An Integrated Biological Inventory of Kanuti National Wildlife Refuge

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- Lisa Saperstein
- Bob Schulz, Merry Maxwell
- Curtis Knight, Rachel Craig
- Melissa Cady, Colleen Handel, Danielle Jerry, Steve Matusoka, Joel Reynolds, Eric Taylor

Two major impetuses for conducting biological inventory of refuge:

1) ANILCA's establishing purposes include:

(i) to conserve fish and wildlife populations and habitats in their ***natural diversity*** *including … migratory birds …*

2) 2002 Biological Program Review recommendations to address #1

and ...

- It also doesn’t hurt to try to optimize usage of funding, especially in Kanuti where transportation costs are the most prohibitive expense
- Milk a site for all it’s worth- birds, plants, mammals, invertebrates!!

Problems to date in documenting refuge's natural diversity:

- Historically small staff
- Historical fieldwork largely restricted to more accessible (via boat/floatplane), waterfowl-rich, and/or "charismatic," well-documented areas (e.g., Kanuti Canyon)
- Some areas (e.g., burns) inaccessible to even helicopters
- Certain taxa often overlooked (invertebrates)
- Nonrandom nature of past work has restricted ability to make inferences (e.g., bird-habitat relationships) to unvisited areas, habitats, etc.

Inventory Preparations

- Meeting in Anchorage , December 2003, with RO think-tank: Colleen Handel, Joel Reynolds, Melissa Cady, Steve Matsuoka, Danielle Jerry, Eric Taylor

- Lisa Saperstein provided PowerPoint presentation stating refuge inventory needs

