

A Survey of NJ Mosquito Control Agencies Regarding the Management of Ticks and Tick-borne Disease

New Jersey is routinely among the top three states with respect to annual Lyme disease (LD) case reporting. In addition to LD, the blacklegged tick, *Ixodes scapularis*, is the known vector of six other human pathogens. Other human-biting tick vectors in New Jersey include the lone star tick, *Amblyomma americanum*, and the American dog tick, *Dermacentor variabilis*, and the invasive Asian longhorned tick, *Haemaphysalis logicornis*, was recently identified in the state. The high incidence rates for LD and other tick-borne diseases (TBD), combined with a well-established mosquito control community, make New Jersey an ideal place to conduct this survey.

Your responses will serve to identify the current level of engagement in ticks/tick-borne disease-related activities within the state, the level of interest in and capability of assuming the responsibility for a tick/tick-borne disease management program, what that tick/tick-borne disease program would look like, what it would cost, and identifying any constraints or roadblocks to establishing such a tick/tick-borne disease management program.

The survey should take about 20 minutes to complete. Your participation in this survey is voluntary. You may refuse to answer any question and can stop the survey at your discretion. Your responses will remain anonymous and your participation will remain confidential.

1. How would you describe your agency/organization?

- ☐ Independent agency/organization
- ☐ Department/division within a larger agency/organization (e.g., health or public works dept.)
- ☐ Other (please specify)

2. If your agency performs active tick surveillance, how many sites within your jurisdiction are routinely surveyed within a 12 month period?

- ☐ fewer than 5
- ☐ 5 to 10
- ☐ 11 to 20
- ☐ more than 20
- ☐ collection performed as needed with no routine surveillance
- ☐ my agency does not perform tick surveillance

3. What is your responsibility within your agency/organization for vector (mosquito and/or tick) surveillance and/or control activities (select all that apply):

- ☐ I am directly involved in vector surveillance/control activities
- ☐ I supervise others who are directly involved in vector surveillance/control activities
- ☐ I am able to comment on the operation of vector surveillance/control programs

4. Roughly how many full-time employees currently work for your organization?

- ☐ fewer than 5
- ☐ 5 to 10
- ☐ 11 to 20
- ☐ more than 20

5. If you employ seasonal staff, on average how many does your agency employ?

- ☐ fewer than 5
- ☐ 5 to 10
- ☐ 11 to 20
- ☐ more than 20

6. What proportion of your agency's total annual effort is devoted to ticks/tick-borne disease?

- ☐ less than 5%
- ☐ 5 to 10%
- ☐ 11 to 20%
- ☐ greater than 20%

7. Is the time devoted to ticks/tick-borne disease activities uniform throughout the year or seasonal? (please check one)

- ☐ Uniform
- ☐ Seasonal
- ☐ As needed

8. If your program is seasonal, in which seasons is it most active? (please check all that apply)

- ☐ January-March
- ☐ April-June
- ☐ July-September
- ☐ October-December
- ☐ my agency does not have a tick/tick-borne disease program

9. Does your agency currently conduct, or has it previously conducted, any of the following tick/tick-borne disease-related activities (please check all that apply).

- | | |
|--|--|
| <input type="checkbox"/> public outreach (dissemination of educational materials on ticks and/or tick-borne disease to the general public) | <input type="checkbox"/> tick control on public lands |
| <input type="checkbox"/> provide technical advice to homeowners on tick management on their property | <input type="checkbox"/> tick control on private property |
| <input type="checkbox"/> active tick surveillance (collecting ticks in the field) | <input type="checkbox"/> educate field inspectors on tick bite prevention |
| <input type="checkbox"/> tick identification services | <input type="checkbox"/> my agency does not have a tick/tick-borne disease program |
| <input type="checkbox"/> testing services to identify tick-borne pathogens in ticks | |
| <input type="checkbox"/> Other (please specify) | |

10. If your agency does not have a tick/tick-borne diseases program, why not? (please check all that apply)

- | | |
|---|--|
| <input type="checkbox"/> few Lyme disease or other tick-borne disease cases within our jurisdiction | <input type="checkbox"/> lack of personnel trained in tick management |
| <input type="checkbox"/> no mandate to address ticks/tick-borne diseases | <input type="checkbox"/> ticks/tick-borne disease is the responsibility of another agency |
| <input type="checkbox"/> lack of public interest | <input type="checkbox"/> ticks/tick-borne disease is a seasonal concern that doesn't require dedicated staff/funding |
| <input type="checkbox"/> lack of funding | |
| <input type="checkbox"/> Other (please specify) | |

11. In response to the problem of ticks/tick-borne disease, does your agency use:

- ☐ staff assigned to solely address the problem
- ☐ staff assigned as needed to address public concerns
- ☐ my agency does not have a tick/tick-borne disease program
- ☐ Other (please specify)

