardous materials. This information can be found in the appropriate Appendix in this manual.

Each laboratory supervisor is responsible for the safety of all individuals present in their laboratory; employees and visitors and building service personnel. When work is hazardous, employees must be well trained in carrying out the emergency plan, visitors must be assured that the laboratory is safe for them to enter and do their work. If the laboratory is not safe at the end of each day, signs must be posted prohibiting entry. If needed, protective equipment will be provided i.e. safety goggles etc.

Procedure

Because a detailed course of action cannot be developed that is applicable in all situations, the Safety Manual and the Chemical Hygiene Plan are general and provide a foundation for each laboratory to develop specific operating procedures (**SOP**). Specific SOP are found in individual laboratories and by Laboratory room number in the Appendix of this manual. Each individual is responsible for being familiar with the location of the SOP, MSDS, and hazards in any given lab.

If assistance or additional information is needed, the project leader/scientist or members of the safety Committee may be contacted.

If accidents occur that may contaminate an area with dangerous chemicals or infectious agents, it is important that the following be done:

1. Get everyone out of the affected area; do not reenter until the extent of the hazard is determined
2. Obtain immediate help.
3. Determine the necessity for treating persons exposed to the dangerous agents.
    a) Everyone must KEEP OUT of the affected area until there is no doubt concerning the safety to reenter. The employee must immediately notify the supervisor of the problem.
    b) If infectious agents are involved, at least one hour should be allowed for aerosols to be carried away and heavier particles to settle.
    c) Chemical spills may evaporate and be swept away rapidly, or remain for a long time. Probability of fire or explosion is high when flammable solvents are spilled and ignition sources are present.
4. In addition to the usual first aid/emergency measures:
        a) Post warning signs as needed.
        b) Limit the damage due to chemicals or to terminate exposure to pathogenic organisms.
        c) Decontaminate exposed personnel.
        d) Restrict contamination to the smallest area.
5. Supervisors are responsible for referring persons exposed to a pathogen (s) to a medical facility, or to another appropriate medical authority. The immediate supervisor of the person being treated is responsible for submitting appropriate forms and for ensuring that all information regarding the specific agent or isolate involved in the exposure is made available to the physician when the patient is admitted to the medical facility.
6. Decontaminate the affected area. This may be carried out by the laboratory staff, or it may require special equipment and personnel. The laboratory supervisor is responsible for requesting needed assistance. The supervisor must request assistance if there is any doubt regarding the extent of the hazard or if there is any reason to believe that those persons doing the decontamination and clean-up will be placed in a hazardous situation.

Standard Operating Procedures:

The Standard Operating Procedures (SOP) for each work area are found in the appropriate Appendix of this manual. A compilation of all SOP for this location can be found in the Main ARS Office.

Requirements for use of Caustics, Corrosives, Flammables

Transportation

All caustic, corrosive (strong acids and bases), or flammable chemicals are to be stored and transported in suitable, approved carrying devices. When transporting caustic or corrosive chemicals by cart, all material must be placed in approved carrying devices; furthermore, all carts used to transport these materials must have sides high enough to retain the containers and wheels large enough to prevent the carts from being caught in cracks and crevices.

Storage

The following items will be stored in approved solvent storage cabinets:

1. All containers of flammable solvents larger than half gallon
2. All flammable solvent supplies, when cumulative amounts greater than two gallons are kept in one laboratory room.
3. Working surfaces of hoods are not to be used as storage areas.
4. Long term storage (2 weeks or longer) is not allowed in the laboratory. If it is necessary to store large amounts of solvents which are not frequently used, it must be done in the chemical storage room.
5. All chemicals (reagents, solvents, acids, bases, pesticides, etc.) are to show a receipt date.
6. A chemical-spill clean-up kit is available in the chemical storage room and is to be used where there is spillage of combustible chemicals, volatile liquids, mercury globules, acids, and bases.
7. Requirements for use of Carcinogens, Mutagens and Teratogens
   a) Policy

      Users of carcinogens/mutagens/teratogens, are referred to the ARS Safety Manual 230.0. This document states policy, authority, and responsibilities for use of potentially carcinogenic chemical agents which are too numerous to list.
8. Each laboratory identifies and compiles a list of all highly toxic and hazardous compounds in their possession. These compounds are appropriately labeled and in suitable containers. A running inventory of compounds and quantities is kept at all times.
9. Removal and transport of any compound within the research facilities is done by placing glass vials or bottles in unbreakable containers. Under no circumstances are individuals to transport highly hazardous chemicals in glass containers only. Distribution of chemicals from one laboratory to personnel of another laboratory is to be made only to qualified, responsible personnel and these distributors must be noted on the inventory.
10. Knowledge of safety precautions, medical treatment and/or literature will be available and distributed to all personnel who are or who will be using the toxic or hazardous chemicals in a research laboratory. This will assure that correct and immediate medial treatment of individuals in emergency situations is possible. This also dictates that individuals working with toxic compounds inform their immediate supervisor or some other predesignated individual prior to the obtainment and/or use of toxic substances in the laboratory. This guideline becomes a mandate with those toxic compounds not covered in the current research protocols. Investigators must review the appropriate SOP and MSDS prior to using all chemicals.
11. Before work is begun on toxic, potentially toxic, or hazardous materials, clean-up and disposal procedures will be defined in case of spills or contamination. This will include designated trained personnel, protective clothing, and disposal systems for contaminated materials.
12. In the event a spill should occur, immediate notification of proper personnel is required by the supervisor in the area. Clean up is to be initiated by authorized persons. Analytical monitoring of spills should be implemented to assure that clean up procedures have reduced contaminants to safe levels.

Use and care of fume hoods and other laboratory equipment:

1. Fume hoods will be inspected annually by the ARS Northern Cluster Environmental Protection Specialist.
2. Research staff is required to maintain other laboratory equipment functioning properly and safely as determined in the SOP or manufactures operation manual.

Medical Surveillance:

1. By law individuals working around or with certain chemicals must be placed in a medical surveillance program. This program consists of a physical exam performed by a qualified physician (The qualification may vary with the type of chemical to which an individual is exposed; i.e. a "B" reader is required to interpret chest X-rays of Asbestos workers.)
   a) A volunteer program has been provided by this location for all qualified ARS employees.
   b) Qualification of an employee is determined by an evaluation of his or her work area by their supervisor, the location coordinator and the Northern Cluster Environmental Protection Specialist.
2. A guide to medical surveillance is available from the ARS Northern Cluster Environmental Protection Specialist.
3. Arrangements for a physical exam can be made through the location Administrative Office.

