MDIFW MOOSE MANAGEMENT

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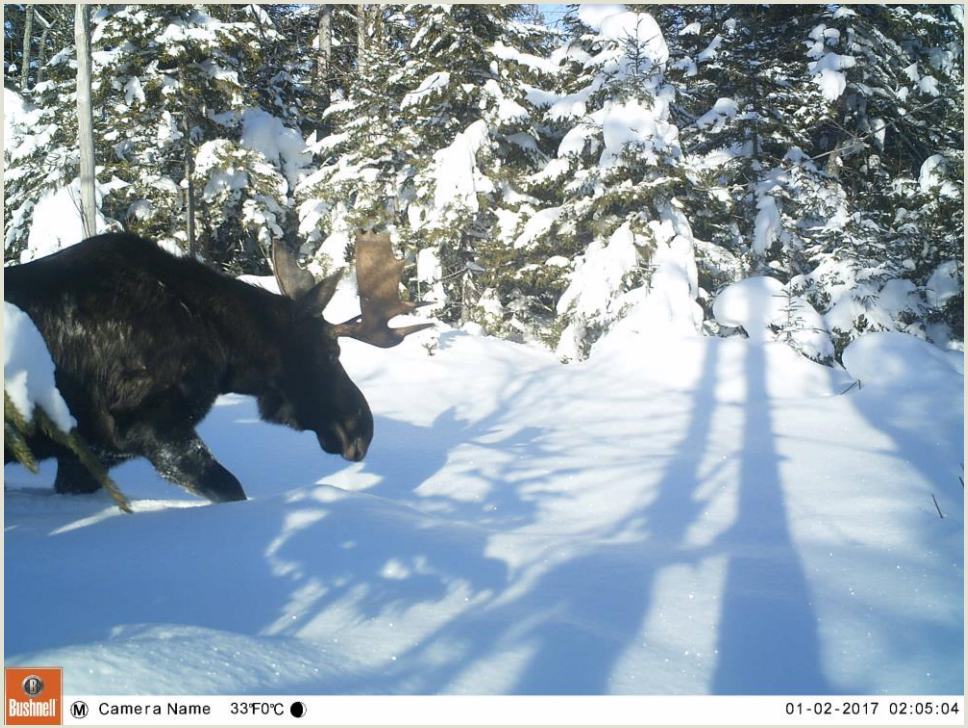
OVERVIEW



- Moose Management
- Winter Ticks
- Adaptive Unit Approach
- Q & A

DEPARTMENT (MDIFW) MISSION

- Protect and manage Maine Moose Population
- Promote Maine's Outdoor Heritage
- Safely connect people with nature, through responsible recreation, sport and science
  - Maine has been recognized as a National and Regional Leader in Moose Management
  - Collaboration w/North American + Northeastern (US/CA) moose managers
    - North American Moose Conference (US/Canada/Europe/Asia)
    - University of Cincinnati – Post doctoral/Smith Fellowship
    - University of New Hampshire: Wildlife and Conservation Biology
    - University of Maine, Orono (Wildlife Disease Genetics Lab/NSF Research Traineeship (NRT) Program in Conservation Science and Practice at the University of Maine
    - University of New Brunswick/Laval University (Quebec), Doctoral Committee

MOOSE POPULATION (1970's-present)

- 1970's-80's:
  - Spruce Budworm defoliation, vast increase of moose habitat
  - Recolonization and growth of moose across New England
- 1990's
  - Maximum population growth by end of decade
- 2000's
  - Changing climate
- 2010-present
  - Rise of winter tick
  - Declining moose health
    - Productivity ↓
    - disease/parasitism ↑

MOOSE MANAGEMENT TODAY

- Moose management driven by:
  - Public process/consultation
    - Responsive Management Inc.
  - Big Game Management Plan (2017)
  - Scientific data collected in Maine

63% of Mainers see Moose Mgt as excellent or good

- Modern Hunt
  - 40 years (1980-present)
    - A success story (Management and Hunt)
    - Public interest remains High
    - Public understanding of moose management or pop'n changes low
    - Book release "the Great Maine Moose Hunt"

