Island Applesnails

(*Pomacea insularum*)

in Louisiana

A Rapid Assessment of Status and Risk

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(alphabetical order)

Time Line

December 2007: USGS Librarian Linda Broussard is contacted over the Christmas-New Year's holiday. She gathers information about the snails for the landowner and makes a tentative identification of exotic applesnails.

January 16, 2008: Scientists Jacoby Carter and Sergio Merino visit the site, take photos and collect samples for identification. Frozen samples of whole snails are shipped for DNA analysis. They are identified as *Pomacea insularum*, island applesnails.

January 24, 2008: A preliminary report is e-mailed to USFWS, USGS Invasive Species Program, LA DWF, and NPS.

February & March 2008: Using maps prepared by Chris Wells, the USGS conducts two surveys in the region around the confirmed site. No other populations of applesnails are found.

March 2008: A presentation and preliminary risk assessment map are prepared for the LA-ANSTF (Louisiana Aquatic Nuisance Species Task Force).

Egg Masses in Chacahoula, LA

Egg Masses in Chacahoula, LA

Sources of Applesnails

Report in the Houma, Louisiana newspaper, The Courier, that the Bayou Blue population was an intentional release of snails purchased at a local retail outlet.

At least one store in Lafayette carries applesnails for aquariums, but they are said to be a different species.

We have not conducted a survey of stores in the area to determine if island applesnails are being sold. By law the USGS has several restrictions that would prevent us from conducting such a survey.

Literature Reviewed for Potential Impacts If Island Applesnails Become Established in Louisiana

Significant impacts to wetland plant communities due to grazing activities.

Significant impacts to rice agriculture due to grazing activities.

Potentially a vector for snailborne diseases.

Once established, they are very difficult to remove. The only effective method seems to be hand removal and destruction of egg masses.

Example of Potential Ecological Impact

INVADING HERBIVORY: THE GOLDEN APPLE SNAIL ALTERS ECOSYSTEM FUNCTIONING IN ASIAN WETLANDS

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Ecology, 2004, vol. 85, no. 6, p. 1575-1580 online at http:dx.doi.org/10.1890/03-3146