Workplace Monitoring

1. Industrial Hygiene/Environmental Health monitoring is provided by the ARS Northern Cluster Environmental Protection Specialist.
   a) Monitoring is done:
      i. When requested by the location. Any employee may request an evaluation of their workplace. The type of monitoring and procedure to use will be determined in conference with the ARS Northern Cluster Environmental Protection Specialist.
      ii. As requested by the Environmental Protection Specialist.
      iii. When requested by the Area Office or Headquarters.
2. Records of all safety inspections and workplace monitoring activities can be found in this facilities Safety Manual located in the Main ARS Office.
   b) Identification of chemical hazards
      iv. Labeling
         1) Primary Labeling: All chemicals entering this facility are examined for proper labeling. The label must contain the following information:
            The Name of the Product
            The Name of the Manufacture
            The Known Hazards of the Product
            An Emergency Phone Number, usually of the manufacture where further information can be obtained about the chemical (This phone must be answered 24 hours a day.).

2) Secondary Labeling: All chemicals that are removed from their original package and placed in another container must have the same labeling information as required on the primary labels.

3) All non-labeled chemicals shall be chemically classified and appropriately destroyed/discarded.

Appendix D – Draft ARS Sheep Station Heritage Management Plan

This document serves as a preliminary Heritage Management Plan developed by the USDA Forest Service TEAMS Enterprise Unit, for operations at the Agricultural Research Service, U.S. Sheep Experimental Station (ARS USSES), Dubois, ID. This preliminary management plan provides direction regarding Section 106 services; recording and managing U.S. Sheep Experimental Station historic properties; and implementing a survey strategy for the Agricultural Research Service, U.S. Sheep Experimental Station, Dubois, Idaho properties.

Section 106 Compliance

The Section 106 process will be completed for all known undertakings with the potential to affect cultural resources. All undertakings will follow appropriate State Historic Office Preservation standards and guidelines and will be in accordance with the State Historic Preservation Offices of Idaho and Montana procedures and forms.

Principal Investigators will meet the Secretary of Interiors Professional Qualification Guidelines.

Archeology

The minimum professional qualifications in archeology are a graduate degree in archeology, anthropology, or closely related field plus:

- At least one year of full-time professional experience or equivalent specialized training in archeological research, administration or management;
- At least four months of supervised field and analytic experience in general North American archeology, and
- Demonstrated ability to carry research to completion.

Architectural History

The minimum professional qualifications in architectural history are a graduate degree in architectural history, art history, historic preservation, or closely related field, with coursework in American architectural history; or a bachelor's degree in architectural history, art history, historic preservation or closely related field plus one of the following:

- At least two years of full-time experience in research, writing, or teaching in American architectural history or restoration architecture with an academic institution, historical organization or agency, museum, or other professional institution; or
- Substantial contribution through research and publication to the body of scholarly knowledge in the field of American architectural history.

Architecture

The minimum professional qualifications in architecture are a professional degree in architecture plus at least two years of full-time experience in architecture; or a State license to practice architecture.

Historic Architecture

The minimum professional qualifications in historic architecture are a professional degree in architecture or a State license to practice architecture, plus one of the following:

- At least one year of graduate study in architectural preservation, American architectural history, preservation planning, or closely related field; or
- At least one year of full-time professional experience on historic preservation projects.

Such graduate study or experience shall include detailed investigations of historic structures, preparation of historic structures research reports, and preparation of plans and specifications for preservation projects.

Field Methods

Field methodology will be determined and documented prior to surveys. These methods can be modified in the field to ensure a comprehensive and successful survey and report.

Survey strategy

Surveys will be conducted at intervals of 30 meters or less. Intensive survey will be 10-15 meter transect intervals, and will be used based on site probability and/or field conditions.

Personnel

All fieldwork must be conducted by or supervised in the field by a person meeting Secretary of Interior's qualifications (48 FR 44738-44739). Resumes of supervising personnel should be submitted with the report or already be on file at the SHPO office.

Areas examined and type of coverage

Describe the transect intervals used and mark transect routes on an attached map that relates their location to the topography of the area. If more than one transect interval is used, indicate these changes and where they occur. If an interval wider than 30 meters is used, a rationale must be included. Survey methods should be explained so that others using the field data can understand how it was obtained, and any limitations or biases. All survey information must be dated.

Ground surface conditions

Any environmental conditions that may have affected survey results should be described. Note any vegetation or snow obscuring visibility. Provide the specific percentage of visible surface. Photographs may be helpful.

Areas not examined

Any areas that are not examined need to be described, including the rationale for not surveying. Generally, all project areas undergoing 106 Review are expected to be surveyed unless access is denied.

Problems encountered in the field

Describe any problems that may have hindered the investigation. If access to an area was impaired or denied, describe any otherwise visible or known properties and provide your perceptions of their presence and condition.

Modifications to requirements

The agency official, in consultation with the State Historic Preservation Officer and Indian tribes as appropriate, may modify or waive field survey requirements when any one of the following conditions is present:

- Past natural or human-caused ground disturbance has modified the surface so extensively that the likelihood of finding evidence of cultural resources is negligible.
- Existing inventory data and landscape-sensitivity-predictive models are sufficient to indicate that the specific environmental situation did not support human occupation or use to a degree that would make further field survey information useful or meaningful.
- The type of undertaking or the environmental setting is exempted from field survey under the terms of a programmatic agreement. Protocols in programmatic agreements may require some type of documentation for projects where field survey has been waived for any specified reason.

Assessment of effects

The U.S. Sheep Experimental Station has offered their proposed undertakings for the next five years. The table below assesses these effects.

Summary

All activities determined to be undertakings will be subject to intensive inventory. It is recommended that prescribed burns be monitored for potential effects as part of the Sampling Survey Procedures. These burns will likely be of short duration with little potential to affect prehistoric sites. Standing structures or artifacts with a low burn threshold may still be affected. Pre burn survey and consultation, partnered with post burn monitoring will help determine best mitigation methods to protect historic structures or artifacts.

Table D- 1. Potential effects of the proposed activities over the next five years

Proposed/Potential Activity (description)	Undertaking with the potential to effect and comments
Replacement of pasture fence with new fence and metal braces	No Effect. Continued maintenance; no new trailing by stock is expected.
Remove Range Enclosures	Potential for Effect (more information required)
Continue repairs on existing enclosures (new posts, wire)	No Effect (continued maintenance)
Replace 2 existing wooden water developments with metal developments.	Potential for Effect. Recommend survey of developed areas historic properties and assessment of wooden structures for historic significance.
Continue annual spring (water) cleanings for water sources.	Potential for Effect. Recommend survey of developed areas for historic properties.
Low impact and dispersed grazing	Potential for Effect. Conduct inventories per Sampling Survey Procedures for ARS USSES
Replace 2 miles of existing border fence with new fence, metal braces, etc.	No Effect (continued maintenance)
Continue to lightly grade the existing roads (NO NEW ROADS)	No Effect

