

**Milfoil weevil (*Euhrychiopsis lecontei*)  
mass rearing pilot study**

*Lake Holcombe*



Amy Thorstenson  
Golden Sands RC&D Council, Inc.  
April 24, 2015

# Developing Mass Rearing Methods

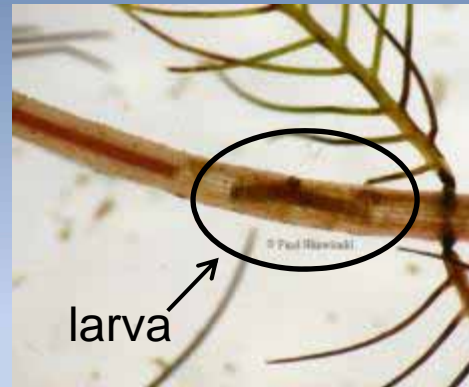
- Purchasing weevils
  - >\$1 per weevil: Cost prohibitive
- Rearing weevils
  - Simple?
  - Cost-effective?
  - Turn \$2K worth of weevils into \$10K worth?



Adam Skadsen

# Milfoil Weevil

(*Eurychiopsis lecontei*)



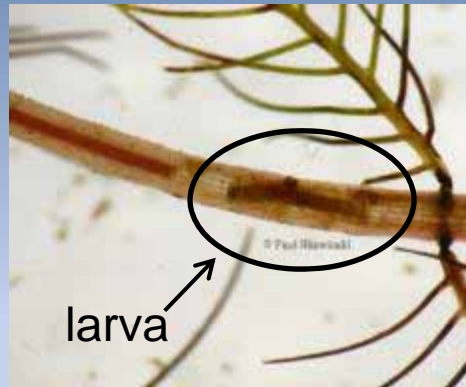
- **Eggs** laid on growing tips
- **Larvae** hatch, mines stem, damages plant the most
- **Pupae** develop within a pupal chamber inside stem

# Milfoil Weevil

(*Eurychiopsis lecontei*)



Paul Skawinski



Paul Skawinski



Adam Skadsen

- **Adults** feed on leaves, lay eggs
  - **Fall** (Sep – Oct) → fly to shore
  - **Winter** → hibernate at the soil/duff interface
  - **Spring** (Apr – May) → fly back to lake

# Developing mass rearing methods

- Developed method method
  - Stock tanks (100 gal)
  - Weevils stocked at 70 per tank
  - EWM stocked at apx. 7 total stems per weevil initially stocked
  - 62 cm EWM stems (about 2 ft)



# Developing mass rearing methods

- Estimated return rate = 9.6
- Cost estimate per weevil = \$0.31/weevil
  - Assumes volunteer labor
  - Year 2, with reused equipment = \$0.14/weevil

# Developing mass rearing methods

- Drawbacks:
  - Weevils go into lake 2 months later
  - Labor intensive (32 weevils per hr invested)
- May be an option for lake groups with more “sweat equity” than cash
- Can volunteers really pull it off?

# Pilot Study 2011-2014

- DNR AIS research grant
  - Minong Flowage
  - Goose Lake
  - Lake Holcombe
  - Perch Lake (BCR)





# Methods

- Tanks set-up in early-June
  - Sunny site
  - Clean, chlorine-free water
  - Cover chambers with screen



# Methods

- Milfoil collected from recipient lake to feed the weevils
- Sorted for healthy stem tips
- Trim to 2' length



# Methods

- Milfoil sprayed to remove debris and insects



# Methods

- Bundled 15 stems together
- Bound to rocks
- 7 bundles into tank





# Methods

- Purchased “starter-stock” weevils from EnviroScience, Inc. (Ohio)
- Stock 70 weevils to each tank (mid-June)
- Feed every 21 days
- Release to lake (Aug)
- Total hold time = 54 days



# Methods

- Release
  - Gently removed from tanks
  - Placed into coolers for transport
  - Gently nestled into thick milfoil beds



# Pilot Study 2013

- Results: **Lake Holcombe**
  - Total released to the lake 2011-2013 = 10,487
  - Group had success in rearing
  - Hot site to accommodate
  - Shade cloth helped considerably
  - 17 day feeding cycle worked well
  - 2014 = not enough EWM left to rear



*Example of weevil larvae  
found in food stems*



**So... what happened in the lake?**

## **Acknowledgements**

### **Team Leaders**

"Doc" Dougherty, Lake Holcombe  
Improvement Assoc (LHIA)

