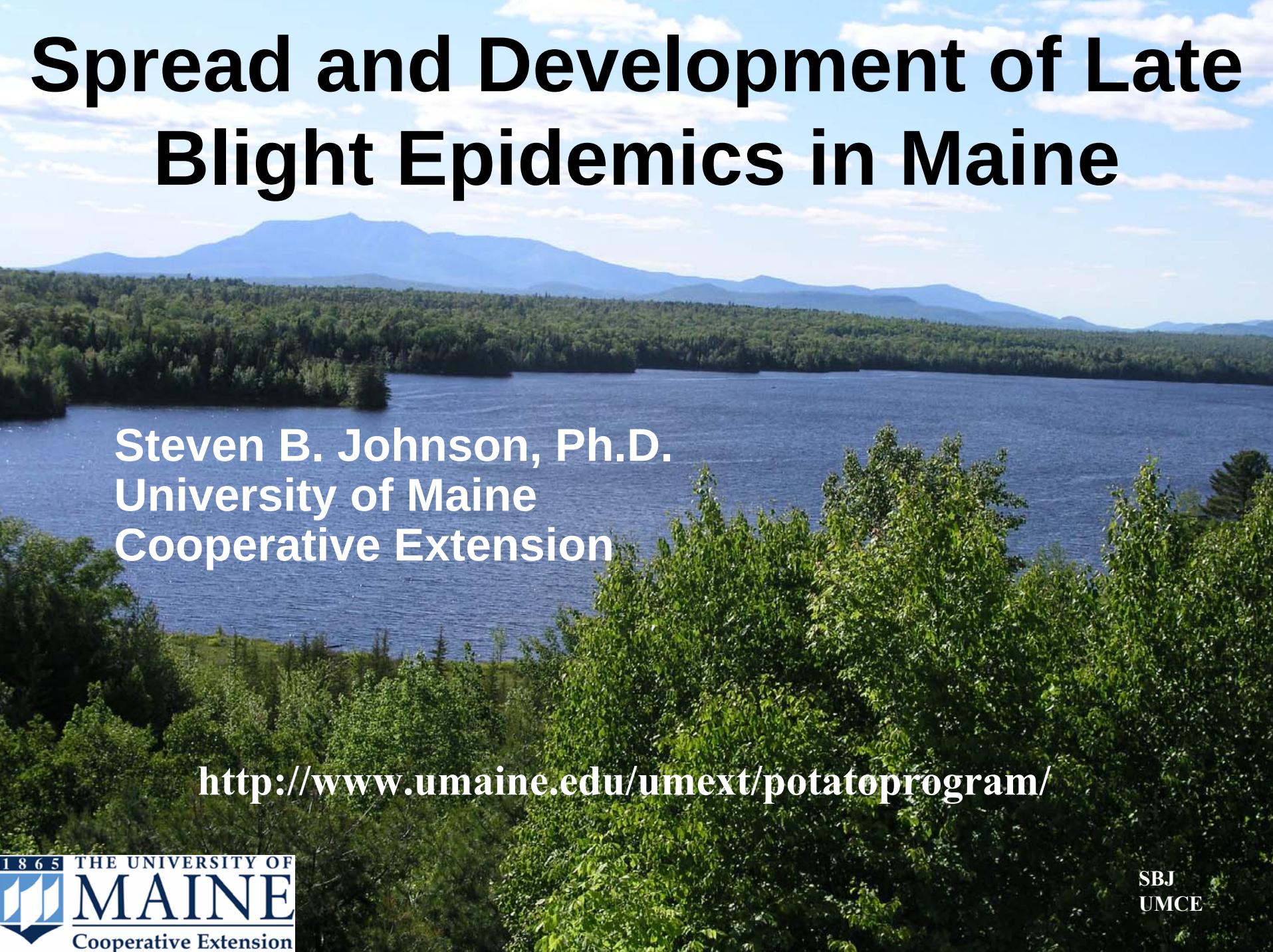
Spread and Development of Late Blight Epidemics in Maine



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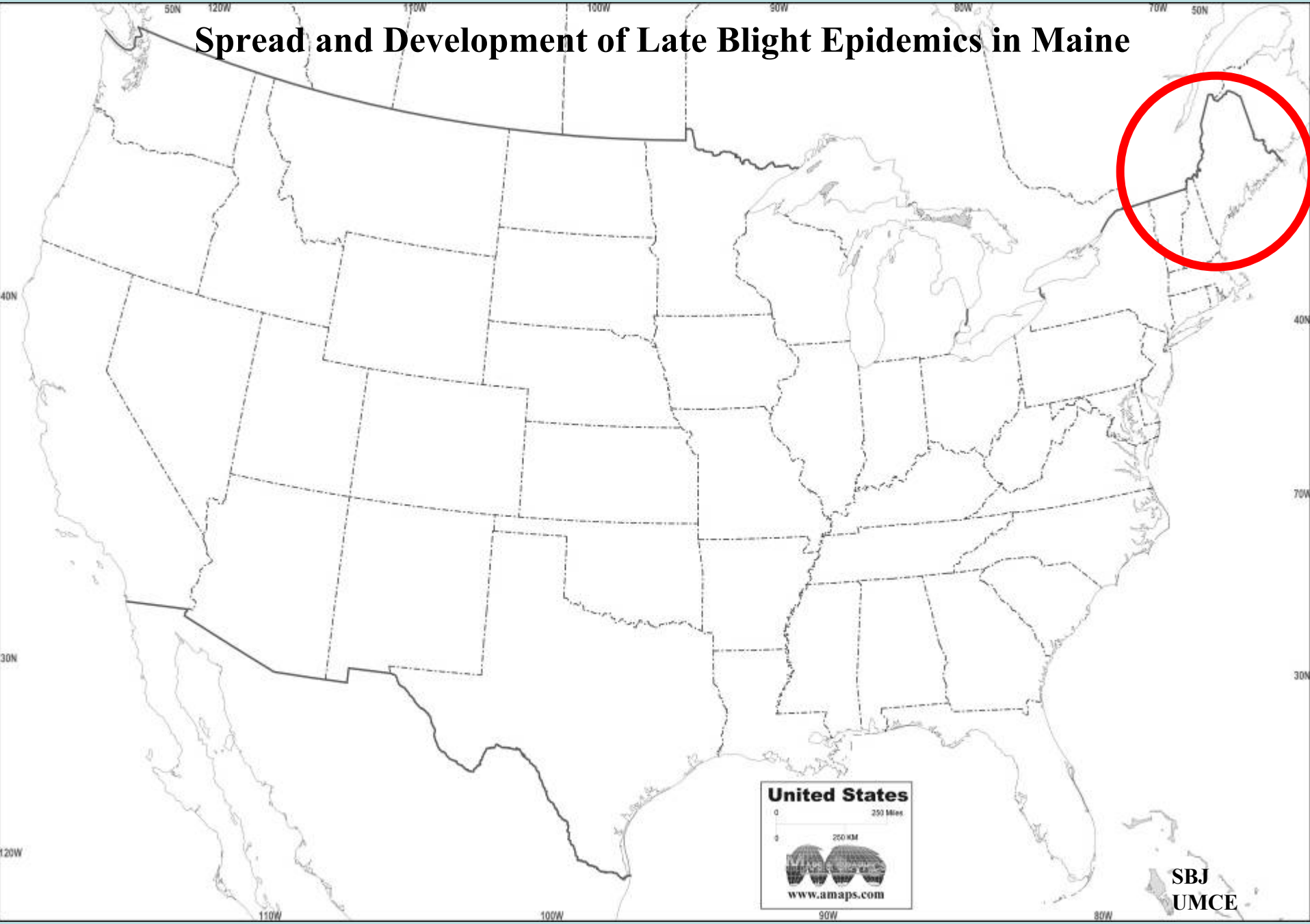
Spread and Development of Late Blight Epidemics in Maine



