

# Substitute Segments in NRI Non-Federal Grazing Land Surveys

# Overview

- Sample design with substitute segments
- When are substitute segments used?
- How are substitute segments used?

# Sample Design with Substitute Segments

# NRI Grazing Land Non-Federal Sample Designs

- Beginning in 2016, stratified sample designs have been developed and applied to NRI Grazing Land non-Federal Pasture and Range surveys
- Stratified sample design features:
  - Better geographic coverage
  - 5-year samples
  - Substitute segments to improve response rates

## Strata and Substrata

- Strata are created using a GIS algorithm to divide the landscape into geographic areas
- Each stratum is sub-divided geographically into 5 substrata
- Two sample segments per stratum are selected each year
- Over a 5-year period they will provide full representation of the substrata within each stratum and in total provide full representation of the non-Federal range or pasture landscape

# Sample and Substitute Segments

- Substitute segments are used when:
  - No field data can be collected for any point in a sample segment
  - No field data can be collected for any point in the substitute segment of lower order
- The number of segments for which field data are collected is equal to or less than the number of sample segments
- The number of points for which field data are collected is equal to or less than twice the number of sample segments

## Sample and Substitute Segments (Cont.)

- Sample and substitute segments are denoted with stratum\_substratum association (e.g., 1\_2)
- Substitute segments are applied:
  - within the same stratum\_substratum as sample segment
  - in a specified order within the stratum\_substratum
- Misuse of substitute segments will cause bias in the data!!

STATE	COUNTY	PSU	COUNTYNM	STRATA_SUBSTRATA	SEGMENT_TYPE	SUBSTITUTE_ORDER
6	51	031207G	Mono	1_2	SAMPLE	0
6	31	040402G	Kings	1_2	SUBSTITUTION	1
6	19	111301G	Fresno	1_2	SUBSTITUTION	2
6	31	030201P	Kings	1_2	SUBSTITUTION	3
6	19	091301U	Fresno	1_2	SUBSTITUTION	4
6	31	060502P	Kings	1_2	SUBSTITUTION	5
6	65	060202A	Riverside	1_5	SAMPLE	0
6	111	020702G	Ventura	1_5	SUBSTITUTION	1
6	71	070302G	San Bernardino	1_5	SUBSTITUTION	2
6	65	040701A	Riverside	1_5	SUBSTITUTION	3
6	59	040502P	Orange	1_5	SUBSTITUTION	4
6	65	050502G	Riverside	1_5	SUBSTITUTION	5
6	85	050601P	Santa Clara	2_2	SAMPLE	0
6	77	040204G	San Joaquin	2_2	SUBSTITUTION	1
6	85	030602G	Santa Clara	2_2	SUBSTITUTION	2
6	77	050204G	San Joaquin	2_2	SUBSTITUTION	3
6	77	040201A	San Joaquin	2_2	SUBSTITUTION	4
6	85	030701G	Santa Clara	2_2	SUBSTITUTION	5



STATE	COUNTY	PSU	COUNTYNM	STRATA_SUBSTRATA	SEGMENT_TYPE	SUBSTITUTE_ORDER
6	67	040301G	Sacramento	3_2	SAMPLE	0
6	67	020303P	Sacramento	3_2	SAMPLE	0
6	67	020302P	Sacramento	3_2	SUBSTITUTION	1
6	67	020202P	Sacramento	3_2	SUBSTITUTION	2
6	13	050802P	Contra Costa	3_2	SUBSTITUTION	3
6	77	070202P	San Joaquin	3_2	SUBSTITUTION	4
6	113	010801G	Yolo	3_2	SUBSTITUTION	5
6	95	020701O	Solano	3_2	SUBSTITUTION	6
6	67	030402P	Sacramento	3_2	SUBSTITUTION	7
6	95	020702B	Solano	3_2	SUBSTITUTION	8
6	67	040403P	Sacramento	3_2	SUBSTITUTION	9
6	77	080206G	San Joaquin	3_2	SUBSTITUTION	10
6	97	031001P	Sonoma	4_3	SAMPLE	0
6	55	020501G	Napa	4_3	SUBSTITUTION	1
6	95	060604G	Solano	4_3	SUBSTITUTION	2
6	67	090402G	Sacramento	4_3	SUBSTITUTION	3
6	61	030103P	Placer	4_3	SUBSTITUTION	4
6	61	020101P	Placer	4_3	SUBSTITUTION	5
6	97	040802G	Sonoma	4_4	SAMPLE	0