90% of Mainers strongly approve of legal moose hunting

MOOSE MANAGEMENT CORNERSTONES

DENSITY
COMPOSITION
PRODUCTIVITY
SURVIVAL

MANAGEMENT CORNERSTONES

Moose Population and Management

- Density and Composition
  - Aerial helicopter surveys (10 years)
    - 1 type to count moose
    - 1 type to classify moose (Bull, cows, calves)
- Productivity
  - Calf:cow counts (Aerial)
  - 7 year Survival study-cow/calf moose “walk-ins”
  - Reproductive info from harvest
    - Ovaries (Corpora Lutea = calves likely born)
- Survival/Mortality
  - 7 year Adult cow and calf survival study

ADULT COW AND CALF SURVIVAL PROJECT

- 2014-2020
  - GPS Collar over 520 moose (survival rates)
  - Baseline health assessment (not previously published)
  - ~285 Field Necropsies (Cause of death)
  - 7 year evaluation of calving
  - 4 peer reviewed scientific papers
- Findings
  - Winter tick primary mortality driver
  - Moderate to high juvenile mortality
    - 2x mortality in western unit
  - High adult survival
  - Depressed reproduction

WINTER TICK INFESTED CALF MORTALITY

WINTER TICK

- Winter tick:
  - 1 host tick
  - 1 year life cycle
- Range from Texas to Southern Canada
- Documented since 30's in Maine, not invasive
- Heavy infestations consecutive years in western unit
  - 50,000-90,000 TICKS ON A SINGLE MOOSE!
- Evidence across core range of reduced productivity
  - Lower twinning rates, calving rates, cow:calf ratios
- Moderating climate + higher density moose = increase in winter tick numbers and impacts by winter tick

Engorged Female
Winter Tick
1 ml of moose blood!

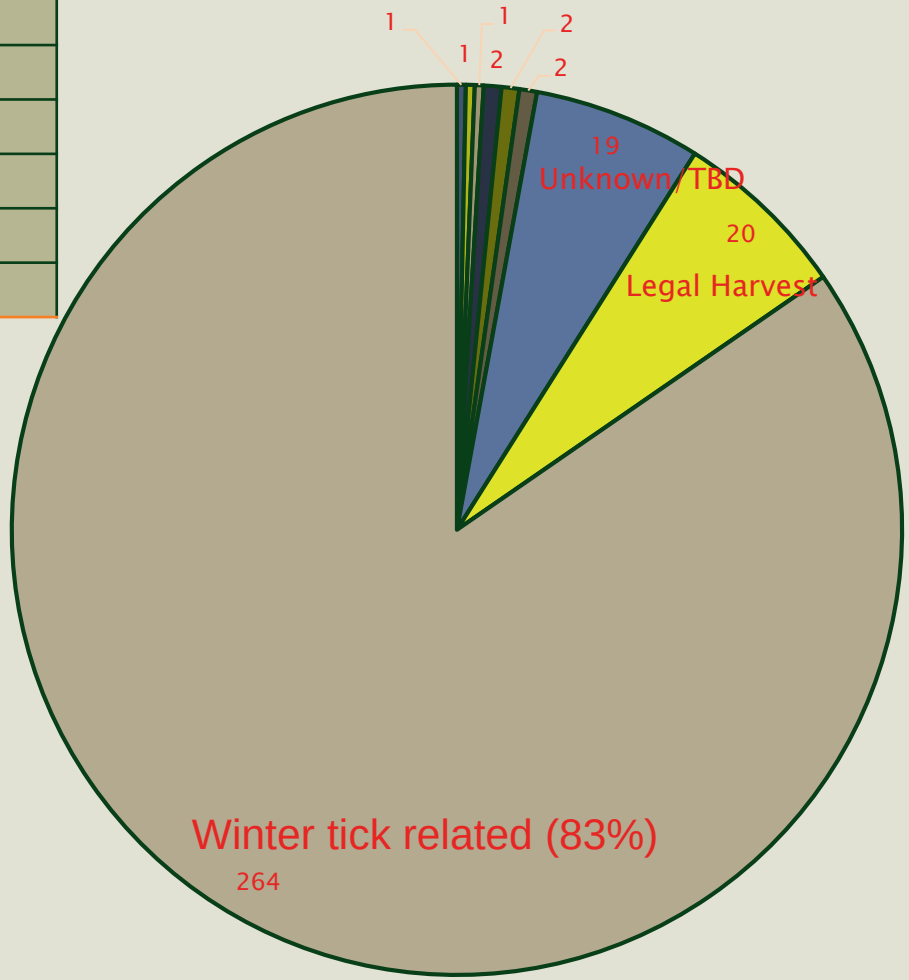
Actual Size

MORTALITY RATES (GPS PROJECT) OF COLLARED CALVES-WMD 2 AND 8: (Out of 35 CALVES/UNIT EACH YEAR)