Spread and Development of Late Blight Epidemics in Maine

Prevention

- Seed screening
- Volunteers
- Cull piles

Prediction

- Source size
- Infection conditions
- Wind direction

Tracking

- Recording infection observations

Key off primary inoculum size distribution

Focus on risk

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Spread and Development of Late Blight Epidemics in Maine

Primary source — **Prevention**

- Known -- not known
- Large -- not large

First spread — **Prevention**

- Early and extensive -- not early and not extensive

Epidemic Spread — **Prediction**

- Active
  - Typical
  - Atypical
  - Rare
- Halted

Host growth — **Prediction**

- Active
- Senescent

Distribution — **Tracking**

- Accurately known -- not accurately known

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Spread and Development of Late Blight Epidemics in Maine

Primary source **Prevention**

Known and not large

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Spread and Development of Late Blight Epidemics in Maine

Primary source **Prevention**

Not known and large

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First spread

Not early

and not extensive

Prevention

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First spread **Prevention**

Early and extensive

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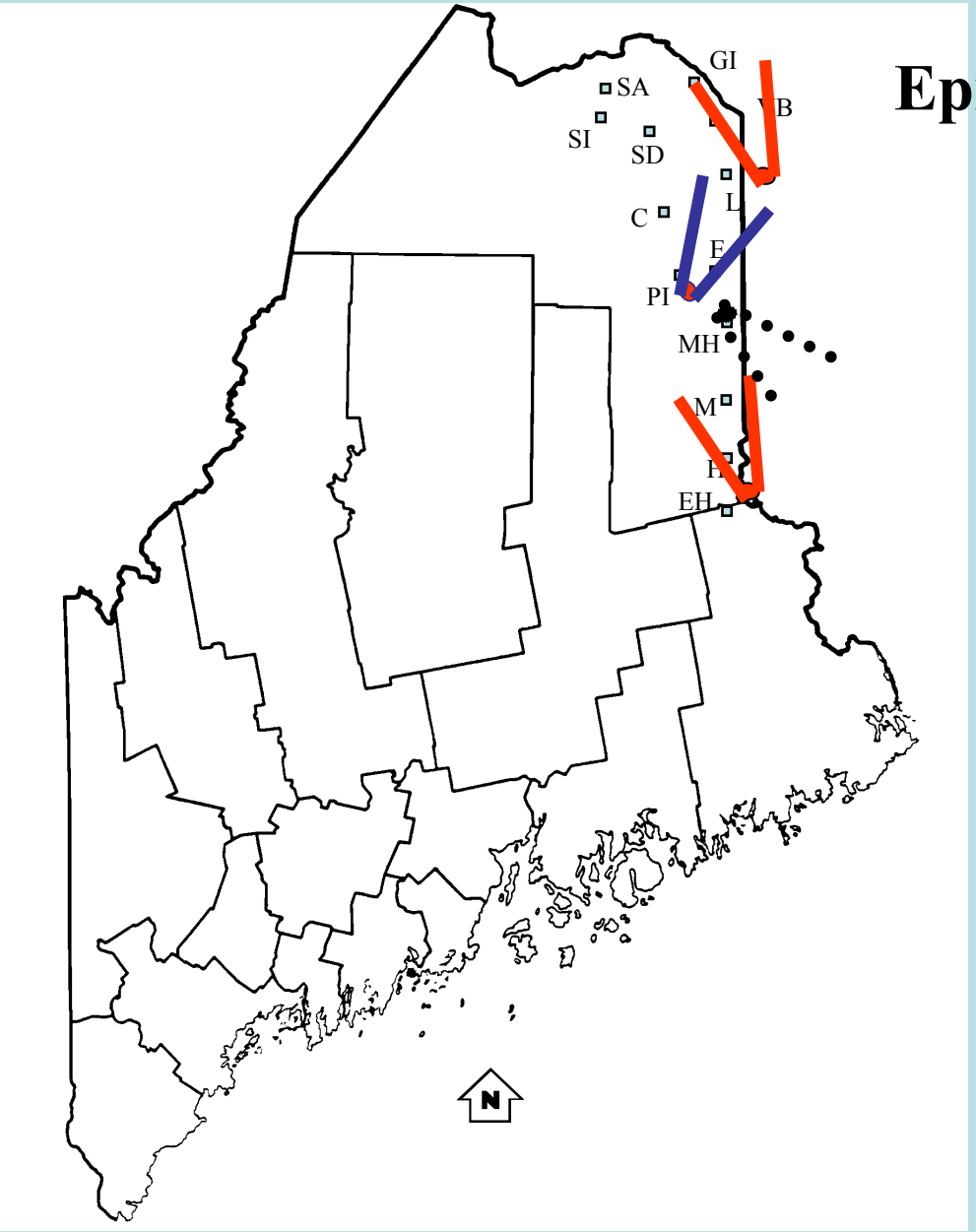