# When are substitute segments used?

# Field Data and Substitute Segments

- Substitute segments are used when:
  - No field data can be collected for any point in a sample segment
  - No field data can be collected for any point in the substitute segment of lower order
- Disposition data provide information about eligibility of points for field data collection

# Disposition Data and Field Data

- Disposition data
  - Track outcomes of data collection for three points
    - Ownership
    - Land cover/use
    - Reason for not collecting data for eligible points
- Field data are collected for the first two eligible points in a segment
- If field data are collected for points 1 and 2, no field visit is required for point 3

# NRI Grazing Land Survey Instrument (a.k.a., CASI)

- Allows substitute segments to be downloaded with the associated sample segment(s)
- Provides preloaded data for sample and substitute segments
- Allows “disposition data” to be entered for sample and substitute segments
- Provides the “activation status” of the downloaded segments

# Preloaded Data for Sample and Substitution Segments

- Point coordinates for navigation and capture
- Soil data:
  - SSAID
  - MUSYM
  - Soil components associated with SSAID and MUSYM
- Soil component previously recorded by data collector

# Location Screen for Disposition Data

08003:010101R:1

**Point Location**  
N 37.00000 W 106.00000

Ownership

Field visit

Field position

N  W

Land Cover/Use

LCU source

Primary gatherer	Title
<input type="text"/>	<input type="text"/>
Other gatherer(s)	Title(s)
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

Save  Tools

08003:010101R:1

**Point Location**  
N 37.00000 W 106.00000

Ownership

Field visit

Field position

N  W

Land Cover/Use

LCU source

Primary gatherer	Title
<input type="text"/>	<input type="text"/>
Other gatherer(s)	Title(s)
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

Save  Tools

NF - Non-Federal

Fed - Federal

<clear>

# Location Screen Disposition Data

08003:010101R:1

**Point Location**  
N 37.00000 W 106.00000

Ownership: NF

Field visit: [dropdown]

Field position: Yes

N: [input field]

Land Cover/Use: [dropdown]

LCU source: [dropdown]

Primary gatherer	Title
[dropdown]	[dropdown]
Other gatherer(s)	Title(s)
[dropdown]	[dropdown]
[dropdown]	[dropdown]
[dropdown]	[dropdown]

Save [keyboard icon] Tools

08003:010101R:2

**Point Location**  
N 37.00000 W 106.00000

Ownership: NF

Field visit: [dropdown]

Field position: Yes

**No contact with land owner/manager**

**Denied access by land owner/manager**

**Not eligible land cover/use or owner ...**

**No access to site**

**No attempt for other reason**

Other gatherer(s)	Title(s)
[dropdown]	[dropdown]
[dropdown]	[dropdown]
[dropdown]	[dropdown]

Save [keyboard icon] Tools



# Location Screen Disposition Data

08003:010101R:1

**Point Location**  
 N 37.00000 W 106.00000

Ownership: **NF**

Field visit: **Yes**

Field position: [dropdown]

Land [dropdown]  
 LCU [dropdown]  
 Pr [dropdown]

[dropdown] [dropdown]

Other gatherer(s) Title(s)

[dropdown] [dropdown]  
 [dropdown] [dropdown]  
 [dropdown] [dropdown]

Save [keyboard icon] Tools

08003:010101R:1

**Point Location**  
 N 37.00000 W 106.00000

Ownership: **NF**

Field visit: **Yes**

Field position: **No GPS**

Land [dropdown]  
 LCU [dropdown]

[dropdown] [dropdown]

Other gatherer(s) Title(s)

[dropdown] [dropdown]  
 [dropdown] [dropdown]  
 [dropdown] [dropdown]

Save [keyboard icon] Tools

- Navigate (NMEA GPS)...
- Navigate (Garmin GPSmap 76)...
- No GPS capture (reached site)
- Unable to reach site/collect data... ▶
- <clear>

