

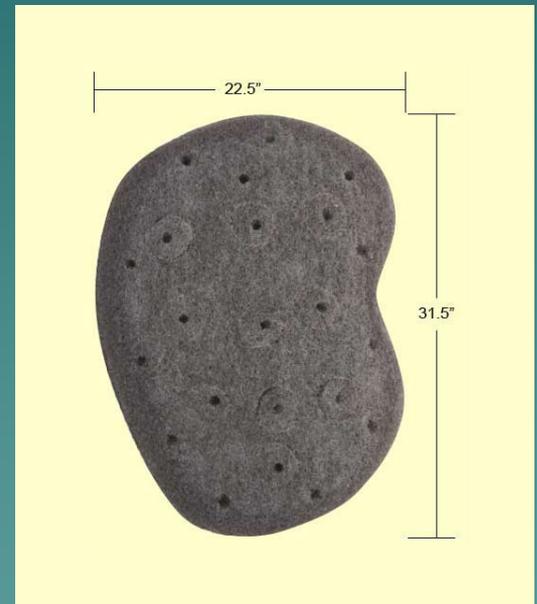
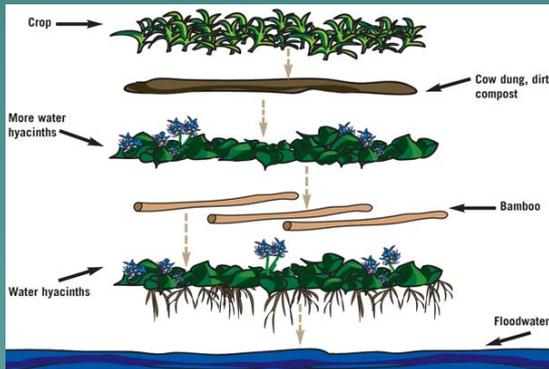
KDHE PRESENTS



Our Mission: To protect and improve the health and environment of all Kansans.

FLOATING WETLANDS - OLD AND NEW

Diana Lehmann
Bureau of Water
Watershed Planning, Monitoring,
and Assessment Section



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What is Old and What is new?

- ❖ Update on Meade State Fishing Lake
- ❖ Report of Eucha Lake in Oklahoma
- ❖ Research done at Clemson University
- ❖ Historical lesson
- ❖ Some creative ideas
- ❖ Water gardening reference

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Water Additives

Some water garden stores and garden centers are suppliers of the additives.

One store added enzymes to their fountains and it removed the algal growth and cleaned the fountain amazingly well.

Lily pond with fish in it didn't fare so well.

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Meade State Fishing Lake Update



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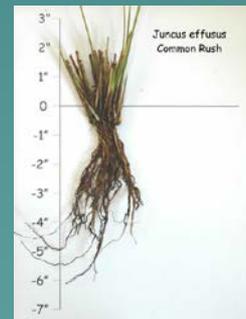


Meade SFL Update

Demonstration project to determine:

- ❖ Nutrient uptake by floating vegetative mats
- ❖ What species of plants would work best

- Blue flag iris - bulb root
- Soft Rush - dense filamentous root system



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Meade State Fishing Lake Update

First planted in Spring of 2012
with a lot of help from
volunteers and staff.



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Meade State Fishing Lake Update

First full year of being sampled:

- ❖ Sampled in August, Sept., and Oct. of 2012
- ❖ Sampled in May, June, July, and August in 2013
- ❖ Establish baseline nutrient uptake data for both types of plants.
- ❖ Samples are being analyzed through Servi-tech out of Dodge City and results are expected in early fall.

Meade State Fishing Lake Update

HAB Reports

- ❖ 2010 – late July – Oct.
- ❖ 2011 – from mid-June to mid-August
- ❖ 2012 – Unconfirmed report in June
- ❖ 2013 – Reported in early Sept. but lifted due to low blue-green cell counts.



Meade State Fishing Lake Update

Islands may be improving water quality but drought has increased well water recharge into the lake, thus run-off has been minimal the last couple of years.



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Meade State Fishing Lake Update



Photo compliments of a friend of the project manager.