Epidemic Spread **Prediction**

Active

Typical

Atypical

Rare

Halted

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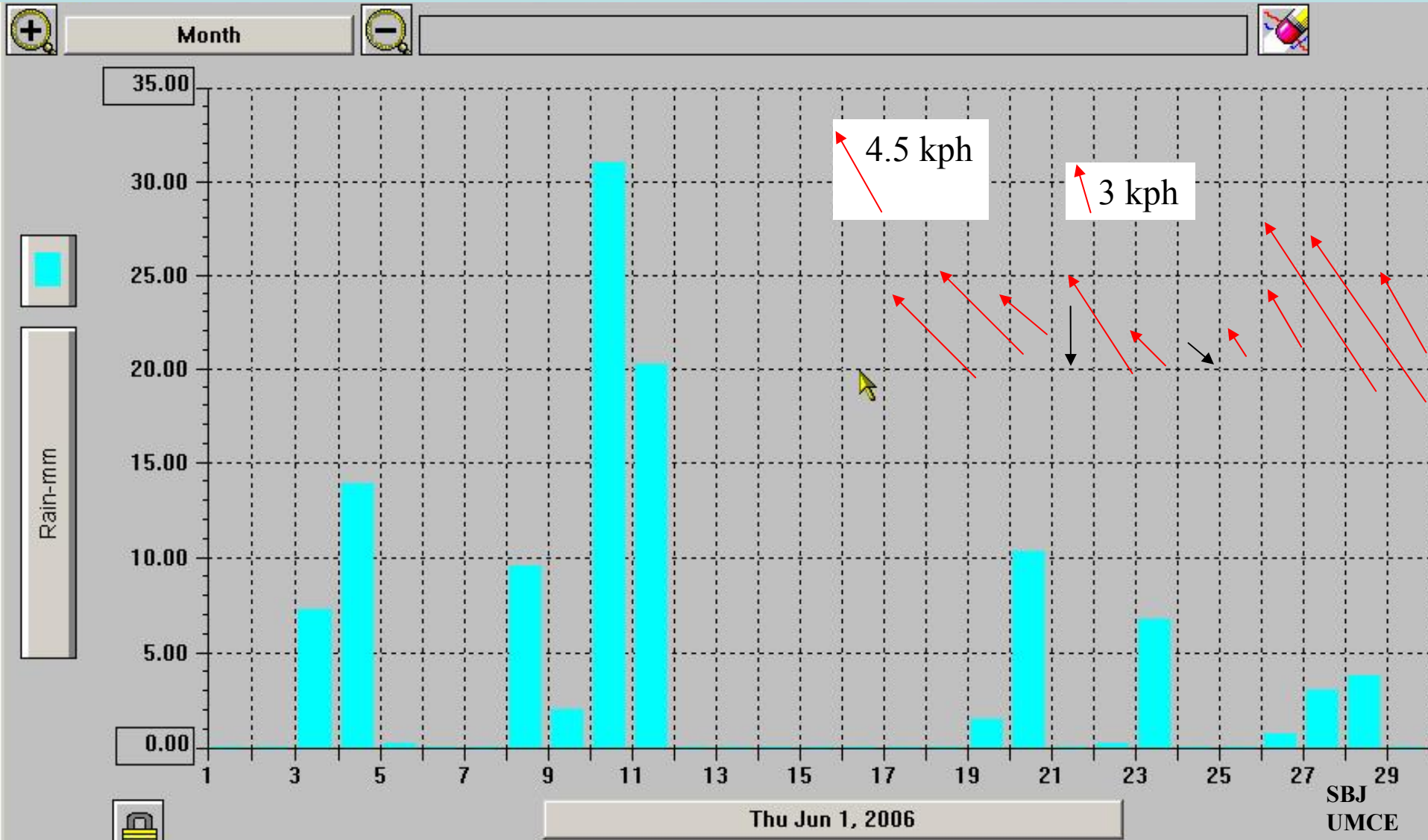
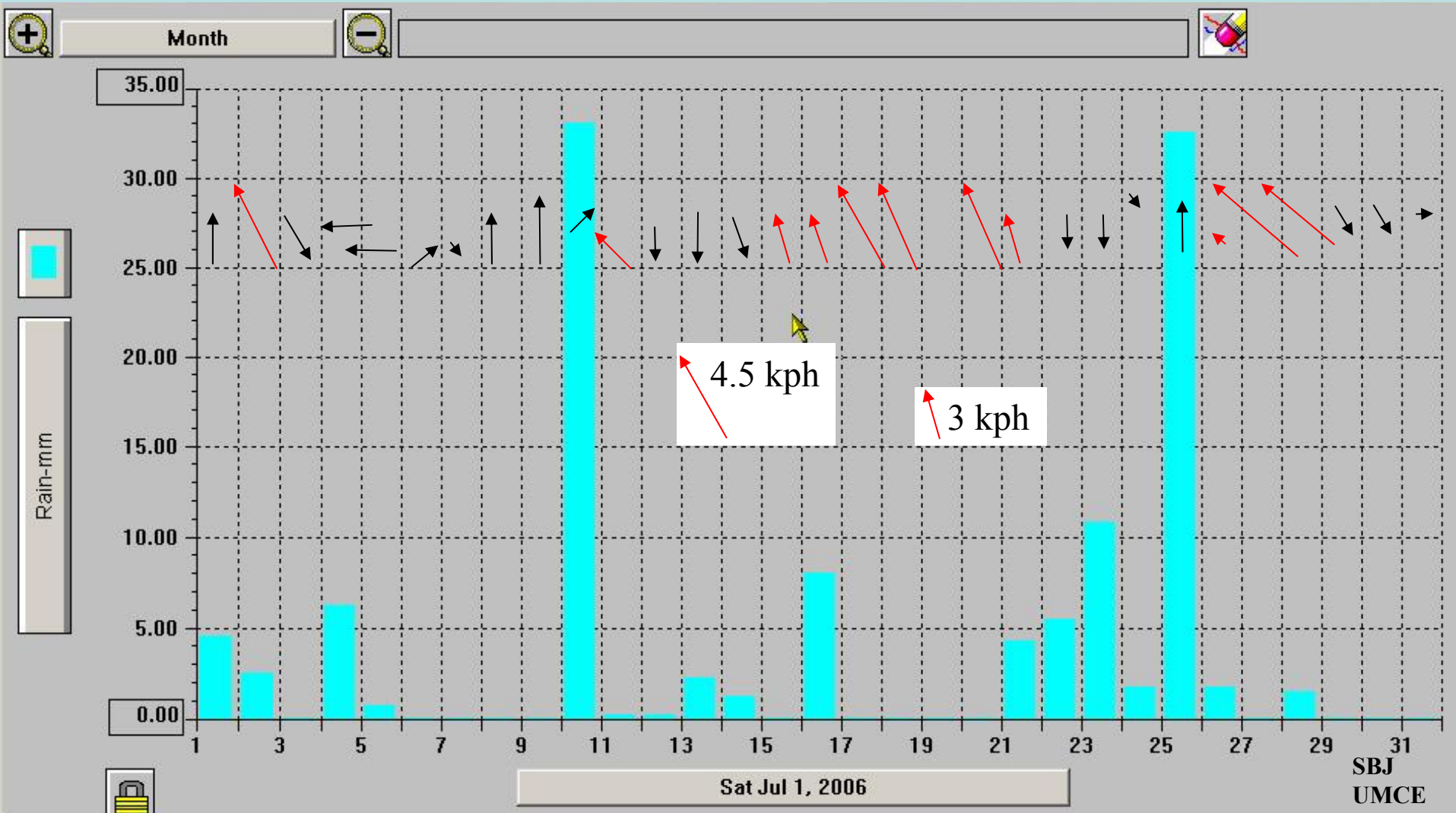
Spread and Development of Late Blight Epidemics in Maine