- Navigate (NMEA GPS)...
- Navigate (Garmin GPSmap 76)...
- No GPS capture (reached site)
- Access denied/locked gates ... ▶
- Topography dangerous/impassible
- Flora/fauna dangerous/impassible
- Other reason

# Location Screen Disposition Data

08003:010101R:1

**Point Location**  
 N 37.00000 W 106.00000

Ownership **NF**

Field visit **Yes**

Field position **No GPS**

Land Cover/Use **211 Pasture/Grass**

LCU source **Field**

Primary **Joe**

Other g **Joan**

Save Tools

08003:010101R:1

**Point Location**  
 N 37.00000 W 106.00000

Ownership **NF**

Field visit **Yes**

Field position **Other**

N  W

Land Cover/Use **250**

LCU source **Field**

Primary **Joe**

Other g **Joan**

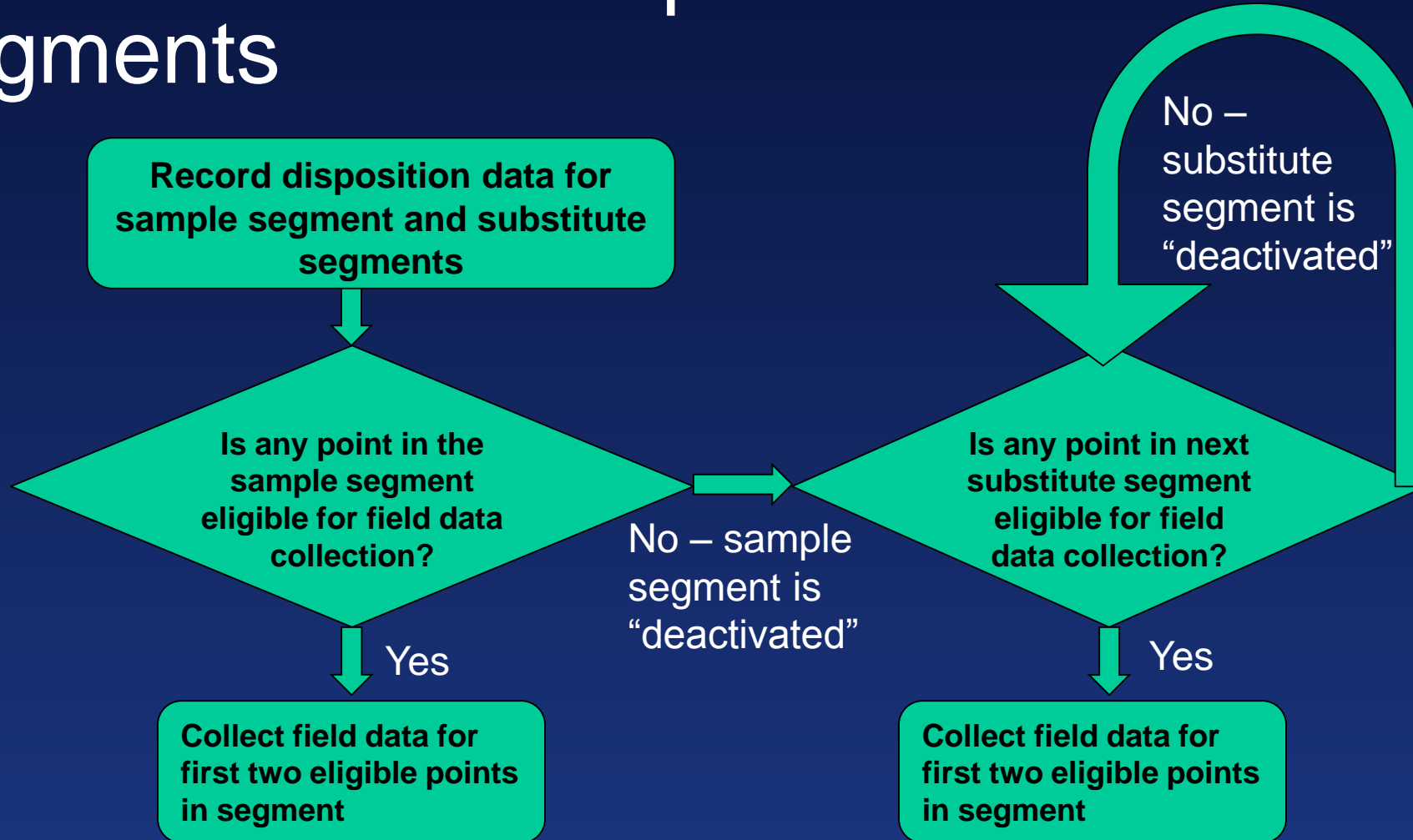
Save Tools

- 211 Pasture/Grass
- 212 Pasture/Legume
- 213 Pasture/Grass-forbs-legumes
- 250 Rangeland
- 001-006 Horticultural crops
- 011-021 Row crops
- 111-116 Close grown crops
- 211-410 Hay, Pasture, Forest
- 611-650 Barren and Other land
- 700-870 Urban and Roads
- 901-924 Water
- <clear>

- Field - Direct field observation
- Site map
- Other map/image
- <clear>

# How are substitute segments used?

# CASI Use with Sample and Substitute Segments



# Activation Status Types

## Activated

- All sample segments start out as activated
- Once activated, a segment either remains activated through CO and RC or is deactivated

## Not-yet-activated

- All substitute segments start out as not-yet-activated
- While in not-yet-activated status, they may go to either:
  - Activated status - if the preceding substitute order segment is deactivated
  - Deactivated status - if the disposition data are complete and no point is eligible for field data collection

## Deactivated

- Disposition data are complete for all points and no point is eligible for field data collection

# Disposition Data Entry by Activation Status

- The following Location screen data fields are available for all “activated” or “not yet activated” segments:
  - Ownership
  - Field visit
  - Land Cover/Use
  - LCU source
  - Primary gatherer and title
  - Other gatherer(s) and title(s)
- Field position (navigation) is only available for “activated” segments

# Activation Status

- The activation status for the sample and substitute segments within a stratum\_substratum group is based on the substitution order.
- Within a stratum\_substratum group, the status of a segment with a higher substitution order is dependent on the status of segments with a lower order.

