



**ILLINOIS NATURAL
HISTORY SURVEY**
PRAIRIE RESEARCH INSTITUTE

Northern Riffleshell and Clubshell Reintroduction Project – Summary of Activities for 2016

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Executive Summary

In 2016, staff from the Illinois Natural History Survey continued to release and monitor translocated populations of two federally-endangered freshwater mussel species in the Vermilion River basin (Wabash River drainage). Through 2016, a total of 3,699 Northern Riffleshell (*Epioblasma rangiana*) and 4,166 Clubshell (*Pleurobema clava*) have been translocated to the Middle Fork and Salt Fork Vermilion in the Vermilion River basin, Champaign and Vermilion counties, Illinois. These translocated animals have been monitored seasonally since being moved to Illinois. This end-of-the-year report summarizes the activities for the 2016 calendar year, and includes a draft of the manuscript submitted after analyzing five-year's worth of mark-recapture data to determine the efficacy of translocation, environmental and ecological conditions that might influence success, and the best means of monitoring translocated mussels. This relocation project is being funded, in part, by a natural resource damage assessment settlement (Hegeler Zinc—Lyondell Basell Companies) to the U.S. Fish and Wildlife Service and to the State of Illinois, and by the U.S. Fish and Wildlife Service's Ohio River Basin Fish Habitat Partnership.

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Project History

[taken from Tiemann (2014, 2015) and Tiemann et al. (2015)]

The Northern Riffleshell *Epioblasma rangiana* and Clubshell *Pleurobema clava* were once widespread throughout the Ohio River basin but both have experienced significant range reductions during the last century as a result of reduced habitat and water quality. Because of this range reduction, the USFWS listed both species as federally-endangered in 1994. The joint recovery plan listed an objective of establishing viable populations of the species in ten separate river drainages throughout their respective ranges, and stated that population augmentations and reintroductions would be needed to achieve this objective. Beginning in 2005, natural resource agencies in Illinois partnered with the USFWS and natural resource agencies in the Ohio and Pennsylvania and began implementing portions of the recovery plan. One goal of the recovery team was to re-establish self-sustaining Northern Riffleshell and Clubshell populations in the Vermilion River basin (Wabash River drainage) in Illinois.

A salvage project in Pennsylvania in the Allegheny River provided an opportunity for the translocation of both species. Between 2010 and 2014, 2,099 Northern Riffleshell (1,196 males and 903 females) and 1,766 Clubshell were PIT (passive integrated transponder) tagged and translocated from the Allegheny River beneath the U.S. Highway 62 (=Hunter Station) Bridge, Tionesta Township, Forest County, Pennsylvania, to eight sites in the Vermilion River basin in Champaign and Vermilion counties, Illinois (Figure 1). Prior to the 2016 efforts, 3,450 (89%) of the 3,865 translocated individuals were encountered once – 1,735 (83%) of the 2,099 placed Northern Riffleshell and 1,715 (97%) of the 1,766 placed Clubshell. Detection and survival rates were highly variable between streams, among years, and by species (see manuscript draft below).

2016 Project Activities

We released a total of 4,000 individuals among 13 sites between August 31 – September 3, 2016 (Table 1). These sites included existing sites (Ford, Horse, Beaver, Smith, Richter, Donut – Figure 1) as well as new sites within IDNR properties. The new areas listed were sampled in 2013 as part of the initial site selection process; these new areas were deemed suitable in 2013 but were not feasible for monitoring with PIT tag readers due to lack of easy access. However, it was approved by USFWS and IDNR that any new sites established in 2016 in the Middle Fork and Salt Fork with suitable habitat did not require monitoring via PIT tags. Therefore, we were able to release glitter tagged mussels that would not need to be monitored individually in the future. Additionally, we put glitter-tagged mussels immediately upstream or downstream of existing sites---outside of the footprint that we monitor with a PIT tag reader, but still

within the same riffle-run segment and within the property boundary. Richter, for example, has suitable habitat of over a quarter mile that stretches between 2 riffles.