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Meade State Fishing Lake Update



Image from Google Earth

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Eucha Lake Project – Oklahoma



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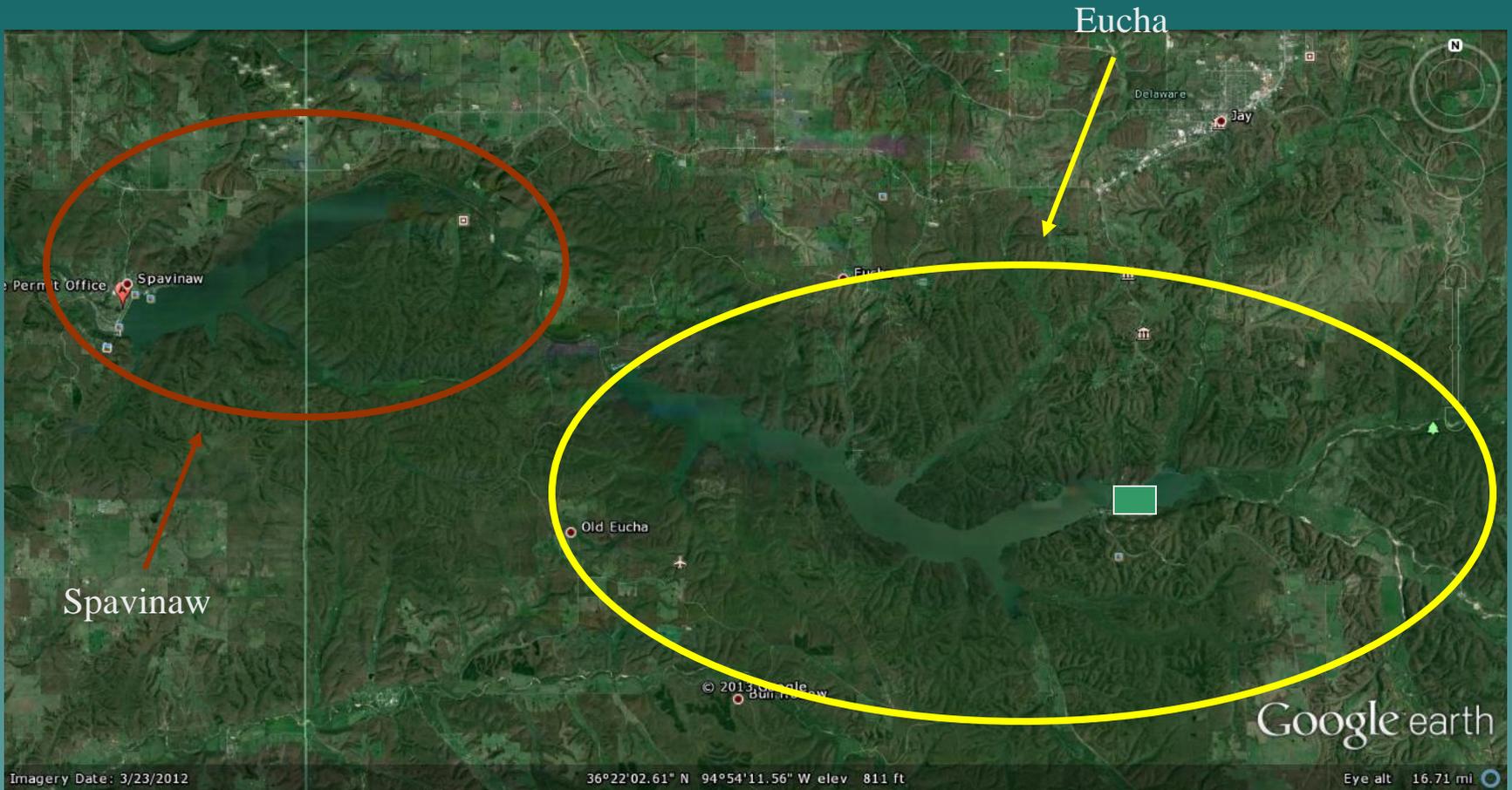




- ❖ 8.5 miles long by 0.7 miles wide
- ❖ Surface area is 2,800 acres
- ❖ Spavinaw Creek watershed covers 229,807 acres
- ❖ Watershed spans across the OK and AR borders
- ❖ Lake Spavinaw is a sister to reservoir to Eucha Lake

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Placement of wetlands in Lake Eucha



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Eucha Lake Project – cont.