# Segment Status Types

- NS** - activated and no disposition data collected; OR  
not-yet-activated and no disposition data collected
- UC/IP** - activated and at least some disposition data collected; OR  
not-yet-activated and some disposition data collected
- CO** - activated and all required disposition data and any required field data collected; OR  
not-yet-activated and all required disposition data collected for completion
- RC** - activated and all required disposition data and, if applicable, field data collected  
and the segment is marked RC; OR  
not-yet-activated and all required disposition data collected to complete the  
segment and the segment is marked RC



# CASI Activation/Deactivation Rules

## 1. All sample segments start out as activated

Communications

Login Get Segments Return Segments

Survey 2016 Sample Any

56 WY Wyoming 3 Big Horn

Transfer	Segment	PS	Loc	Sample	Substrata
Get	56003_105619B	NS	In	BLM	-
Get	56003_200220B	NS	In	BLM	-
Get	56003_070101O	NS	In	RANGE	8_4 #0
Get	56003_070103G	NS	In	RANGE	8_4 #1
Get	56003_070601P	NS	In	RANGE	9_4 #0
Get	56003_050501O	NS	In	RANGE	9_4 #1
Get	56003_030601P	NS	In	RANGE	14_2 #0
Get	56043_070601B	NS	In	RANGE	14_2 #0
Get	56003_020502O	NS	In	RANGE	14_2 #1
Get	56043_080602P	NS	In	RANGE	14_2 #2

- White background indicates “Activated” status
- All BLM segments are “Activated”
- All sample segments “Substratum=0” are “Activated”
- Dark gray background indicates “Not-yet-activated” status

# CASI Activation/Deactivation Rules

2. A substitute segment may be changed from not-yet-activated status to deactivated status

State	56 Wyoming		
County	017 Hot Springs		
Seg ID	040803R		
Substrata	2_4 #1, Not yet activated		
Status	Complete (CO)		
<input type="checkbox"/> Return Incomplete	<input type="button" value="Deactivate segment"/>		
Points	<input type="button" value="Point 1"/>	<input type="button" value="Point 2"/>	<input type="button" value="Point 3"/>
Status	CS	CS	CS
Own	Fed	Fed	NF
LC/U	213	250	730
Field	Not elig.	Not elig.	Not elig.
<input type="button" value="Close Segment"/>			

**Deactivate Segment**

	Segment	Strata and Substrata	Substitution Order
Deactivate:	56017_040803R	2_4	1
Activate:	-		

Ready to deactivate 56017\_040803R

By pressing OK you will deactivate segment 56017\_040803R. After segment 56017\_040803R is deactivated no site data will be able to be collected on any point of that segment! This is not reversible. Be certain that this is what you want to do.