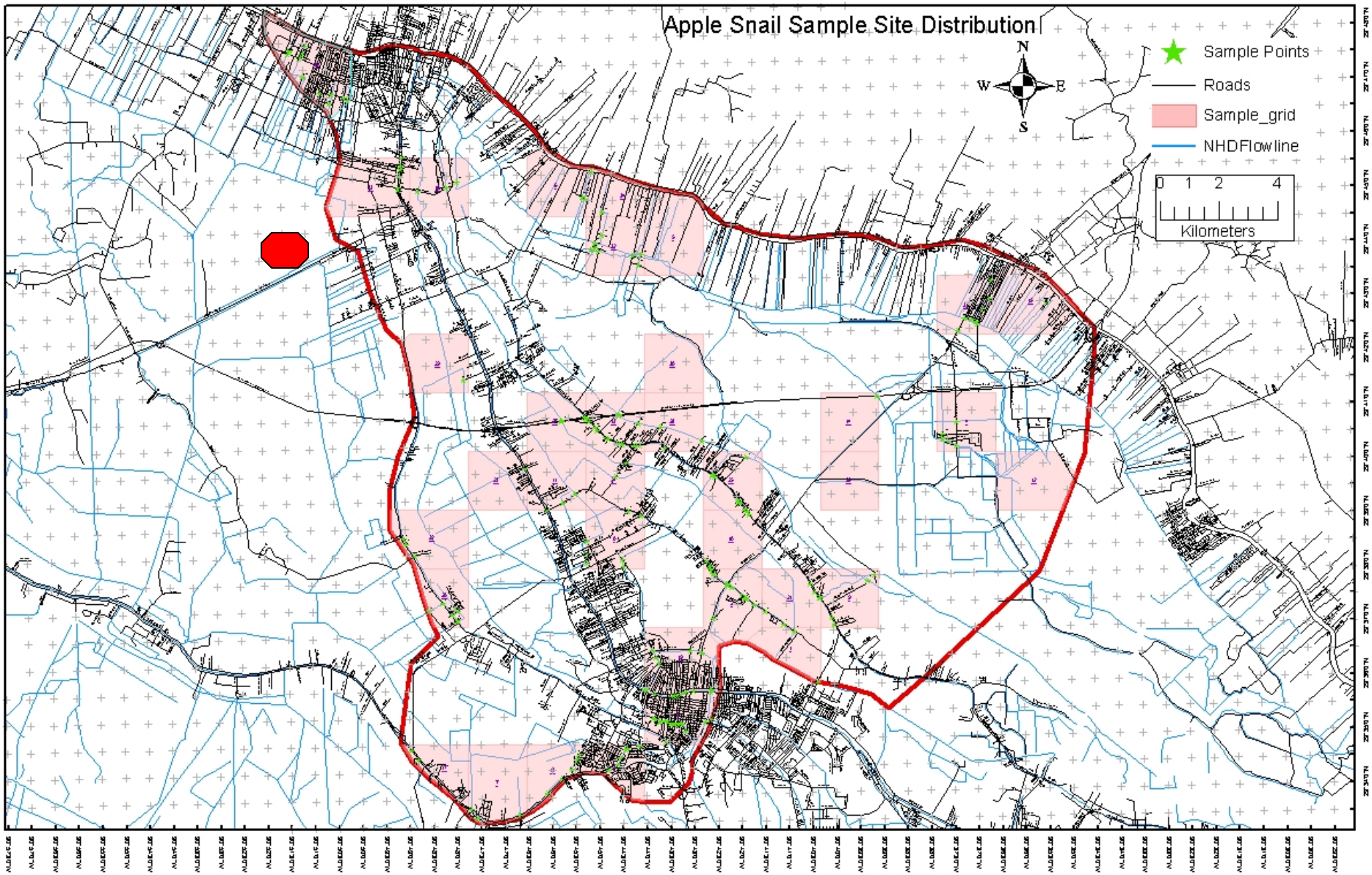
Abstract. We investigated the effects of an exotic snail, the golden apple snail (*Pomacea canaliculata*) on biodiversity and ecosystem functioning in tropical wetland ecosystems. This large snail (up to 80-mm shell height) has invaded large parts of Southeast Asia during recent decades. A survey of natural wetlands in Thailand showed that high densities of the snail were associated with almost complete absence of aquatic plants, high nutrient concentrations, and high phytoplankton biomass, that is, a complete shift in both ecosystem state and function. A field experiment demonstrated that grazing by the snail can cause the loss of aquatic plants, a change toward dominance of planktonic algae, and thereby a shift toward turbid water. Estimates of biologically fixed nutrients released through snails grazing on aquatic plants revealed that phosphorus releases were sufficient to explain the recorded increase in phytoplankton biomass. Hence, our study demonstrates how an herbivore may trigger a shift from clear water and macrophyte dominance to a turbid state dominated by planktonic algae. This shift and the continuing aggressive invasion of this exotic species are detrimental to the integrity and functioning of wetland ecosystems, and to the services these provide in Southeast Asia.

Rapid Assessment Surveys

The first survey concentrated on the areas north and west of the site of infestation. An attempt was made to visit all overpasses and inspect all road/stream or river intersections.

The second survey concentrated on the area to the east of the study site. This survey looked at a randomly selected sample of intersections. An effort was made to inspect the areas where they were previously reported such as the Bayou Blue area.

Rapid Assessment 2



Limiting Environmental Factors for *P. insularum*

(Ramakrishnan 2007)