	WMD 2 Calves	WMD 8 Calves
2014	NA	73%
2015	NA	60%
2016	48%	74%
2017	24%	57%
2018	29%	45%
2019	70%	74%
2020	15%	54%

CAUSES OF MORTALITY AMONG COLLARED MOOSE 2014-2020 (n=320)

Illegal Harvest	1
Wounding Loss	1
Drowning	1
Vehicle	2
Precipitous fall	2
Capture Related	2



DEPRESSED REPRODUCTION

Attribute	1985-1989	2010-2019	that means
Yearling pregnancy	0.4	0.2	4 vs 2 calves per 100 cows
Later 1st pregnancy	High tick years		Less Pregnant 2 year old
Twinning rates	42%	19%	84 calves vs 38 (46 less per 100 cows)
Avg. CL Count	1.4	1.05	140 vs 105 calves (35 less per 100 cows)

- *ATTRIBUTES LOWER IN WESTERN WMDS (E.G., WMD 4)*
- *COMPOUNDING EFFECT…SO, LESS CALVES BORN AS WELL AS… DECREASED SURVIVAL RATES OF CALVES IN 1ST 3 WEEKS*

NORTH AMERICAN (NA) MOOSE DENSITIES (PER SQUARE MILE)

- Typical moose densities across NA range close to 1/sq. mi.
- Moose densities are typically a product of habitat quality
- Few places > 3/sq. mi
- Maine has areas > 5/sq. mi. (including proposed Adaptive Unit)
- High densities cause population problems

DENSITY DEPENDENCE IN WILDLIFE

- Refers to any regulating factor that affects the productivity/health of the population due to the density of the population
  - E.g., When there are too many animals and not enough food, reproduction rates drop
  - Dense populations incur higher prevalence and rates of infectious disease and/or parasites (E.g., COVID 19)

- Fishery Management
  - E.g., Stunted growth due to lack of resources in fish requires more intensive removal (fishing) to increase availability of resources and thus size of fish

DENSITY DEPENDENCE IN MAINE MOOSE

- Food quality and quantity remains stable and not regulating moose

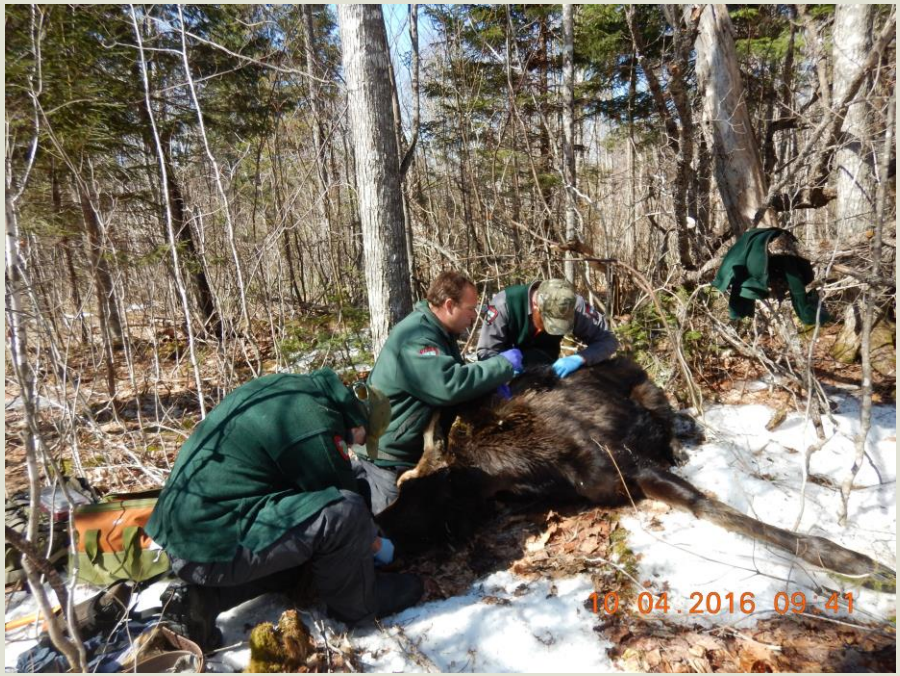
- Conservative hunting permits not regulating moose numbers