- ❖ Backup water supply for Tulsa, Spavinaw, and Jay along with 7 other municipalities Tulsa supplies water to.
- ❖ Listed in the 2008 Oklahoma's Dept. of Env. Quality Integrated Report as impaired for Chl-a, total phosphorus, and dissolved oxygen.
- ❖ For the 2011 sampling period, TP levels averaged 0.062 mg/L and 2012 period, TP levels averaged 0.043 mg/L. Oklahoma Water Quality Standards list numerical criteria for phosphorus at 0.0168 mg/L.

Eucha Lake Project – cont.

- ❖ The United States Geological Survey (USGS) estimated that the mean annual load of phosphorus to Eucha Lake from the basin is 99,900 lbs (43,314 kg).
- ❖ 93% of the phosphorus load into Eucha Lake comes from the watershed



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What did they do?



Two broad goals for
Tulsa were:

1. Establish floating islands as a method of reducing phosphorous levels.
2. Provide habitat for aquatic organisms and other wildlife in the lake.

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Were the goals met?

1. The floating wetlands were installed as planned.
2. Habitat outcome was increased as a result of the floating wetlands thus benefiting the organisms of the lake.
3. Total phosphorus (TP) was determined to be reduced as a result of the floating wetlands. Removal measured via sedimentation traps and plant biomass was estimated at some 41 kg TP per year.

Were the goals met? – cont.

4. However the area of the floating wetlands would have to be increased 58 times the initial area to yield a 7% reduction of the annual phosphorus load estimated for 2011.
5. Thus it would still be most cost effective to concentrate on removal of nutrients at the watershed level to reduce nutrient load into the lake.

What other research is being done?

Baltimore, Maryland

Las Vegas, Nevada

Hayden Lake in Idaho

And at Clemson University



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Research from:

Sarah A. White, Ph.D.

Assistant Professor, Nursery Extension Specialist
School of Agricultural, Forest, & Environmental
Sciences
Clemson University



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Dr. White's research

This research presents an effective method for cleansing low-level nutrient contaminants from runoff in agricultural ditches, channels, and retention ponds

- ❖ Nitrogen & phosphorus levels in nutrient rich runoff were reduced
- ❖ Nitrogen removal was consistent in both pond and vegetated channels
- ❖ Phosphorus removal was consistent over the 5 months of sampling

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Her Conclusions

~ Floating wetlands “polish” wastewater for release into low nutrient environments where low phosphorus levels in effluent are needed

~Aeration in pond treatment systems increased nutrient fixation in roots and shoots of *Canna* and *Juncus*

~ Benefits include ease of:

- installation
- maintenance
- harvest

Conclusions cont.

Floating wetland treatment technology is:

- Easy to implement
- Adaptable to a wide variety of plant species
- Applicable in a variety of settings

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New technology – Or not!

Floating gardens, island, or wetlands found in:



❖ Bangladesh

➤ training provided by Practical Action group to families to raise produce.

❖ Peru

❖ Mexico

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Matrix used for these wetlands