Table 1. Locations and numbers where mussels were released during the 2016 calendar year. Site information can be found in Tiemann (2014) and Figure 1.

Site	River	Property			PIT Clubshell	Glitter Clubshell	PIT riffleshell	Glitter riffleshell	Totals
Ford	Middle Fork	Middle Fork Fish & Wildlife Area			60		20	50	130
downstream of Ford	Middle Fork	Middle Fork Fish & Wildlife Area				100		100	200
new area (sampled 2013)	Middle Fork	Middle Fork Fish & Wildlife Area				100		250	350
new area (sampled 2013)	Middle Fork	Middle Fork Fish & Wildlife Area				150			150
new area (sampled 2013)	Middle Fork	Middle Fork Fish & Wildlife Area				150			150
downstream of Horse	Middle Fork	Middle Fork Fish & Wildlife Area				40			40
Horse	Middle Fork	Middle Fork Fish & Wildlife Area						50	50
Beaver	Middle Fork	Middle Fork Fish & Wildlife Area			80				80
downstream of Beaver	Middle Fork	Middle Fork Fish & Wildlife Area						50	50
Richter (and near)	Salt Fork	University of Illinois				760	40		800
new area (sampled 2013)	Salt Fork	Kickapoo State Park				200		300	500
Donut (and near)	Salt Fork	Kickapoo State Park			100	200	80	620	1000
Smith (and near)	Salt Fork	Private conservation land				420	80		500
				Totals	240	2120	220	1420	4000

Mussels were monitored during two events (Table 2) – spring (pre-2016 release) and autumn (post-2016 release). Monitoring protocols were similar to those previously reported (Tiemann 2014, 2015; Tiemann et al. 2015). For the 2016 calendar year, 27.6% (448 / 1,623) of the sampled Northern Riffleshell and were 55.5% (973 / 1,753) of the sampled Clubshell encountered (Table 1), which is comparable to previous years (Tiemann 2014, 2015; Tiemann et al. 2015).

Table 2. Encounter rates by species by site (with stream name) per sampling period for the 2016 calendar year for PIT tagged mussels (NRS = Northern Riffleshell and CS = Clubshell). Data are number detected / maximum number of individuals in the stream at a site at that period. Site information can be found in Tiemann (2014) and Figure 1. “NS” = not sampled. *Only half of the Richter site was sampled during both periods. †One individual was placed at Horse and discovered at Beaver.

Species	Sampling period	<i>Richter</i> * (Salt)	<i>Smith</i> (Salt)	<i>Donut</i> (Salt)	<i>MFNP</i> (Middle)	<i>Ford</i> (Middle)	<i>Horse</i> (Middle)	<i>Kennekuk</i> (Middle)	<i>Beaver</i> (Middle)
NRS	Spring	2/182	78/444	149/335	NS	16/227	NS	5/169	1/50
NRS	Autumn	26/221	144/522	212/416	NS	30/247	NS	NS	2/50 [†]
CS	Spring	95/351	277/337	209/327	NS	75/225	NS	10/223	33/50
CS	Autumn	106/351	258/337	304/427	NS	123/285	NS	NS	100/130