Proposed/Potential Activity (description)	Undertaking with the potential to effect and comments
Continue cleaning the existing ditches with the ditching tool.	No Effect
Install new concrete diversion head gate on the USFS ground (once approved by USFS) This will allow better measurement of the water usage and less erosion problems with the ditch.	Potential for Effect
Replace 3 miles of existing fence with new fence (same location)	No Effect (continued maintenance)
Surplus the existing house and have it removed. Clean-up the cinder brick foundation, etc	Potential for Effect. Recommend site recording, evaluation for NRHP, and assessment of project effects. Recommend assessment of all structures on land to determine age, significance, and incorporate into management plan. See Historic Structures
Install 2 new Weir Boxes into Modoc Creek (better measurement of water)	No Effect
Continue clean-up of old nonfunctional fence lines, equipment	Potential for Effect (more information needed)
Annual road maintenance (pulling up the shoulders and smoothing out potholes). All replacement gravel is hauled in from the State of Idaho gravel pits	No Effect if maintained within the existing road prism
Remove, clean, repair and reinstall 6 existing cattle guards	No Effect
Clean-up nonfunctional research pens.	Potential for Effect (more information needed)
Yearly maintenance to structures including repair to waterlines, broken windows and annual chimney safety inspections.	Potential for Effect. Recommend assessment of all structures on land to determine age, significance, and incorporate into management plan. See Historic Structures
Several different storage buildings that have been proposed for exterior painting.	Potential for Effect. Recommend assessment of all structures on land to determine age, significance, and incorporate into management plan. See Historic Structures
Replace 2 existing drain pipes in the feedlot. These divert runoff from sheep pens to spring.	No Effect (continued maintenance)
Install new siding on horse and ram barns	Potential for Effect. Recommend assessment of all structures on land to determine age, significance, and incorporate into management plan. See Historic Structures
Build four new triangle enclosures measuring 55x55m for research purposes.	Potential for Effect. Recommend survey of area prior to construction.
Remove Shed	Potential for Effect. Recommend assessment of all structures on land to determine age and significance to incorporate into management plan. See Historic Structures
Prescribed burning, approximately 900 acres/year	Potential for Effect (see Section 106 compliance). Post burning monitoring is proposed to asses for effects
Continued cattle and horse grazing	Potential for Effect. See Sampling Survey Procedures for ARS USSES
Introduction of limited bison for grazing	Potential for Effect. See Sampling Survey Procedures for ARS USSES

Proposed/Potential Activity (description)	Undertaking with the potential to effect and comments
Seeding	No Effect if activities are not ground disturbing (no plowing or scarification)
Predator Avoidance and Abatement	No Effect
Integrated Pest Management	Potential for Effect. See Item C. No Effect if non-mechanized treatments are implemented.

Historic Structures

Historic Buildings Survey

Two ranch complexes and a research center are associated with Agricultural Research Service lands in Idaho. Both these complexes require an historic buildings survey following the Secretary of the Interior's Standards for Architectural and Engineering Documentation.

Standard I. Documentation shall adequately explicate and illustrate what is significant or valuable about the historic building, site, structure or object being documented.

The historic significance of the building, site, structure or object identified in the evaluation process should be conveyed by the drawings, photographs and other materials that comprise documentation. The historical, architectural, engineering or cultural values of the property together with the purpose of the documentation activity determine the level and methods of documentation. Documentation prepared for submission to the Library of Congress must meet the Historic American Buildings Survey / Historic American Engineering Record (HABS/HAER) Guidelines.

Standard II. Documentation shall be prepared accurately from reliable sources with limitations clearly stated to permit independent verification of the information.

The purpose of documentation is to preserve an accurate record of historic properties that can be used in research and other preservation activities. To serve these purposes, the documentation must include information that verifies its reliability.

Standard III. Documentation shall be prepared on materials that are readily reproducible, durable and in standard sizes.

The size and quality of documentation materials are important factors in the preservation of information for future use. Selection of materials should be based on the expected duration storage, anticipated frequency of use and a reasonable size for storage.

Standard IV. Documentation shall be clearly and concisely produced.

In order for documentation to be useful for future research, written materials must be legible and understandable, and graphic materials must include scale and location references.

Idaho SHPO additional direction

Structure surveys will be documented on Idaho SHPO historical structure assessment forms following the SHPO guidelines.

In addition to following the specifications for recording sites on Intermountain Antiquities Computer System (IMACS) forms, historic buildings will be recorded onto a Building Description Form.

Photographs of structures will include opposite corner photos, and any other photos needed to adequately record all relevant details of a structure, and evaluate its significance.

Each structure will need a floor plan; drawn to scale with appropriate distances noted. The floor plan should at minimum show all walls, windows, and doors.

In consultation with the Idaho State Historic Preservation Officer, evaluate structures for eligibility to the National Register of Historic Places.

Structure Management Plan

Determine the future use of U.S. Sheep Experimental Station structures including activities associated with yearly maintenance, safety inspections, modifications, or demolition.

In cooperation with the Idaho State Historic Preservation Officer, develop a plan for any modification or change to exteriors to ensure they meet State of Idaho Health and Safety Standards and U.S. Sheep Experimental Station needs. Idaho SHPO recommends using in-kind or historically accurate materials following Secretary of Interior and Idaho SHPO standards and guidelines. This may include siding, paint, windows, shingles, additions, or other changes.

Summary

The historic structures at the U.S. Sheep Experimental Station (USSES) have not been assessed for historical integrity. The staff at the USSES would like to continue using the structures under standard operating procedure and maintain them as necessary. A historical buildings assessment and structure management plan will lay the groundwork for continued use and habitation of these structures; establish and preserve the historical integrity of the structures and compound; and provide the framework for consulting with the Idaho State Historic Preservation Officer regarding changes or undertakings. Interior modifications may be necessary to meet the USSES mission and research needs. Preservation of historic fabric should be considered with any interior modifications.

Sampling Survey Procedures for USSES property

Sampling survey procedures will comply with State Historic Office Preservation standards and guidelines.

A statistically based sampling survey procedure for less than 100 percent of an area of potential effect will be developed for a project to:

- Aid in characterizing the probable density, diversity, and distribution of cultural resources;
- Develop and test predictive models; and
- Answer appropriate research questions.

Impacts from grazing are expected to be low, due to the small numbers of sheep and horses used on USSES lands, allotment rotation, and periods of use. Impacts are more likely to be associated with areas subject to repeated use (enclosures, water improvements, sheep camps, stock driveways).

A predictive model has been developed to determine areas of high probability using the following parameters:

- **Distance to water** - 1/2 kilometer of perennial waters is weighted 1 versus other areas 0.

- **Slopes** - areas under 10 percent will have greatest weight of 4 and decreasing weight values with categories of 3 is 10-20, 2 is 20-30, and 1 is greater than 30 percent.

- **Aspect** - areas with southern exposure, 112.5-247.5 degrees, will be weighted 1 versus areas with other aspects have a value of 0.