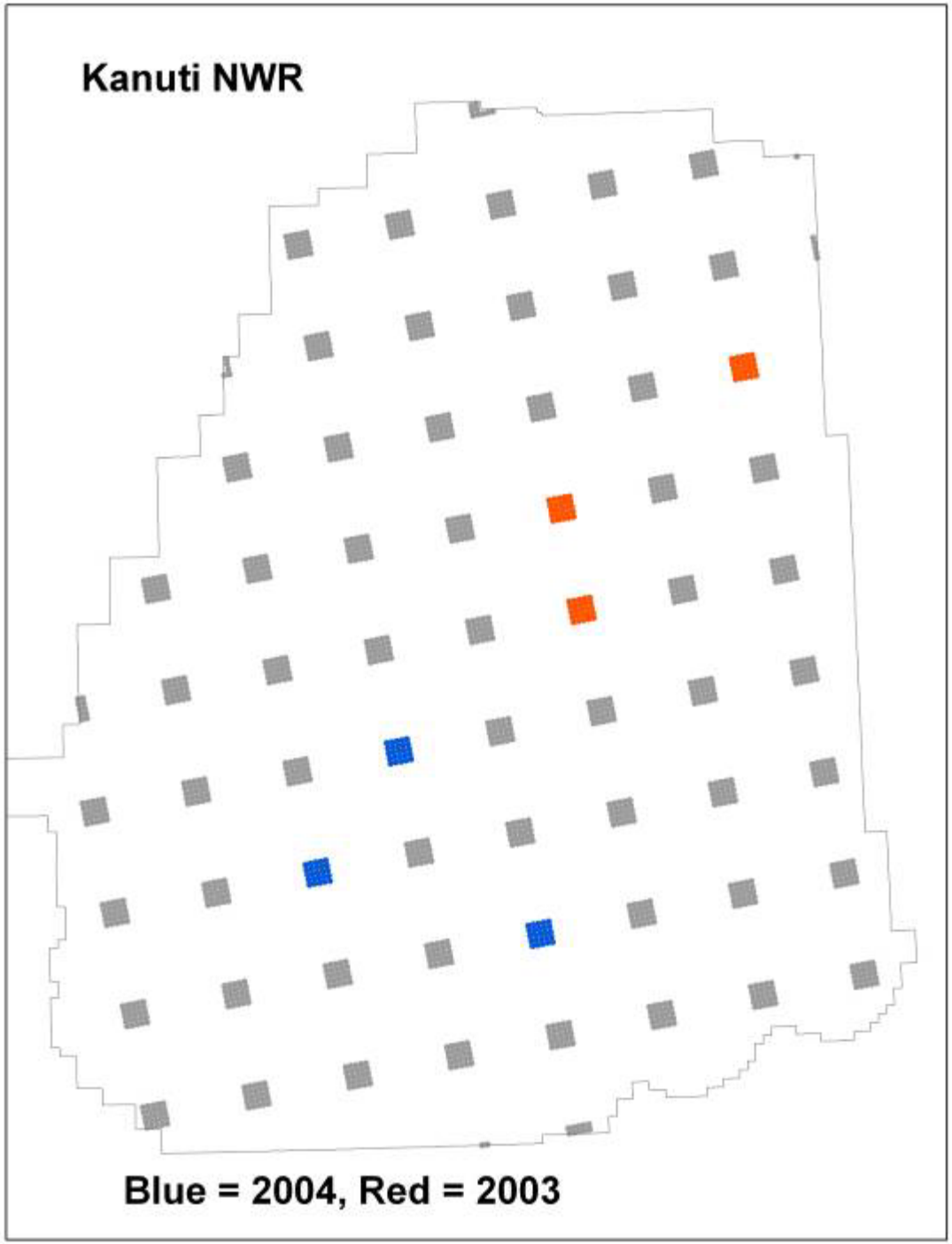
Sampling Design Options

- Simple random sample
- *Possible clustering undesirable; we want wide spatial coverage*

- Stratified random sample
- *For one-time inventory, can use dynamic feature (e.g., landcover) OR for later conversion to monitoring, want static feature (e.g., surficial geology)*

Sampling scheme chosen

- Chose systematic random sampling grid (10-km spacing) developed for ALMS
- Decided we could do all 60+ plots covering refuge over 10-15 years; this largely possible because of land unit size (1.6 million acres)…not possible on say, ANWR, YDNWR, etc.
- *Note: Denali NPP considered 66 plots achievable*