# CASI Activation/Deactivation Rules

3. Within a substratum, both the activated segment (sample or substitute) AND next substitute order segment MUST be checked out to the same field instrument or computer before the activated segment can be deactivated

Transfer	Segment	PS	Loc	Sample	Substrata
Get	56003_105619B	NS	In	BLM	-
Get	56003_200220B	NS	In	BLM	-
Get	56003_0701010	NS	In	RANGE	8_4 #0
Get	56003_070103G	NS	In	RANGE	8_4 #1
Get	56003_070601P	NS	In	RANGE	9_4 #0
Get	56003_0505010	NS	In	RANGE	9_4 #1
Get	56003_030601P	NS	In	RANGE	14_2 #0
Get	56043_070601B	NS	In	RANGE	14_2 #0
Get	56003_0205020	NS	In	RANGE	14_2 #1
Get	56043_080602P	NS	In	RANGE	14_2 #2

- To deactivate the sample segment in 8\_4=0, the substitute segment in 8\_4=1 must also be checked out
- To deactivate either sample segment in 14\_2=0, the substitute segment in 14\_2=1 must also be checked out

# CASI Activation/Deactivation Rules

4. Within a substratum, if an activated segment is to be deactivated and the next substitute segment is already deactivated, then the three segments (the segment to be deactivated, the deactivated substitute segment, and the next substitute segment) MUST be checked out to the same field instrument or computer before the activated segment can be deactivated