### **Photo Credits**

Paul Skawinski  
Adam Skadsen  
Lake Holcombe Lake District

### **Partner Groups**

Lake Holcombe Association

### **Funding**

DNR Aquatic Invasive  
Species Grant Program

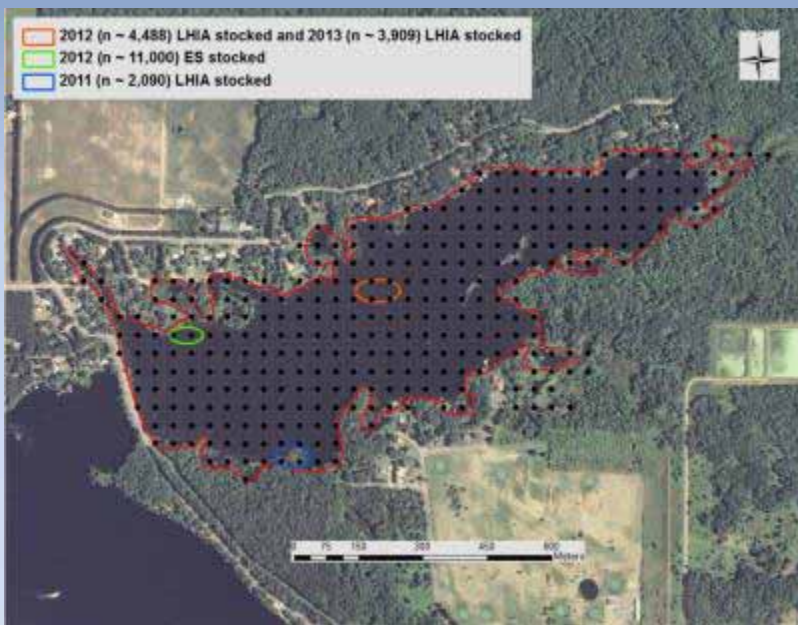


# So... what happened in the lake?



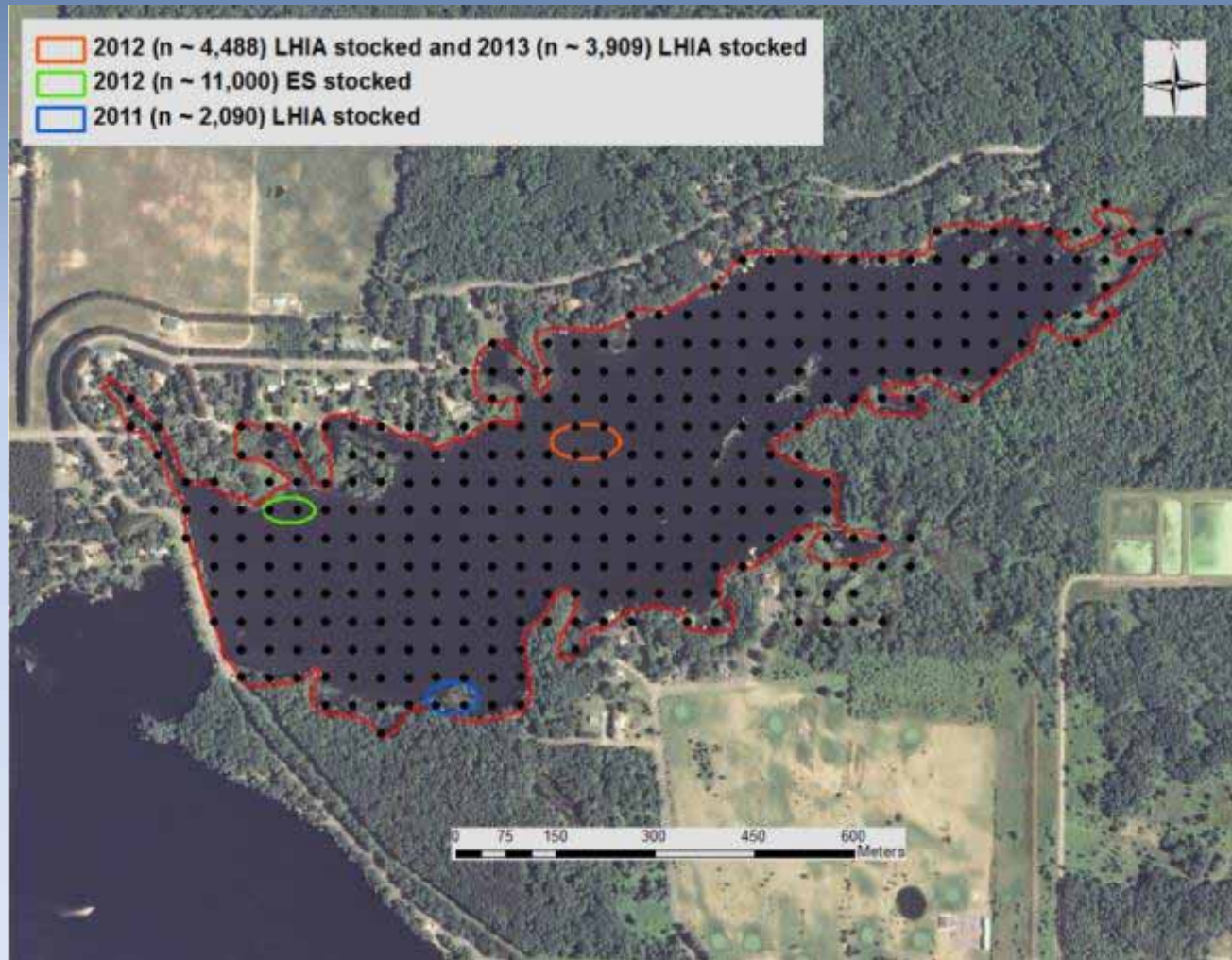
Jodi Lepsch  
Wisconsin Department of Natural Resources  
April 24, 2015

# Methods



- Spring and summer PI surveys
  - 2011-2014
- Two stems of EWM collected at every site
  - 2012-2014
  - Lab inspection for weevil life stages and apical meristems