- Winter tick impacts on overwintering calf mortality and cow productivity are regulating moose numbers

ADAPTIVE MANAGEMENT UNIT

COMBATING WINTER TICK

- Pesticides on tick or in woods
  - No known dosage
  - No feasible
  - Not practical
- Prescribed burns:
  - Private land ownership
  - Impractically
  - Not feasible
  - Large scale needed



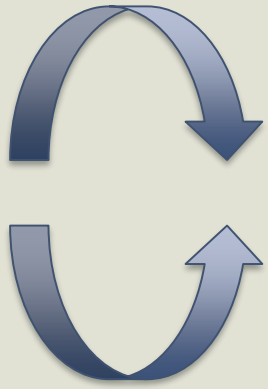
- Reduction of primary host (moose)

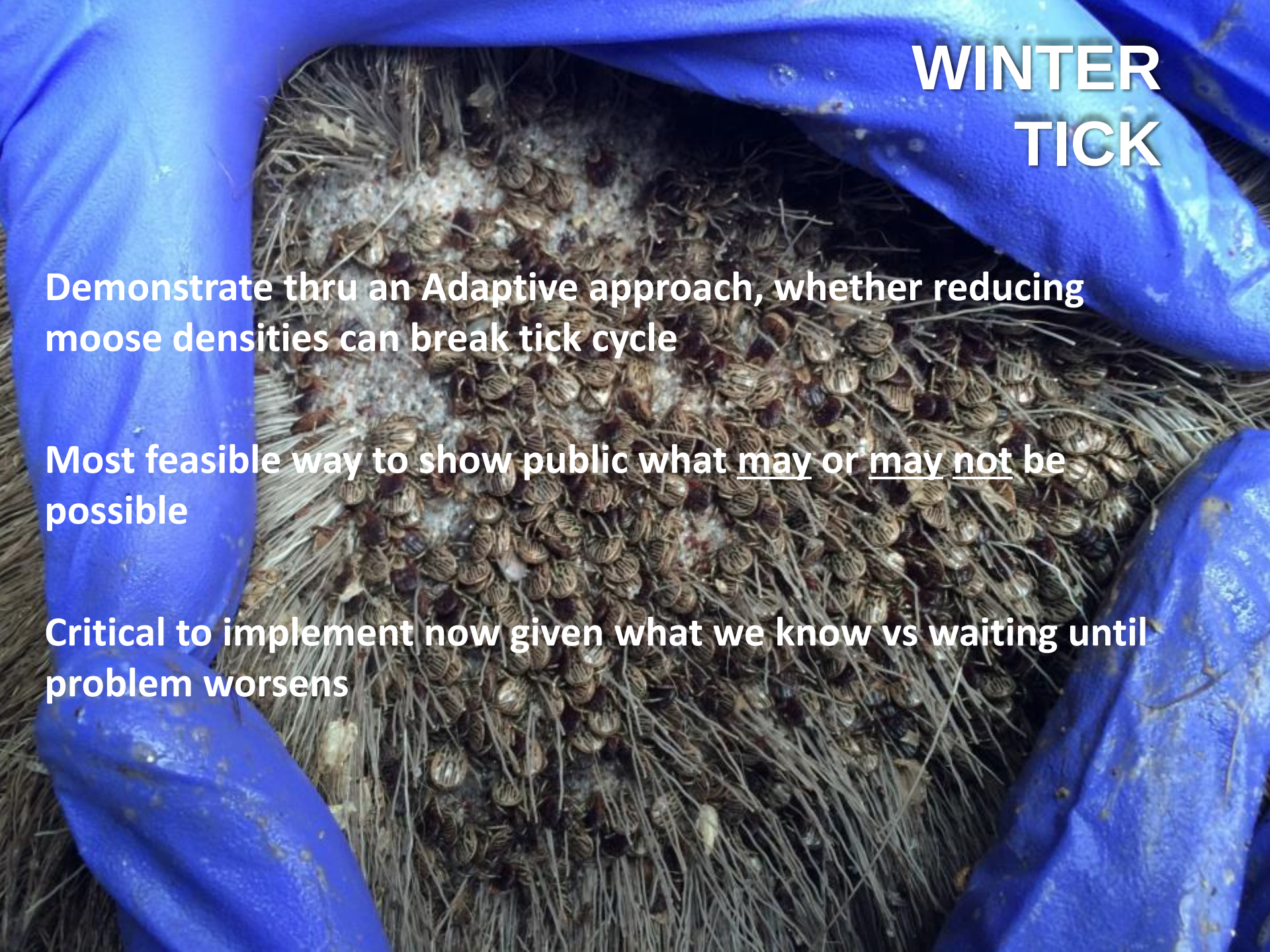
MANAGEMENT-PUBLIC OPINION

- 7 years of GPS Collaring/monitoring Adult and Calf Survival
  - Demonstrated the severe impacts by winter ticks and primary driver of population
- Public sentiment: concerns regarding increasing cow permits (antlerless)
- Public sees less moose