Epidemic Spread **Prediction**



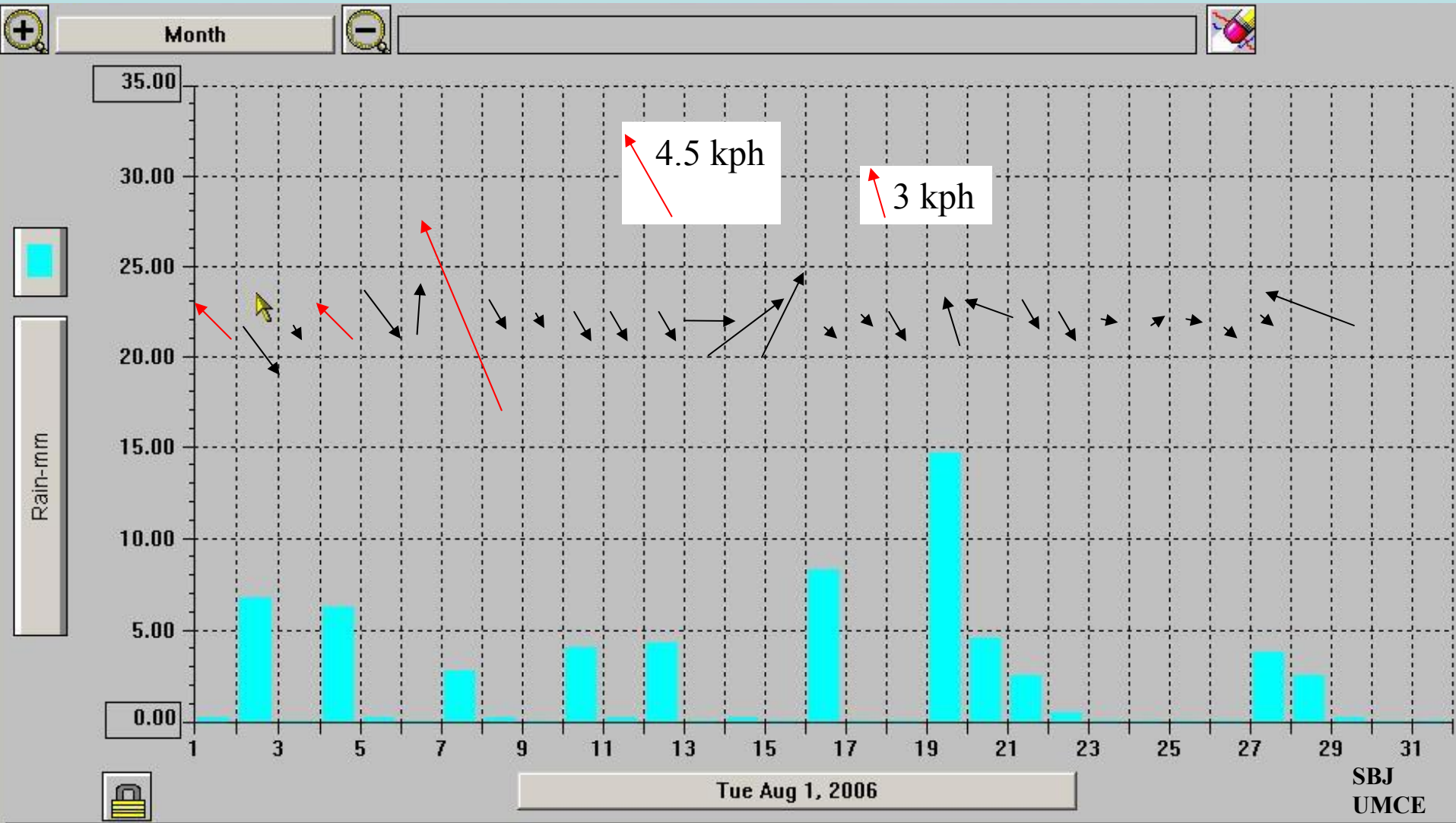
Spread and Development of Late Blight Epidemics in Maine

Epidemic Spread **Prediction**



Spread and Development of Late Blight Epidemics in Maine

Epidemic Spread **Prediction**



Spread and Development of Late Blight Epidemics in Maine

Epidemic Spread	Prediction
Small	Under 9 square meters
Medium	Between 9 and 37 square meters
Large	Between 37 and 900 square meters
Too Big	Over 900 square meters

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Spread and Development of Late Blight Epidemics in Maine

Epidemic Spread Prediction

Source Size Factor

Small	Medium	Large	Too Big
-1	0	area / 900	+1

$$\text{risk} = e^{-1.6*km} + \text{source size}[(1-e^{-1.6*km})*(e^{-1.6*km})]$$