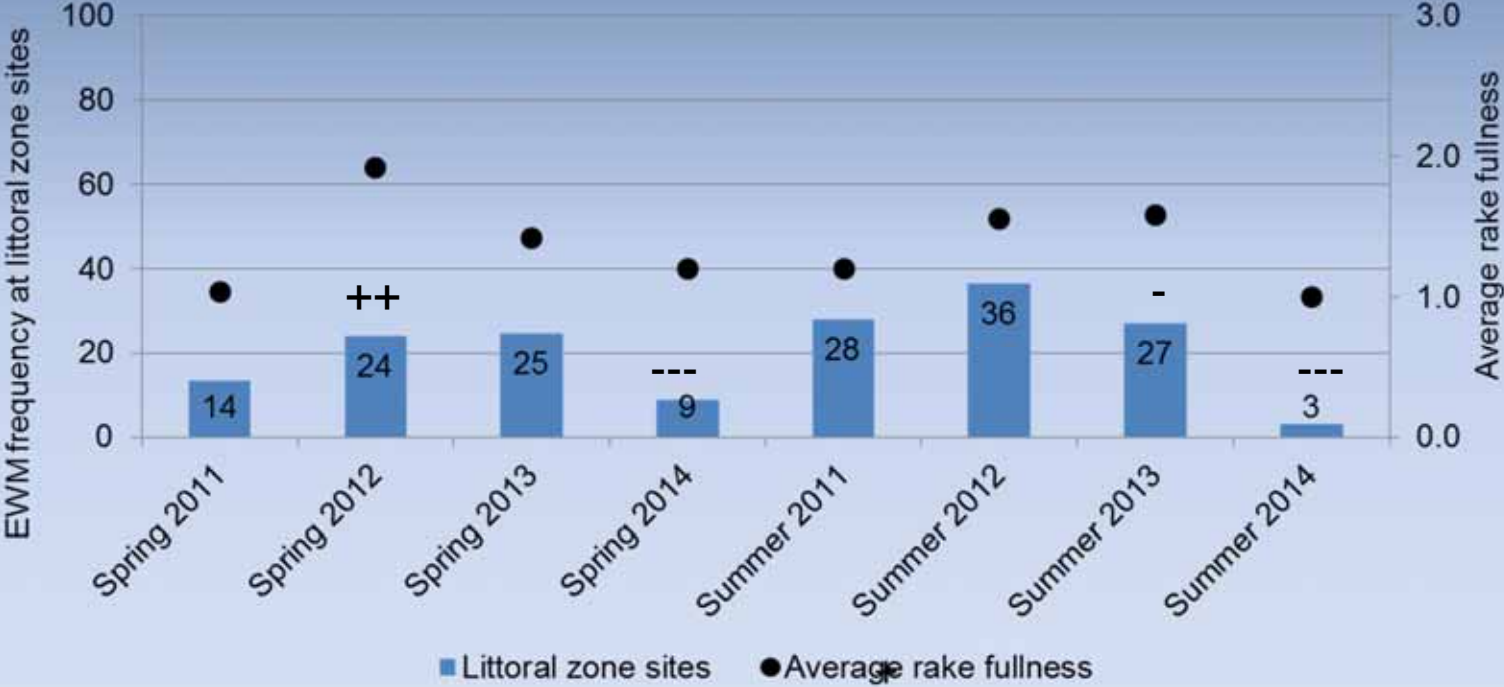
# Weevil Stocking



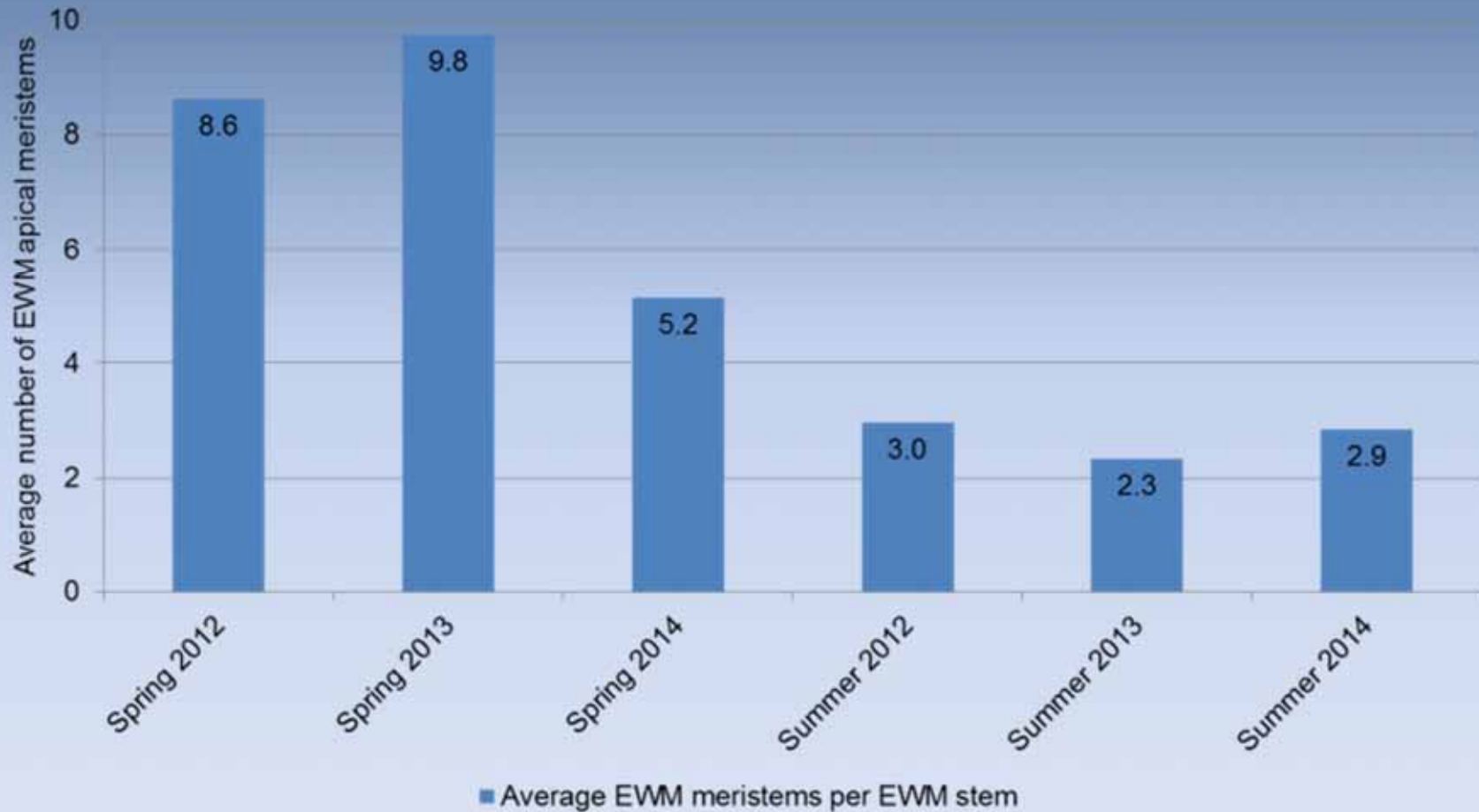


# EWM Frequency

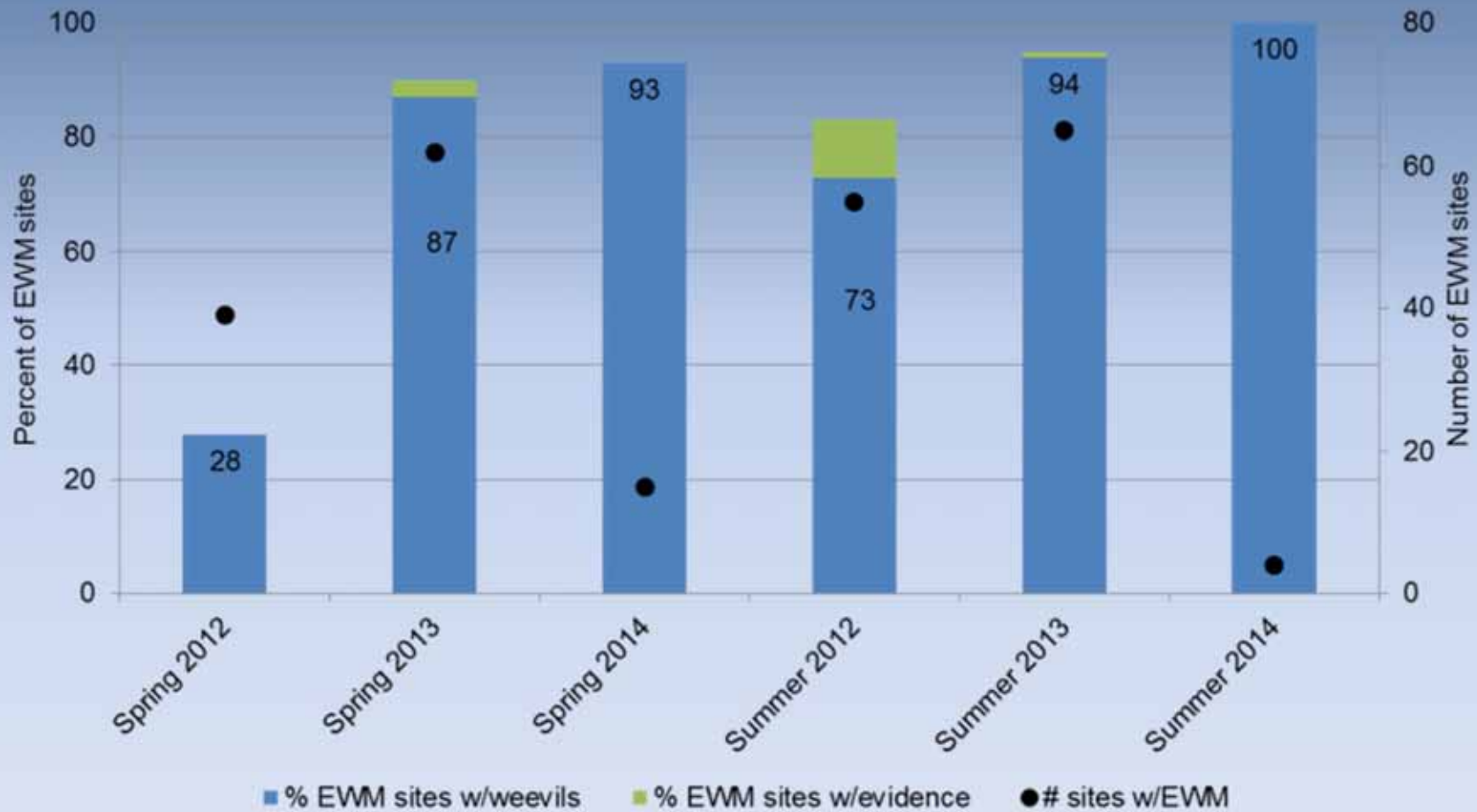