There are six levels of probability, values 1-6, in the outcome of the model for the five grazing areas. A value of 1 is the lowest probability and a value of 6 is the highest probability. The highest probability areas, value of 6, would be those within ½ kilometer of perennial water, have slope of less than 10 percent, and a southern aspect.

Overlaying the results of the predictive model with the designated pastures generates maps of varying probabilities within each pasture, which in turn provides the basis on which to develop effective sampling procedures (see maps 1-6).

Table D- 2 displays site probability by pasture.

Table D- 2. Site probability in acres and percent by pasture

Pasture	Acres	*Lowest*	Site Probability				*Highest*
		1	2	3	4	5	6
		acres (percent)					
Headquarters	27373	11 (<1%)	73 (<1%)	237 (1%)	7686 (28%)	14195 (52%)	5171 (19%)
Humphrey	2420	<1 (<1%)	34 (1%)	155 (6%)	522 (22%)	1209 (50%)	500 (21%)
Henninger	1364	0 (0%)	3 (<1%)	36 (3%)	148 (11%)	672 (49%)	505 (37%)
Summer W.	11875	168 (1%)	3006 (25%)	3461 (29%)	2927 (25%)	1886 (16%)	427 (4%)
Summer E.	3981	205 (5%)	1462 (37%)	1199 (30%)	782 (20%)	285 (7%)	48 (1%)

Breakdown of site probability across USSES lands

USSES Administered Pastures

While Henninger has the highest percentage of area with a probability of 6 (37%); Headquarters has the most area with a probability of 6 (5,171 acres). The two summer grazing units have the least area with a probability of 6 (427 and 48 acres).

Exclosures

There are exclosures in the Headquarters and the two summer grazing pastures.

Because the headquarters exclosure is large, it includes areas of differing site probability. The headquarter exclosure consists of 21.9 percent probability level 6, 65.9 probability level 5, and 12.2 probability level 4.

The summer grazing exclosures are small, each consisting of only one probability level; with one in 6, two in 5, three in 4, and two in 3.

Trails

Drive trails are found on the two summer grazing pastures.

The trails in the East Summer Grazing Pasture cover 0.53 miles. Only 0.02 miles are covered by probability level 4. The rest of the trails are in probability levels 2 and 3.

The trails in the West Summer Grazing Pasture cover 2.55 miles. Approximately 0.61 miles cross probability levels 5 and 6. Approximately 0.71 miles cross probability level 4. The final 1.23 miles cross the three lowest probability levels 1-3.

Missing data

There is no GIS data available for watering locations, other stock congregating areas, and sheep herder camps. So they cannot be compared to the predictive model.

Implementation of heritage surveys

A percentage of the high probability areas identified by overlaying the predictive model on the grazing areas Table D- 2 will be subjected to stratified sampling procedures In general, three percent of high probability areas (acres) in the allotments will be sampled over the next three years. All other features identified above will be intensively surveyed.

Surveys are scheduled to begin in the spring of 2010.

Results will be reported in standard Section 106 format following Montana and Idaho State Historic Preservation Officers guidelines and procedures.

After three years, review the stratified sampling results with the Idaho and Montana SHPOs. If no or minimal effects are found within the allotments, discontinue the stratified sampling procedures and continue with basic Section 106 surveys for proposed undertakings.

Summary

In most cases, allotment boundaries will be the Area of Potential Effect. Because these areas are usually extremely large, the focus of analysis will be limited to livestock congregation areas and their intersection with areas known or likely to contain cultural resources. Congregation areas should be defined based upon the number of livestock in the allotment, the duration, and the likelihood of soil and other resource damage.

Grazing has been occurring on the USSES for 86 years and across 33,300 acres. On average 3,300 AUMs (animal unit months (sheep)) are used of the 48,667 AUMS available. A survey strategy based on high probability locations will quickly and efficiently facilitate the collection of data associated with cultural resources, determine past, present, and future potential effects, contribute to the knowledge of sites in the area, comply with Section 106, and identify areas for future survey.

Timing

Priority 1

The first undertaking at the research station should be the immediate inventory of structures to determine eligibility and develop a structural management plan in order to:

- Continue yearly maintenance of structures;
- Paint storage buildings;

- Install new siding on horse and ram barns;
- Remove a shed;
- Surplus the existing house and have it removed and clean up its foundation;
- Replace two existing wooden water developments with metal developments; and
- Continue annual spring water cleaning of water sources.

Priority 2

Following the structural inventory should be surveys to cover any improvements to the facilities. These surveys should be done each year in order to:

- Remove range enclosures;
- Install a new concrete diversion head gate;
- Continue clean-up of nonfunctional fence lines and equipment;
- Build four new triangle enclosures for research purposes;
- Continue integrated pest management if it is mechanized treatment; and
- Implement any other improvements that area proposed.

Priority 3

Third, conduct a general survey of 3 percent of high probability areas. This should be done each year in order to:

- Ensure minimal impact and dispersed sheep grazing;
- Continue cattle and horse grazing;
- Introduce limited bison grazing; and
- Implement prescribed burning. (Post fire monitoring should occur after the burning).

The USSES will provide a list and location of all proposed undertakings by March of each year, to be reviewed by a professional archaeologist for Section 106 compliance procedures. Then follow the timing recommended for the three priorities listed above.

Results of the heritage surveys will be provided to the appropriate State Historic Preservation Offices by March of the following year.