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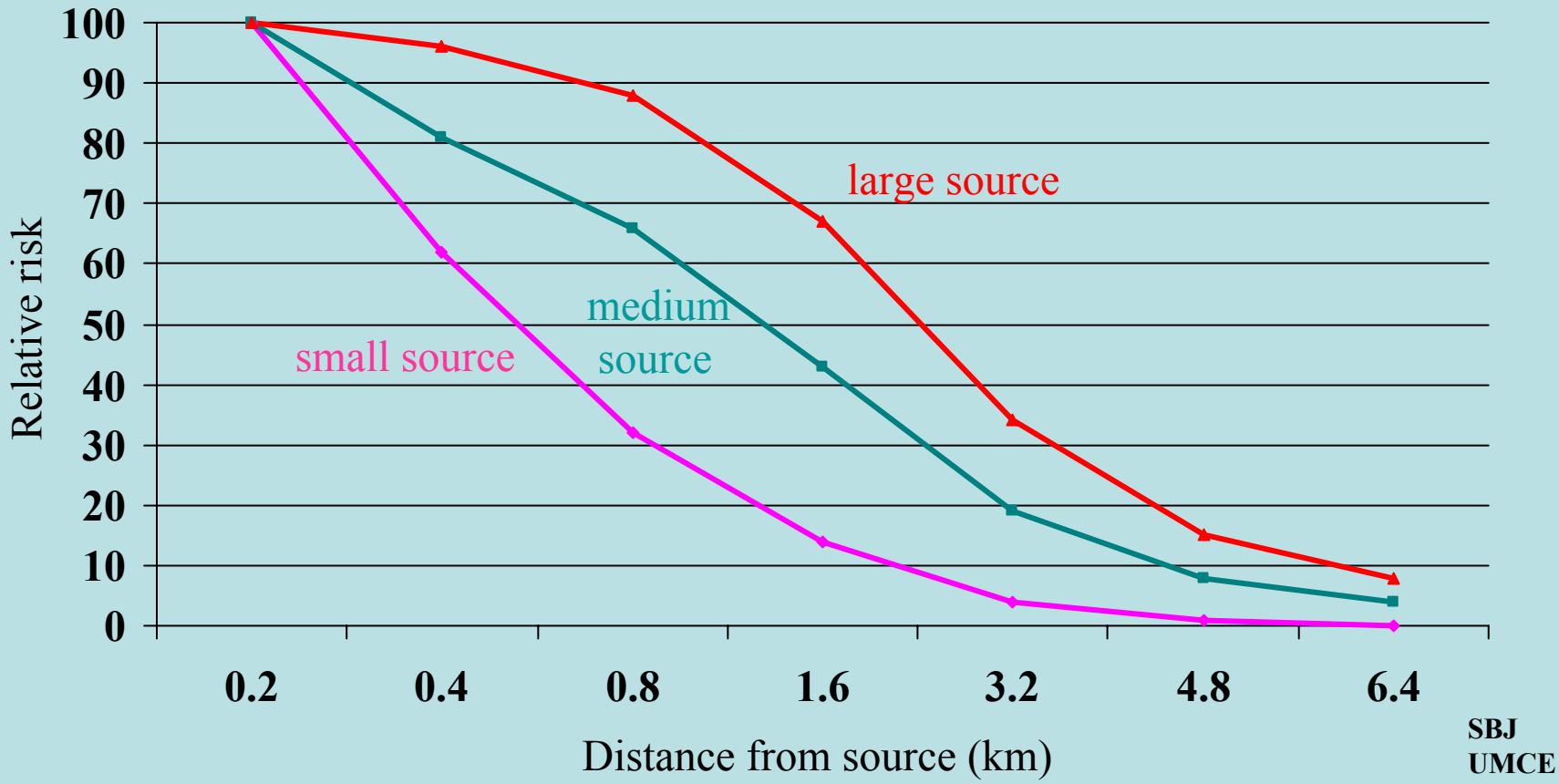
Spread and Development of Late Blight Epidemics in Maine

Epidemic Spread **Prediction**

Source Size Factor

$$risk = e^{-1.6*km} + source\ size[(1-e^{-1.6*km})*(e^{-1.6*km})]$$



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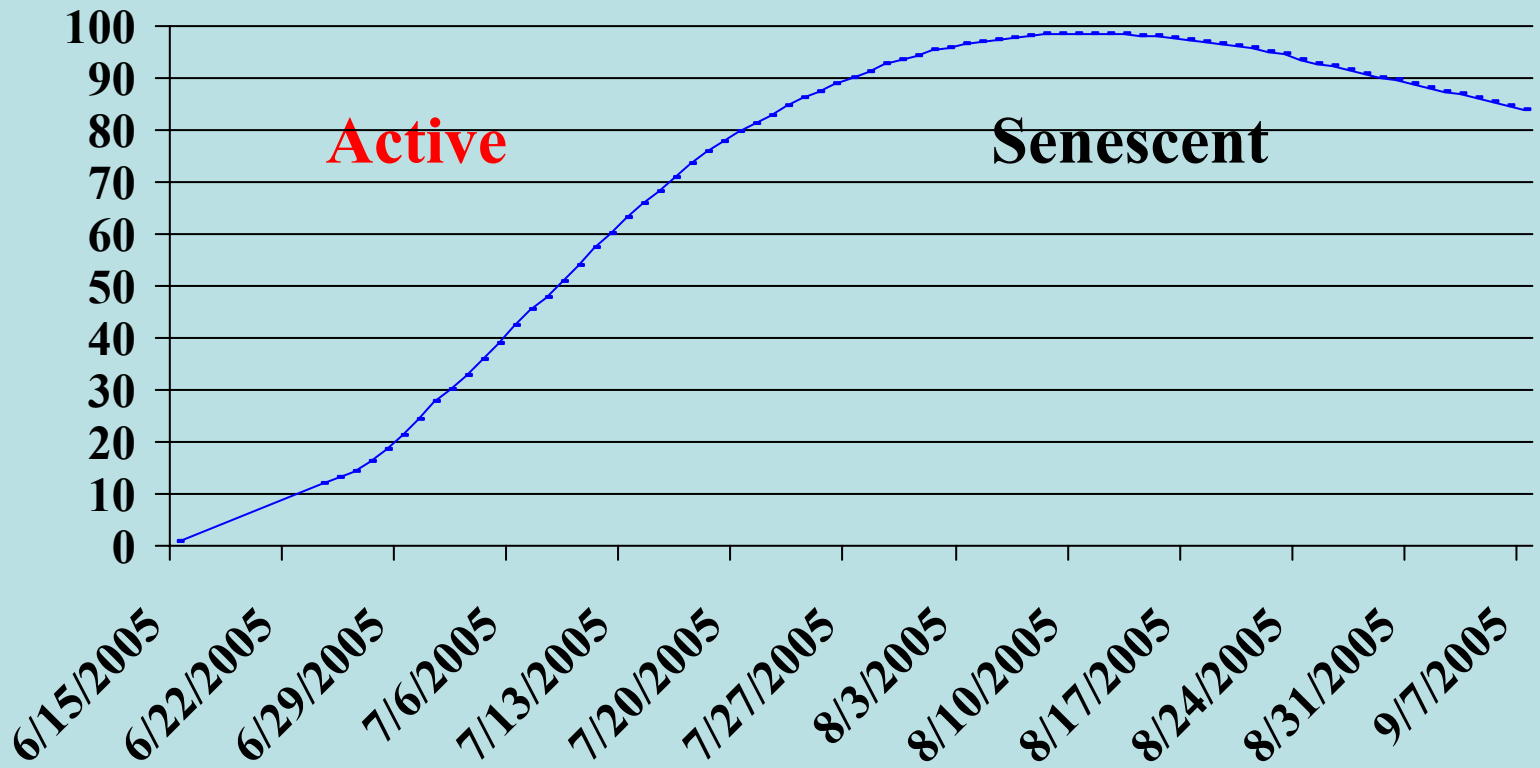
Spread and Development of Late Blight Epidemics in Maine