P. insularum incipient tolerated temperature range of 15.2°–36.6°C. Its lower lethal limit is 15°C.

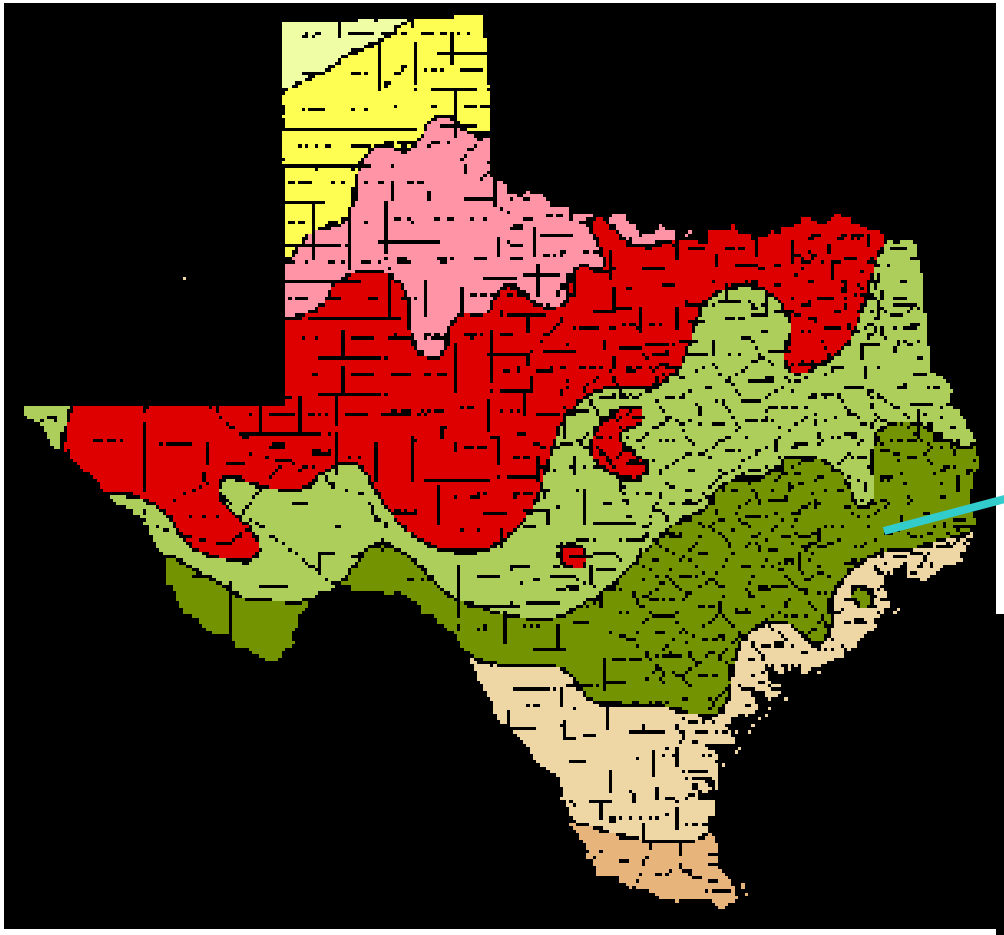
Its tolerated salinity range was 0–6.8‰ which should prevent it from deeply invading estuarine habitats.

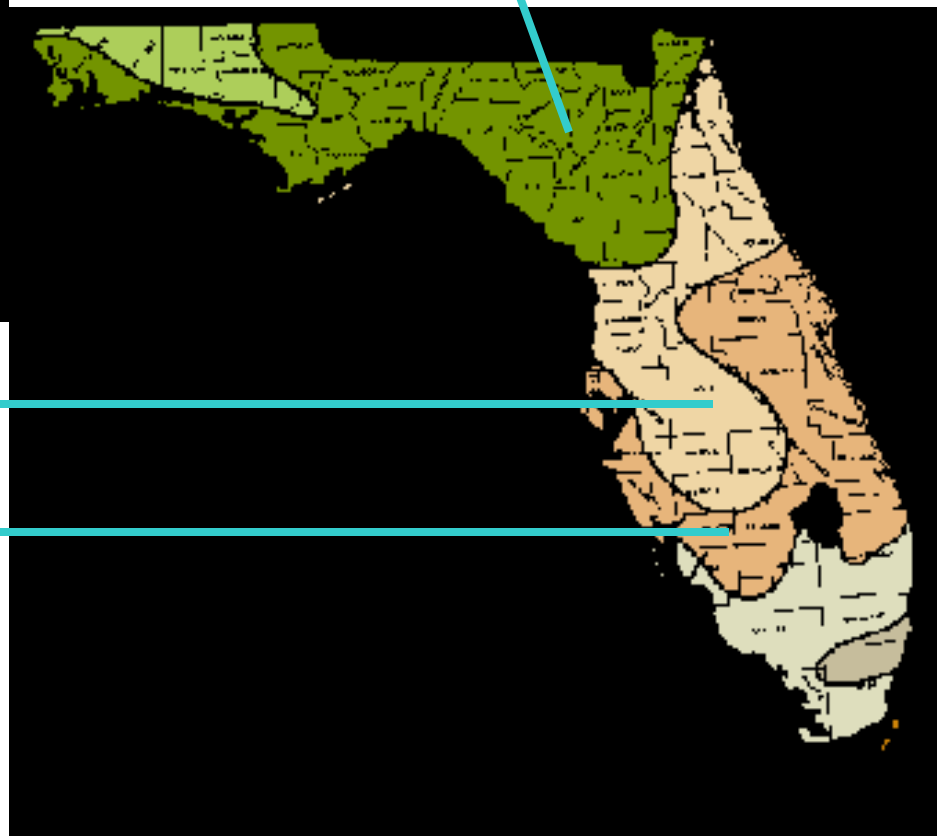
Range Limitations

To determine temperature zones that applesnails might survive in, we used the USDA's agriculture cold hardiness maps along with current distribution maps of applesnails in other states to estimate where they might be able to survive in Louisiana.