Funding

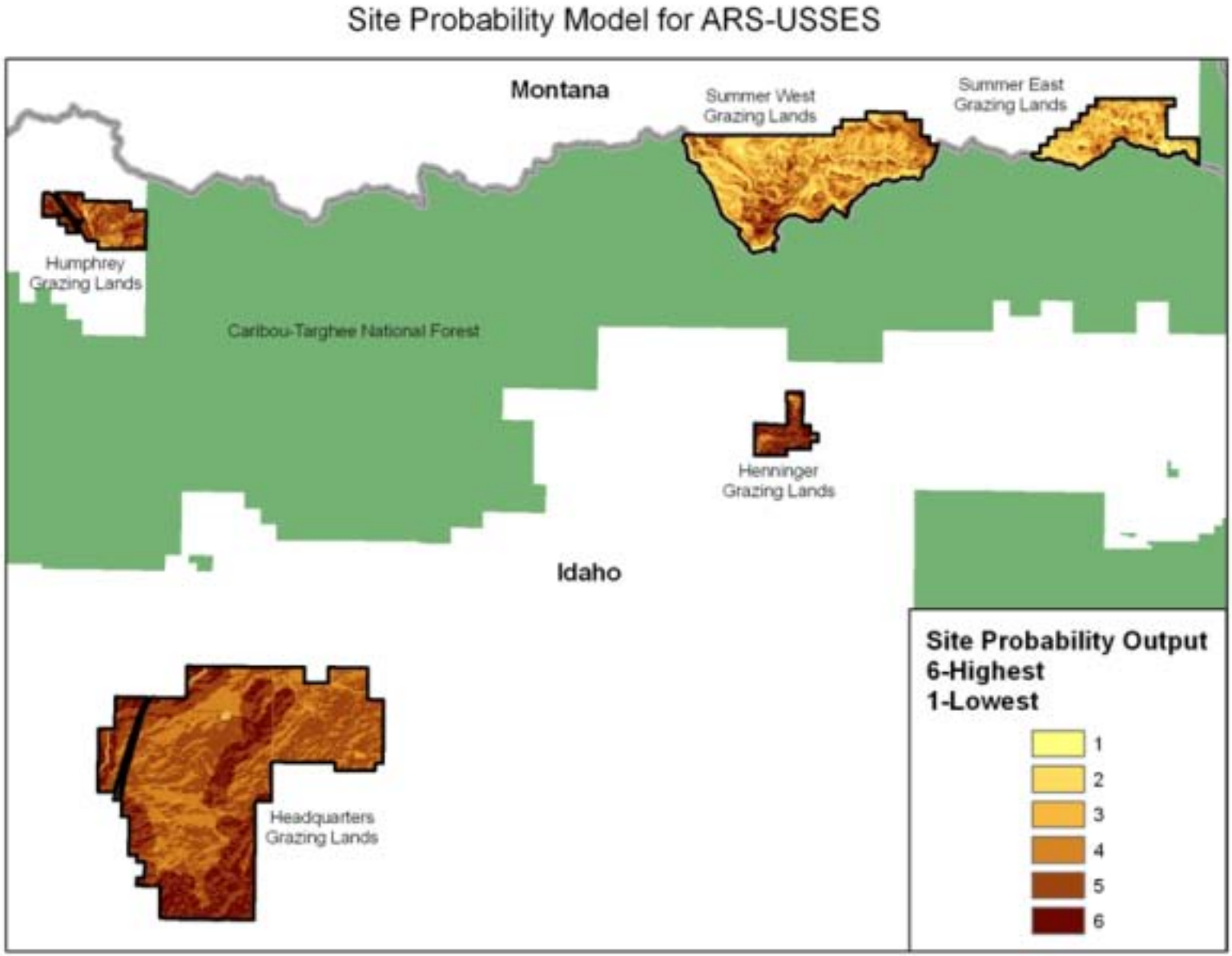
The USSES will ensure adequate funding exists to support the plan as described. The USSES will also identify at this time the proposed agency or consulting firm needed for the surveys and reports, or may elect to conduct the surveys in-house by hiring USSES professional staff.

Curation

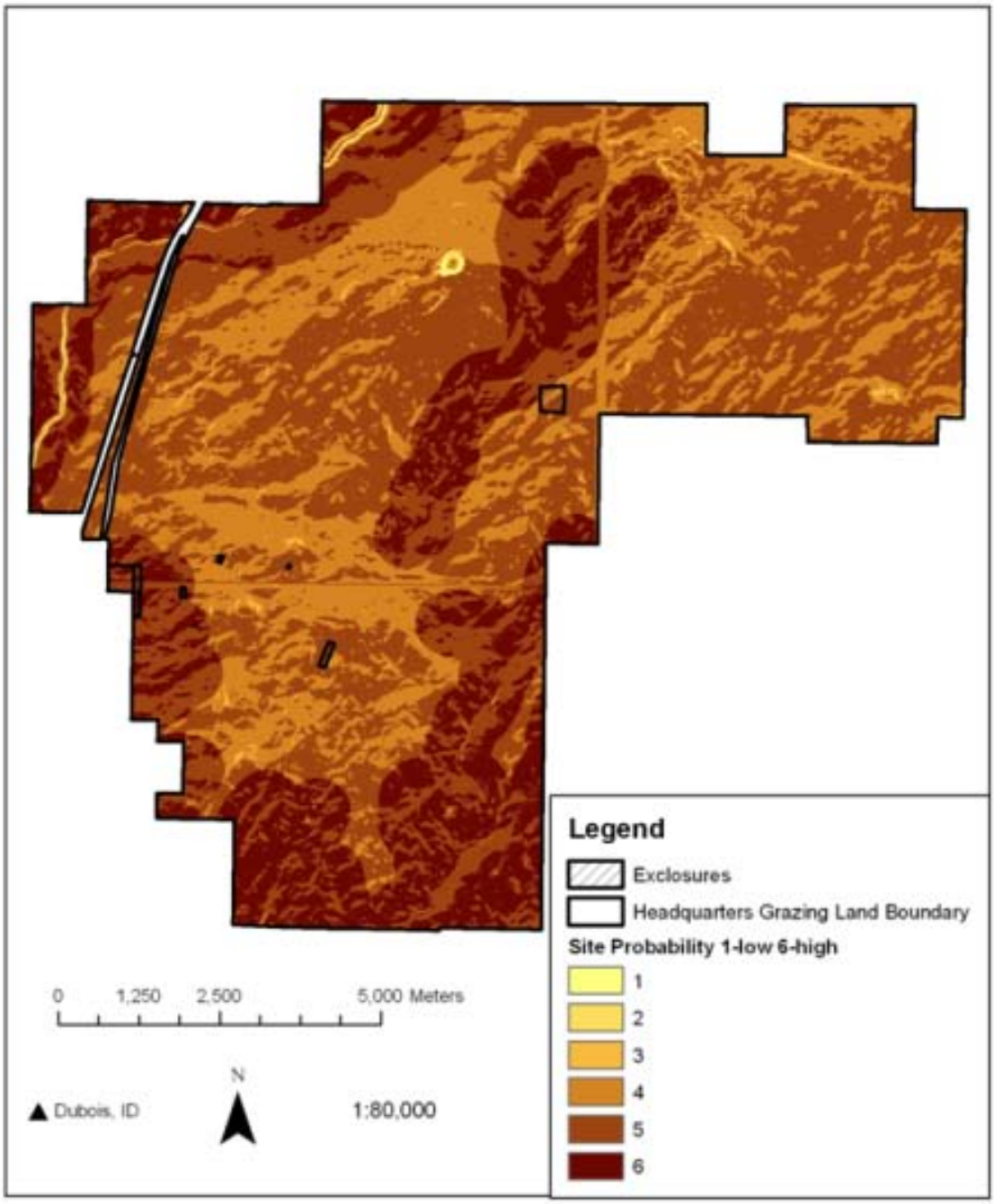
The USSES lacks adequate curation facilities. No artifacts will be collected unless directed by the appropriate SHPO, which will be responsible for any collected or curated objects. An agreement must be developed between ARS and the SHPOs regarding curation.