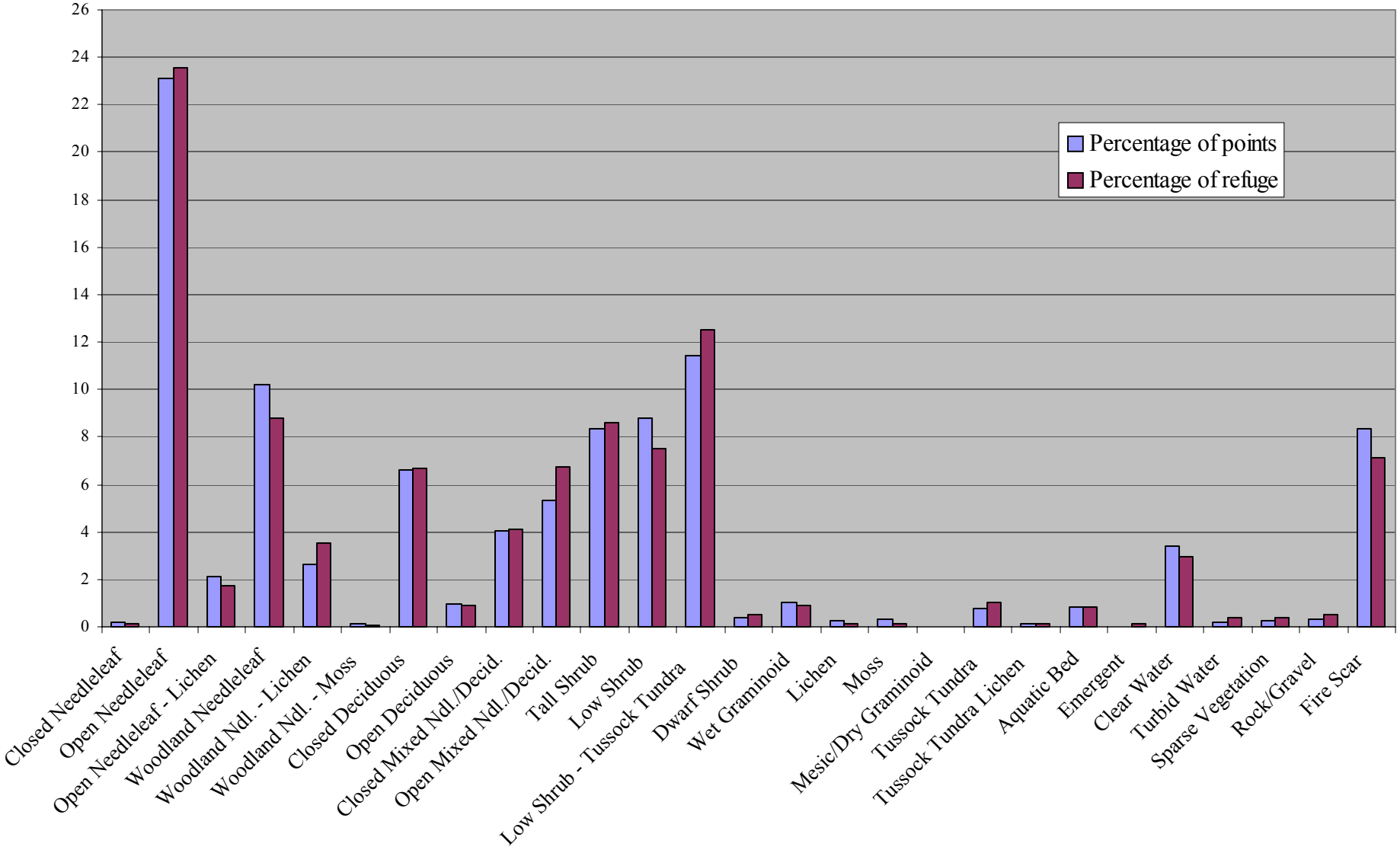

Kanuti NWR
Blue = 2004, Red = 2003

Potential Sampling Concern

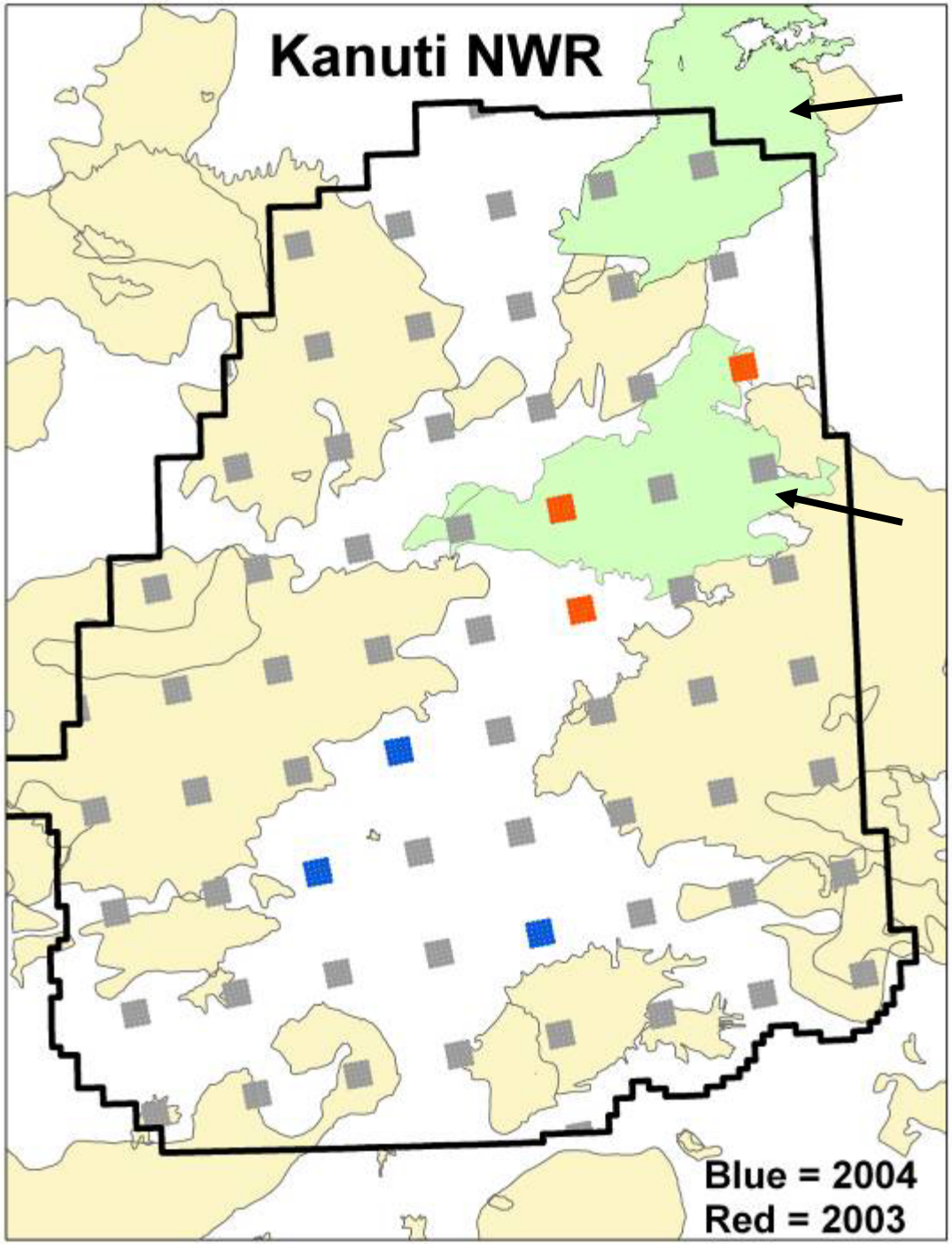
- Because of concerns of possibly omitting rare/unique areas with systematic sampling, we overlaid grid with landcover and geology maps to ensure adequate representation of classes

Landcover

- Overlaying landcover map with systematic sample units showed good proportional representation of landcover classes