Host growth **Prediction**



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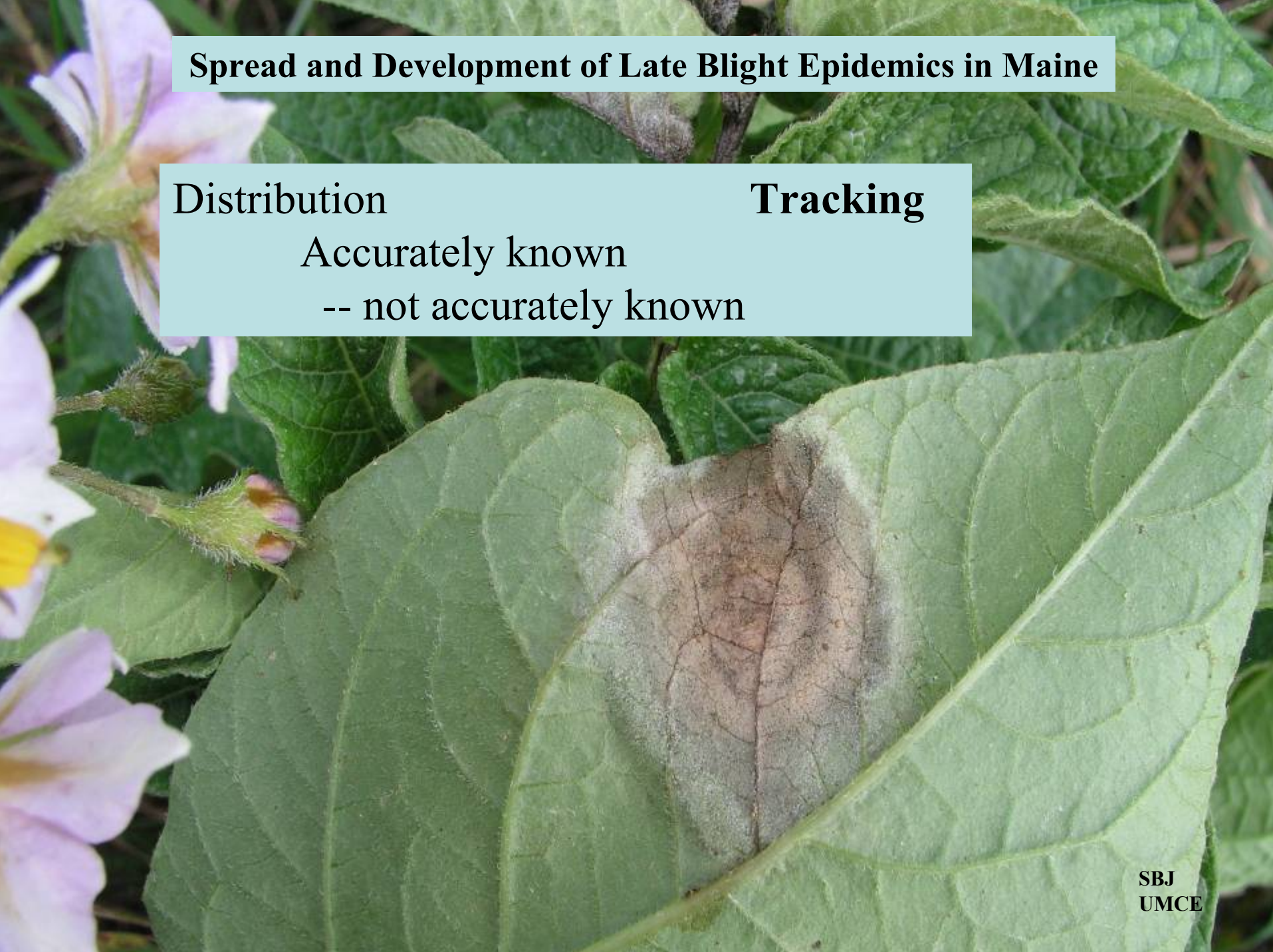

Spread and Development of Late Blight Epidemics in Maine

Distribution **Tracking**

Accurately known

-- not accurately known

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Pulling it together
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Spread and Development of Late Blight Epidemics in Maine

01/7 – 15/7
+ 1 each
LB present in Region last season
LB present in Area last season
LB present on Farm last season
18 Severity Values met
Cull piles in area
LB present in Region
LB present in Area

+ 2
LB present in Field

+1 per day per event
Weather forced longer spray interval than recommended

Risk is a function of primary inoculum, disease distribution, secondary spread, and the effect of host growth

Situation:

DIRE	>6
RISKY	4-6
OK	≤ 3

Damage Potential for LB:

Foliage:	High
Tuber:	Low
Control Target:	Rate of Spread
Control Tactic:	Coverage of new growth
Control Key:	Timing/Rate

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Spread and Development of Late Blight Epidemics in Maine

Risk is a function of primary inoculum, disease distribution, secondary spread, and the affect of current host growth

	≤ 15/6 – 31/6	01/7– 15/7	16/7 – 15/8	16/8 – 31/8	01/9 – ≥ 15/9
Damage Potential for LB:					
Foliage:	Extreme	High	Medium	Medium	Low
Tuber:	Low	Low	Low	Medium	High
Control Target:					
	Initial Inoculum	Rate of Spread	Rate of Spread	Rate of Spread/ Maximum Disease	Maximum Disease
Control Tactic:					
	Coverage of new growth	Coverage of new growth Replacing Eroded Material	Replacing Eroded Material	Replacing Eroded Material Protection of Tubers	Protection of Tubers
Control Key:					
	Timing	Timing/Rate	Rate	Rate/Material	Material