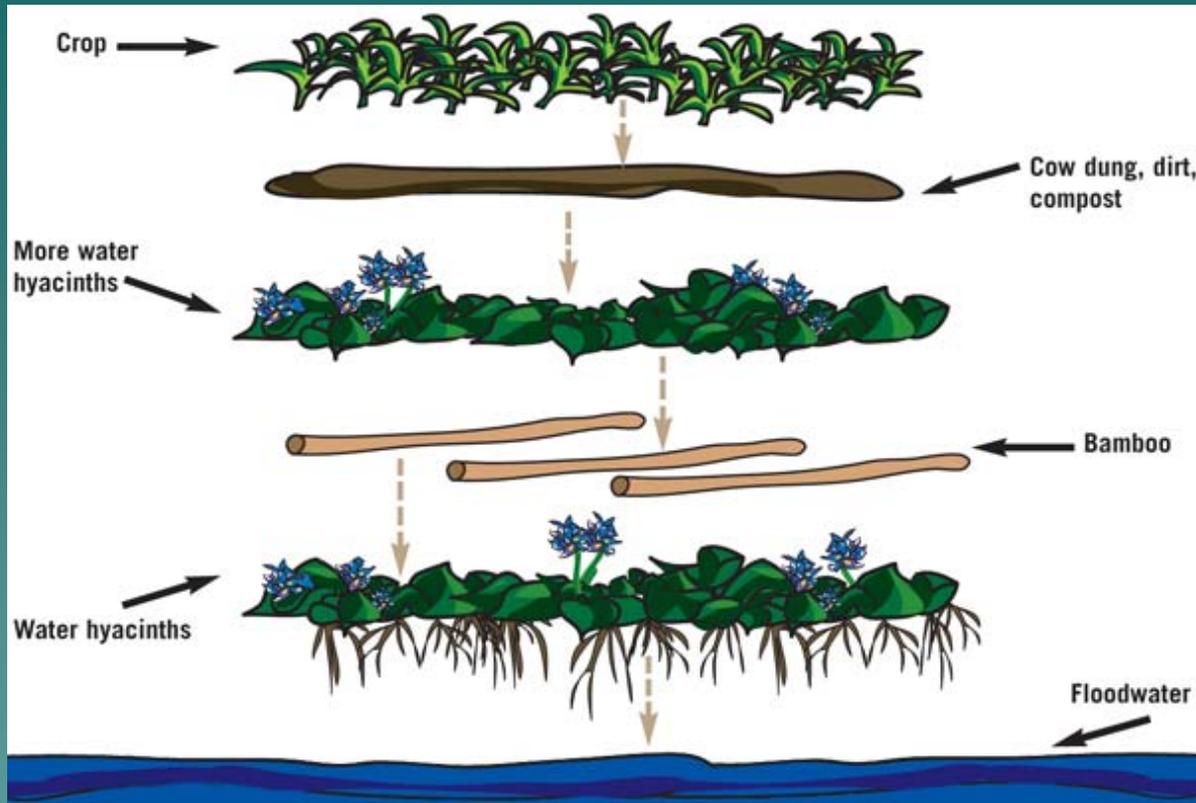


Photo courtesy of: practicalaction.org

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Other ideas

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<http://www.koiphen.com/forums/showthread.php?111937-Make-your-own-floating-island-under-20>

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Mill Creek Watershed Council of Communities Floating Wetlands
Building the structure

Pvc pipe formed into a raft

Heavy weight screen fabric attached to the pvc

Bamboo layered on top of the PVC pipe



Prepping for plants

Cocoa matt placed on top of bamboo layer
(straw may be another option and it is reported to inhibit algae growth.)



Adding wetland plants

Plantings are added



Launching the structures

And the raft is floated.

<http://www.butlerswcd.org/Ponds/FloatingWetland.html>

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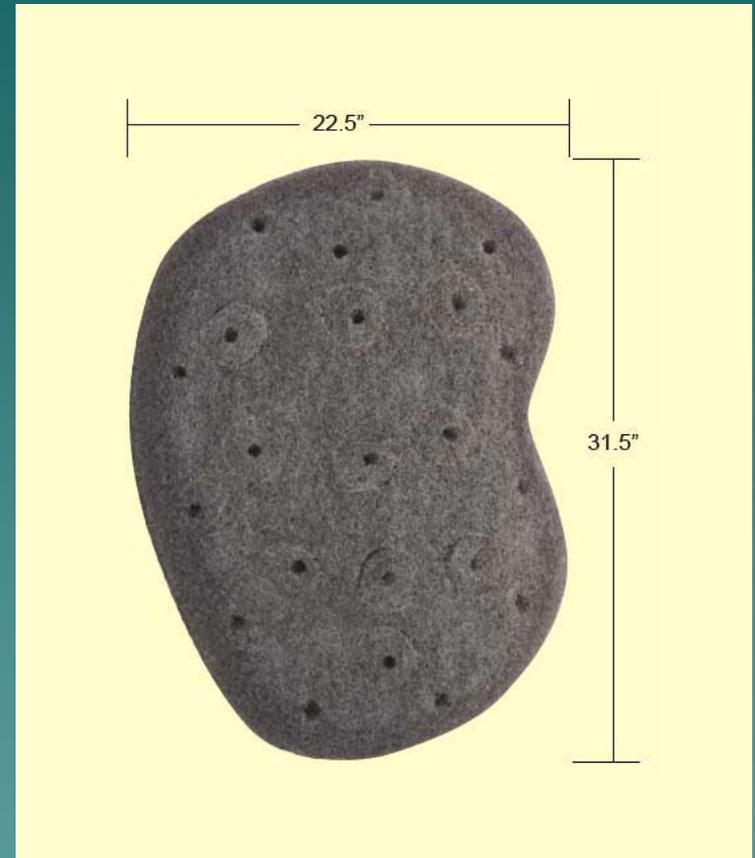