2011	+++
2012	+
2013	ns
2014	-



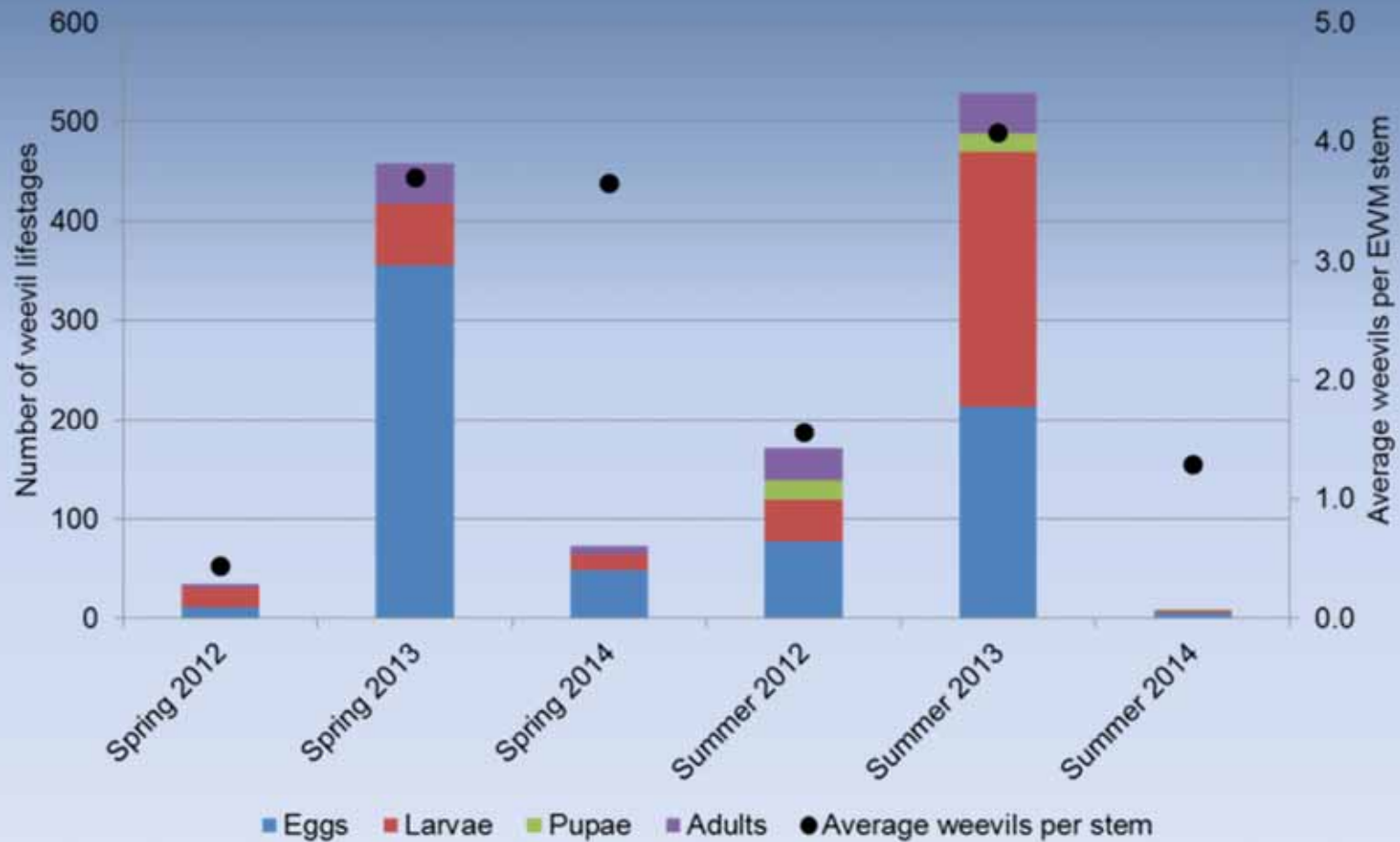
# Apical Meristems

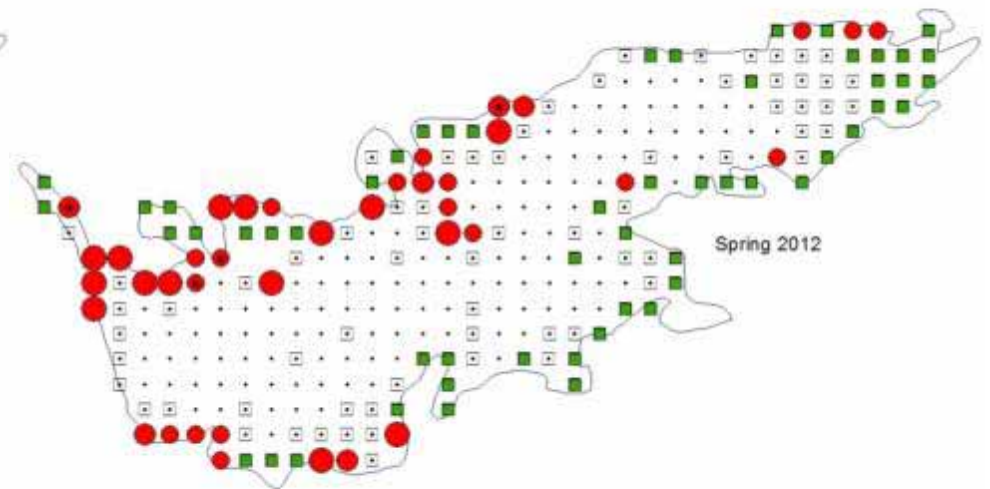