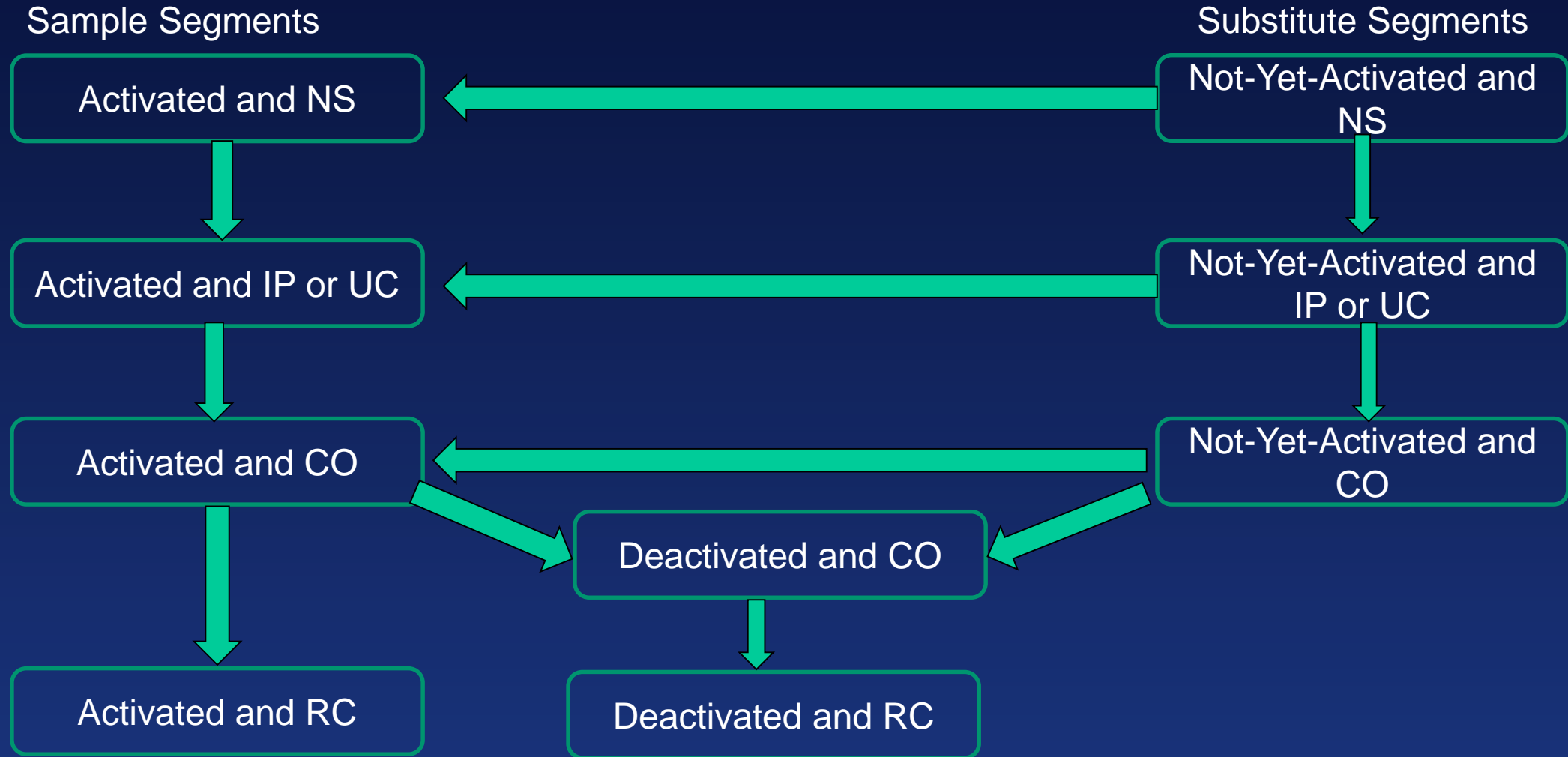
Transfer	Segment	PS	Loc	Sample	Substrata
Get	56017_105703B	NS	In	BLM	-
Get	56017_105713B	NS	In	BLM	-
Get	56017_040804R	NS	In	PASTURE	2_4 #0
Get	56017_040803R	CO	In	PASTURE	2_4 #1
Get	56017_040801R	NS	In	PASTURE	2_4 #2
Get	56017_040802R	NS	In	PASTURE	2_4 #3
Get	56017_040701P	NS	In	PASTURE	2_5 #0
Get	56035_070801R	NS	In	PASTURE	2_5 #1
Get	56017_040601R	NS	In	PASTURE	2_5 #2
Get	56013_091101O	NS	In	PASTURE	2_5 #3

Segment	Str	Seg	1	2	3
56017_040804R	2_4	NS	NS	NS	NS
56017_040803R	2_4	CO	CS	CS	CS
56017_040801R	2_4	NS	NS	NS	NS
56017_040802R	2_4	NS	NS	NS	NS