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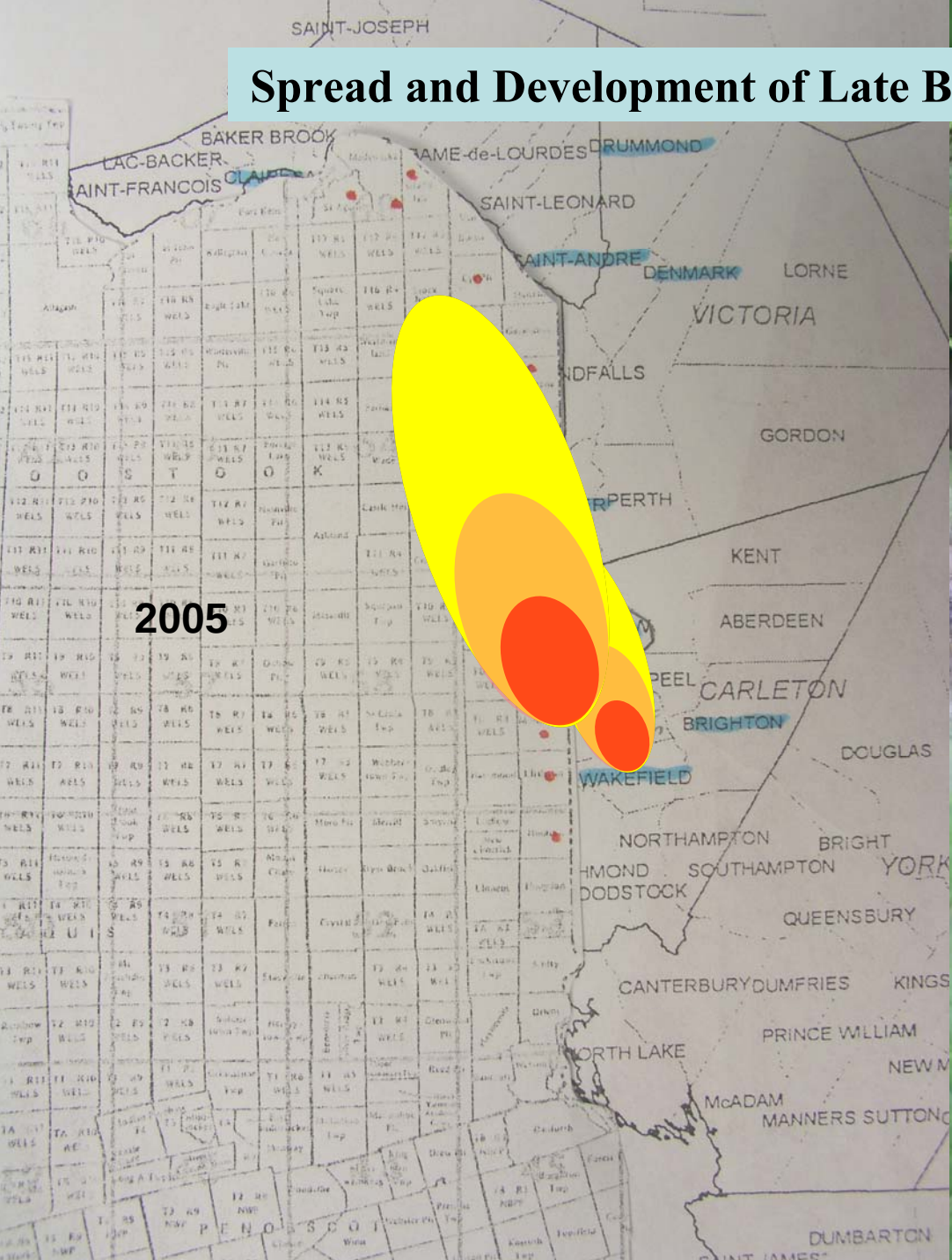

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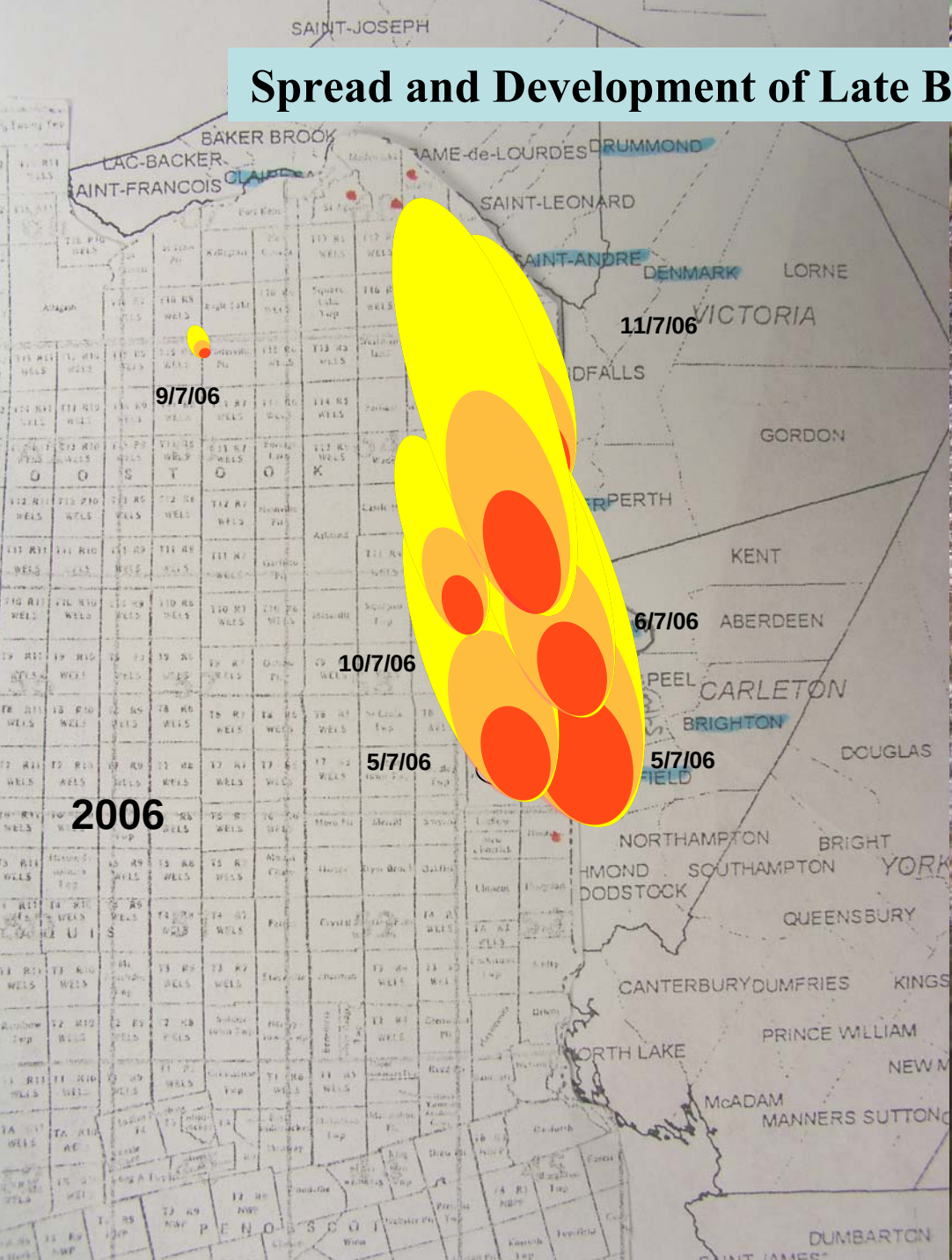