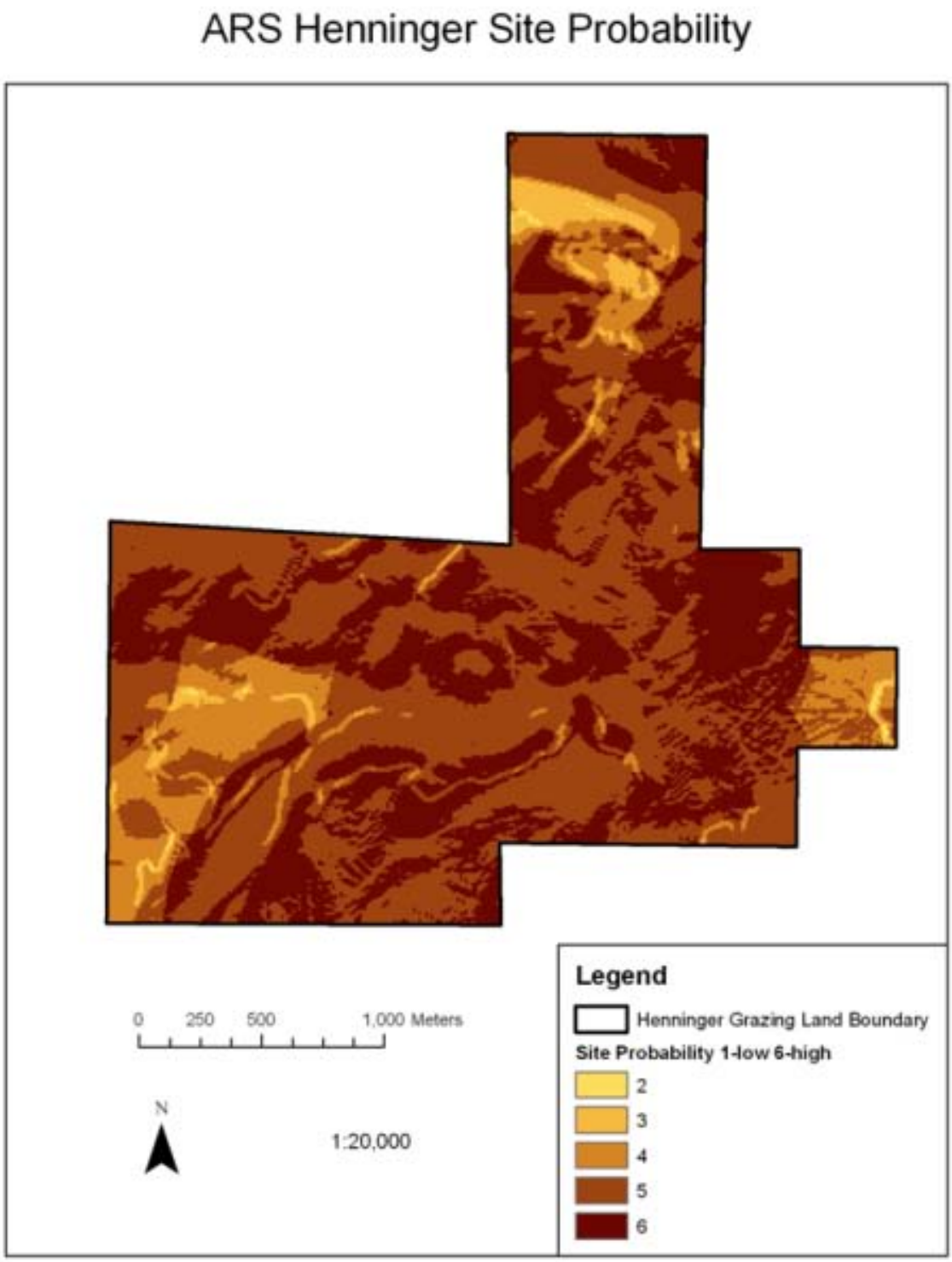
Tribal Consultation

Establishing and maintaining tribal consultations is the responsibility of the USSES.


Site Probability Model for ARS-USSES
Montana
Summer West Grazing Lands
Summer East Grazing Lands
Humphrey Grazing Lands
Caribou-Targhee National Forest
Henninger Grazing Lands
Idaho
Headquarters Grazing Lands
Site Probability Output
6-Highest
1-Lowest
1
2
3
4
5
6

ARS Headquarters Site Probability




ARS Henninger Site Probability
0 250 500 1,000 Meters
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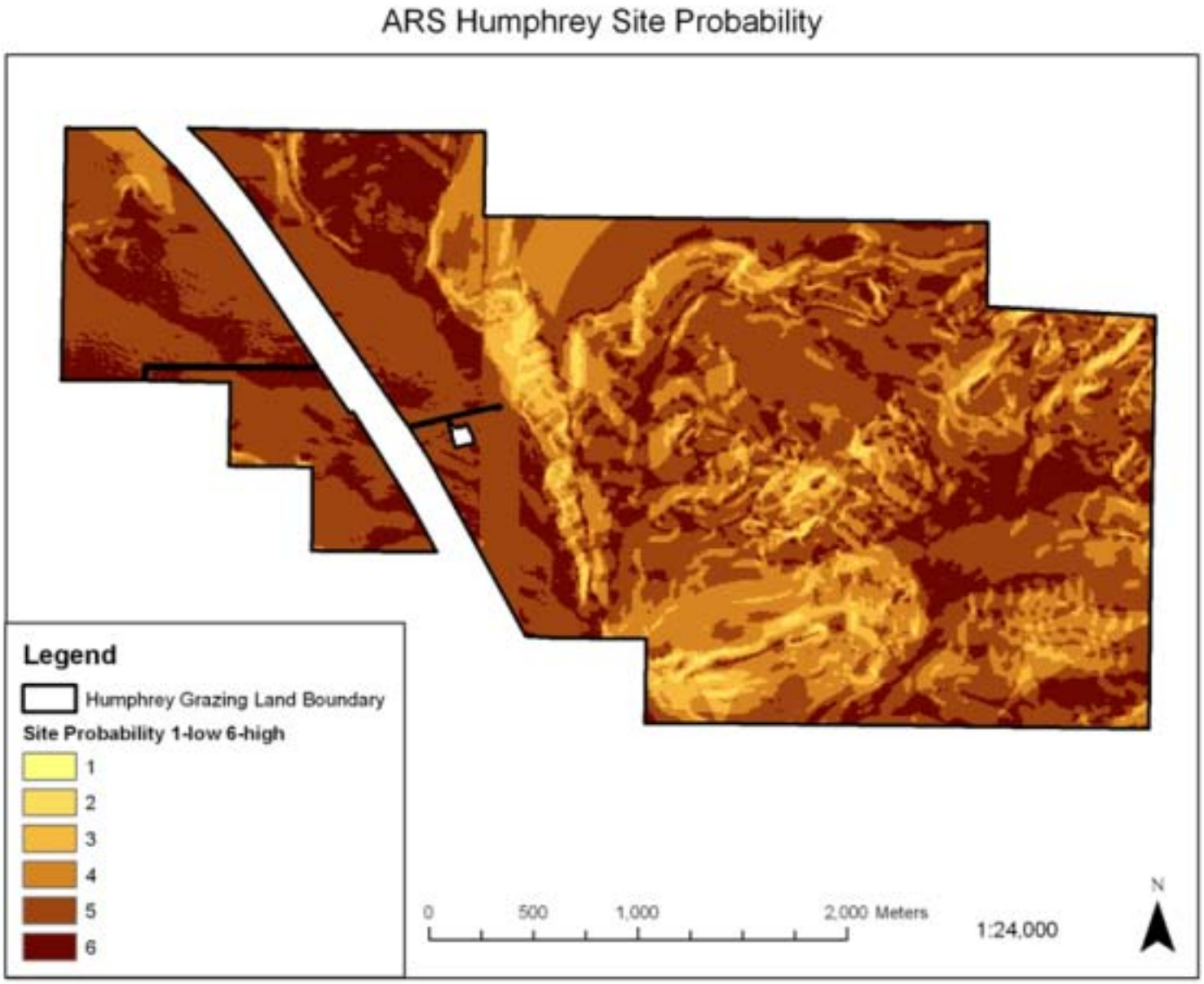
1:20,000
Legend
Henninger Grazing Land Boundary
Site Probability 1-low 6-high
2
3
4
5
6