12. Within your agency, who responds to questions about ticks/tick-borne diseases from the public? (please check all that apply)

- | | |
|---|---|
| <input type="checkbox"/> only senior staff | <input type="checkbox"/> clerical staff |
| <input type="checkbox"/> our tick/tick-borne disease expert | <input type="checkbox"/> my agency does not have a tick/tick-borne diseases program |
| <input type="checkbox"/> person on telephone duty for the day | |
| <input type="checkbox"/> Other (please specify) | |

13. If your agency's tick/tick-borne disease response includes public education, how do you distribute information? (please check all that apply)

- | | |
|--|--|
| <input type="checkbox"/> hand-out or mailing of brochures and pamphlets | <input type="checkbox"/> consultation with the medical community |
| <input type="checkbox"/> provision of information via website | <input type="checkbox"/> my agency does not provide public education on ticks/tick-borne disease |
| <input type="checkbox"/> public presentations (e.g., school assemblies, town meetings) | |
| <input type="checkbox"/> Other (please specify) | |

14. If your agency's tick/tick-borne disease response includes public education, what subjects are included in distributed materials (please check all that apply)

- | | |
|--|--|
| <input type="checkbox"/> description of signs/symptoms and treatment of tick-borne diseases | <input type="checkbox"/> tick control methods |
| <input type="checkbox"/> identification of tick habitats | <input type="checkbox"/> pesticide recommendations |
| <input type="checkbox"/> tick encounter prevention methods (avoidance of tick habitat, tick checks, repellent use, dressing appropriately) | <input type="checkbox"/> repellent recommendations |
| <input type="checkbox"/> tick biology, behavior, and ecology | <input type="checkbox"/> my agency does not provide public education on ticks/tick-borne disease |
| <input type="checkbox"/> Other (please specify) | |

15. If your agency's tick/tick-borne disease program has a public education component, roughly how often do you update the information?

- ☐ every year
- ☐ every two years
- ☐ between 3-5 years
- ☐ other (please specify)
- ☐ more than 5 years
- ☐ as necessary
- ☐ my agency does not provide public education on ticks/tick-borne disease

16. Does your agency maintain its own ticks/tick-borne disease website or other web content, or do you link to another site?

- ☐ we maintain our own web content
- ☐ we link to another web content
- ☐ both
- ☐ neither

17. From what sources does your agency routinely obtain information about ticks/tick-borne diseases? (please check all that apply)

- ☐ medical and scientific journals
- ☐ NJDOH
- ☐ CDC, NIH, or other federal government sources
- ☐ universities/colleges
- ☐ cooperative extension service
- ☐ other (please specify)
- ☐ professional conferences/meetings
- ☐ Lyme disease support groups/organizations
- ☐ news or social media
- ☐ my agency does not provide public education on ticks/tick-borne disease

18. How does your agency update staff on new information about ticks/tick-borne disease risk? (please check all that apply)

- ☐ in-house training by our tick/tick-borne disease or outside expert
- ☐ attending professional meetings or training sessions
- ☐ periodic distribution of technical information
- ☐ my agency does not have a tick/tick-borne disease program
- ☐ Other (please specify)

19. Does your agency perform active tick surveillance (collection of ticks from the environment)?

- ☐ Yes
- ☐ No

20. If your agency performs active tick surveillance, how often are these sites surveyed?

- ☐ once per year
- ☐ twice per year
- ☐ three or more times per year
- ☐ collections performed as needed with no routine surveillance
- ☐ my agency does not perform active tick surveillance

21. If your agency performs active tick surveillance, what tick stages are targeted? (please check all that apply)

- ☐ Nymph
- ☐ Adult
- ☐ Larva
- ☐ my agency does not perform active tick surveillance

22. If your agency performs active tick surveillance, what are the goals? (please check all that apply)

- ☐ determine geographical distribution of ticks
- ☐ determine changes in tick populations over time as a measure of disease transmission risk
- ☐ identify new tick species
- ☐ determine presence and distribution of tick-borne pathogens
- ☐ my agency does not perform active tick surveillance
- ☐ other (please specify)

23. If your agency performs active tick surveillance, how many sites within your jurisdiction are routinely surveyed within a 12 month period?