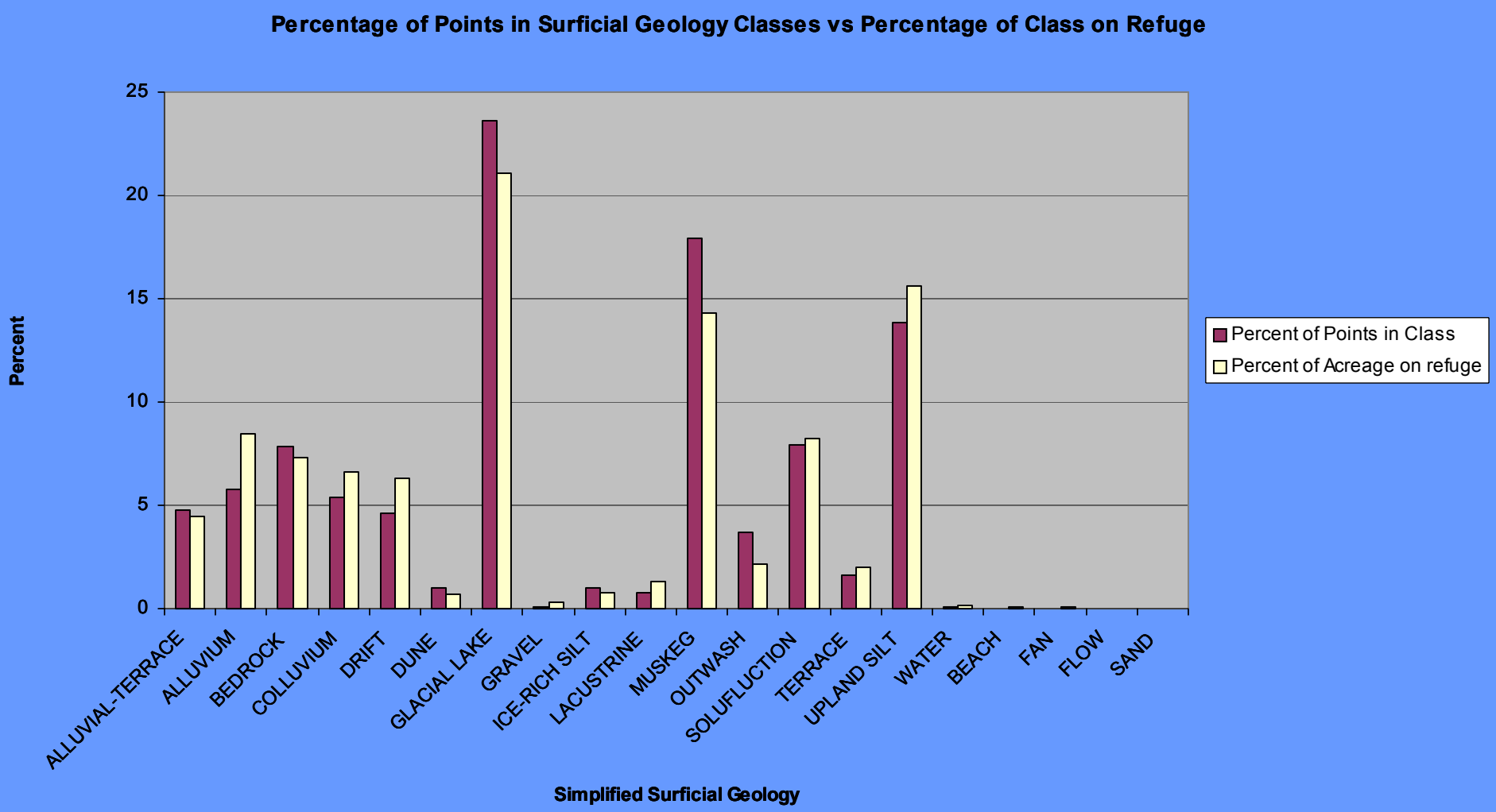

26
24
22
20
18
16
14
12
10
8
6
4
2
0
Percentage of points
Percentage of refuge
Closed Needleleaf
Open Needleleaf
Open Needleleaf - Lichen
Woodland Needleleaf
Woodland Ndl. - Lichen
Woodland Ndl. - Moss
Closed Deciduous
Open Deciduous
Closed Mixed Ndl./Decid.
Open Mixed Ndl./Decid.
Tall Shrub
Low Shrub
Low Shrub - Tussock Tundra
Dwarf Shrub
Wet Graminoid
Lichen
Moss
Mesic/Dry Graminoid
Tussock Tundra
Tussock Tundra Lichen
Aquatic Bed
Emergent
Clear Water
Turbid Water
Sparse Vegetation
Rock/Gravel
Fire Scar

- Distribution of landcover classes <u>over time</u> is highly dynamic on Kanuti due in large part to active fire history
- Truly precludes its consideration as stratification feature for long-term monitoring