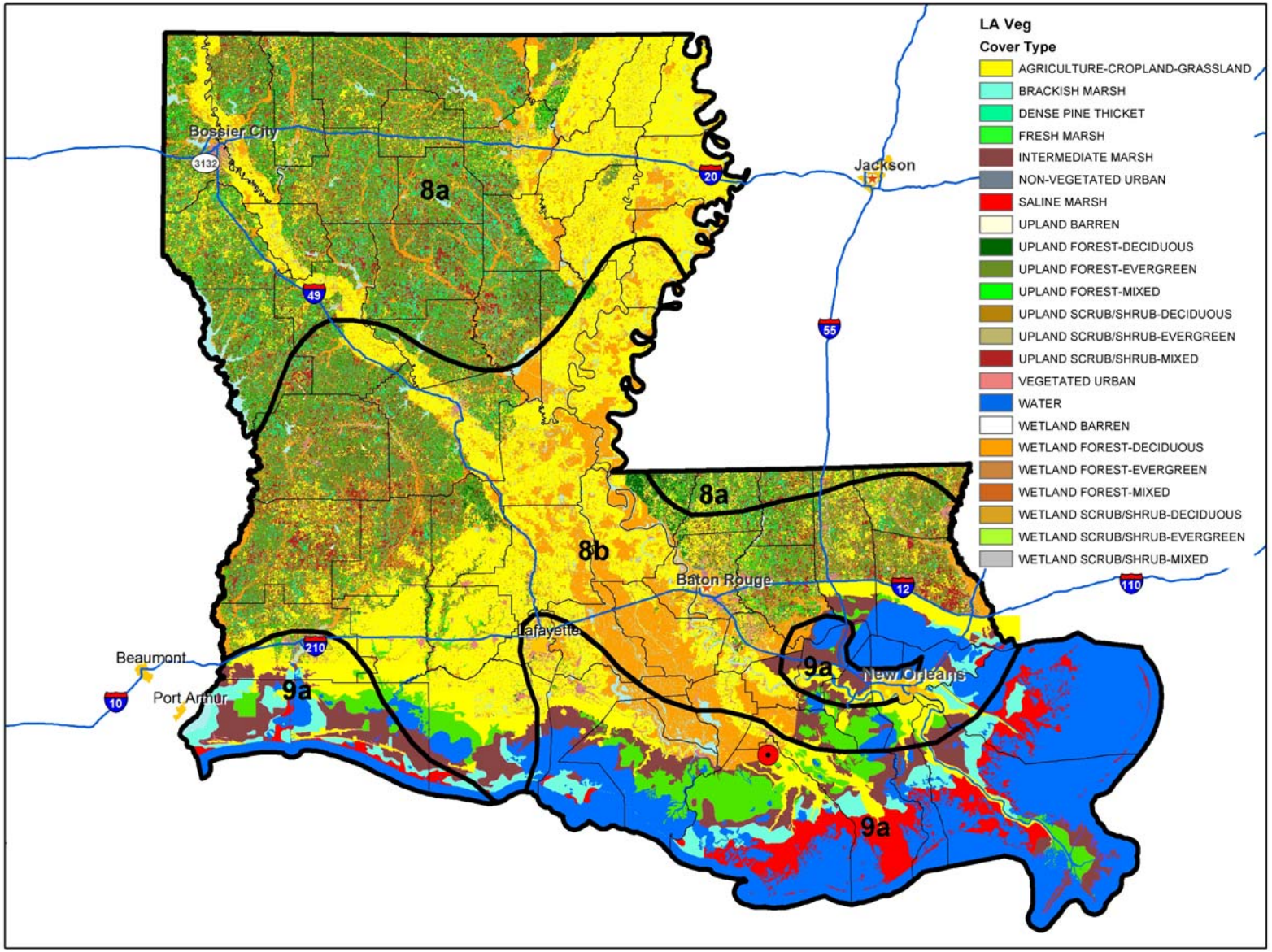
To determine areas that were in a salinity range applesnails could tolerate, we used maps of coastal wetland systems.

Applesnails are reported to have established populations in TX and FL in hardiness zones 8B, 9A, and 9B





Overlay of USDA Hardiness Zones and Habitat Maps to Identify Regions of Potential Applesnail Habitat



Future Research Plans
(Where do we go from here?)

No Follow-on Research Planned: No funding.

Recommendations:

No management recommendations; however, other agencies should be informed, including those associated with agriculture.

Acknowledgements

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Key References

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