- Combating ticks by reducing moose density counter intuitive

ADAPTIVE UNIT

- Adaptive Management
  - Is an Iterative approach to assess effects of management actions (feedback loop)
  - Is Science based AND driven
  - Provides ability to move forward with actions to find answers to meet management objectives
  - allows changes (permit adjustments) as more information becomes available





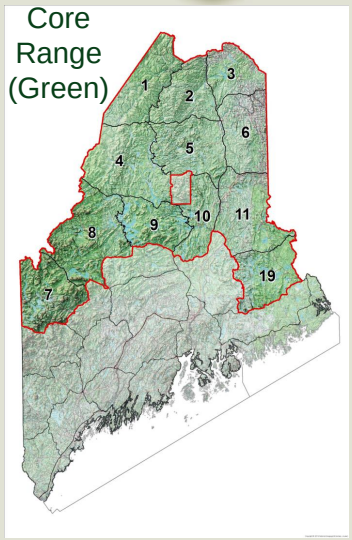
WINTER TICK

Demonstrate thru an Adaptive approach, whether reducing moose densities can break tick cycle

Most feasible way to show public what may or may not be possible

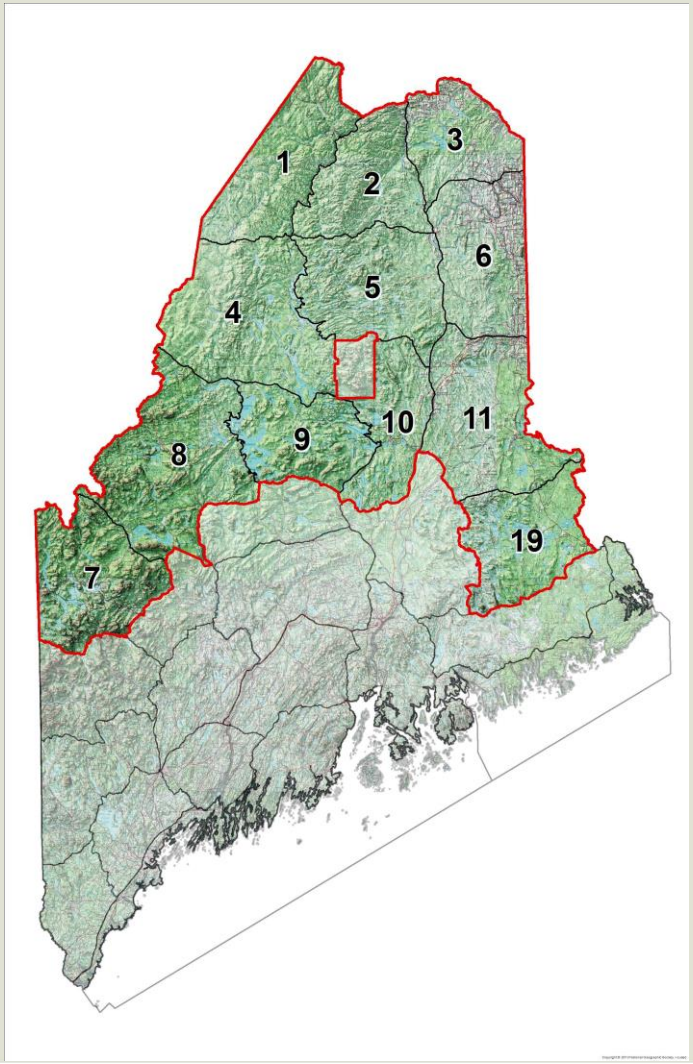
Critical to implement now given what we know vs waiting until problem worsens