ARS Humphrey Site Probability
Legend
Humphrey Grazing Land Boundary
Site Probability 1-low 6-high
1
2
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4
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6
0
500
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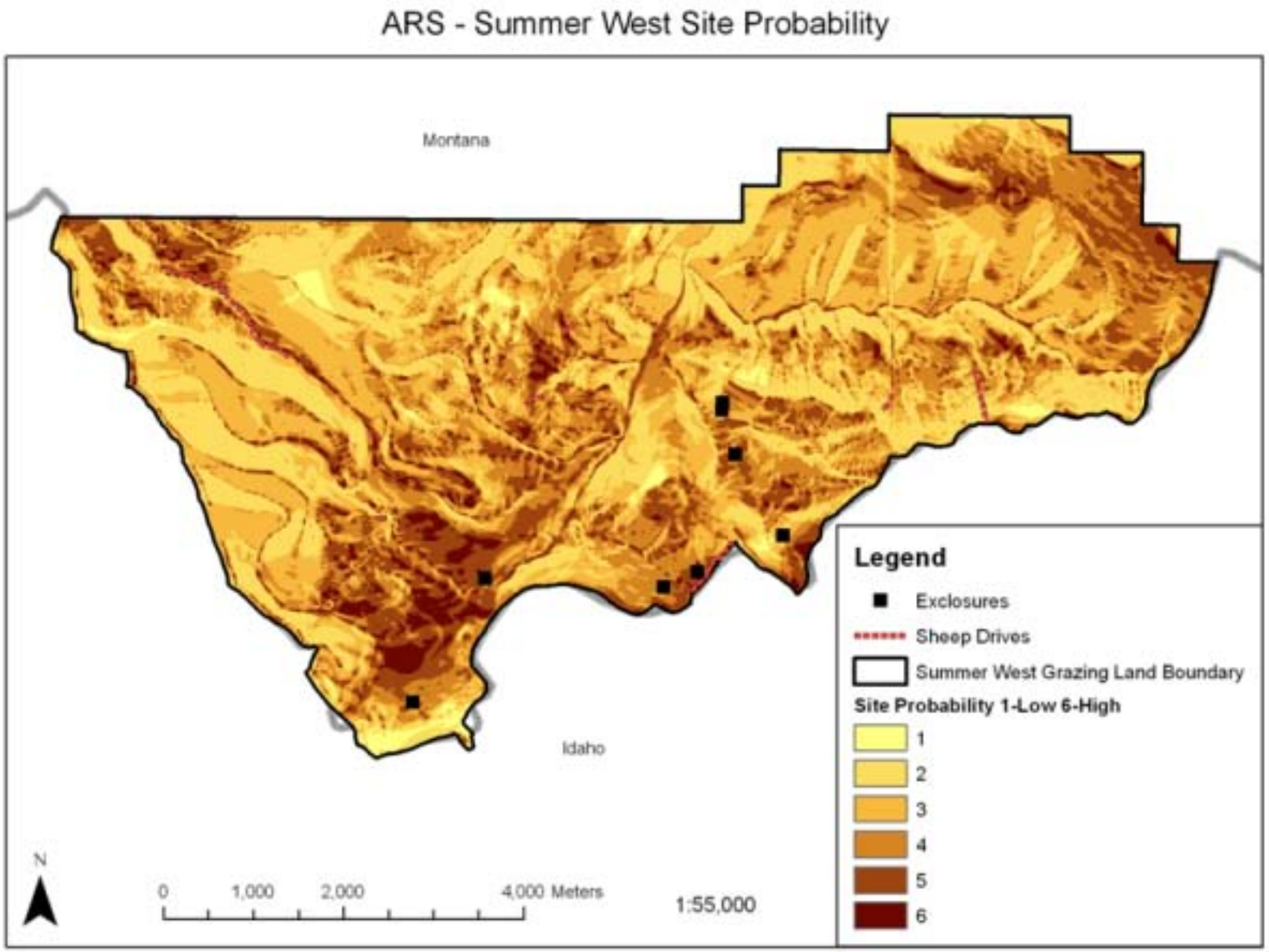
N