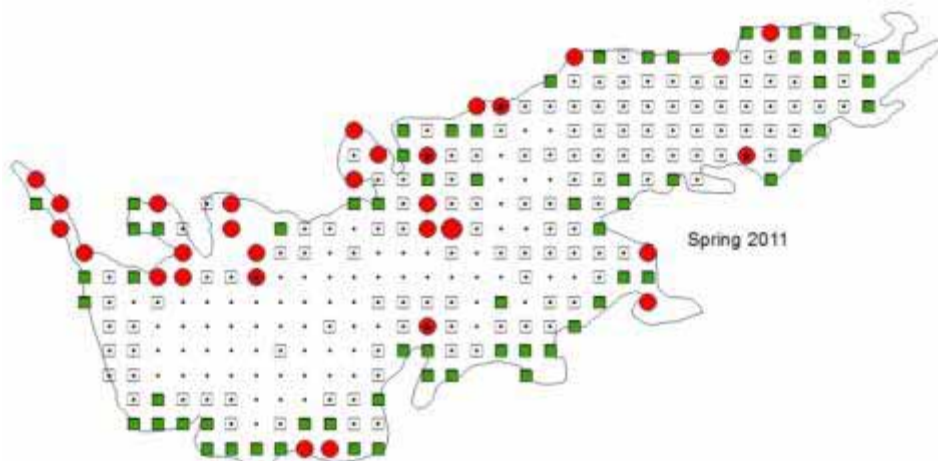


# EWM with Weevils

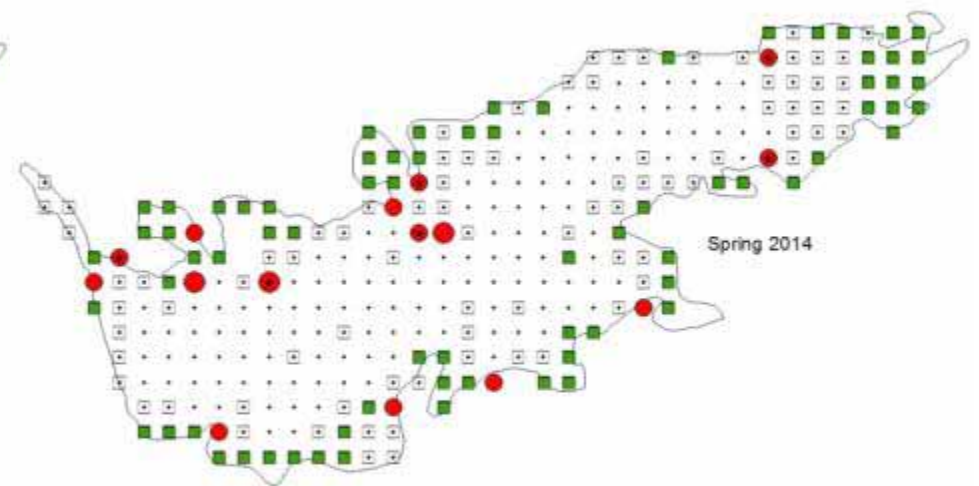
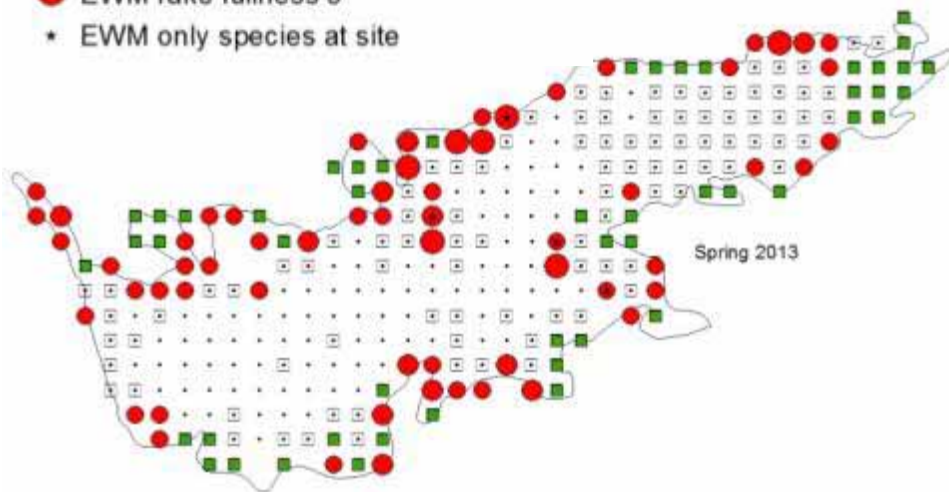