Ready made islands



Biohaven floating islands

Garden Landscapes IP100 -
<http://www.watergarten.org>



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For small floats



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Photo by: Diana Lehmann

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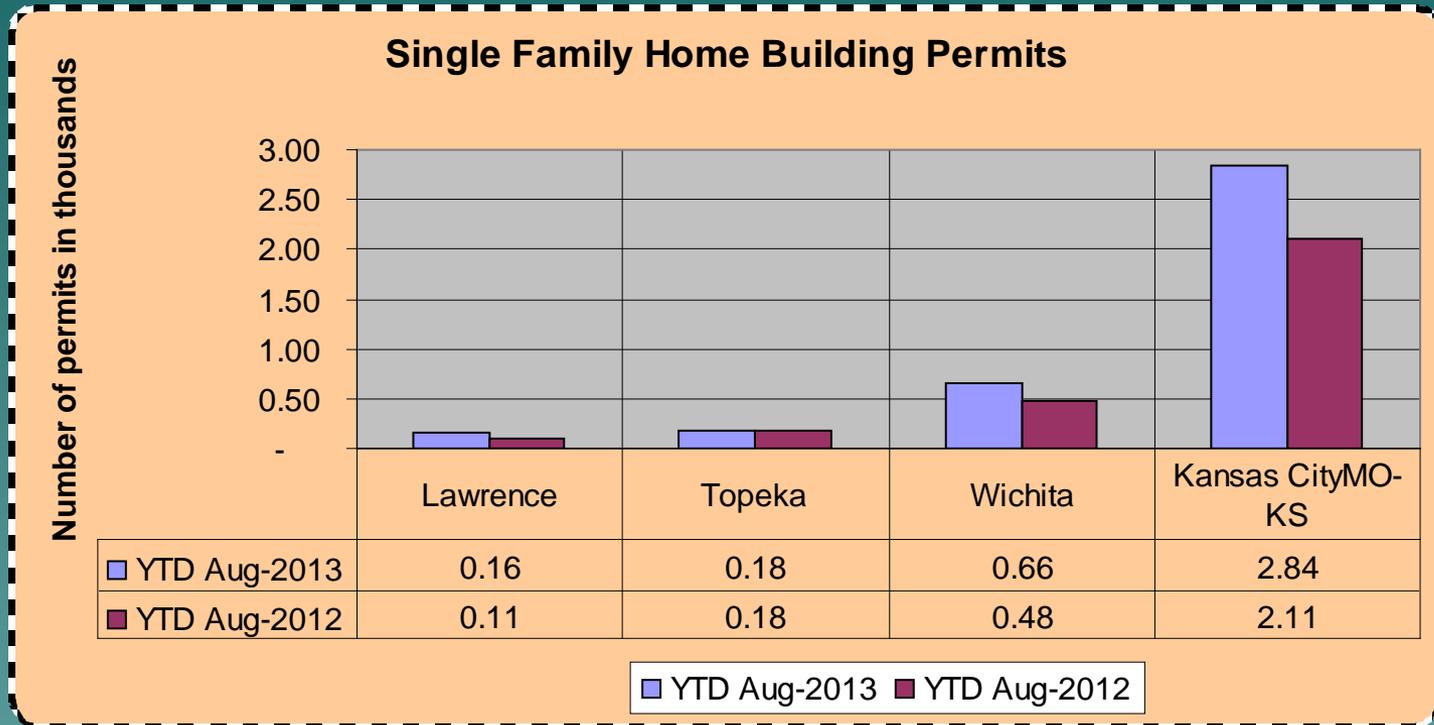


Photo by: Diana Lehmann

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Using Creativity when speaking to landowners/HOA's



<http://www.nahb.org/> (National Home Builders Association)
 Source: Bureau of Census

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Acknowledgements:

❑ Meade SFL update and photos provided by:
Scott Satterthwaite, BOW, Pollution Control Specialist, Watershed
Mgmt. Section, ssatterthwaite@kdheks.gov
785-296-5573

❑ Eucha Lake Report and photos:
“Reducing the Impact of NPS Pollution through the
Establishment of Floating Wetlands in Eucha Lake – Final
Report.”

❑ Clemson Research:
Dr. Sarah White, Ph.D. Assistant Professor, Nursery
Extension Specialist, School of Agricultural, Forest, &
Environmental Sciences, Clemson University

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???Questions???

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THANK YOU

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