ARS - Summer West Site Probability
Montana
Idaho
Legend
Exclosures
Sheep Drives
Summer West Grazing Land Boundary
Site Probability 1-Low 6-High
1
2
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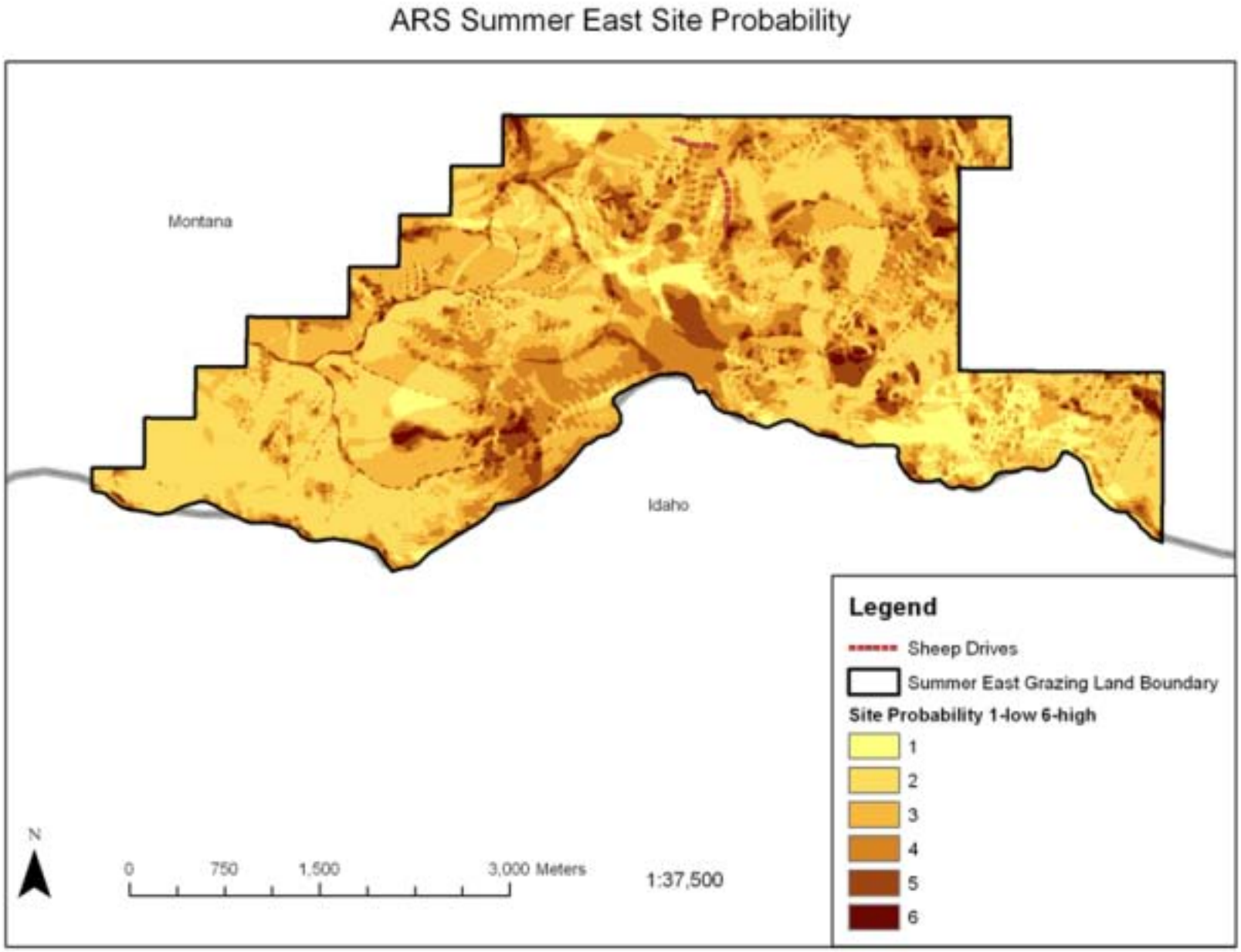
4,000 Meters
1:55,000


ARS Summer East Site Probability
Montana
Idaho
Legend
Sheep Drives
Summer East Grazing Land Boundary
Site Probability 1-low 6-high
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750
1,500
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Appendix E – Collaborative Research at the ARS USSES

The United States Sheep Experiment Station (Sheep Experiment Station) of the Agricultural Research Service, USDA is a critical western hub generating research-based solutions for (1) population limiting infectious diseases in wildlife and domestic animals, (2) state of the art genomics research providing markers for improved food/fiber production and resistance to disease, (3) critical rangeland use and sustainability research and (4) research partnerships.

1) The Sheep Experiment Station continues to play a central role in infectious disease research concerning the prion disease scrapie, malignant catarrhal fever virus and *Anaplasma ovis* (see References Cited at the end of this apendix). Malignant catarrhal fever virus and Anaplasma species infections are found in wildlife and domestic animals. Currently the Sheep Experiment Station is collaborating on research involving transmission of the respiratory pathogens, ovine progressive pneumonia virus (OPPV) and *Mannheimia haemolytica (Mh)*. Ovine progressive pneumonia virus is a lentivirus in the same genus as human immunodeficiency virus (HIV) and shares many of the same pathological properties with HIV. Current collaborative research efforts have yielded new information that OPPV is predominantly transmitted horizontally (86-90 percent) and not maternally (Broughton-Neiswanger et al. 2010). Other recent collaborative research includes a quantitative bacterial survey in nasal swabbings of domestic sheep at the Sheep Station. Most importantly, in terms of current needs for scientifically based policy development, the risk of pathogen transmission between wildlife and between wildlife and domestic animals can only truly be assessed under the conditions of concern. The Sheep Experiment Station represents the only location capable of conducting such studies.

2) The Sheep Experiment Station is central to collaborative genomics research aimed at understanding the role of sheep genetics in everything from disease susceptibility to efficient production. This collaborative research was the first to show breed differences in proviral concentration of OPPV-infected animals, implying a genetic component in control of viral replication. The Sheep Experiment Station collaboration demonstrated some of the first specific gene associations with OPPV. Recent collaborative research with the Sheep Experiment Station has yielded the first validated genetic marker set for reducing OPPV infection in domestic sheep. This marker set significantly associates with a three-fold reduction in OPPV infection in every animal group tested. This should enable genetic selection of animals with reduced susceptibility to OPPV, and has great potential to reveal new research avenues for human medicine. A key to this research is the ability to work in large, statistically well-defined populations under natural conditions.

Further, current sire breeds with the best lamb production records also confer undesirable wool characteristics including dark wool fibers. These darker fibers are more difficult to process into high quality clothing and other products, but ongoing research at the Sheep Experiment Station aims to continue past success in developing widely used sheep breeds to solve producer problems. Specifically, a new sire breed is under development to combine high lamb productivity with excellent white wool fibers for highly efficient range production systems.

3) The future of wildlife populations and food/fiber production systems are dependent on rangelands. There are numerous rangeland issues which require Sheep Experiment Station research and solution, including vegetation composition as impacted by fire, grazing, weather, and other environmental factors. Other important issues include wildlife interaction with rangelands and with domestic livestock. The Sheep Experiment Station is uniquely equipped and placed to lead this research.

4) Based in part on a meeting with Ralph H. Crawford at the USDA Forest Service Headquarters in Washington D. C., ARS is exploring ways to enter into collaborative research with the Forest Service. This collaboration with the Forest Service would examine the risk of contact between domestic and bighorn sheep. The Sheep Experiment Station is a critical component of this research effort. Grazing lands for the Sheep Experiment Station flock through the Bureau of Land Management and USDA Forest Service include bighorn habitat, and this is a unique feature of the Sheep Experiment Station location. In addition, the availability of over 3000 mature ewes and their lambs allows for statistically valid research. No other research unit in the U.S.A. provides this unique environment and the numbers of animals to conduct risk assessments in the context of the domestic and bighorn sheep interface (Knowles, personal communication 2011).

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