# Total Number of Weevils

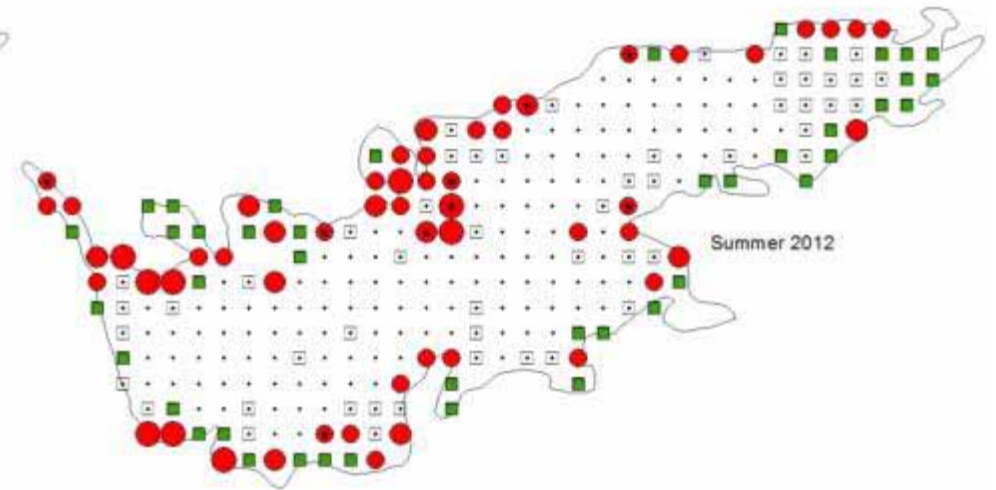
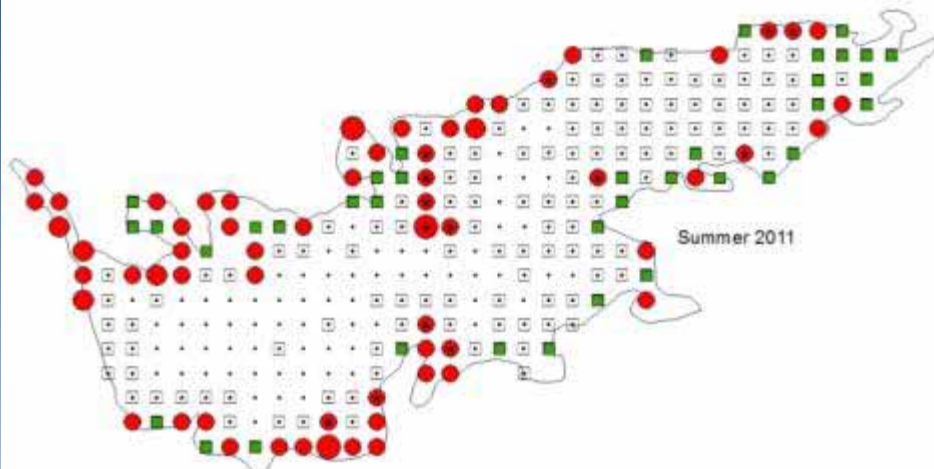