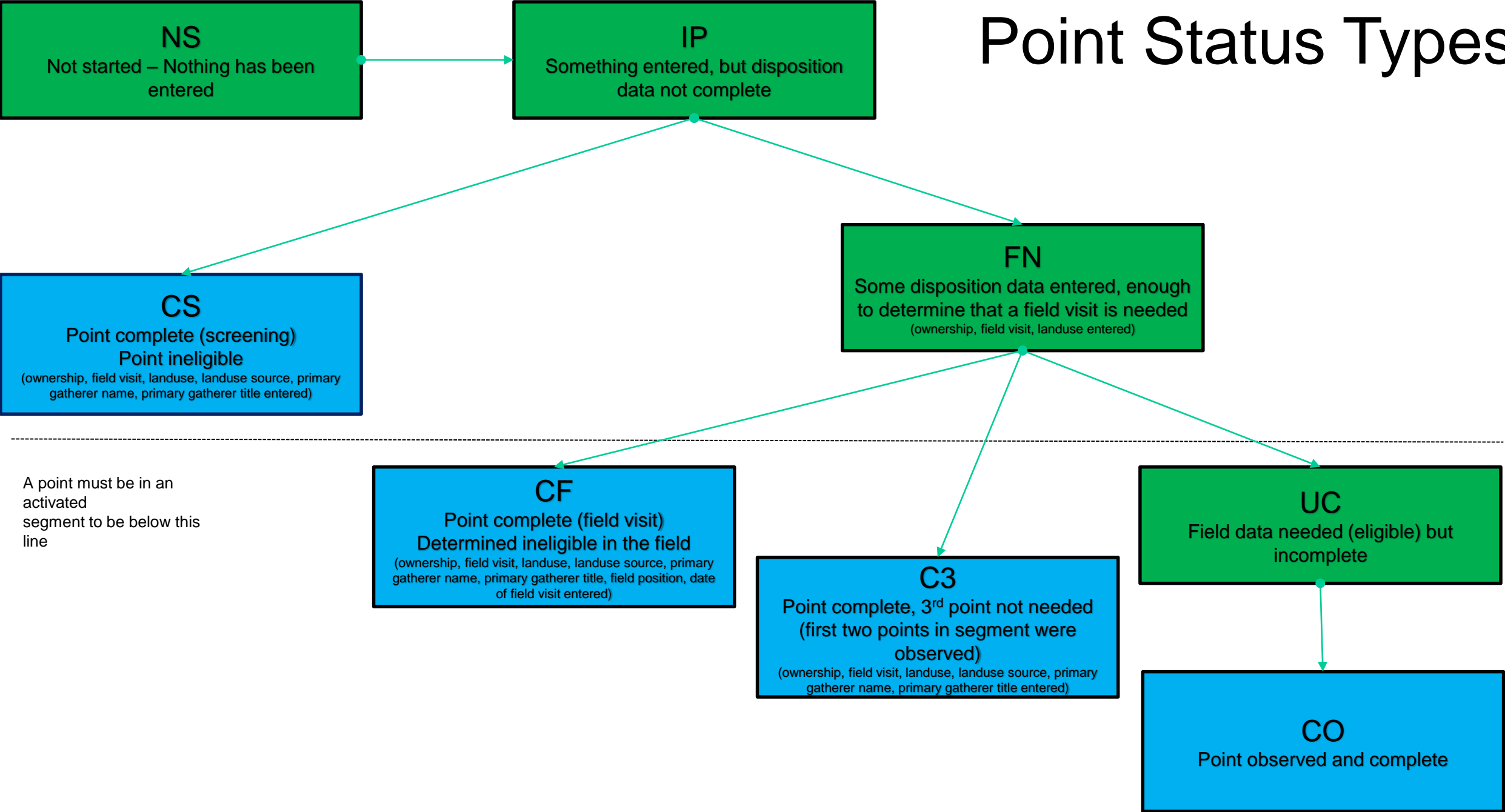
It may be good to check out the full substratum set of segments

# CASI Activation/Deactivation Rules

- All sample segments start out as activated
- A substitute segment may be changed from not-yet-activated status to deactivated status
- Within a substratum, both the activated segment (sample or substitute) AND next substitute order segment **MUST** be checked out to the same field instrument or computer before the activated segment can be deactivated
- Within a substratum, if an activated segment is to be deactivated and the next substitute segment is already deactivated, then the three segments (the segment to be deactivated, the deactivated substitute segment, and the next substitute segment) **MUST** be checked out to the same field instrument or computer before the activated segment can be deactivated
- An activated segment that goes to RC status may **NOT** be checked out.
- A segment that is deactivated from the not-yet-activated state **MAY** be checked out.
- The last activated segment in a substratum cannot be deactivated if there are no substitute segments left in the substratum
- All completed or partially completed segments must be returned to the database.



# Point Status Types



**NS**  
Not started – Nothing has been entered

**IP**  
Something entered, but disposition data not complete

**CS**  
Point complete (screening)  
Point ineligible  
(ownership, field visit, landuse, landuse source, primary gatherer name, primary gatherer title entered)

**FN**  
Some disposition data entered, enough to determine that a field visit is needed  
(ownership, field visit, landuse entered)

**CF**  
Point complete (field visit)  
Determined ineligible in the field  
(ownership, field visit, landuse, landuse source, primary gatherer name, primary gatherer title, field position, date of field visit entered)

**C3**  
Point complete, 3<sup>rd</sup> point not needed  
(first two points in segment were observed)  
(ownership, field visit, landuse, landuse source, primary gatherer name, primary gatherer title entered)

**UC**  
Field data needed (eligible) but incomplete

**CO**  
Point observed and complete

A point must be in an activated segment to be below this line