WHY WMD 4?



- Within core moose range (i.e., WMDs 1-11 and 19)
- Impacted by winter ticks
- Lower cow ovulation rates (<1.00/cow)
- Representative habitat/winter conditions northwestern ME
- Latitudinally between the Adult cow and calf study areas (WMD's 2 and 8)
- 2020: 38% of collared calves died

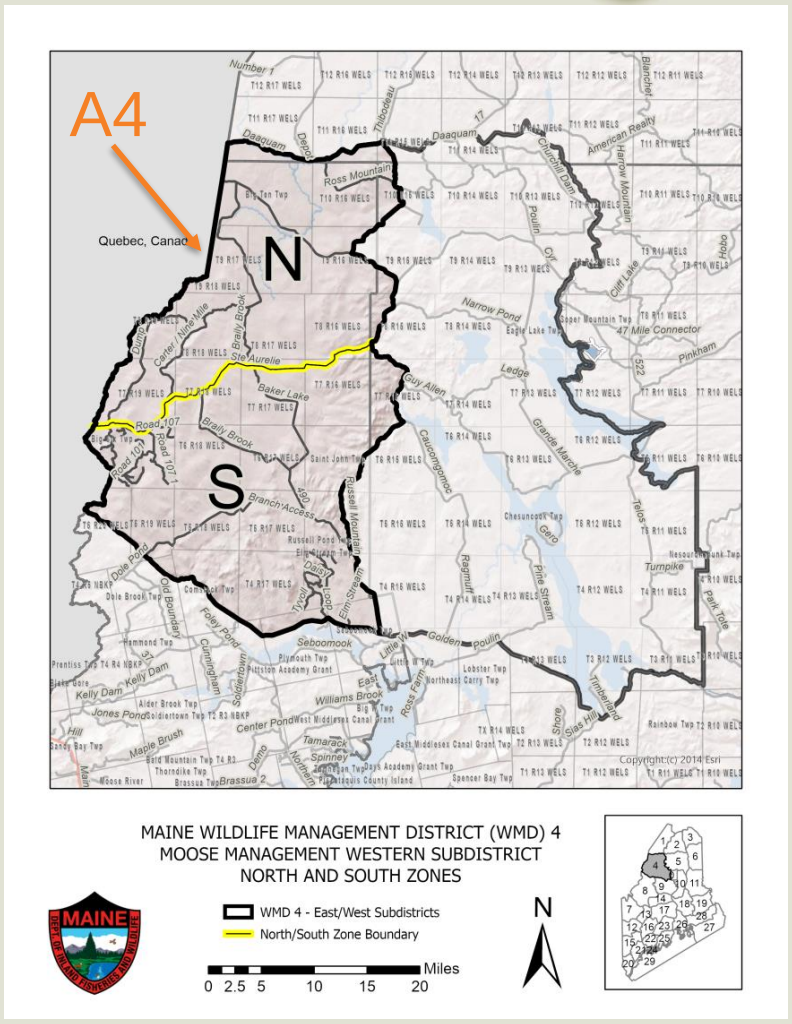
MOOSE CORE RANGE



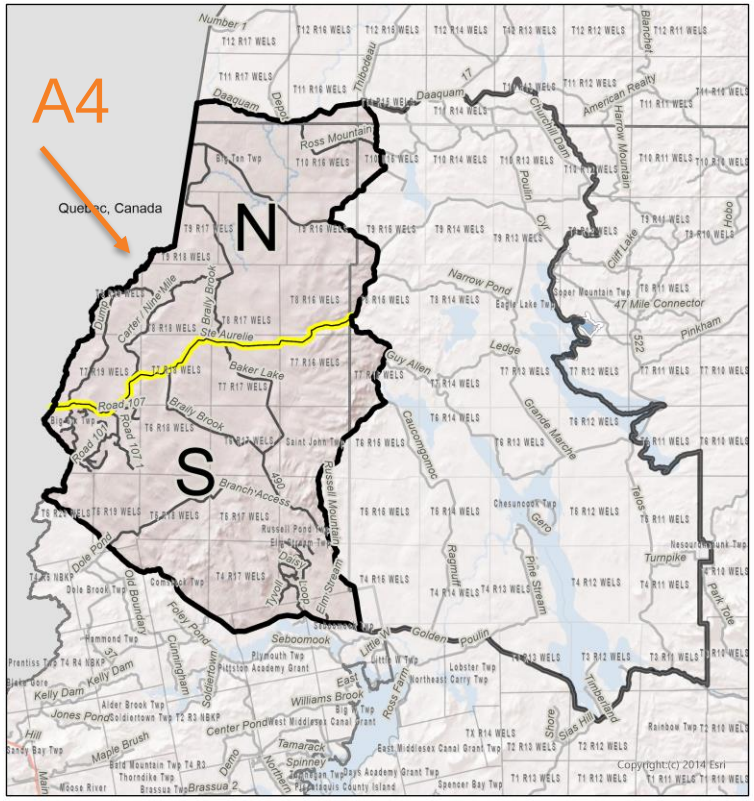
- Adaptive Unit would comprise 6% of core range
- Wildlife Management Districts 1-11, and 19
  - Mostly Commercial Forestlands
- ~16,000 Sq. mi.
- State of NH is ~9,000+ Sq. mi.

ADAPTIVE UNIT OBJECTIVE

- Adaptive unit (A4), divide WMD 4 in half
  - A4: the adaptive management zone
    - Currently ~8 moose/sq. mi
    - Increase antlerless permits
    - Reduce moose density (1-2/sq. mi.) to
      - decrease winter tick mortalities and increase annual productivity
  - WMD 4 traditional hunt
    - East side currently ~4 moose/sq. mi.
    - Management remains as specified in the 2017 Big Game Plan Management Plan (MDIFW 2017) goals



WMD 4
(West side Adaptive Unit (A4) and N/S Division)

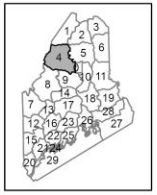


MAINE WILDLIFE MANAGEMENT DISTRICT (WMD) 4
MOOSE MANAGEMENT WESTERN SUBDISTRICT
NORTH AND SOUTH ZONES

WMD 4 - East/West Subdistricts
North/South Zone Boundary

Miles