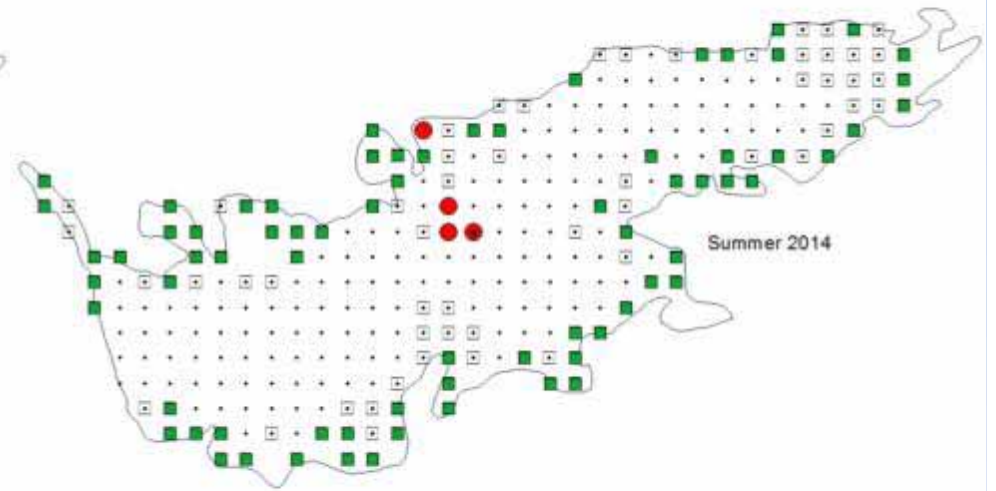
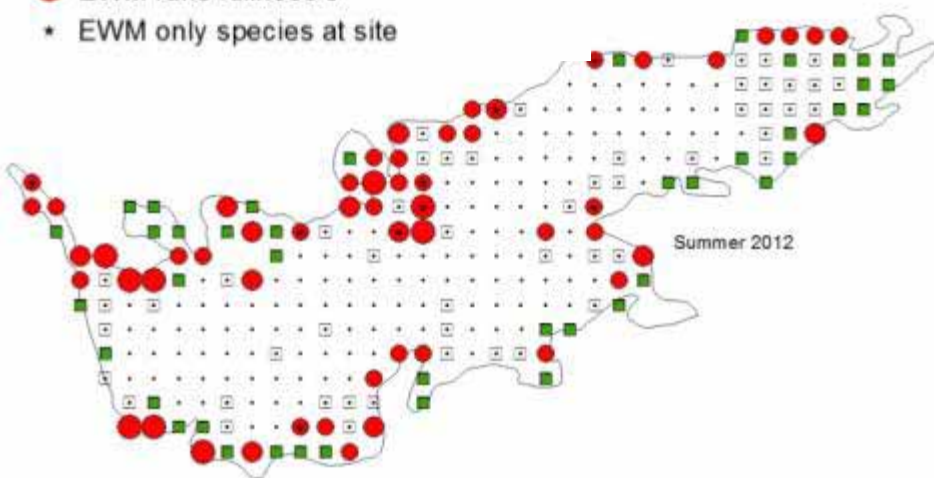
- Site beyond max depth of vegetation
- Site in littoral zone with no vegetation
- Vegetated site with no EWM
- EWM rake fullness 1
- EWM rake fullness 2
- EWM rake fullness 3
- EWM only species at site

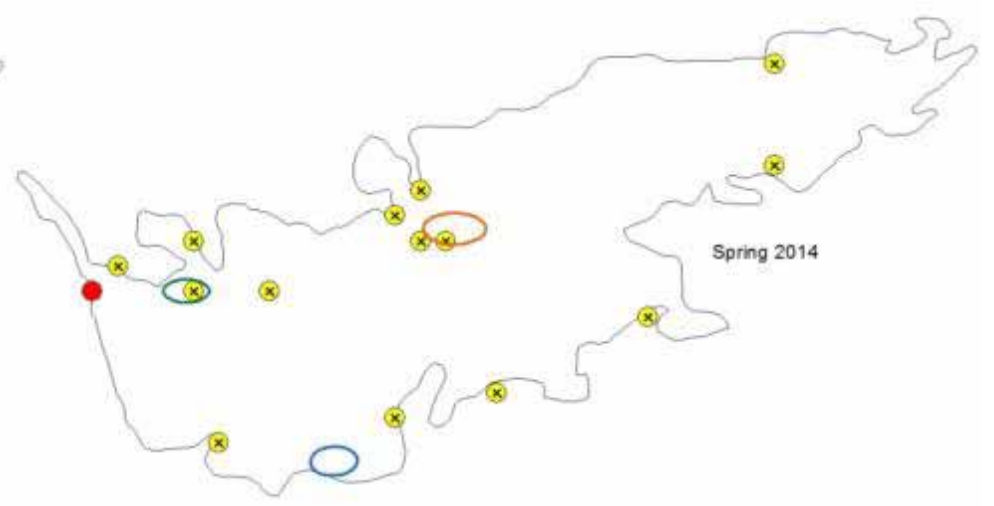
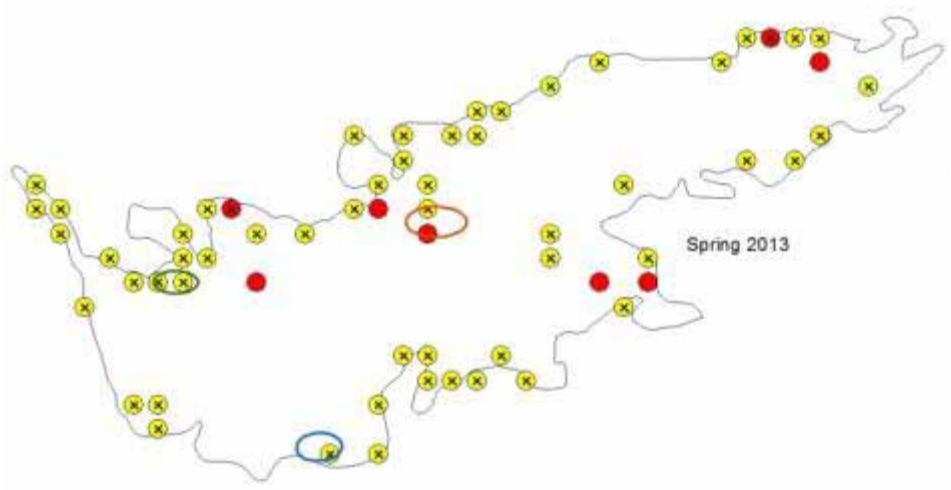
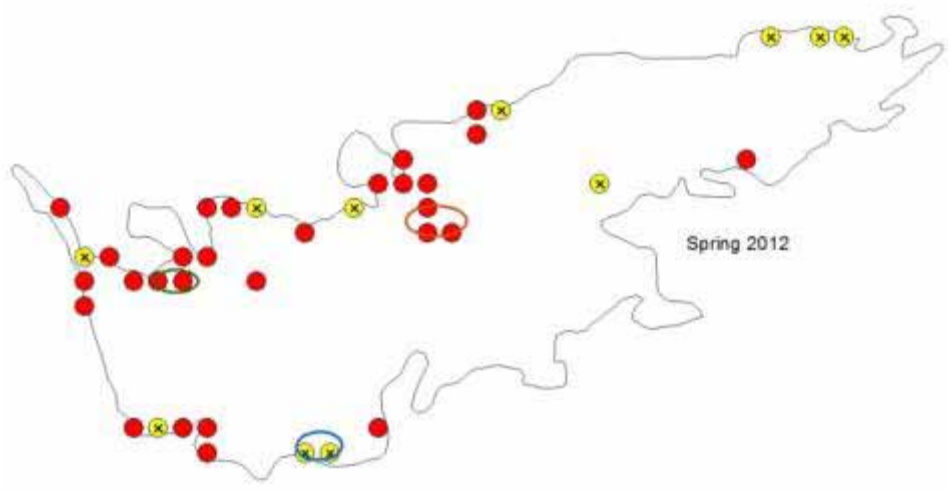