- ☐ Fewer than 5
- ☐ 5 to 10
- ☐ 11 to 20
- ☐ More than 20
- ☐ Collection performed as needed with no routine surveillance
- ☐ my agency does not perform active tick surveillance

24. If your agency performs active tick surveillance, how often are these sites surveyed?

- ☐ once per year
- ☐ twice per year
- ☐ three or more times per year
- ☐ collections performed as needed with no routine surveillance
- ☐ my agency does not perform active tick surveillance

25. If your agency performs active tick surveillance, what tick stages are targeted? (please check all that apply)

- ☐ Nymph
- ☐ Adult
- ☐ Larva
- ☐ my agency does not perform active tick surveillance

26. If your agency performs active tick surveillance, what are the goals? (please check all that apply)

- ☐ determine geographical distribution of ticks
- ☐ determine changes in tick populations over time as a measure of disease transmission risk
- ☐ identify new tick species
- ☐ determine presence and distribution of tick-borne pathogens
- ☐ my agency does not perform active tick surveillance
- ☐ other (please specify)

27. How familiar are you with each of the following tick control methods?

	Very familiar	Somewhat familiar	Unfamiliar
Synthetic pesticides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Natural product pesticides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Entomopathogenic fungal pesticides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thermacell or Damminix Tick Tubes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Select TCS rodent bait boxes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4-Poster deer treatment device	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Deer population reduction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Installation of deer fencing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Landscape management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

28. If your agency provides public information on tick control, what methods are covered? (please check all that apply)

- | | |
|--|--|
| <input type="checkbox"/> application of conventional synthetic pesticides | <input type="checkbox"/> deployment of 4-Poster deer bait stations |
| <input type="checkbox"/> application of natural, plant-derived (eco-friendly) pesticides | <input type="checkbox"/> deer population reduction |
| <input type="checkbox"/> application of entomopathogenic fungi | <input type="checkbox"/> installation of deer fencing |
| <input type="checkbox"/> deployment of Thermacell or Damminix Tick Tubes | <input type="checkbox"/> landscape management |
| <input type="checkbox"/> deployment of Select TCS rodent bait boxes | <input type="checkbox"/> my agency does not offer guidance/recommendations on tick control |

29. If your agency does not provide information about tick control, why not?(please check all that apply)

- ☐ concerns about legal liability from providing the information
- ☐ lack of expertise regarding tick control methods/effectiveness
- ☐ recommending tick control is the responsibility of other agencies
- ☐ my agency does not have a ticks/tick-borne disease program

30. Assuming information was readily available on the various tick control methods, on what basis would you select methods for inclusion in an integrated tick management program? (please rank with 1 being highest)



efficacy



cost



ease of application or deployment



environmental considerations

31. Does your agency provide actual tick control services within your jurisdiction?

☐

Yes

☐

No

32. If your agency provides actual tick control services within your jurisdiction, where does your agency control ticks?

☐

public lands only

☐

private property only

☐

both public and private property

☐

my agency does not provide tick control services

33. If your agency does not provide actual tick control services within your jurisdiction, why not? (please check all that apply)

☐

insufficient technical expertise/experience

☐

too costly

☐

lack of public support/adverse public perceptions

☐

vector control should be the responsibility of another agency

☐

too many legal issues

☐

my agency does not have a tick/tick-borne disease program

☐

logistically difficult

☐

other (please specify)

34. If your agency has previously been involved in tick surveillance/control activities at any time, how was it funded? (please check all that apply):

- | | |
|--|---|
| <input type="checkbox"/> local or county tax-based funding | <input type="checkbox"/> state funded through a grant(s) |
| <input type="checkbox"/> local or county funded through a grant(s) | <input type="checkbox"/> federal cooperative agreement or grant funding |
| <input type="checkbox"/> other local or county funding | <input type="checkbox"/> my agency has not conducted tick surveillance/control activities |
| <input type="checkbox"/> state funded through appropriations | |
| <input type="checkbox"/> other (please specify) | |

35. Were the tick surveillance/control activities conducted with other partners? (please check all that apply):

- ☐ academic institution
- ☐ state agency
- ☐ other local or county agency
- ☐ outside contractors (e.g. pest control firms)
- ☐ my agency has not conducted tick surveillance/control activities
- ☐ other (please specify)

36. If your agency was given adequate resources, how interested would you be in creating or expanding your current program to address ticks/tick-borne diseases?

- ☐ very interested (ticks are a major problem/concern in our jurisdiction)
- ☐ moderately interested
- ☐ not interested

37. How would you rate your agency's current capacity to create or expand a program to address ticks/tick-borne diseases?