0 2.5 5 10 15 20

N



- WMD 4: 2,000 square miles
- WMD 4 maintains traditional hunt
- West side/A4 (~1,000 sq. mi)
- Hunters will be placed either north or south

ADAPTIVE UNIT FRAMEWORK

Proposed hunt framework 2021-2025:

- Traditional September bull
- Traditional October bull
- Three additional 6-day cow hunts starting mid-October/early November
- No overlap between bull hunters and cow hunters during the same week

- Sept Bull WMD 4
  - 200 Permits
- Oct Bull WMD 4
  - 200 Permits
- Oct Antlerless – Adaptive Unit
  - 200 Permits
- Oct Adaptive Unit and WMD 4
  - Antlerless 150/100 Permits
- Nov Antlerless Adaptive Unit
  - 200 Permits

- Total: 1,050 WMD 4 Permits of which 550 in Adaptive Unit Portion

ADAPTIVE UNIT ASSESSMENT

- GPS collar 60-70 calves/year during the study (starting 2020).
- Collect harvest information: tooth for aging, winter tick counts, ovary and carcass weights
- Conduct annual surveys for abundance and classification (Bulls/cows/calves) aerial surveys.
- Quantify annual reproduction from harvested cows

POTENTIAL OUTCOMES

- Increased harvest does not affect tick numbers or lower calf mortality

OR

- Increased harvest reduces tick numbers and/or calf mortalities/Improves reproduction

AND

- May provide another management tool to maintain a healthy moose population

QUESTIONS