Kanuti NWR
Blue = 2004
Red = 2003

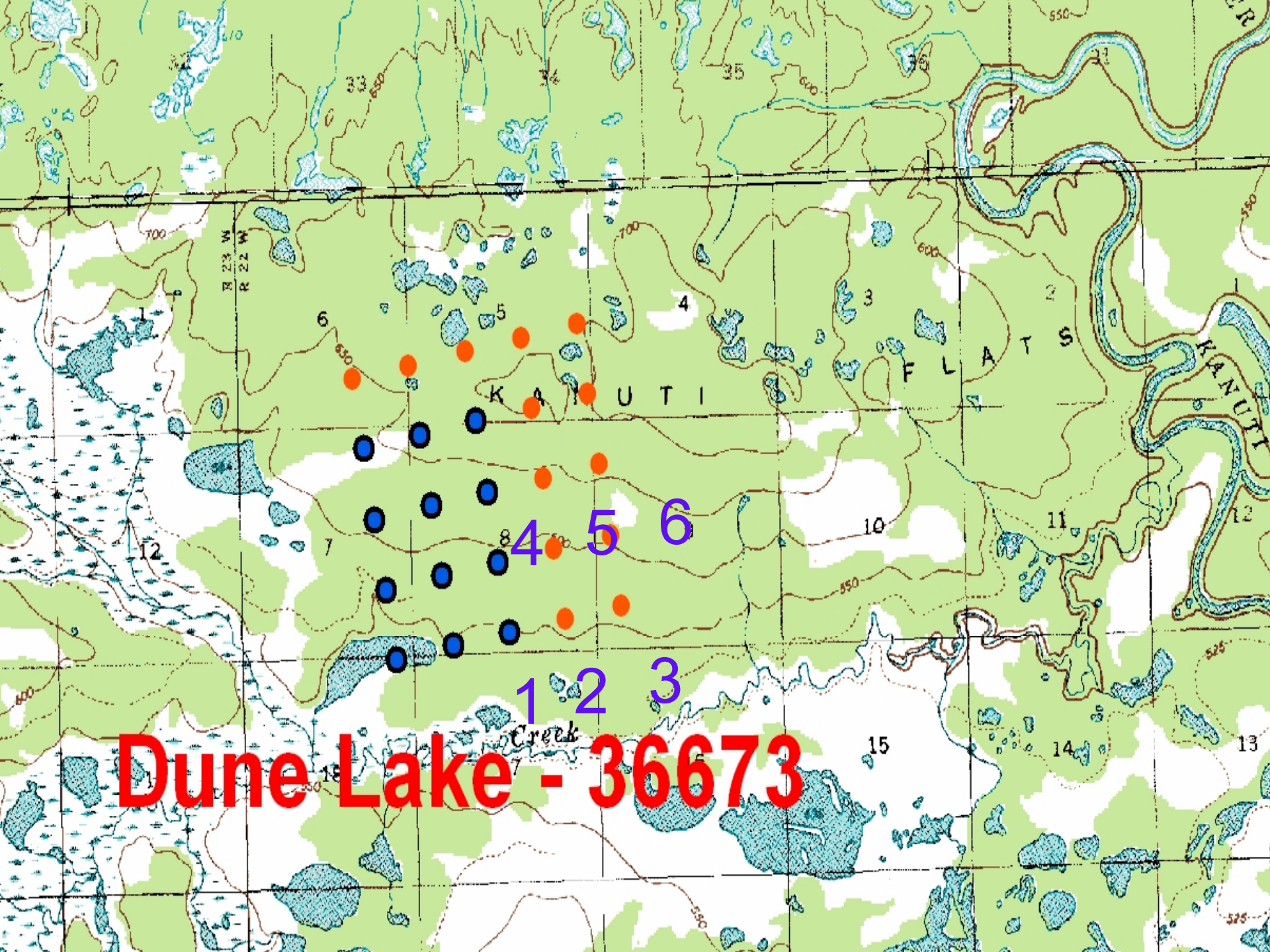
Surficial Geology

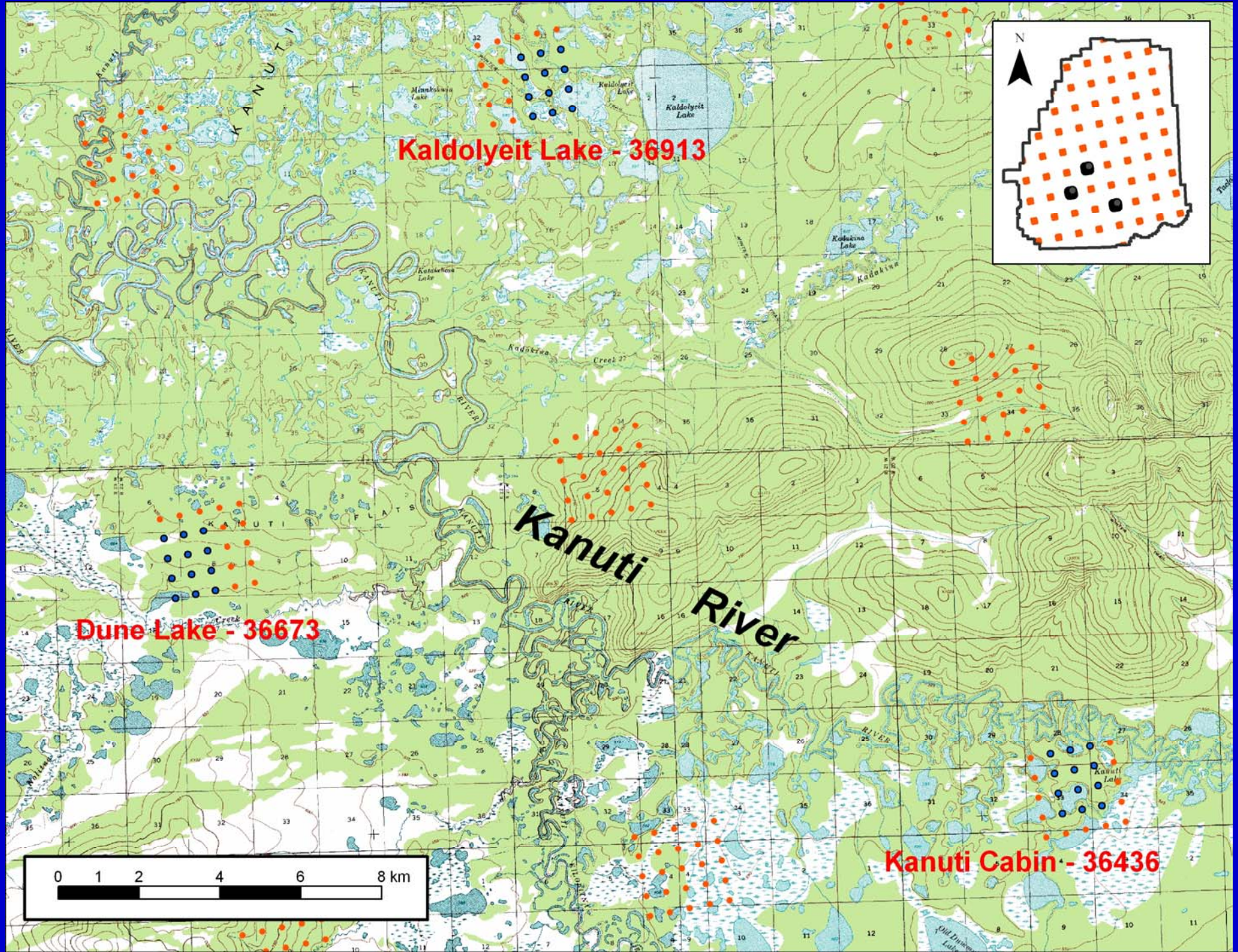
- Overlaying surficial geology map with sample units showed good relative representation of geological classes would be achieved
- Classes poorly represented by sample units (e.g., dunes, which may support unusual flora/fauna) may be investigated incidentally, but will be analyzed separately from overall systematic design


Percentage of Points in Surficial Geology Classes vs Percentage of Class on Refuge
Percent
25
20
15
10
5
0
ALLUVIAL-TERRACE
ALLUVIUM
BEDROCK
COLLUVIUM
DRIFT
DUNE
GLACIAL LAKE
GRAVEL
ICE-RICH SILT
LACUSTRINE
MUSKEG
OUTWASH
SOLUFLUCTION
TERRACE
UPLAND SILT
WATER
BEACH
FAN
FLOW
SAND
Simplified Surficial Geology
Percent of Points in Class
Percent of Acreage on refuge