- ☐ high (we have the tools, we have the talent)
- ☐ moderate (staff will require some training)
- ☐ low (no trained staff)

38. What are the barriers that might prevent your agency from creating and sustaining a program to address the problem of ticks and tick-borne disease within your jurisdiction? (please rate the following)

	Major Barrier	Minor Barrier	Not a Barrier
little public support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
absence of sustainable funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
lack of trained personnel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
lack of facilities/equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
unreasonable public expectations of controlling ticks versus mosquitoes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
work-related conflicts regarding seasonality of ticks versus mosquitoes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
legal constraints on managing ticks on private properties	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
lack of best management practices for tick control	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
lack of standardized tick surveillance across agencies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
technical issues regarding efficacy of tick control measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
absence of state and/or federal oversight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
my agency is not interested in creating a tick/tick-borne disease program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

other (please specify)

39. If you were creating a tick and tick-borne disease management program within your agency, what components would you include? (please check and rate all that apply: 1 = least likely to include, 5 = most likely to include)

	1	2	3	4	5
public education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
detect the presence of vector ticks by species	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
map presence and abundance of ticks by species	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
monitor current and future distribution of ticks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
monitor emergence of new tick species	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
detect the presence and prevalence of tick-borne pathogens in ticks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
assess and map the risk of tick-borne disease to humans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
provide tick identification services to the public	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
provide testing services to identify tick-borne pathogens to the public	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
conduct tick surveys/risk assessment on public lands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
conduct tick surveys/risk assessment on private properties	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
conduct tick control activities on public lands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
conduct tick control activities on private properties	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
my agency is not interested in creating a tick/tick-borne disease program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

40. If you were considering a public education program, what information would it include? (please check all that apply)

- | | |
|---|--|
| <input type="checkbox"/> description of signs/symptoms and treatment of ticks/tick-borne diseases | <input type="checkbox"/> tick control methods |
| <input type="checkbox"/> identification of tick habitats | <input type="checkbox"/> pesticide recommendations |
| <input type="checkbox"/> tick bite prevention methods (avoidance of tick habitat, tick checks, repellent use, dressing appropriately) | <input type="checkbox"/> repellent recommendations |
| <input type="checkbox"/> tick biology, behavior, and ecology | <input type="checkbox"/> my agency is not interested in creating a tick/tick-borne disease program |
| <input type="checkbox"/> other (please specify) | |

41. If you were considering a public education program, what methods would you use to disseminate information? (please check all that apply)

- | | |
|---|--|
| <input type="checkbox"/> hand-out or mailing of brochures and pamphlets | <input type="checkbox"/> school presentations |
| <input type="checkbox"/> provision of information via website | <input type="checkbox"/> interaction with the medical community |
| <input type="checkbox"/> town meetings | <input type="checkbox"/> my agency is not interested in creating a tick/tick-borne disease program |
| <input type="checkbox"/> other (please specify) | |

42. Assuming your agency expanded its response to the problem of ticks/tick-borne disease, would it include performing tick control or assisting with tick control?

- ☐ yes, on public property only
- ☐ yes, on public and private property
- ☐ no, tick control would not be included
- ☐ my agency is not interested in creating or expanding a tick/tick-borne disease program

43. If your agency would not consider performing actual tick control or assisting with tick control, why not? (please check all that apply)

- | | |
|---|---|
| <input type="checkbox"/> technically too difficult | <input type="checkbox"/> logistically too difficult |
| <input type="checkbox"/> public relations nightmare | <input type="checkbox"/> too costly |
| <input type="checkbox"/> too many legal issues | <input type="checkbox"/> tick control should be the responsible of other agencies |
| <input type="checkbox"/> other (please specify) | |

44. Using the responses you provided in previous questions regarding creating or expanding a tick/tick-borne disease management program, what is the approximate annual budget for establishing and maintaining such a program?

- | | |
|---|--|
| <input type="radio"/> Less than \$100,000 | <input type="radio"/> \$400,000 - \$500,000 |
| <input type="radio"/> \$100,000 - \$200,000 | <input type="radio"/> more than \$500,000 |
| <input type="radio"/> \$200,000 - \$300,000 | <input type="radio"/> My agency is not interested in creating or expanding a tick/tick-borne disease program |
| <input type="radio"/> \$300,000 - \$400,000 | |

45. What is the approximate current annual budget for addressing the problem of ticks/tick-borne disease?

- | | |
|---|---|
| <input type="radio"/> Less than \$100,000 | <input type="radio"/> \$400,000 - \$500,000 |
| <input type="radio"/> \$100,000 - \$200,000 | <input type="radio"/> More than \$500,000 |
| <input type="radio"/> \$200,000 - \$300,000 | <input type="radio"/> My agency does not have a tick/tick-borne disease program |
| <input type="radio"/> \$300,000 - \$400,000 | |

46. What in your opinion is the appropriate level of government to assume responsibility for the following tick and tick-borne disease-related activities?

	Local/County	Region (multiple counties)	State
provide technical advice to homeowners on management of their property	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
active tick surveillance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tick identification services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
testing services to identify tick-borne pathogens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tick control on public lands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tick control on private property	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

other activity not included above (please specify)