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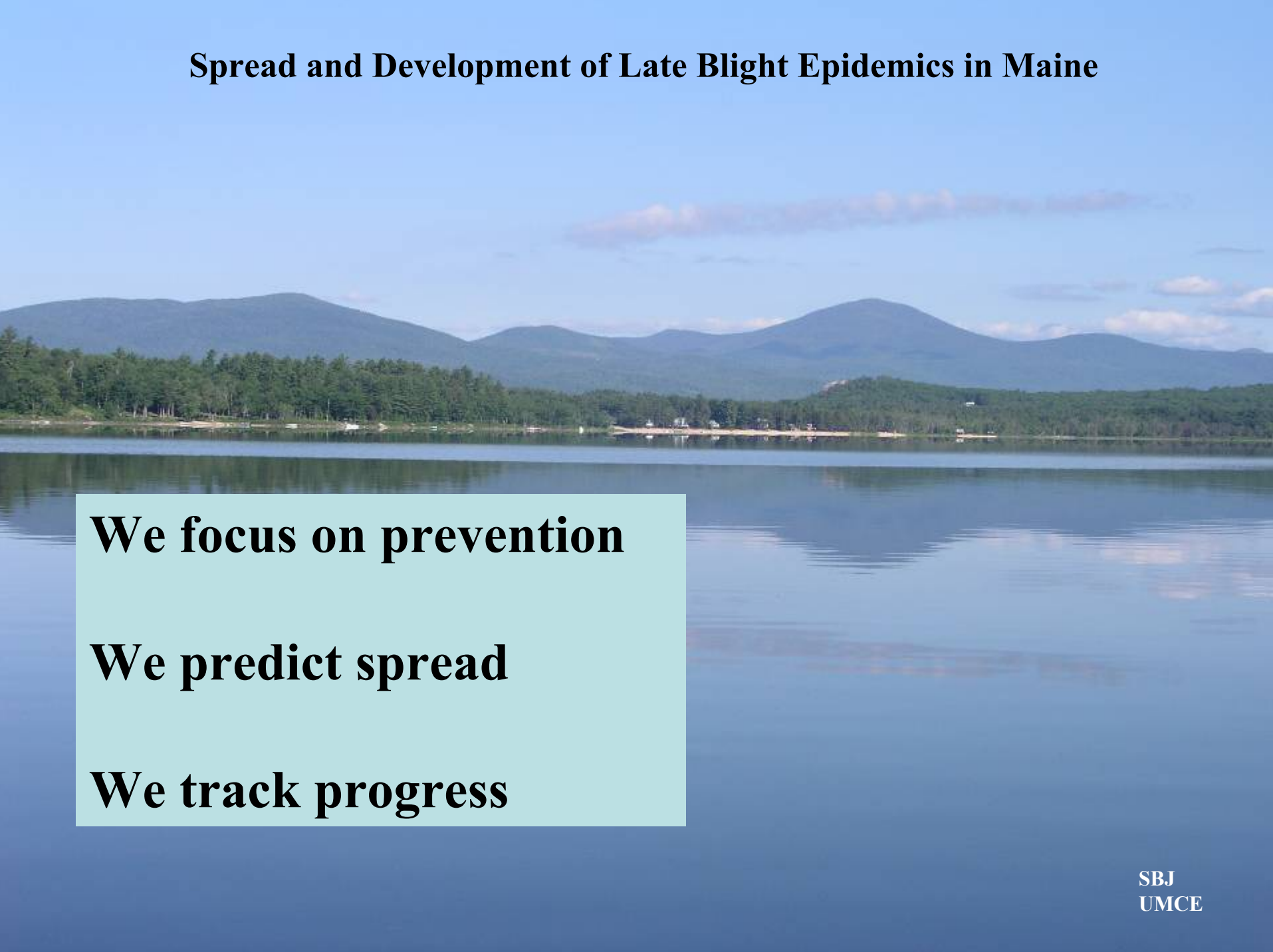

We focus on prevention

We predict spread

We track progress

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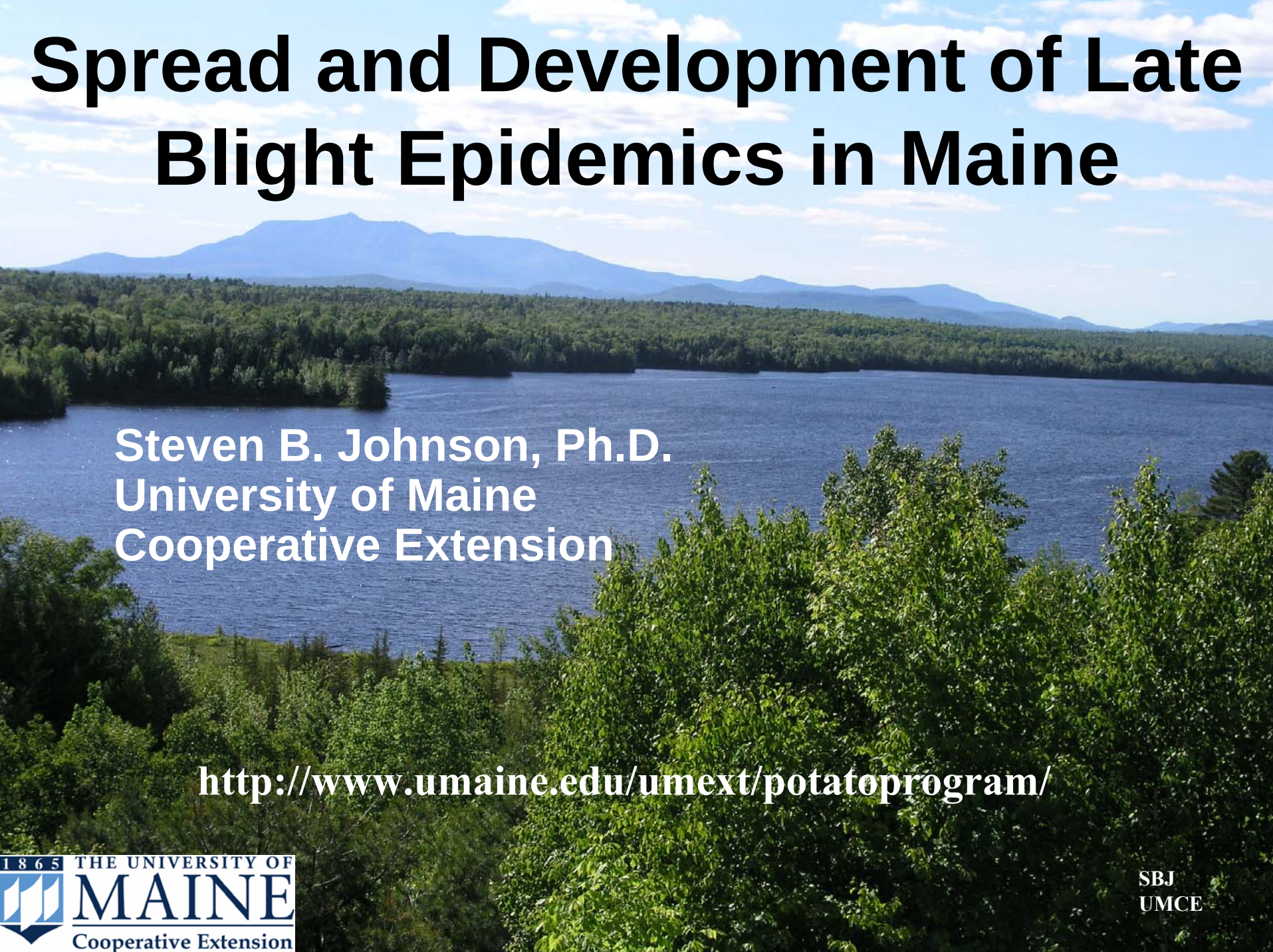

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