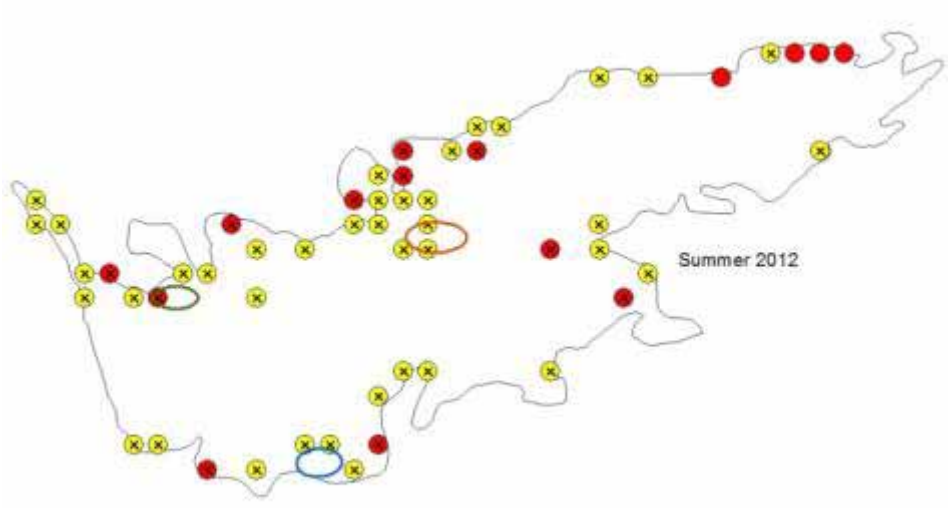




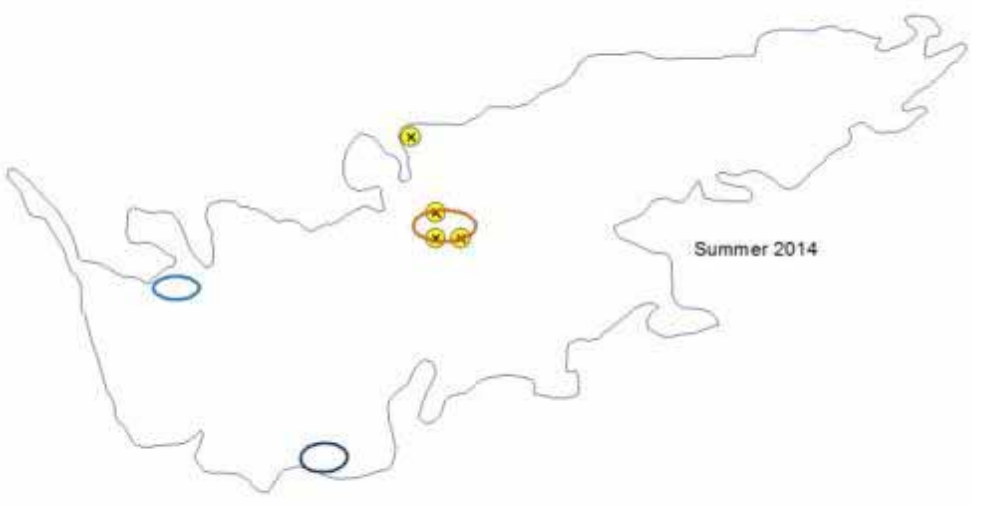
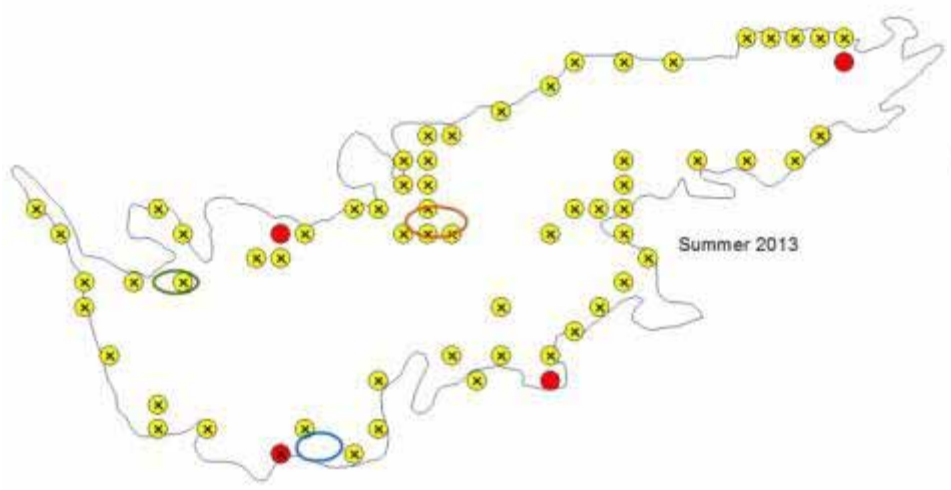
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- 2012 (n ~ 4,488) LHIA stocked and 2013 (n ~ 3,909) LHIA stocked
- 2012 (n ~ 11,000) ES stocked
- 2011 (n ~ 2,090) LHIA stocked
- EWM with weevils present
- EWM with no weevils
- × EWM with evidence of weevils



# Conclusions

- Significant decreases in the EWM population
- Weevils continue to overwinter and reproduced successfully

## Next Steps

- Continued monitoring
- LHIPA is equipped to rear weevils if needed