Sampling design details

- For inventory purposes, decided more sites better than more points per site (we expected habitat sampling to be time-consumptive)
- Thus chose 12-point “mini-grid” (vs. 25-point used in ALMS and Denali) with randomly chosen SW corner
- Array is 4 rows by 3 columns
- 500-meter spacing of points
- Primarily a terrestrial survey so require a minimum of 10 terrestrial points (for cost- and time-effectiveness)
- Max. point relocation distance = 200 m


Dune Lake - 36673
1 2 3
4 5 6
KANUTI FLATS
Creek
R 23 W
R 22 W


Kaldolyeit Lake - 36913
Kanuti River
Dune Lake - 36673
Kanuti Cabin - 36436
N
0 1 2 4 6 8 km

Inventory Resources

- Breeding birds
- Habitat/vegetation
- Small mammals
- Terrestrial invertebrates

- Standard protocols

- Other mammals

- Incidentally

- Aquatic resources (plants, fish, inverts, H_2O quality & quantity, etc.)

- Other methods likely unassociated with this inventory

Methods: Bird Inventory

- Protocols follow ALMS, except only 12 points are visited
- 10-min counts
- Distance Estimation

Methods: Habitat inventory

- Hybrid of methods used by Denali NPP I & M program and ALMS
- Also collecting tree cookies and/or increment core samples to document fire history
- Conducting vegetation surveys concurrently with bird surveys is best for describing bird-habitat relationship; however mid-July is better for strictly sampling plants themselves…2 surveys likely not practical, however

Methods: Small Mammal Inventory

- Small mammals captured concurrently with bird survey work, following UAF Museum protocols
- 3 trap nights
- 4 snap-traps and 1 pitfall trap at each point
- Verification and archival of specimens done by UAF Museum

Methods: Terrestrial Invertebrate Inventory

- 1 site, generally at point closest to camp
- 3 capture days
- 1 malaise trap and active use of 2 sweep nets: 1 coarse type for grass, brush, etc. and 1 fine type for large flying inverts (e.g., butterflies, moths, dragonflies)
- Collection follows UAF Museum protocols
- Identification, pinning, cataloguing, etc. likely contracted out (UAF Museum?)

So….A Day in the Life…of a Kanuti Inventory Grunt in 2004

Survey schedule per plot – Day 1

- Establish camp
- Begin establishing/flagging points
- Begin vegetation/habitat survey
- Begin setting out small mammal traps
- Establish Malaise trap

Survey schedule per plot – Day 2

- Finish establishing/flagging points
- Continue vegetation/habitat survey
- Finish setting out small mammal traps
- Check malaise trap; do net sweeps for inverts (day #1)

Survey schedule per plot – Day 3

- Conduct bird survey (03:00-08:00)
- Continue vegetation/habitat survey
- Check small mammal traps (trap night #1)
- Check malaise trap; do net sweeps for inverts (day #2)

Survey schedule per plot – Day 4

- Alternate date for bird survey
- Continue vegetation/habitat survey
- Check small mammal traps (trap night #2)
- Check malaise trap; do net sweeps for inverts (day #3); break down trap

Survey schedule per plot – Day 5

- Alternate date for bird survey
- Finish vegetation/habitat survey
- Check small mammal traps (trap night #3); remove traps
- Remove flagging, etc. from points
- Strike camp
- Move to next plot

Summary of 2004 Inventory Effort

- 3 Plots visited
- Completed bird, small mammal, & invertebrate surveys
- Veg/habitat surveys not done (did 1 point [not plot!!]- took 1 day),
- Did collect tree cookies and increment core samples

Did I mention Palm Warbler?!

Projected 2005 Inventory Effort – Year 2 of Pilot Effort

- Revisit 2004 plots to test/conduct vegetation/habitat work
- Revisit 2003 ALMS plots and complete all inventory aspects
- Visit new plots (in 2004 burns, if possible)

Projected 2006 Inventory Effort

- Year 1 of full implementation of inventory effort
- Two crews to double number of plots done (aspire to $\geq$ 6 plots done per summer)