Acknowledgements

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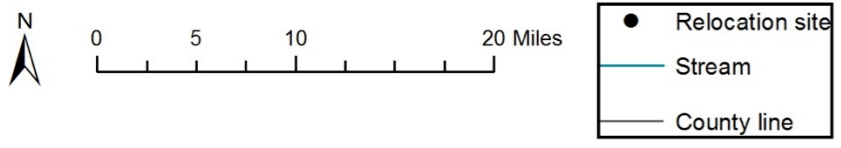
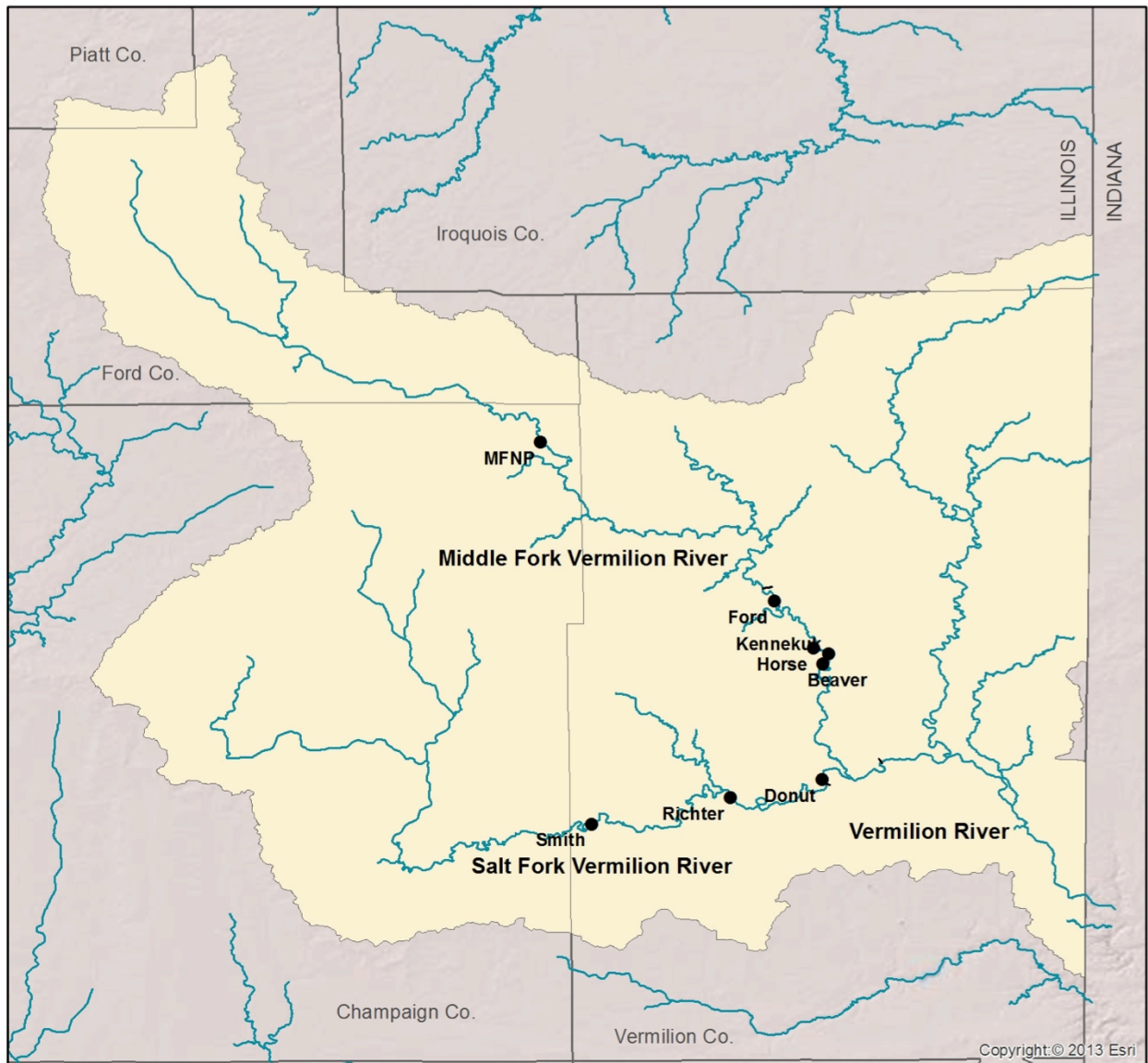


Figure 1. Translocation sites from the Northern Riffleshell and Clubshell project in the Vermilion River basin (Wabash River drainage), Illinois.